

Surgical management of pelvic organ prolapse in women (Review)

Maher C, Feiner B, Baessler K, Schmid C



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TABLE OF CONTENTS

HEADER	1
ABSTRACT	1
PLAIN LANGUAGE SUMMARY	2
BACKGROUND	3
OBJECTIVES	4
METHODS	5
RESULTS	7
Figure 1.	8
Figure 2.	10
Figure 3.	11
DISCUSSION	25
AUTHORS' CONCLUSIONS	29
ACKNOWLEDGEMENTS	30
REFERENCES	30
CHARACTERISTICS OF STUDIES	39
DATA AND ANALYSES	123
Analysis 1.1. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 1 Number of women with prolapse symptoms (subjective failure).	158
Analysis 1.2. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 2 Number of women unsatisfied with surgery.	159
Analysis 1.3. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 3 Number of women who visited a physician after surgery because of pelvic floor symptoms.	160
Analysis 1.4. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 4 Patient global impression Improvement PGI-I (very much better).	160
Analysis 1.5. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 5 Number of women with any prolapse (objective failure).	161
Analysis 1.6. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 6 Number of women with recurrent vault/uterine prolapse (objective).	162
Analysis 1.7. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 7 Vault distance from hymen (cm) POPQ point C after surgery.	163
Analysis 1.8. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 8 Total vaginal length (cm) after surgery.	164
Analysis 1.9. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 9 Number of women with recurrent cystocele (objective).	165
Analysis 1.10. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 10 Objective anterior compartment prolapse after surgery.	166
Analysis 1.11. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 11 Anterior vaginal wall distance from hymen (cm) POPQ point Ba after surgery.	167
Analysis 1.12. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 12 Number of women with recurrent rectocele (objective).	168
Analysis 1.13. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 13 Objective posterior compartment prolapse after surgery.	169
Analysis 1.14. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 14 Posterior vaginal wall distance from hymen (cm) POPQ point Bp after surgery.	170
Analysis 1.15. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 15 Number of women with post-operative stress urinary incontinence.	171
Analysis 1.16. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 16 Number of women with de novo stress incontinence.	172
Analysis 1.17. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 17 Number of women with urgency, detrusor overactivity or overactive bladder.	173

Analysis 1.18. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 18 Number of women with de novo (new) urgency, detrusor overactivity or overactive bladder.	174
Analysis 1.19. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 19 Number of women with persistent voiding dysfunction.	175
Analysis 1.20. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 20 Number of women with new voiding dysfunction.	175
Analysis 1.21. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 21 Number of women with de novo nocturia.	176
Analysis 1.22. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 22 Postoperative voiding dysfunction symptoms.	177
Analysis 1.23. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 23 Number of women with faecal incontinence.	177
Analysis 1.24. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 24 Number of women with constipation.	178
Analysis 1.25. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 25 Number of women with de novo constipation.	179
Analysis 1.26. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 26 Number of women with obstructed defecation.	179
Analysis 1.27. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 27 Postoperative dyspareunia.	180
Analysis 1.28. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 28 Women with de novo (new) postoperative dyspareunia.	181
Analysis 1.29. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 29 Postoperative sexual function score (PISQ-12).	181
Analysis 1.30. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 30 Blood loss (ml).	182
Analysis 1.31. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 31 Postoperative decrease in Hb (gm/dl).	183
Analysis 1.32. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 32 Adverse effects.	184
Analysis 1.33. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 33 Operating time (minutes).	186
Analysis 1.34. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 34 Length of stay in hospital (days).	188
Analysis 1.35. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 35 Time to return to normal activity ADL (days).	189
Analysis 1.36. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 36 Days to return to work.	189
Analysis 1.37. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 37 Cost (US dollars).	190
Analysis 1.38. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 38 Time to recurrence of prolapse (months).	191
Analysis 1.39. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 39 Women having further prolapse surgery.	191
Analysis 1.40. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 40 Women having further continence surgery.	193
Analysis 1.41. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 41 Women having further related to primary surgery (prolapse, continence or mesh complications).	194
Analysis 1.42. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 42 mesh exposure.	195
Analysis 1.43. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 43 surgery for mesh exposure.	196
Analysis 1.44. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 44 Prolapse Quality of Life questionnaire (P-QOL).	197
Analysis 2.1. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 1 Number of women with prolapse symptoms (subjective failure).	198
Analysis 2.2. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 2 number of women with posterior or apical prolapse.	201

Analysis 2.3. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 3 Severity of prolapse symptoms (measured using visual analogue scale).	201
Analysis 2.4. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 4 Prolapse Quality of Life after surgery (P-QOL).	202
Analysis 2.5. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 5 Number of women with prolapse (objective failure any site).	203
Analysis 2.6. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 6 Number of women with anterior prolapse / cystocele (objective failure).	204
Analysis 2.7. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 7 Number of women with posterior prolapse / rectocele (objective failure).	209
Analysis 2.8. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 8 Number of women with postoperative stress urinary incontinence.	210
Analysis 2.9. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 9 Number of women with de novo (new) stress urinary incontinence.	211
Analysis 2.10. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 10 Number of women with urgency, detrusor overactivity or overactive bladder.	212
Analysis 2.11. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 11 De novo overactive bladder symptoms.	214
Analysis 2.12. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 12 Postoperative voiding dysfunction symptoms.	214
Analysis 2.14. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 14 Persistent voiding dysfunction.	215
Analysis 2.15. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 15 Time to return to spontaneous voiding (days).	217
Analysis 2.16. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 16 Pelvic Floor Incontinence Questionnaire-7 after surgery.	217
Analysis 2.17. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 17 Number of women with worse bowel function / constipation.	218
Analysis 2.18. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 18 Number of women with dyspareunia.	219
Analysis 2.19. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 19 Blood loss (ml).	220
Analysis 2.20. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 20 Haemoglobin change.	222
Analysis 2.21. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 21 Number of women with postoperative complications.	223
Analysis 2.22. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 22 Mesh erosion.	224
Analysis 2.23. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 23 Death.	225
Analysis 2.24. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 24 Operating time (minutes).	226
Analysis 2.25. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 25 Length of stay in hospital (days).	227
Analysis 2.26. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 26 Number of women having further prolapse surgery.	228
Analysis 2.27. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 27 Number of women having further incontinence surgery.	230
Analysis 2.28. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 28 number of women with denovo dyspareunia.	231
Analysis 2.29. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 29 Prolapse quality of life (PFDI-20).	232

Analysis 2.30. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 30 quality of life (PFDI-7).	232
Analysis 2.31. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 31 urinary distress inventory (UDI).	233
Analysis 2.32. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 32 mesh erosion surgical correction.	234
Analysis 2.33. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 33 new urinary stress incontinence postoperative.	235
Analysis 2.34. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 34 cystotomy.	236
Analysis 2.35. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 35 PISQ-12 Prolapse and Incontinence Sexual Questionnaire.	237
Analysis 2.36. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 36 Point Ba.	237
Analysis 2.37. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 37 Point Aa.	238
Analysis 2.38. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 38 Point C.	238
Analysis 2.39. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 39 Point Bp.	239
Analysis 2.40. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 40 POPQ Total vaginal length in cm.	239
Analysis 2.41. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 41 Subsequent surgery (prolapse, incontinence, mesh exposure, pain).	240
Analysis 3.1. Comparison 3 One method of posterior prolapse repair versus another surgical method, Outcome 1 Number of women with prolapse symptoms (subjective failure).	241
Analysis 3.2. Comparison 3 One method of posterior prolapse repair versus another surgical method, Outcome 2 Number of women with prolapse (objective failure).	242
Analysis 3.3. Comparison 3 One method of posterior prolapse repair versus another surgical method, Outcome 3 Number of women with faecal incontinence after operation.	243
Analysis 3.4. Comparison 3 One method of posterior prolapse repair versus another surgical method, Outcome 4 Number of women with anal incontinence to flatus after operation.	244
Analysis 3.5. Comparison 3 One method of posterior prolapse repair versus another surgical method, Outcome 5 Number of women with obstructed defecation / constipation after surgery.	244
Analysis 3.6. Comparison 3 One method of posterior prolapse repair versus another surgical method, Outcome 6 Number of women with sexual function not improved after operation.	245
Analysis 3.7. Comparison 3 One method of posterior prolapse repair versus another surgical method, Outcome 7 Number of women with dyspareunia.	245
Analysis 3.8. Comparison 3 One method of posterior prolapse repair versus another surgical method, Outcome 8 Blood loss (ml).	246
Analysis 3.9. Comparison 3 One method of posterior prolapse repair versus another surgical method, Outcome 9 Change in hematocrit.	247
Analysis 3.10. Comparison 3 One method of posterior prolapse repair versus another surgical method, Outcome 10 Difference in haemoglobin.	248
Analysis 3.11. Comparison 3 One method of posterior prolapse repair versus another surgical method, Outcome 11 Postoperative narcotic (morphine) use.	248
Analysis 3.12. Comparison 3 One method of posterior prolapse repair versus another surgical method, Outcome 12 Number of women with postoperative complications.	249
Analysis 3.13. Comparison 3 One method of posterior prolapse repair versus another surgical method, Outcome 13 Persistent postoperative pain.	250
Analysis 3.14. Comparison 3 One method of posterior prolapse repair versus another surgical method, Outcome 14 Operating time (minutes).	250

Analysis 3.15. Comparison 3 One method of posterior prolapse repair versus another surgical method, Outcome 15 Length of stay in hospital (days).	251
Analysis 3.16. Comparison 3 One method of posterior prolapse repair versus another surgical method, Outcome 16 Number of women having further prolapse surgery.	252
Analysis 3.17. Comparison 3 One method of posterior prolapse repair versus another surgical method, Outcome 17 rectocele size (centimetres) on defecography.	253
Analysis 3.18. Comparison 3 One method of posterior prolapse repair versus another surgical method, Outcome 18 modified obstructed defecation syndrome patient questionnaire.	253
Analysis 3.19. Comparison 3 One method of posterior prolapse repair versus another surgical method, Outcome 19 rectocele on examination (point Ap).	254
Analysis 6.1. Comparison 6 No graft versus use of graft (synthetic mesh or biological graft), Outcome 1 Number of women with prolapse symptoms (subjective failure).	255
Analysis 6.2. Comparison 6 No graft versus use of graft (synthetic mesh or biological graft), Outcome 2 Prolapse symptom score at 1 to 5 years.	257
Analysis 6.3. Comparison 6 No graft versus use of graft (synthetic mesh or biological graft), Outcome 3 Quality of life (VAS) for severity of prolapse symptoms.	258
Analysis 6.4. Comparison 6 No graft versus use of graft (synthetic mesh or biological graft), Outcome 4 Number of women with anterior prolapse / cystocele (objective failure).	259
Analysis 6.5. Comparison 6 No graft versus use of graft (synthetic mesh or biological graft), Outcome 5 Objective failure all sites.	260
Analysis 6.6. Comparison 6 No graft versus use of graft (synthetic mesh or biological graft), Outcome 6 Number of women with posterior prolapse / rectocele (objective failure).	261
Analysis 6.7. Comparison 6 No graft versus use of graft (synthetic mesh or biological graft), Outcome 7 Objective failure, any site, no mesh versus any mesh.	262
Analysis 6.8. Comparison 6 No graft versus use of graft (synthetic mesh or biological graft), Outcome 8 Number of women having repeat prolapse surgery.	265
Analysis 6.9. Comparison 6 No graft versus use of graft (synthetic mesh or biological graft), Outcome 9 Number of women with urgency, detrusor overactivity or overactive bladder.	267
Analysis 6.10. Comparison 6 No graft versus use of graft (synthetic mesh or biological graft), Outcome 10 Number of women with postoperative urinary incontinence.	267
Analysis 6.11. Comparison 6 No graft versus use of graft (synthetic mesh or biological graft), Outcome 11 Postoperative voiding dysfunction symptoms.	268
Analysis 6.12. Comparison 6 No graft versus use of graft (synthetic mesh or biological graft), Outcome 12 Persistent voiding dysfunction.	268
Analysis 6.13. Comparison 6 No graft versus use of graft (synthetic mesh or biological graft), Outcome 13 Number of women with dyspareunia.	269
Analysis 6.14. Comparison 6 No graft versus use of graft (synthetic mesh or biological graft), Outcome 14 De novo dyspareunia.	270
Analysis 6.15. Comparison 6 No graft versus use of graft (synthetic mesh or biological graft), Outcome 15 Number of women with postoperative complications.	271
Analysis 6.16. Comparison 6 No graft versus use of graft (synthetic mesh or biological graft), Outcome 16 Death.	271
Analysis 6.17. Comparison 6 No graft versus use of graft (synthetic mesh or biological graft), Outcome 17 Length of stay in hospital (days).	272
Analysis 6.18. Comparison 6 No graft versus use of graft (synthetic mesh or biological graft), Outcome 18 new urinary stress incontinence postoperative.	273
Analysis 6.19. Comparison 6 No graft versus use of graft (synthetic mesh or biological graft), Outcome 19 mesh erosion.	274
Analysis 6.20. Comparison 6 No graft versus use of graft (synthetic mesh or biological graft), Outcome 20 surgery for mesh erosion.	275
Analysis 6.21. Comparison 6 No graft versus use of graft (synthetic mesh or biological graft), Outcome 21 cystotomy.	276
Analysis 6.22. Comparison 6 No graft versus use of graft (synthetic mesh or biological graft), Outcome 22 Patient global impression of improvement (PGI-I) very much or much better.	277
Analysis 6.23. Comparison 6 No graft versus use of graft (synthetic mesh or biological graft), Outcome 23 PISQ-12 Prolapse and Incontinence Sexual Questionnaire.	278

Analysis 6.24. Comparison 6 No graft versus use of graft (synthetic mesh or biological graft), Outcome 24 number undergoing further continence surgery.	279
Analysis 6.25. Comparison 6 No graft versus use of graft (synthetic mesh or biological graft), Outcome 25 Subsequent surgery (prolapse, incontinence, mesh exposure, pain).	280
Analysis 6.26. Comparison 6 No graft versus use of graft (synthetic mesh or biological graft), Outcome 26 Blood loss (ml).	281
Analysis 6.27. Comparison 6 No graft versus use of graft (synthetic mesh or biological graft), Outcome 27 Point Ba.	282
Analysis 6.28. Comparison 6 No graft versus use of graft (synthetic mesh or biological graft), Outcome 28 Point Aa.	282
Analysis 6.29. Comparison 6 No graft versus use of graft (synthetic mesh or biological graft), Outcome 29 Point C. .	283
Analysis 6.30. Comparison 6 No graft versus use of graft (synthetic mesh or biological graft), Outcome 30 Point Bp.	283
Analysis 6.31. Comparison 6 No graft versus use of graft (synthetic mesh or biological graft), Outcome 31 POPQ Total vaginal length in cm.	284
Analysis 7.2. Comparison 7 One type of graft (synthetic mesh or biological graft) versus another type of graft, Outcome 2 Number of women with anterior prolapse / cystocele (objective failure).	284
Analysis 7.3. Comparison 7 One type of graft (synthetic mesh or biological graft) versus another type of graft, Outcome 3 Number of women having further prolapse surgery.	285
Analysis 7.4. Comparison 7 One type of graft (synthetic mesh or biological graft) versus another type of graft, Outcome 4 Stress urinary incontinence de novo.	285
Analysis 7.5. Comparison 7 One type of graft (synthetic mesh or biological graft) versus another type of graft, Outcome 5 Increased daytime urinary frequency post-op.	286
Analysis 7.6. Comparison 7 One type of graft (synthetic mesh or biological graft) versus another type of graft, Outcome 6 Dyspareunia post-op.	286
Analysis 7.7. Comparison 7 One type of graft (synthetic mesh or biological graft) versus another type of graft, Outcome 7 Vaginal mesh erosion.	287
Analysis 7.8. Comparison 7 One type of graft (synthetic mesh or biological graft) versus another type of graft, Outcome 8 Hospital stay (days).	287
Analysis 8.1. Comparison 8 One suture type versus another type of suture, Outcome 1 Number of women with prolapse symptoms up to 1 year (subjective failure).	288
Analysis 8.2. Comparison 8 One suture type versus another type of suture, Outcome 2 Number of women with prolapse symptoms at 1 to 5 years (subjective failure).	288
Analysis 8.3. Comparison 8 One suture type versus another type of suture, Outcome 3 Prolapse symptom score up to 1 year.	289
Analysis 8.4. Comparison 8 One suture type versus another type of suture, Outcome 4 Prolapse symptom score at 1 to 5 years.	289
Analysis 8.5. Comparison 8 One suture type versus another type of suture, Outcome 5 Quality of life score due to prolapse (VAS) up to 1 year.	290
Analysis 8.6. Comparison 8 One suture type versus another type of suture, Outcome 6 Quality of life score due to prolapse (VAS) at 1 to 5 years.	290
Analysis 8.7. Comparison 8 One suture type versus another type of suture, Outcome 7 Objective failure all sites. . .	291
Analysis 8.8. Comparison 8 One suture type versus another type of suture, Outcome 8 Number of women with urinary incontinence at 1 to 5 years.	291
Analysis 8.9. Comparison 8 One suture type versus another type of suture, Outcome 9 ICI Urinary symptom score at 1 to 5 years.	292
Analysis 8.10. Comparison 8 One suture type versus another type of suture, Outcome 10 Number of women with dyspareunia at 1 to 5 years.	292
Analysis 8.11. Comparison 8 One suture type versus another type of suture, Outcome 11 Death.	293
Analysis 8.12. Comparison 8 One suture type versus another type of suture, Outcome 12 Number of women having repeat prolapse surgery.	293
Analysis 9.1. Comparison 9 Prolapse surgery and bladder function, Outcome 1 number with de novo (new) stress urinary incontinence.	294
Analysis 9.2. Comparison 9 Prolapse surgery and bladder function, Outcome 2 Number with de novo (new) stress urinary incontinence (objective).	296
Analysis 9.3. Comparison 9 Prolapse surgery and bladder function, Outcome 3 Further continence surgery. . . .	297

Analysis 9.4. Comparison 9 Prolapse surgery and bladder function, Outcome 4 Number with denovo (new) urgency, detrusor overactivity or overactive bladder.	299
Analysis 9.5. Comparison 9 Prolapse surgery and bladder function, Outcome 5 Longterm voiding dysfunction.	301
Analysis 9.6. Comparison 9 Prolapse surgery and bladder function, Outcome 6 Number with new or denovo SUI who had occult SUI pre-operatively.	303
Analysis 9.7. Comparison 9 Prolapse surgery and bladder function, Outcome 7 post prolapse surgery SUI objective.	304
Analysis 9.8. Comparison 9 Prolapse surgery and bladder function, Outcome 8 Incontinence Impact Questionnaire IIQ post.	305
Analysis 9.9. Comparison 9 Prolapse surgery and bladder function, Outcome 9 Urinary Distress Inventory (UDI-6).	306
Analysis 9.10. Comparison 9 Prolapse surgery and bladder function, Outcome 10 Bothersome SUI (PFDI) post-operative.	307
Analysis 9.11. Comparison 9 Prolapse surgery and bladder function, Outcome 11 satisfaction (VAS 0-10).	308
Analysis 9.12. Comparison 9 Prolapse surgery and bladder function, Outcome 12 Pelvic Floor Incontinence questionnaire (PFIQ) bladder domain.	308
Analysis 9.13. Comparison 9 Prolapse surgery and bladder function, Outcome 13 Pelvic organ Prolapse/Urinary incontinence Sexual Function Questionnaire (PISQ).	309
Analysis 9.14. Comparison 9 Prolapse surgery and bladder function, Outcome 14 further Prolapse surgery.	309
Analysis 9.15. Comparison 9 Prolapse surgery and bladder function, Outcome 15 De novo Stress urinary incontinence women with negative preoperative stress test.	310
Analysis 9.16. Comparison 9 Prolapse surgery and bladder function, Outcome 16 blood loss (mls).	311
Analysis 9.17. Comparison 9 Prolapse surgery and bladder function, Outcome 17 POPQ point Aa.	311
Analysis 9.18. Comparison 9 Prolapse surgery and bladder function, Outcome 18 Point Ap.	312
Analysis 9.19. Comparison 9 Prolapse surgery and bladder function, Outcome 19 POP-Q Point Ba.	312
Analysis 9.20. Comparison 9 Prolapse surgery and bladder function, Outcome 20 POPQ point Bp.	313
Analysis 9.21. Comparison 9 Prolapse surgery and bladder function, Outcome 21 POPQ point C.	314
Analysis 9.22. Comparison 9 Prolapse surgery and bladder function, Outcome 22 POPQ point D.	314
Analysis 9.23. Comparison 9 Prolapse surgery and bladder function, Outcome 23 Total vaginal length (TVL cm).	315
Analysis 9.24. Comparison 9 Prolapse surgery and bladder function, Outcome 24 Pelvic Floor Urinary Impact Questionnaire (PFUIQ).	316
Analysis 9.25. Comparison 9 Prolapse surgery and bladder function, Outcome 25 Number with persisting stress urinary incontinence after prolapse and continence surgery.	317
ADDITIONAL TABLES	317
APPENDICES	319
WHAT'S NEW	331
HISTORY	331
CONTRIBUTIONS OF AUTHORS	332
DECLARATIONS OF INTEREST	332
SOURCES OF SUPPORT	332
INDEX TERMS	333

[Intervention Review]

Surgical management of pelvic organ prolapse in women

Christopher Maher¹, Benjamin Feiner², Kaven Baessler³, Corina Schmid⁴

¹Royal Brisbane Women's Hospital, Brisbane, Australia. ²Division of Urogynecology, Hillel Yaffe Medical Center, Hadera, Israel.

³Urogynaecology Department, Pelvic Floor Centre Charite, Berlin, Germany. ⁴Royal Brisbane Hospital and Wesley Urogynaecology, Brisbane, Australia

Contact address: Christopher Maher, Royal Brisbane Women's Hospital, University Queensland, Brisbane, Queensland, Australia. chrismaher@urogynaecology.com.au.

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ABSTRACT

Background

Pelvic organ prolapse may occur in up to 50% of parous women. A variety of urinary, bowel and sexual symptoms may be associated with the prolapse.

Objectives

To determine the effects of the many different surgeries used in the management of pelvic organ prolapse.

Search methods

We searched the Cochrane Incontinence Group Specialised Register, which contains trials identified from the Cochrane Central Register of Controlled Trials (CENTRAL), MEDLINE, MEDLINE In Process and handsearching of journals and conference proceedings, healthcare-related bibliographic databases, handsearched conference proceedings (searched 20 August 2012), and reference lists of relevant articles. We also contacted researchers in the field.

Selection criteria

Randomised or quasi-randomised controlled trials that included surgical operations for pelvic organ prolapse.

Data collection and analysis

Trials were assessed and data extracted independently by two review authors. Six investigators were contacted for additional information with five responding.

Main results

Fifty-six randomised controlled trials were identified evaluating 5954 women. For upper vaginal prolapse (uterine or vault) abdominal sacral colpopexy was associated with a lower rate of recurrent vault prolapse on examination and painful intercourse than with vaginal sacrospinous colpopexy. These benefits must be balanced against a longer operating time, longer time to return to activities of daily living and increased cost of the abdominal approach. In single studies the sacral colpopexy had a higher success rate on examination and lower reoperation rate than high vaginal uterosacral suspension and transvaginal polypropylene mesh.

Twenty-one trials compared a variety of surgical procedures for anterior compartment prolapse (cystocele). Ten compared native tissue repair with graft (absorbable and permanent mesh, biological grafts) repair for anterior compartment prolapse. Native tissue anterior

Surgical management of pelvic organ prolapse in women (Review)

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1

repair was associated with more recurrent anterior compartment prolapse than when supplemented with a polyglactin (absorbable) mesh inlay (RR 1.39, 95% CI 1.02 to 1.90) or porcine dermis mesh inlay (RR 2.08, 95% CI 1.08 to 4.01), however there was no difference in post-operative awareness of prolapse after absorbable mesh (RR 0.96, 95% CI 0.33 to 2.81) or a biological graft (RR 1.21, 95% CI 0.64 to 2.30). Data on morbidity and other clinical outcomes were lacking. Standard anterior repair was associated with more anterior compartment prolapse on examination than for any polypropylene (permanent) mesh repair (RR 3.15, 95% CI 2.50 to 3.96). Awareness of prolapse was also higher after the anterior repair as compared to polypropylene mesh repair (28% versus 18%, RR 1.57, 95% CI 1.18 to 2.07). However, the reoperation rate for prolapse was similar at 14/459 (3%) after the native tissue repair compared to 6/470 (1.3%) (RR 2.18, 95% CI 0.93 to 5.10) after the anterior polypropylene mesh repair and no differences in quality of life data or de novo dyspareunia were identified. Blood loss (MD 64 ml, 95% CI 48 to 81), operating time (MD 19 min, 95% CI 16 to 21), recurrences in apical or posterior compartment (RR 1.9, 95% CI 1.0 to 3.4) and de novo stress urinary incontinence (RR 1.8, 95% CI 1.0 to 3.1) were significantly higher with transobturator meshes than for native tissue anterior repair. Mesh erosions were reported in 11.4% (64/563), with surgical interventions being performed in 6.8% (32/470).

Data from three trials compared native tissue repairs with a variety of total, anterior, or posterior polypropylene kit meshes for vaginal prolapse in multiple compartments. While no difference in awareness of prolapse was able to be identified between the groups (RR 1.3, 95% CI 0.6 to 1.7) the recurrence rate on examination was higher in the native tissue repair group compared to the transvaginal polypropylene mesh group (RR 2.0, 95% CI 1.3 to 3.1). The mesh erosion rate was 35/194 (18%), and 18/194 (9%) underwent surgical correction for mesh erosion. The reoperation rate after transvaginal polypropylene mesh repair of 22/194 (11%) was higher than after the native tissue repair (7/189, 3.7%) (RR 3.1, 95% CI 1.3 to 7.3).

Data from three trials compared posterior vaginal repair and transanal repair for the treatment of posterior compartment prolapse (rectocele). The posterior vaginal repair had fewer recurrent prolapse symptoms (RR 0.4, 95% CI 0.2 to 1.0) and lower recurrence on examination (RR 0.2, 95% CI 0.1 to 0.6) and on defecography (MD -1.2 cm, 95% CI -2.0 to -0.3).

Sixteen trials included significant data on bladder outcomes following a variety of prolapse surgeries. Women undergoing prolapse surgery may have benefited from having continence surgery performed concomitantly, especially if they had stress urinary incontinence (RR 7.4, 95% CI 4.0 to 14) or if they were continent and had occult stress urinary incontinence demonstrated pre-operatively (RR 3.5, 95% CI 1.9 to 6.6). Following prolapse surgery, 12% of women developed de novo symptoms of bladder overactivity and 9% de novo voiding dysfunction.

Authors' conclusions

Sacral colpopexy has superior outcomes to a variety of vaginal procedures including sacrospinous colpopexy, uterosacral colpopexy and transvaginal mesh. These benefits must be balanced against a longer operating time, longer time to return to activities of daily living, and increased cost of the abdominal approach.

The use of mesh or graft inlays at the time of anterior vaginal wall repair reduces the risk of recurrent anterior wall prolapse on examination. Anterior vaginal polypropylene mesh also reduces awareness of prolapse, however these benefits must be weighted against increased operating time, blood loss, rate of apical or posterior compartment prolapse, de novo stress urinary incontinence, and reoperation rate for mesh exposures associated with the use of polypropylene mesh.

Posterior vaginal wall repair may be better than transanal repair in the management of rectocele in terms of recurrence of prolapse. The evidence is not supportive of any grafts at the time of posterior vaginal repair. Adequately powered randomised, controlled clinical trials with blinding of assessors are urgently needed on a wide variety of issues, and they particularly need to include women's perceptions of prolapse symptoms. Following the withdrawal of some commercial transvaginal mesh kits from the market, the generalisability of the findings, especially relating to anterior compartment transvaginal mesh, should be interpreted with caution.

PLAIN LANGUAGE SUMMARY

Surgical management of pelvic organ prolapse in women

Pelvic organs, such as the uterus, bladder or bowel, may protrude into the vagina due to weakness in the tissues that normally support them. The commonest symptom experienced by women with prolapse is the sensation or feeling, or seeing, a vaginal bulge. Commonly these women have abnormalities in bladder, bowel and sexual function that may or may not be related to the prolapse. The surgical repair performed depends on the type of prolapse seen on examination and on the associated symptoms. Women should be aware that the principle aim of surgery is to relieve the vaginal bulge. Women who have stress urinary incontinence in addition to their

prolapse commonly have that corrected at the same surgery. Pelvic organ prolapse surgery is usually effective in controlling the principle symptoms of prolapse (awareness of vaginal bulge). The impact of pelvic organ prolapse surgery on specific bowel, bladder and sexual functions can be predicted however individual women should be aware that occasionally the intervention may make symptoms worse or result in new symptoms, such as leakage of urine or problems with sexual intercourse.

The review found 56 trials including 5954 women with a variety of types of prolapse. The trials showed that abdominal sacral colpopexy, 'abdominal route surgery', may be better than vaginal sacrospinous colpopexy or 'vaginal route surgery' for prolapse of the uterus or vaginal apex after hysterectomy. Limited evidence suggests that vaginal surgery may be better than surgery performed through the anus for posterior vaginal prolapse (rectocele). The use of grafts (biological or synthetic) reduces the risk of prolapse symptoms and recurrent anterior vaginal prolapse on examination when compared to native tissue repairs (colporrhaphy). However, the advantages of a permanent polypropylene mesh must be weighed against disadvantages including longer operating time, greater blood loss, prolapse in other areas of the vagina, new onset urinary stress incontinence, and the mesh becoming exposed in the vagina in 11% of women. In general, there is a lack of evidence to support transvaginal mesh operations used in apical or posterior compartment surgery.

Continence surgery performed at the time of prolapse surgery is effective in reducing the risk of urinary stress incontinence after the prolapse surgery. Overall, however, there was not enough evidence on most types of common prolapse surgery nor about the use of mesh or grafts in vaginal prolapse surgery.

BACKGROUND

Pelvic organ prolapse is common and is seen on examination in 40% to 60% of parous women (Handa 2004; Hendrix 2002). The annual aggregated rate of associated surgery in the USA is in the range of 10 to 30 per 10,000 women (Brubaker 2002).

Description of the condition

Pelvic organ prolapse is the descent of one or more of the pelvic organs (uterus, vagina, bladder or bowel). The different types of prolapse include:

- upper vaginal prolapse i.e. uterus, vaginal vault (after hysterectomy when the top of the vagina drops down);
- anterior vaginal wall prolapse i.e. cystocele (bladder descends), urethrocele (urethra descends), paravaginal defect (pelvic fascia defect);
- posterior vaginal wall prolapse i.e. enterocele (small bowel descends), rectocele (rectum descends), perineal deficiency.

A woman can present with prolapse of one or more of these sites. The aetiology of pelvic organ prolapse (POP) is complex and multi-factorial. Possible risk factors include pregnancy, childbirth, congenital or acquired connective tissue abnormalities, denervation or weakness of the pelvic floor, ageing, hysterectomy, menopause and factors associated with chronically raised intra-abdominal pressure (Bump 1998; Gill 1998; MacLennan 2000). Women with prolapse commonly have a variety of pelvic floor symptoms only some of which are directly related to the prolapse. Generalised symptoms of prolapse include pelvic heaviness; bulge,

lump or protrusion coming down from the vagina; a dragging sensation in the vagina; or backache. Symptoms of bladder, bowel or sexual dysfunction are frequently present. For example, women may need to reduce the prolapse by using their fingers to push the prolapse up to aid urinary voiding or defaecation. These symptoms may be directly related to the prolapsed organ, for example poor urinary stream when a cystocele is present or obstructed defaecation when a rectocele is present. They may also be independent of the prolapse, for example symptoms of overactive bladder when a cystocele is present.

Many women with POP report concomitant stress urinary incontinence (SUI); in women with stage II POP, about 55% also have stress urinary incontinence. However, this prevalence decreases with increasing prolapse, and possibly obstruction of the urethra due to the prolapse, to 33% in women with stage IV POP (Slieker-ten Hove 2009). As it is unclear how to approach cases with POP and concomitant SUI, this review includes studies with appropriate data.

Although in many women SUI decreases with increasing prolapse, stress incontinence may be demonstrated when the prolapse is reduced digitally or with the help of a pessary, sponge holder or speculum in up to 80% of women (Visco 2008; Wei 2011). This type of incontinence is termed occult stress incontinence to describe SUI which is demonstrable only when the prolapse is reduced in otherwise continent women. No standardisation or best technique to test for occult incontinence has been established (Visco 2008).

The term *de novo* SUI is used to describe stress incontinence that develops following surgical correction of the prolapse amongst

women who were symptomatically continent prior to surgery. De novo or new SUI after prolapse surgery is clearly disappointing to women and was one of the outcome measures considered in this review.

Description of the intervention

Treatment of prolapse depends on the severity of the prolapse, its symptoms, the woman's general health, and surgeon preference and capabilities. Options available for treatment are conservative, mechanical or surgical interventions.

Generally, conservative or mechanical treatments are considered for women with a mild degree of prolapse, those who wish to have more children, the frail or those women unwilling to undergo surgery. Conservative and mechanical interventions have been considered in separate Cochrane reviews (Adams 2004; Hagen 2011). There was no good evidence to guide management in either of these reviews.

The current review considers all surgical procedures for women with pelvic organ prolapse. The aims of surgery include:

- the restoration of normal vaginal anatomy;
- the restoration or maintenance of normal bladder function;
- the restoration or maintenance of normal bowel function;
- the restoration or maintenance of normal sexual function.

A wide variety of abdominal and vaginal surgical techniques are available for the treatment of prolapse (see Appendix 1). The most common procedures are anterior repair (colporrhaphy) for anterior vaginal wall prolapse and posterior repair (colporrhaphy) for posterior vaginal wall prolapse. Together, anterior and posterior compartment surgery account for over 90% of all prolapse operations (Olsen 1997). Two main approaches can be used.

- Vaginal approaches include vaginal hysterectomy, anterior or posterior vaginal wall repair (colporrhaphy), McCall culdoplasty, Manchester repair (amputation of the cervix with uterus suspension to the cardinal ligaments), prespinous and sacrospinous colpopexy, enterocele ligation, paravaginal repair, Le Fortes procedure and perineal reconstruction.

- Abdominal approaches include hysterectomy, sacral colpopexy, paravaginal repair, vault suspending and uterosacral ligament plication, enterocele ligation and posterior vaginal wall repair. Abdominal surgery can be performed through an open incision or keyhole incisions via the laparoscope or robot.

A combination of some of these procedures may be employed in the surgical correction of prolapse as frequently more than one type of prolapse may occur.

In addition to the variety of prolapse operations, the surgeon must choose whether to use absorbable sutures such as polyglycolic acid based materials (for example polyglactin), delayed-absorption sutures such as polydioxanone, or non-absorbable sutures such as polypropylene. Furthermore, some techniques require the routine

use of grafts or mesh, for example sacral colpopexy uses different materials to bridge the gap between the vaginal cuff and the hollow of the sacrum, whereas for other techniques grafts are optional. Graft material can be synthetic (for example permanent polypropylene or absorbable polyglactin mesh) or biological. Biological grafts can be further divided into autologous (using a person's own tissue, such as fascial sheath), alloplastic (from animals, for example porcine dermis) or homologous (for example cadaveric fascia lata).

The choice of operation depends on a number of factors, which include the nature, site and severity of the prolapse; whether there are additional symptoms affecting urinary, bowel or sexual function; the general health of the woman; and surgeon preference and capability. Concomitant procedures to treat or prevent urinary incontinence are often performed at the same time.

To aid the assessment of the success of surgery, clear pre and post-operative site-specific vaginal grading and details of the operative intervention should be recorded in the reports.

Why it is important to do this review

The wide variety of surgical treatments available for prolapse indicates the lack of consensus as to the optimal treatment. Guidelines have been published using the available literature but are based on studies of mixed type and quality (Carey 2001). Provided that sufficient numbers of trials of adequate quality have been conducted, the most reliable evidence is likely to come from the consideration of randomised controlled trials, and this is the basis for the review. The aim is to help identify optimal practice and to highlight where there is a need for further research.

OBJECTIVES

To determine the impact of pelvic organ prolapse surgery including patient symptoms, examination findings, complications, cost, and bladder, bowel and sexual function.

The following comparisons were made.

1. One type of upper vaginal prolapse (uterine and vaginal vault) repair versus another

Including open or laparoscopic abdominal sacral colpopexy, vaginal sacrospinous colpopexy, vaginal or abdominal hysterectomy, high levator myorrhaphy, uterosacral ligament vault suspension, vaginal Mayo McCall repair.

2. One type of anterior vaginal wall prolapse repair versus another

Including anterior vaginal wall repair (anterior colporrhaphy) with or without graft reinforcement, abdominal paravaginal repair.

3. One type of posterior vaginal wall prolapse repair versus another

Including posterior vaginal wall repair (posterior colporrhaphy) with or without graft reinforcement, transanal repair, abdominal posterior repair.

4. Any type of surgical prolapse repair versus conservative treatment

5. Any type of surgical prolapse repair versus mechanical devices

6. No graft versus use of graft (synthetic mesh or biological graft)

7. One type of graft (synthetic mesh or biological graft) versus another type of graft

8. One type of suture versus another type of suture

9. Prolapse surgery and bladder function

A. One type of POP surgery alone versus another type of POP surgery alone

B. POP surgery alone versus POP surgery with an additional continence procedure

METHODS

Criteria for considering studies for this review

Types of studies

Randomised controlled trials (RCTs) or quasi-randomised controlled clinical trials (CCTs) in which at least one arm was a surgical intervention for pelvic organ prolapse.

Types of participants

Adult women seeking treatment for symptomatic pelvic organ prolapse. Both primary and recurrent prolapse were considered. Pelvic organ prolapse includes:

- upper vaginal prolapse (uterine or vaginal vault);
- anterior vaginal wall prolapse (cystocele, urethrocele, paravaginal defect);
- posterior vaginal wall prolapse (enterocele, rectocele, perineal deficiency).

Types of interventions

Trials including any type of abdominal or vaginal surgery for pelvic organ prolapse in at least one trial group. Comparison interventions included no treatment, conservative management, a mechanical device, or an alternative approach to surgery. Concomitant operations to treat or prevent urinary incontinence were also evaluated.

Types of outcome measures

Primary outcomes

Women's observations related to prolapse

- Perceived cure or improvement in prolapse symptoms
- Acceptability of procedure or satisfaction with outcome (e.g. Patient Global Impression of Improvement (PGI-I))
- Prolapse-specific quality of life questionnaires (e.g. Prolapse - Quality of Life (P-QOL), Sheffield Prolapse Symptoms Questionnaire)

Clinicians' observations related to prolapse

Site-specific grading of prolapse, reported as rate of recurrence, for example:

- International Continence Society Pelvic Organ Prolapse Quantification System (POP-Q) classification ([Bump 1996a](#));
- Baden-Walker half-way system ([Baden 1972](#)).

Secondary outcomes

Quality of life

- Other condition-specific quality of life questionnaires: related to urinary incontinence (e.g. Bristol Female Lower Urinary Tract Symptoms Questionnaire (BFLUTS), Incontinence Impact Questionnaire (IIQ), International Consultation on Continence Questionnaire - Short Form (ICI-SF)); sexual function (e.g. Pelvic Organ Prolapse/Urinary

Incontinence Sexual Function Questionnaire (PISQ), ICIQ-FLUTSsex); bowel function (e.g. Faecal Incontinence Quality of Life Scale, Wexner score)

- Generic quality of life or health status measures (e.g. Short Form-36) (Ware 1992)
- Psychological outcome measures (e.g. Hospital Anxiety and Depression Scale (HADS)) (Zigmond 1983)

Measures of associated symptoms (objective or subjective)

- Bladder symptoms, including symptomatic and occult incontinence
- Bowel symptoms
- Sexual problems

Surgical outcome measures

- Operating time, blood loss, inpatient days
- Further pelvic organ prolapse surgery
- Further continence surgery

Complications

- Need for transfusion
- Infection including mesh or graft infection
- Adverse effects (e.g. return to theatre, damage to surrounding viscera, mesh or graft exposure, graft rejection)
- Other adverse effects

Economic measures

For example catheter days, inpatient days, days to return to activities of daily living

- Use of resources
- Costs of interventions or resources
- Resource implications of effects of treatment
- Formal economic evaluations

Search methods for identification of studies

We did not impose any language or other limits on any of the searches which are detailed below.

Electronic searches

This review has drawn on the search strategy developed for the Cochrane Incontinence Review Group. Relevant trials were identified from the Group's Specialised Register of controlled trials which is described, along with the Review Group search strategy, under the Group's [module](#) in *The Cochrane Library*. The Register contains trials identified from the Cochrane Central Register of

Controlled Trials (CENTRAL), MEDLINE, CINAHL and handsearching of journals and conference proceedings. The Incontinence Group Specialised Register was searched using the Group's own keyword system (all searches were of the keyword field of Reference Manager 12, Thomson Reuters). The search terms used were:

```
{design.cct*} OR {design.rct*}
```

AND

```
{topic.prolapse*}
```

AND

```
{intervent.surg*}
```

The trials in the Incontinence Group Specialised Register are also contained in CENTRAL.

The review authors also undertook searches of healthcare-related bibliographic databases (most recent 20 August 2012).

Searching other resources

We handsearched conference proceedings, searched the reference lists of relevant articles, and contacted researchers in the field.

Data collection and analysis

Selection of studies

Titles and, if available, abstracts of all possibly eligible studies were assessed by two review authors for their methodological quality (method of randomisation and adequacy of concealment of the randomisation process; intention to treat analysis; and completeness of follow-up). In this update blinding status of patients and assessors and sources of funding of the updated trials were recorded, and relevance to the review objectives. Full reports of each study likely to be eligible were then independently assessed by at least two review authors using the Cochrane Incontinence Group's assessment criteria. Authors agreed on whether or not to include the study according to the inclusion criteria for the review.

Studies were excluded if they were not randomised or quasi-randomised trials of surgery for women with pelvic organ prolapse or if the sample size was less than 20 in each group and the review time was less than six months. Excluded studies are listed with the reasons for their exclusion in the table [Characteristics of excluded studies](#).

Data extraction and management

Data extraction was undertaken independently by at least two review authors and comparisons made to ensure accuracy. Discrepancies were resolved by discussion or by referral to a third party. Where trial data were not reported adequately, attempts were made to acquire the necessary information from the trialist.

Data synthesis

Included trial data were processed as described in the *Cochrane Handbook for Systematic Reviews of Interventions* (Higgins 2011). Meta-analyses were undertaken to synthesise trial data, when appropriate. The method of meta-analysis depended on the nature of the outcomes. For categorical outcomes we related the numbers reporting an outcome to the numbers at risk in each group in order to derive a risk ratio (RR). For continuous variables we used means and standard deviations to derive a mean difference (MD). As a general rule, a fixed-effect model was used for calculations of summary estimates and their 95% confidence intervals (CI).

Subgroup analysis and investigation of heterogeneity

Trials were only combined if the interventions were similar enough based on clinical criteria. When important heterogeneity was suspected from visual inspection of the results, the Chi² test for heterogeneity (at 10%) or the I² statistic (Higgins 2003) was determined looking for further differences between the trials. When concern about heterogeneity persisted, a random-effects model was to be used.

Trials were separately identified and combined if they addressed other secondary objectives of the review related to the prevention or treatment of complications or evaluation of urinary, bowel or sexual function.

RESULTS

Description of studies

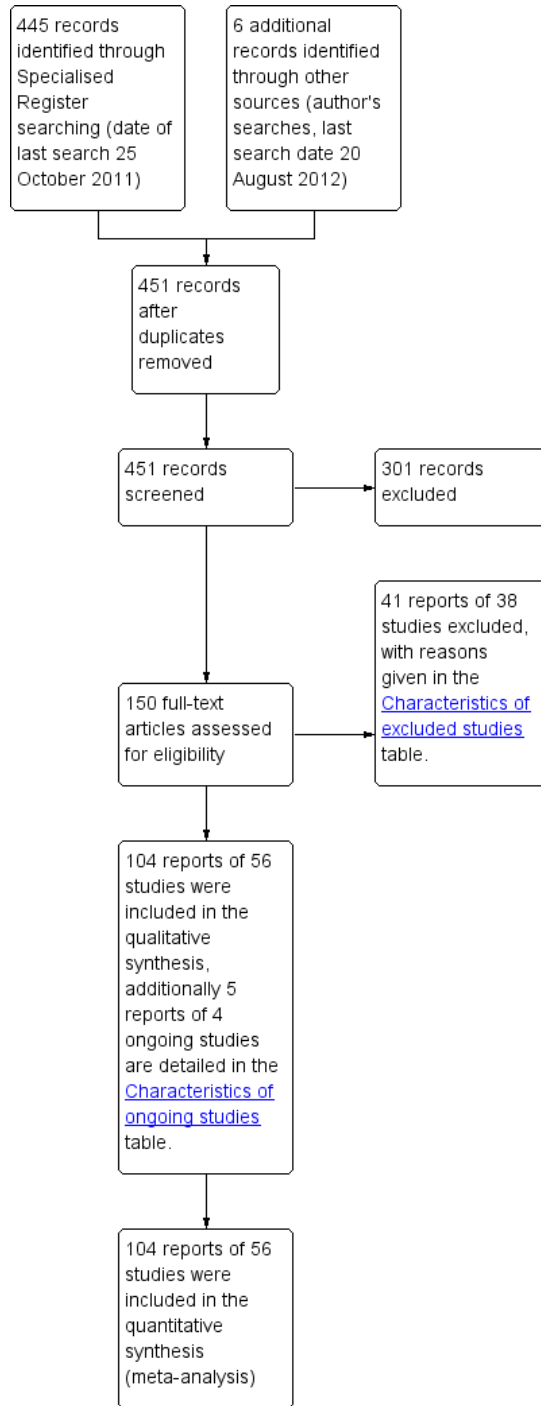
See: [Characteristics of included studies](#); [Characteristics of excluded studies](#); [Characteristics of ongoing studies](#).

Results of the search

Full reports of 94 potentially eligible studies were assessed. For this update, 20 new eligible studies were assessed and 16 were included (Altman 2011; Farid 2010; Feldner 2010; Halaska 2012; Iglesia 2010; Maher 2011; Menefee 2011; Minassian 2010 abstract; Paraiso 2011; Rondini 2011 abstract; Sung 2012; Thijs 2010 abstract; Vijaya 2011 abstract; Vollebregt 2011; Wei 2011; Withagen 2011). Ten previously included studies were updated (Al-Nazer 2007; Borstad 2010; Carey 2009; Costantini 2008; Culligan 2005; Dietz 2010; Guerette 2009; Natale 2010; Nieminen 2008; Pantazis 2011) and Sokol is a one year update of Iglesia 2010 which was included for the first time. There are two studies (Ek 2010; Ek 2011) which are ancillary reports to Altman 2011.

The flow of literature through the assessment process is shown in the PRISMA flowchart (Figure 1).

Figure 1. PRISMA study flow diagram.



Studies randomising catheter issues (Dixon 2010; Huang 2011; Kamilya 2010; Kokabi 2010; Kringel 2010; Van Der Steen 2011; Weemhoff 2011) only at the time of POP surgery will be reviewed in a separate analysis within the Cochrane Incontinence Group.

In total, 56 randomised controlled trials on the surgical management of pelvic organ prolapse were evaluated in this review. These trials were conducted in 12 countries (Italy, USA, Australia, UK, the Netherlands, Taiwan, Finland, Belgium, Chile, Czech Republic, Egypt, France, Singapore and Sweden). The trials involved a total of 5954 women of which 1873 were new in this update and all of whom received a surgical intervention.

Seven trials (Ali 2006 abstract; Borstad 2010; Farid 2010; Jeng 2005; Pantazis 2011; Schierlitz 2007; Vijaya 2011 abstract) reported median follow up of less than one year and only four trials reported outcomes at greater than five years (Colombo 1997; Colombo 2000; Roovers 2004; Culligan 2005).

Given the diverse nature of pelvic organ prolapse, to allow a meaningful and structured analysis of the data the review was divided into three sections related to the site of the prolapse.

1. Upper vagina including cervix, uterus or vault (post-hysterectomy).

2. Anterior vaginal wall.

3. Posterior vaginal wall

Two further sections related to:

4. prolapse surgery and impact on bladder function;

5. prolapse surgery with and without grafts.

Full details of the description of the studies under the nine objectives of the review are available as [Appendix 2](#).

Full details of the included trials are given in the '[Characteristics of included studies](#)' table.

Excluded studies

Overall 38 studies were excluded from the review, four during this update (Lopes 2010; Lundarelli 2009; Svabik 2010; Tincello 2009). Full details are given in the '[Characteristics of excluded studies](#)' table.

Risk of bias in included studies

Allocation

Including the 26 new or updated trials, sufficient detail was provided in 31 of 56 RCTs, which adequately described the ran-

domisation process and confirmed that secure concealment of the randomisation process was used, for example allocation by a remote person or sealed envelopes (Ali 2006 abstract; Allahdin 2008; Al-Nazer 2007; Altman 2011; Benson 1996; Borstad 2010; Brubaker 2008; Bump 1996; Costantini 2008; Culligan 2005; Dietz 2010; Feldner 2010; Gandhi 2005; Guerette 2009; Hviid 2010; Iglesia 2010; Maher 2004; Maher 2011; Meschia 2004; Meschia 2004a; Meschia 2007; Minassian 2010 abstract; Natale 2009; Nguyen 2008; Nieminen 2008; Paraiso 2006; Roovers 2004; Sivaslioglu 2008; Sung 2012; Weber 2001). However, in one of these trials four women received the opposite treatment to their randomised allocation (mesh instead of fascia) and were subsequently analysed in the mesh group thus compromising the randomisation process; an intention-to-treat analysis was not used (Culligan 2005).

Of the remainder, 23 trials stated that they used computer generated number lists but it was unclear whether the allocation was concealed before assignment (Braun 2007 abstract; Carey 2009; Colombo 1996; Colombo 1997; De Ridder 2004 abstract; de Tayrac 2008; Costantini 2007; Halaska 2012; Menefee 2011; Kahn 1999; Lo 1998; Natale 2010; Nieminen 2004; Pantazis 2011; Paraiso 2011; Rondini 2011 abstract; Sand 2001; Schierlitz 2007; Thijs 2010 abstract; Vijaya 2011 abstract; Vollebregt 2011; Withagen 2011; Wei 2011); another gave no details of the randomisation process (Jeng 2005). The last trial stated that a computer generated but open number list was used and it was, therefore, classified as a quasi-randomised trial (Colombo 2000).

Blinding

Women and surgeons could not be blinded to the procedure when different surgical routes were compared (Benson 1996; Braun 2007 abstract; Colombo 2000; Maher 2004; Maher 2011; Roovers 2004). Blinding of patients and the post-operative reviewer were performed in nine trials (Allahdin 2008; Brubaker 2008; Culligan 2005; Iglesia 2010; Menefee 2011; Nguyen 2008; Paraiso 2006; Paraiso 2011; Sung 2012). Outcome assessments were conducted by non-surgeons in 16 trials (Allahdin 2008; Al-Nazer 2007; Benson 1996; Costantini 2008; Culligan 2005; Feldner 2010; Iglesia 2010; Maher 2004; Maher 2011; Meschia 2007; Natale 2009; Paraiso 2006; Paraiso 2011; Roovers 2004; Sung 2012; Weber 2001). These findings are summarised in [Figure 2](#).

Figure 2. Risk of bias summary: review authors' judgements about each risk of bias item for each included study.

	Random sequence generation (selection bias)	Allocation concealment (selection bias)	Blinding of participants and personnel (performance bias)	Blinding of outcome assessment (detection bias)	Incomplete outcome data (attrition bias)	Other bias
Ali 2008 abstract	?	?	?	?	?	?
Allahdin 2008	?	?	?	?	?	?
Al-Nazer 2007	?	?	?	?	?	?
Altman 2011	?	?	?	?	?	?
Bensrud 1998	?	?	?	?	?	?
Borstad 2010	?	?	?	?	?	?
Braun 2007 abstract	?	?	?	?	?	?
Brubaker 2008	?	?	?	?	?	?
Bump 1996	?	?	?	?	?	?
Carey 2009	?	?	?	?	?	?
Colombo 1996	?	?	?	?	?	?
Colombo 1997	?	?	?	?	?	?
Colombo 2000	?	?	?	?	?	?
Costantini 2007	?	?	?	?	?	?
Costantini 2008	?	?	?	?	?	?
Culligan 2005	?	?	?	?	?	?
De Ridder 2004 abstract	?	?	?	?	?	?
de Tavarac 2008	?	?	?	?	?	?
Dietz 2010	?	?	?	?	?	?
Fandi 2010	?	?	?	?	?	?
Feldner 2010	?	?	?	?	?	?
Gandhi 2005	?	?	?	?	?	?
Ouereth 2009	?	?	?	?	?	?
Halaska 2012	?	?	?	?	?	?
Heid 2010	?	?	?	?	?	?
Iglesia 2010	?	?	?	?	?	?
Jeng 2005	?	?	?	?	?	?
Kahn 1999	?	?	?	?	?	?
Lo 1996	?	?	?	?	?	?
Maier 2004	?	?	?	?	?	?
Maier 2011	?	?	?	?	?	?
Menefee 2011	?	?	?	?	?	?
Meschia 2004	?	?	?	?	?	?
Meschia 2004a	?	?	?	?	?	?
Meschia 2007	?	?	?	?	?	?
Minassian 2010 abstract	?	?	?	?	?	?
Natalie 2009	?	?	?	?	?	?
Natalie 2010	?	?	?	?	?	?
Nguyen 2008	?	?	?	?	?	?
Nieminen 2004	?	?	?	?	?	?
Nieminen 2008	?	?	?	?	?	?
Pantazis 2011	?	?	?	?	?	?
Paraiso 2006	?	?	?	?	?	?
Paraiso 2011	?	?	?	?	?	?
Rondini 2011 abstract	?	?	?	?	?	?
Roovers 2004	?	?	?	?	?	?
Sand 2001	?	?	?	?	?	?
Schientz 2007	?	?	?	?	?	?
Sivasiloglu 2008	?	?	?	?	?	?
Sung 2012	?	?	?	?	?	?
Thijis 2010 abstract	?	?	?	?	?	?
Vijaya 2011 abstract	?	?	?	?	?	?
Vollebregt 2011	?	?	?	?	?	?
Weber 2001	?	?	?	?	?	?
Wei 2011	?	?	?	?	?	?
Wihagen 2011	?	?	?	?	?	?

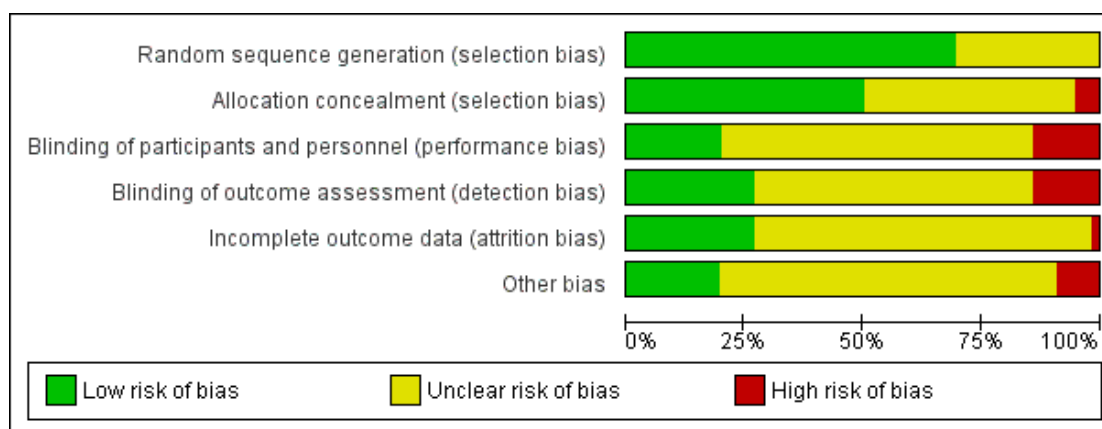
Incomplete outcome data

Loss to follow up was a variable problem, ranging from zero (Allahdin 2008; Colombo 1997; Jeng 2005; Kahn 1999; Meschia 2004; Meschia 2004a) to 53% (49 out of 93) in Guerette 2009. Weber also reported a statistically significant higher loss to follow up in one arm of the trial (ultra-lateral anterior vaginal wall repair) (Weber 2001).

Other potential sources of bias

CONSORT statements were reported by 13 trials (Altman 2011; Brubaker 2008; Costantini 2008; Dietz 2010; Halaska 2012; Iglesia 2010; Nguyen 2008; Nieminen 2008; Maher 2011; Paraiso 2006; Paraiso 2011; Roovers 2004; Sivaslioglu 2008). In 13 trials, data were analysed on an intention-to-treat basis (Allahdin 2008; Altman 2011; Brubaker 2008; Iglesia 2010; Jeng 2005; Maher 2004; Maher 2011; Meschia 2007; Nguyen 2008; Paraiso 2006; Paraiso 2011; Roovers 2004; Sung 2012, Weber 2001). These findings are summarised in Figure 3.

Figure 3. Risk of bias graph: review authors' judgements about each risk of bias item presented as percentages across all included studies.



Baseline descriptive characteristics were reported in all trials and were equally distributed except in four trials: Sand 2001 reported that previous hysterectomy was more common in the mesh overlay group; Kahn 1999 reported a difference in menopausal status and previous hysterectomies between the groups; women in the vaginal sacrospinous colpopexy arm in Meschia's trial were significantly older (Meschia 2004a); and women in the native tissue group had greater degree prolapse at point A posterior (Ap), point B posterior (Bp) and genital hiatus (GH) as compared to the mesh group, and prior sacral colpopexy was three times more frequent in the mesh group than in the native tissue group in Withagen 2011. Pre-operative prolapse status was reported in all trials but one (De Ridder 2004 abstract), but equal distribution and severity of prolapse between groups was not specifically reported in seven trials (Ali 2006 abstract; Benson 1996; Bump 1996; Meschia 2004; Pantazis 2011; Sand 2001; Schierlitz 2007). One trial included 7% of women with Stage 1 anterior vaginal wall prolapse pre-

operatively (at time of inclusion), which would also have been classified as a post-operative success (Weber 2001).

Length of follow up was less than one year in nine trials (Ali 2006 abstract; Borstad 2010; Farid 2010; Jeng 2005; Pantazis 2011; Paraiso 2011; Schierlitz 2007; Vijaya 2011 abstract) and greater than five years in another four trials (Colombo 1997; Colombo 2000; Culligan 2005; Roovers 2004) with all other trialists reporting results at between one and five years.

Effects of interventions

1. One type of upper vaginal prolapse (uterine and vaginal vault) repair versus another (Comparison 1)

Nineteen studies evaluated surgeries for upper vaginal prolapse (uterine or vault) (Benson 1996; Braun 2007 abstract; Brubaker 2008; Costantini 2007; Costantini 2008; Culligan 2005; de

Tayrac 2008; Dietz 2010; Halaska 2012; Jeng 2005; Lo 1998; Maher 2004; Maher 2011; Meschia 2004a; Natale 2010; Pantazis 2011; Paraiso 2011; Rondini 2011 abstract; Roovers 2004).

Four of these were new included trials (Halaska 2012; Maher 2011; Paraiso 2011; Rondini 2011 abstract) and four were updates of previously included trials (Culligan 2005; Dietz 2010; Natale 2010; Pantazis 2011 from abstract). All trials provided data regarding the outcome of prolapse surgery except Jeng 2005. All the trials with mesh used non-absorbable, permanent mesh except one trial in which an absorbable mesh was compared with a non-absorbable mesh (Culligan 2005 UPDATE).

Abdominal sacral colpopexy versus vaginal sacrospinous colpopexy

Three trials were considered to be similar enough to address the comparison of abdominal sacral colpopexy and vaginal sacrospinous colpopexy (Benson 1996; Lo 1998; Maher 2004).

There was no statistically significant difference between the abdominal and vaginal approach in the number of women reporting prolapse symptoms, although there were more reports of subjective failure in the vaginal group (subjective failure after abdominal surgery 9/84 versus 18/85 after vaginal surgery; RR 0.53, 95% CI 0.25 to 1.09; Analysis 1.1.1) (Benson 1996; Maher 2004). The limited evidence was not sufficient to detect a statistically significant difference between the abdominal and vaginal approach for patient satisfaction (RR 0.82, 95% CI 0.32 to 2.06; Analysis 1.2.1) (Maher 2004).

Abdominal sacral colpopexy was better than vaginal sacrospinous colpopexy in terms of:

- the number of women failing to improve to Stage 2 or better (3 out of 52 versus 13 out of 66; RR 0.29, 95% CI 0.09 to 0.97; Analysis 1.5.2) (Lo 1998);
- a lower rate of recurrent vault prolapse (3 out of 84 versus 13 out of 85; RR 0.23, 95% CI 0.07 to 0.77; Analysis 1.6.1) (Benson 1996; Maher 2004);
- less post-operative SUI (14 out of 47 versus 28 out of 81; RR 0.55, 95% CI 0.32 to 0.95; Analysis 1.15.1) (Benson 1996; Maher 2004);
- less post-operative dyspareunia (7 out of 45 versus 22 out of 61; RR 0.39, 95% CI 0.18 to 0.86; Analysis 1.27) (Benson 1996; Lo 1998; Maher 2004).

However, caution should be exercised when evaluating these data due to significant variation in the methodology of the three trials as detailed in the 'Description of studies, appendix 2'.

There were no statistically significant differences in objective failure at any site (any pelvic organ prolapse RR 0.77, 95% CI 0.39 to 1.53; Analysis 1.5.1) (Maher 2004) or reoperation rates for SUI (RR 0.6, 95% CI 0.21 to 1.73; Analysis 1.40) (Benson 1996; Lo 1998; Maher 2004).

Although data were available for bowel outcomes (Analysis 1.24; Analysis 1.23; Analysis 1.26) and adverse events (Analysis 1.32),

they were too few to provide sufficiently precise estimates to identify or rule out clinically important differences.

The lower reoperation rate for prolapse after abdominal surgery as compared to vaginal surgery did not reach statistical significance (6 out of 84 versus 14 out of 85; RR 1.46, 95% CI 0.19 to 1.11; Analysis 1.39.1) (Benson 1996; Maher 2004).

The results for intra-operative blood loss were inconsistent in two studies, with a mean difference of 298 ml less blood loss in the abdominal group in Lo's study (Lo 1998) and 33 ml more blood loss in Maher's trial (Maher 2004) (Analysis 1.30.1). Benson did not report blood loss but the post-operative change in haemoglobin was not statistically different (Benson 1996).

Women treated abdominally took significantly longer to present with recurrent prolapse (months to recurrence MD -10.90, 95% CI -17.12 to -4.68; Analysis 1.38.1) in one trial (Benson 1996).

On the other hand, abdominal sacral colpopexy was associated with a longer operating time (MD 21 min, 95% CI 12 to 30; Analysis 1.33.1) (Benson 1996; Lo 1998; Maher 2004), a longer time to recover (MD 8.3 days, 95% CI 3.9 to 12.7; Analysis 1.35.1) (Maher 2004) and was more expensive (weighted mean difference (WMD) USD 1334, 95% CI 1027 to 1641; Analysis 1.37.1) (Benson 1996; Maher 2004) than the vaginal approach.

Sacral colpopexy and abdominal hysterectomy versus vaginal Mayo McCall culdoplasty and vaginal hysterectomy

One small trial (Braun 2007 abstract) compared 47 women who underwent total abdominal hysterectomy (TAH) and sacral colpopexy using synthetic combined absorbable and non-absorbable (Vypro) mesh with 47 women who underwent vaginal hysterectomy (VH) plus anterior and posterior colporrhaphy plus the Mayo McCall procedure using delayed absorbable polydioxanone (PDS) sutures. Anatomical failure rates at 33 months mean follow up were none in the sacral colpopexy group and 2/24 in the Mayo-McCall group (one with vault prolapse and one with anterior prolapse which required further intervention), although a quantitative definition for success or failure was not provided (Analysis 1.5.3). The mean operating time, length of hospitalisation and rates of complications were higher in the sacral colpopexy group but, in the absence of statistical analysis to support these results, one cannot comment on their significance.

Abdominal sacral colpopexy versus high vaginal uterosacral colpopexy (HUSLS)

In a single study, Rondini 2011 abstract compared sacral colpopexy (n = 54) and high uterosacral vault suspension (n = 56) in women with point C greater than 1 cm beyond the introitus. At one year the objective success rate at point C less than -1 cm was 100% (54/54) as compared to 46/56 in the uterosacral suspension group. Recurrence in the anterior or posterior compartment (point Ba or point Bp) was significantly less after the sacral colpopexy 5.5% (3/54) as compared to 33.9% (19/56) in the HUSLS. The reoperation rate for prolapse was significantly lower after sacral colpopexy: 5%

(3/54) as compared to 17.8% (10/56) in the HUSLS. Both intra-operative complications (3.7% versus 0%, $P = 0.15$) and post-operative complications (20.4% versus 7.3%, $P = 0.047$) were higher following the sacral colpopexy as compared to HUSLS. The operating time in minutes (102 versus 80) and hospital stay in days (3.7 versus 2.1) were significantly less ($P < 0.01$) after the sacral colpopexy as compared to HUSLS.

Uterine suspension (preservation) versus vaginal hysterectomy

Three trials addressed this comparison (Dietz 2010; Jeng 2005; Roovers 2004). These trials could not be combined as the non-hysterectomy groups were too different (clinical heterogeneity) and Jeng did not supply any anatomical outcomes.

Abdominal uterine preservation versus vaginal hysterectomy and repair

One trial (Roovers 2004) compared abdominal sacral hysteropexy with uterine preservation versus vaginal hysterectomy and repair with vault fixation to the uterosacral-cardinal ligament complex. Although more women had subjective prolapse symptoms at one year after abdominal surgery (RR 3.2, 95% CI 1.29 to 7.92; Analysis 1.1.2), there was no statistically significant difference in the prolapse domain of the urinary distress inventory (UDI) (mean difference 4.1, 95% CI -5.4 to 13.6) nor the score for urinary incontinence (mean difference (MD) 6, 95% CI -2 to 14). However, at one year after surgery the vaginal group reported significantly better (lower) scores on the discomfort/pain domain (7.1, 95% CI 1.1 to 13.2), overactive bladder domain (8.7, 95% CI 0.5 to 16.9) and the obstructive micturition domain (10.3, 95% CI 0.6 to 20.1) as compared to the abdominal group.

More women in the abdominal group required repeat prolapse repair (RR 9.00, 95% CI 1.19 to 67.85; Analysis 1.39.2). In the first year after surgery five women (12%) in the abdominal group had or were due to undergo a reoperation for recurrent cystocele and four women (10%) for recurrent uterine prolapse, whereas in the vaginal group only one patient required surgery for vaginal vault prolapse. The operating time was less for the abdominal group (MD -10 min, 95% CI -12 to -8; Analysis 1.33.2) possibly reflecting the less invasive nature of the abdominal procedure in this trial (the uterus was preserved in the abdominal group as opposed to removed in the vaginal group).

Long-term follow up

At the eight year follow up in one trial (Roovers 2004), the higher number of women reporting prolapse symptoms at one year was not reproduced: 87% in the vaginal group versus 68% in the abdominal group reported that prolapse symptoms had improved

compared to before primary surgery (RR 2.60, 95% CI 1.02 to 6.65; Analysis 1.1.3). There was also no statistically significant difference in the prolapse reoperation rate: 11/42 (26%) patients in the abdominal group and 6/42 (14%) in the vaginal group required further prolapse or incontinence surgery (RR 1.83, 95% CI 0.75 to 4.50; Analysis 1.41.2). IIQ scores and POP-Q scores were similar for both groups. Defecation symptoms had more adverse effects on quality of life in the abdominal group than in the vaginal group. The difference in the constipation obstruction domain of the Defecation Distress Inventory (DDI) was statistically significant. Eight (19%) of the 42 patients in the vaginal group and 18 (43%) of the patients in the abdominal group ($P = 0.03$) visited a physician after primary surgery because of pelvic floor symptoms (Analysis 1.3) (Roovers 2004).

Vaginal sacrospinous uterine suspension versus vaginal hysterectomy

In another trial (Jeng 2005), vaginal sacrospinous uterine hysteropexy (suspension) with uterine preservation was compared with vaginal hysterectomy. There were few reports of dyspareunia in either group (Analysis 1.27.3) but there were more adverse symptoms in the sacrospinous suspension arm, mostly due to buttock pain (RR 4.23, 97% CI 1.25 to 14.25; Analysis 1.32.6) (Jeng 2005).

In a third, small trial, Dietz 2010 reported on vaginal sacrospinous uterine hysteropexy as compared to vaginal hysterectomy. At one year, the higher rate of apical compartment recurrence in the hysteropexy group of 7/34 (21%) was not statistically different from that in the hysterectomy group with 1/33 (3%) (RR 0.16, 95% CI 0.02 to 1.20; Analysis 1.6.4). The rates of cystocele and rectocele recurrence were not significantly different between the groups. Four women (12%) underwent further prolapse surgery in the hysteropexy group as compared to two (6%) in the hysterectomy group (Analysis 1.39). Women undergoing the sacrospinous hysteropexy had a median hospital stay that was one day shorter than in the hysterectomy group (3 versus 4, $P = 0.03$), and the mean number of days to return to work was 23 days earlier (95% CI 9 to 37; Analysis 1.36.1) than in the hysterectomy group. No differences were reported in domain scores for quality of life and urogenital symptoms between the two procedures one year after the surgery.

Hysterectomy with high levator myorrhaphy (HLM) versus hysterectomy with uterosacral vaginal vault suspension (UVVS)

One trial (Natale 2010) compared two vaginal vault procedures, HLM ($n = 116$) and UVVS ($n = 113$), in patients with Stage 2 or more uterine prolapse. All women underwent vaginal hysterectomy and anterior repair with concomitant mono-filament polypropylene mesh in over 90% of women.

There were no data on the subjective reporting of prolapse symptoms by the women.

At follow up, apical (Analysis 1.6.5), anterior (Analysis 1.9) and posterior (Analysis 1.12) compartment recurrence rates were similar in both groups. The mean total vaginal length was significantly shorter (7.9 cm after HLM versus 8.91 cm after UVVS, $P = 0.04$). Urinary symptoms (Analysis 1.15; Analysis 1.17; Analysis 1.18; Analysis 1.20; Analysis 1.16; Analysis 1.21), bowel symptoms (Analysis 1.25), sexual function (Analysis 1.27; Analysis 1.28) and urodynamic parameters did not differ between groups post-operatively. Post-operative unilateral ureteric angulation leading to hydronephrosis was identified in 10/113 patients in the UVVS group; and was identified intra-operatively and corrected with replacement of uterosacral sutures (Analysis 1.32.8). Mesh erosion rates were comparable between the two groups.

Open abdominal sacral colpopexy versus laparoscopic sacral colpopexy (LSC)

A single multi-centre equivalence trial (Pantazis 2011) compared open and LSC in the treatment of POP-Q Stage 2 vault prolapse. The median Patient Global Impression of Improvement (PGI-I) (one to seven score, one being best improvement and seven being worst deterioration) was one in both groups. At one year the elevation of the vaginal vault above the hymen (point C) was similar in the two groups (open 6.6 cm, laparoscopic 6.7 cm, $P = 0.71$; MD 0.00, 95% CI -0.74 to 0.74; Analysis 1.7.4) and there was no difference in the number of patients who were 'very satisfied' using the PGI-I (D 0.88, 95% CI 0.26 to 2.99; Analysis 1.4.1). The mean blood loss was significantly greater in the open arm (MD 184 ml, 95% CI 96 to 272; Analysis 1.30.6) and the number of inpatient days was less in the laparoscopic group (MD 0.9 days, 95% CI 0.1 to 1.7) (Al-Nazer 2007). There was no difference in operating time (Analysis 1.33.6), serious adverse events (Analysis 1.32.9) or in the Prolapse quality of life outcome (Analysis 1.44.1).

Laparoscopic sacral colpopexy (LSC) versus total vaginal polypropylene mesh kit (TVM)

A single centre randomised controlled trial compared LSC ($n = 53$) and a total vaginal polypropylene mesh kit (Prolift) ($n = 55$) in women with grade 2 post-hysterectomy vaginal vault prolapse at mean two year review (Maher 2011). The LSC took significantly longer to perform with a MD of 52 min (95% CI 41.2 to 62.6), had reduced blood loss (MD 32 ml, 95% CI 5 to 59), reduced inpatient days with a MD of 0.5 days (95% CI 0.1 to 0.9), and resulted in quicker return to activities of daily living with a MD of 5.3 days (95% CI 2.3 to 8.4) as compared to TVM.

The objective recurrence rate (Stage 2 POP at any vaginal site) was significantly lower in the laparoscopic group (12/53) compared to the TVM group (32/55) (RR 0.39, (95% CI 0.23 to 0.67; Analysis 1.5.8). Following LSC point C (vaginal vault) was significantly higher with a MD of 1.39 cm (95% CI 0.39 to 2.39; Analysis 1.7.2), point Ba (middle anterior vaginal wall) was sig-

nificantly higher with a MD of 0.7 cm (95% CI 0.36 to 1.04; Analysis 1.11.2), point Bp (mid-point posterior vaginal wall) was significantly higher with a MD of 0.7 cm (95% CI 0.37 to 1.03; Analysis 1.14.2) and total vaginal length was significantly longer with a MD of 1.0 cm (95% CI 0.6 to 1.4; Analysis 1.8.4) as compared to TVM.

Mesh exposure risk was not significantly different after the LSC (1/53) as compared to TVM (7/55) (RR 0.13 95% CI 0.02 to 1.11; Analysis 1.42.1), however the reoperation rate related to primary intervention was significantly less likely after the LSC (3/53) as compared to TVM (12/55) (RR 0.26, 95% CI 0.08 to 0.87; Analysis 1.41.3). Mean patient satisfaction on a visual analogue scale of 0 to 100 (with 100 being the highest) was significantly higher following LSC as compared to TVM, with a MD of 8.1 (95% CI 0.2 to 16.0). Two validated pelvic floor questionnaires were utilised, the Australian Pelvic Floor Questionnaire (APFQ) and the Prolapse Quality of Life Questionnaire (P-QOL), and both demonstrated a significant improvement following the interventions as compared to before surgery. There was not enough evidence to detect a difference in outcomes between the groups after the intervention.

Total vaginal polypropylene mesh (TVM) versus sacrospinous colpopexy

A single multi-centre randomised trial compared sacrospinous colpopexy ($n = 83$) and native tissue repairs with the total vaginal mesh Prolift ($n = 85$) for grade 2 or greater post-hysterectomy prolapse (Halaska 2012). The allocation concealment and blinding status of patients and reviewer were not recorded. No concomitant surgery was performed. All surgeons had completed at least 20 cases of each procedure prior to commencing the study. The primary outcome was any grade 2 or greater prolapse on examination at one year and demonstrated that the sacrospinous colpopexy group had a higher objective recurrence rate: 28/72 (39%) compared to 13/79 (17%) in the TVM group. Mesh exposure was identified in 16 of 79 (20%) with 10 of 79 (13%) undergoing surgical correction. Reoperation for prolapse was performed in 3 of 72 in the sacrospinous colpopexy group and 1 of 79 in the vaginal mesh group. No differences were identified between the groups in terms of de novo SUI, bladder overactivity, dyspareunia, pelvic pain or in functional outcomes measured with the Prolapse Incontinence Sexual Questionnaire - 12 (PISQ-12), the Urinary Impact Questionnaire (UIQ), the Colo-Recto-Anal Impact Questionnaire (CRAIQ) or the Pelvic Organ Prolapse Impact Questionnaire (POPIQ).

Laparoscopic versus robotic sacral colpopexy

Paraiso 2011 demonstrated that LSC ($n = 33$) had a shorter operating time of 199 ± 46 minutes as compared to 265 ± 50 minutes to the robotic group, and less use of NSAIDS (11 days versus 20

days). The laparoscopic approach was significantly cheaper than the robotic approach (MD -\$1936, 95% CI 417 to 3454). At one year both groups reported significant and similar improvements in objective assessment and functional outcomes.

Vaginal sacrospinous colpopexy versus posterior intravaginal slingplasty (PIVS) also termed infracoccygeal sacropexy

Two trials ([de Tayrac 2008](#); [Meschia 2004a](#)) compared vaginal sacrospinous colpopexy with PIVS using multi-filament polypropylene tape in women having uterine or vault suspension. They were considered similar enough to combine in a meta-analysis. The combined trials had too few data to identify differences in most of the outcomes reported, including:

- satisfaction ([Analysis 1.2.2](#));
- objective recurrences at the upper vagina following PIVS and sacrospinous colpopexy ([Analysis 1.6.2](#));
- anterior compartment prolapse ([Analysis 1.10.1](#));
- posterior compartment prolapse ([Analysis 1.13.1](#));
- the rate of post-operative SUI ([Analysis 1.15.2](#));
- urge incontinence ([Analysis 1.17.2](#));
- constipation ([Analysis 1.24.2](#));
- adverse events ([Analysis 1.32.3](#));
- hospital stay ([Analysis 1.34.3](#)).

On the other hand, with the PIVS operation the mean operating time was shorter (MD 8 min, 95% CI 4 to 11; [Analysis 1.33.3](#)) and blood loss less (MD 70 ml, 95% CI 56 to 84; [Analysis 1.30.3](#)) ([Meschia 2004a](#)).

Apical prolapse repair without continence surgery versus prolapse repair with any continence surgery (also Comparison 9)

Two trials ([Brubaker 2008](#); [Costantini 2008](#)) evaluated the efficacy of adding continence surgery to sacral colpopexy. As the primary focus of these papers was continence outcomes they were also evaluated in prolapse surgery and bladder function (Comparison 9). However, regarding their prolapse and other outcomes:

- women were more satisfied after surgery with additional colposuspension, in one trial ([Analysis 1.4](#)) ([Costantini 2008](#));
- the vault was higher (better) and the vaginal length longer after additional colposuspension ([Analysis 1.7](#); [Analysis 1.8](#));
- the anterior wall of the vagina was higher (better) in women who had the additional colposuspension ([Analysis 1.11](#)) but the results were conflicting with regard to the position of the posterior wall ([Analysis 1.14](#)): in one trial ([Brubaker 2008](#)) the posterior wall was higher (better) in the sacral colpopexy alone arm while in the other ([Costantini 2008](#)) the posterior wall was higher in the group who had the additional colposuspension;
- there were too few women having repeat prolapse surgery to draw conclusions ([Analysis 1.39.6](#)).

One type of graft versus another type of graft in sacral colpopexy (also Comparison 7)

One trial ([Culligan 2005](#)) compared abdominal sacral colpopexy using either absorbable cadaveric fascia lata graft (Tutoplast) or non-absorbable (permanent) mono-filament polypropylene mesh (Trex). There were no recurrences of vaginal vault prolapse in either group, but the objective failure rate for recurrence at any other vaginal site was significantly worse (14/44 (32%) in the fascial graft group versus 4/45 (9%) in the mesh group (RR 3.58, 95% CI 1.28 to 10.03; [Analysis 1.5.4](#)). There were no vaginal erosions in the 46 women in the fascial graft group but two out of 54 women had mesh erosion in the non-absorbable mesh group. No data on bladder, bowel or sexual function were provided. Additional five year data have been published and on examination recurrence (any POP-Q point ≥ -1) was higher if cadaveric fascia was utilised (9/29) as compared to mono-filament polypropylene mesh (2/29; P = 0.02) (TATE 2011). No difference was detected between the groups at five years for the individual points Ba ([Analysis 1.11.3](#)), Bp ([Analysis 1.14.3](#)), C ([Analysis 1.7.3](#)) and TVL ([Analysis 1.8.3](#)).

2. One type of anterior vaginal wall prolapse repair versus another (Comparison 2)

Twenty-one trials included various surgical procedures for treating anterior vaginal wall prolapse with or without SUI ([Allahdin 2008](#); [Ali 2006 abstract](#); [Al-Nazer 2007](#); [Altman 2011](#); [Carey 2009](#); [Colombo 2000](#); [De Ridder 2004 abstract](#); [Feldner 2010](#); [Gandhi 2005](#); [Guerette 2009](#); [Hviid 2010](#); [Menefee 2011](#); [Meschia 2007](#); [Natale 2009](#); [Nguyen 2008](#); [Nieminen 2008](#); [Sand 2001](#); [Sivaslioglu 2008](#); [Thijs 2010 abstract](#); [Vollebregt 2011](#); [Weber 2001](#)).

Combination of data was possible for the following sets of trials:

- two were comparable in terms of type of population (women with prolapse only) and types of operation (anterior repair with and without absorbable mesh) ([Sand 2001](#); [Weber 2001](#));
- three were comparable in terms of types of interventions (anterior colporrhaphy versus porcine dermis graft (Pelvicoll)) ([Hviid 2010](#); [Meschia 2007](#); [Menefee 2011](#));
- one trial compared anterior colporrhaphy with small intestine submucosa graft ([Feldner 2010](#));
- 10 trials assessed anterior colporrhaphy versus polypropylene mesh ([Ali 2006 abstract](#); [Al-Nazer 2007](#); [Altman 2011](#); [Carey 2009](#); [Nguyen 2008](#); [Nieminen 2008](#); [Menefee 2011](#); [Sivaslioglu 2008](#); [Thijs 2010 abstract](#); [Vollebregt 2011](#)).

The last 10 trials were further divided in order to assess (a) anterior colporrhaphy alone versus inlay or armed mesh, and (b) anterior colporrhaphy alone versus mesh with anterior colporrhaphy.

- Three trials assessed anterior colporrhaphy alone versus polypropylene Gynemesh inlays (Ali 2006 abstract; Al-Nazer 2007; Carey 2009).
- Six assessed anterior colporrhaphy alone versus armed transobturator polypropylene meshes (Altman 2011; Nguyen 2008; Nieminen 2008); Sivaslioglu 2008; Thijs 2010 abstract; Vollebregt 2011).
- Two assessed anterior colporrhaphy alone versus polypropylene mesh alone (Menefee 2011; Sivaslioglu 2008).
- Four trials assessed anterior colporrhaphy plus polypropylene mesh (Ali 2006 abstract; Nguyen 2008; Nieminen 2008; Carey 2009).
- Two trials compared anterior colporrhaphy and self-styled armed transobturator polypropylene mesh (Nieminen 2008; Sivaslioglu 2008).
- Four trials compared anterior colporrhaphy and commercial transobturator polypropylene mesh kits (Altman 2011; Nguyen 2008; Thijs 2010 abstract; Vollebregt 2011).

Anterior vaginal wall repair versus abdominal paravaginal repair

No trials were identified.

Anterior vaginal wall repair alone versus anterior vaginal wall repair with graft or mesh reinforcement (see also Comparison 7 below)

These results have been divided into two to reflect the different qualities of types of biological grafts and synthetic meshes.

Anterior vaginal wall repair versus anterior vaginal wall repair with biological graft reinforcement (for midline cystocele defects)

One trial (Meschia 2007) compared anterior colporrhaphy (vicryl plication) without and with porcine dermis overlay (Pelvicol). The trial demonstrated that at one year follow up the objective failure rate of the anterior compartment was higher (20/103, 19%) in the anterior colporrhaphy alone group as compared to the porcine dermis group (7/98, 7%) (Meschia 2007). There were no differences between groups in blood loss, inpatient days, changes in haemoglobin, post-operative voiding dysfunction and dyspareunia; but all had wide CIs. There was one porcine dermis graft rejection requiring surgical removal (Table 1). The two year update of this trial (from an abstract) confirmed that women had a better anatomical outcome at point Ba (failure rate 11/98, 11%) with Pelvicol augmentation versus without (24/103, 23%) (RR 2.08, 95% CI 1.08 to 4.01; Analysis 2.6.9) (Meschia 2007).

Hviid 2010 also compared Vicryl plication anterior colporrhaphy and a Pelvicol porcine dermis (4 x 7 cm) graft at one year and the objective failure rate (defined as point Ba \geq -1) was 2/28 in the Pelvicol group as compared to 4/26 in the anterior colporrhaphy,

which was not significant. When evaluated in a meta-analysis with Meschia 2007, the failure rate on examination with anterior repair was significantly greater as compared to a Pelvicol repair (RR 2.09, 95% CI 1.14 to 3.84; Analysis 2.6.9). The difference in operating time was significantly less in the no graft repair group (MD 9 min, 95% CI 4.4 to 13.6; Analysis 2.24.3) with no difference in blood loss between the groups (Analysis 2.19.1) (Hviid 2010). No significant difference was seen in the P-QOL questionnaire scores between the groups at one year although full data were not available. Due to variations in the methodology, including Meschia 2007 allowing concomitant continence and prolapse surgery and Hviid 2010 not, no other meta-analysis was performed. Another trial (Gandhi 2005) compared anterior colporrhaphy without or with Tutoplast (solvent dehydrated cadaveric fascia lata). At 13 months the objective and subjective failure rates of the anterior compartment were not statistically significantly different: 23/78 and 16/76 (RR 1.4, 95% CI 0.8 to 2.44; Analysis 2.6.10) and 6/57 and 6/55 (RR 0.96, 95% CI 0.33 to 2.81; Analysis 2.1.1), respectively (Gandhi 2005). Apart from urinary voiding function there were no other bladder, bowel or sexual function outcomes reported.

Guerette 2009 compared the anterior colporrhaphy group (n = 47) and anterior colporrhaphy with bovine pericardium collagen matrix graft reinforcement (n = 46). This trial reported no difference in recurrence rate on examination (Ba failure Ba \geq -1) with anterior colporrhaphy 10/27 (37%) versus 4/17 for bovine pericardium (24%) (RR 1.6, 95% CI 0.6 to 4.2; Analysis 2.6.19) or reoperation rate for prolapse (37% versus 24%, RR 1.6, 95% CI 0.6 to 4.2; Analysis 2.26.8), similar in both groups at two year review. Quality of life data from the Urogenital Distress inventory-6 (UDI-6) and PISQ-12 reported no difference in outcomes between groups, however only median results without measures of variation were reported so the data was not able to be included for meta-analysis. Unfortunately less than 50% of patients completed examination at the two year review with no measures in the methodology to account for this loss.

Feldner 2010 compared anterior colporrhaphy (AC) with a 7 x 10 cm small intestine submucosa (SIS) graft and demonstrated reduced operating time in the AC group (30 min versus 46 in the SIS group, P = 0.02). The objective failure rate was 9/27 (33%) versus 4/29 (13.8%) in the SIS group (RR 2.42, 96% CI 0.84 to 6.94; Analysis 2.6.20). The dyspareunia rate was similar in both groups (AC 4/27 versus 5/20 SIS) and no reoperations were reported. The P-QOL improved post-operatively in both groups with no significant difference between the groups (WMD -0.10, 95% CI -0.63 to 0.42; Analysis 2.4.3).

Finally, Menefee 2011 compared three operations, AC (midline plication delayed absorbable suture), vaginal paravaginal repair using porcine dermis graft (Pelvicol) and vaginal paravaginal with self-styled polypropylene mesh. They reported a 10/19 (53%), 12/23 (52%), and 25/29 (86%) objective success rate, respectively. The subjective failure rate was similar in all three groups (3/19,

16%; 3/23, 13%; and 1/29, 3.4%, respectively). The graft erosion rate was 1/23 (4.3%) in the Pelvicol group and 4/29 (13.8%) in the mesh group. There were significant differences in the methodology of this study in comparison to the other graft studies and [Menefee 2011](#) could not be included in any meta-analysis due to significant differences in surgical techniques.

When AC was compared to any biological graft the objective failure rate in the anterior compartment was significantly higher in the AC group: 70/246 (28%) as compared to biological graft group 43/244 (18%) (RR 1.64, 95% CI 1.18 to 2.27; [Analysis 2.6.23](#)). Results from two trials ([Gandhi 2005](#); [Meschia 2007](#)) demonstrated no difference in awareness of prolapse when native tissue repair was compared to biological graft repair (RR 1.2, 95% CI 0.6 to 2.3; [Analysis 2.1.14](#)). When AC was compared to a porcine dermis graft ([Hviid 2010](#); [Menefee 2011](#); [Meschia 2007](#)) the objective failure rate in the anterior compartment was significantly higher in the AC group 42/153 (27%) as compared to the porcine dermis group (25/152, 16%) (RR 1.7, 95% CI 1.1 to 2.6; [Analysis 2.6.9](#)). Differences in the methodology and the nature of the different biological grafts utilised in the remaining trials ([Feldner 2010](#); [Guerette 2009](#)) were considered to be too dissimilar to combine with any other results in a meta-analysis.

Anterior vaginal wall repair alone versus anterior vaginal wall repair with synthetic mesh reinforcement (for cystocele or anterior compartment prolapse)

Absorbable synthetic mesh

Three trials evaluated the effects of using absorbable polyglactin (Vicryl) mesh inlay to augment prolapse repairs ([Allahdin 2008](#); [Sand 2001](#); [Weber 2001](#)). The data from two trials were aggregated in a meta-analysis as they included follow up of at least 12 months ([Sand 2001](#); [Weber 2001](#)) and the non-mesh arms from one trial (traditional anterior vaginal wall repair and ultra-lateral anterior vaginal wall repair) were also aggregated for comparison with the mesh arm in one of the trials ([Weber 2001](#)). Standard colporrhaphy was associated with a significantly higher recurrence rate of cystocele compared with augmentation with polyglactin mesh inlay (RR 1.39, 95% CI 1.02 to 1.90; [Analysis 6.4.1](#)) ([Sand 2001](#); [Weber 2001](#)). One vaginal polyglactin mesh erosion was reported from two trials ([Sand 2001](#); [Weber 2001](#)) and two women needed removal of some mesh in the other ([Allahdin 2008](#)). Rectocele recurrence appeared to be equally common with and without polyglactin mesh augmentation in another trial but the CIs were wide (RR 1.13, 95% CI 0.40 to 3.19; [Analysis 6.6.1](#)) ([Sand 2001](#)). Other outcomes were inconclusive due to small numbers.

Non-absorbable synthetic mesh

Objective and subjective prolapse outcomes

Data from eight of 10 trials on transvaginal polypropylene mesh ([Ali 2006 abstract](#); [Al-Nazer 2007](#); [Altman 2011](#); [Menefee 2011](#); [Nguyen 2008](#); [Nieminen 2008](#); [Sivaslioglu 2008](#); [Vollebregt 2011](#)) demonstrated a higher recurrence rate on examination following anterior colporrhaphy (220/478, 46%) as compared to any transvaginal polypropylene mesh (69/498, 14%) (RR 3.3, 95% CI 2.6 to 4.2; [Analysis 2.6.14](#)) in the management of anterior compartment prolapse.

Data from three trials ([Ali 2006 abstract](#); [Al-Nazer 2007](#); [Menefee 2011](#)) demonstrated a higher recurrence rate on examination after the native tissue anterior colporrhaphy (25/87, 29%) as compared to the polypropylene mesh inlay (9/94, 10%) (RR 3.08, 95% CI 1.56 to 6.11; [Analysis 2.6.1](#)).

Transobturator armed polypropylene meshes ([Altman 2011](#); [Nguyen 2008](#); [Nieminen 2008](#); [Sivaslioglu 2008](#); [Vollebregt 2011](#)) had a lower rate of anterior compartment prolapse on examination (59/424, 14%) as compared to anterior colporrhaphy alone (200/410, 49%) (RR 3.50, 95% CI 2.71 to 4.52; [Analysis 2.6.17](#)). Both self-styled ([Nieminen 2008](#); [Sivaslioglu 2008](#)) (RR 3.41, 95% CI 2.04 to 5.67; [Analysis 2.6.16](#)) and commercial transobturator polypropylene mesh kits ([Altman 2011](#); [Nguyen 2008](#); [Vollebregt 2011](#)) (RR 3.53, 95% CI 2.62 to 4.74; [Analysis 2.6.15](#)) had a lower rate of anterior compartment prolapse as compared to anterior colporrhaphy alone.

Data from four trials ([Altman 2011](#); [Al-Nazer 2007](#); [Sivaslioglu 2008](#); [Vollebregt 2011](#)) demonstrated that polypropylene mesh repair without a concomitant anterior colporrhaphy was superior to anterior colporrhaphy alone in reducing anterior compartment prolapse (RR 3.49, 95% CI 2.59 to 4.7; [Analysis 2.6.22](#)).

Polypropylene mesh repair with a concomitant anterior colporrhaphy was also better than anterior colporrhaphy alone (RR 3.38, 95% CI 2.15 to 5.33; [Analysis 2.6.18](#)) ([Ali 2006 abstract](#); [Nguyen 2008](#); [Nieminen 2008](#)).

Four trials demonstrated that women receiving anterior colporrhaphy (98/349, 28%) had a higher awareness of prolapse (subjective failure) than with the anterior transvaginal mesh repair (62/363, 17%) (RR 1.6, 95% CI 1.2 to 2.2; [Analysis 2.1.9](#)) ([Al-Nazer 2007](#); [Altman 2011](#); [Carey 2009](#); [Nieminen 2008](#)). Further prolapse surgery was not significantly more common after anterior colporrhaphy (14/459, 3%) as compared to after transobturator polypropylene mesh (6/470, 1.3%) (RR 2.18, 95% CI 0.93 to 5.10; [Analysis 2.26.2](#)) ([Altman 2011](#); [Menefee 2011](#); [Nguyen 2008](#); [Nieminen 2008](#); [Thijs 2010 abstract](#); [Vollebregt 2011](#)).

Two trials reported on the impact of anterior compartment surgery on other vaginal compartments ([Nieminen 2008](#); [Vollebregt 2011](#)). They demonstrated that those women undergoing polypropylene mesh kits repair were more likely to develop apical or posterior compartment prolapse than those undergoing anterior colporrhaphy (27/153, 18% versus 14/147, 10%) (RR 1.8, 95% CI 1.0 to 3.4; [Analysis 2.2](#)).

Quality of life outcomes

Three of the available 10 studies reported no validated pelvic floor questionnaires (Ali 2006 abstract; Al-Nazer 2007; Vollebregt 2011). Altman 2011 reported the Urinary Distress Inventory (UDI) and Pelvic Organ Prolapse Urinary Incontinence Sexual Questionnaire (PISQ-12), Menefee 2011 reported changes in the short form of Pelvic Floor Distress Inventory (PFDI) and Pelvic Organ Prolapse/Urinary Incontinence Sexual Questionnaire (PISQ-12), and Nyugen 2008 reported P-QOL, PFIQ, Pelvic Floor Distress Inventory (PFDI-20) and PISQ. Nieminen 2008 reported unvalidated questions, and Thijs 2010 abstract reported the UDI.

Nguyen 2008 did not demonstrate a difference in quality of life between the two groups (PFIQ-7 MD 9, 95% CI -4 to 22; Analysis 2.16 and PFDI-20 MD 11, 95% CI -3 to 25; Analysis 2.8). Altman 2011 detected no difference between the groups utilising the UDI (MD 0.00, 95%CI -1.57 to 1.57; Analysis 2.31.1), and Thijs 2010 abstract was unable to demonstrate a significant difference in outcomes between the two groups utilising an alternative UDI. Sivaslioglu 2008 was also unable to demonstrate a difference in quality of life outcomes using the P-QOL (MD 0.22, 95% CI -0.21 to 0.65; Analysis 2.4.1). Menefee 2011 reported no significant change between the groups pre and post-intervention in the short form of the PFDI and PISQ-12

There was no difference in sexual function in trials evaluating anterior colporrhaphy and polypropylene mesh as measured by the PISQ-12 (MD 0.08, 95% CI -0.18 to 0.35; Analysis 2.35) (Altman 2011; Nguyen 2008).

Perioperative outcomes

In four trials which compared transobturator meshes with anterior colporrhaphy blood loss was significantly less in the anterior colporrhaphy group as compared to the transobturator mesh group, measured as blood loss (MD -56 ml, 95% CI -72 to -42; Analysis 2.19) (Al-Nazer 2007; Altman 2011; Nieminen 2008) or change in haemoglobin (Analysis 2.20.2) (Nguyen 2008).

The operating time was significantly reduced in the anterior colporrhaphy group as compared to polypropylene mesh repair (WMD -16 min, 95% CI -18 to -13; Analysis 2.24.6) (Al-Nazer 2007; Altman 2011; Nguyen 2008).

Complications

The intra-operative cystotomy rate was 1/307 (0.3%) after anterior colporrhaphy as compared to 8/340 (2.4%) after a transobturator mesh (RR 0.19, 95% CI 0.0 to 1.1; Analysis 2.34) (Al-Nazer 2007; Altman 2011; Menefee 2011; Nieminen 2008).

There were no significant differences in the rates of de novo dyspareunia after anterior colporrhaphy or anterior transvaginal mesh (4% versus 7%, RR 0.6, 95% CI 0.3 to 1.3; Analysis 2.28) (Al-Nazer 2007; Altman 2011; Nguyen 2008; Sivaslioglu 2008;

Vollebregt 2011) and sexual function was described in two trials using the PISQ and again no difference was identified between the groups (RR 0.08, 95% CI -0.18 to 0.35; Analysis 2.35) (Altman 2011; Nguyen 2008).

Mesh erosions were reported in 11.4% (64/563) of women who had an anterior compartment polypropylene mesh (Analysis 2.22.1), and surgical intervention to correct mesh erosion occurred in 6.8% (32/470) (Analysis 2.32.1). The risk of subsequent surgery (prolapse, stress incontinence, mesh exposure or pain) was significantly reduced after native tissue anterior repair (31/626, 5.0%) compared to anterior transvaginal permanent polypropylene mesh (65/647, 10%) (RR 0.5, 95% CI 0.4 to 0.8; Analysis 2.41) (Al-Nazer 2007; Altman 2011; Carey 2009; Menefee 2011; Nieminen 2008; Sivaslioglu 2008; Thijs 2010 abstract; Vollebregt 2011). See Table 2.

Continence issues (also Comparison 9)

Four trials evaluated de novo SUI in women undergoing anterior colporrhaphy as compared to transvaginal mesh for anterior compartment prolapse (Al-Nazer 2007; Altman 2011; Nieminen 2008; Sivaslioglu 2008). There was a lower rate of de novo SUI after anterior repair as compared to transvaginal polypropylene mesh (26/324, 8% versus 41/320, 13%) (RR 0.6, 95% CI 0.4 to 0.9; Analysis 2.9.1).

Further continence surgery was performed in 15/368 women following anterior colporrhaphy and 12/380 after the polypropylene mesh procedure (RR 1.29, 95% CI 0.63 to 2.63; Analysis 2.27.1). These data need to be interpreted with caution as variations in concomitant surgeries existed.

Anterior colporrhaphy versus any permanent mesh or biological graft

Meta-analysis of no mesh versus all types of grafts showed the following.

- Results from five trials (Allahdin 2008; Altman 2011; Gandhi 2005; Meschia 2007; Nieminen 2008) demonstrated that significantly more women had an awareness of prolapse (subjective failure) after the anterior colporrhaphy (118/430, 27.4% as compared to 86/436, 18.3%) after anterior compartment graft repair (RR 1.5, 95% CI 1.2 to 1.9; Analysis 2.1.13).
- Results from three trials (Gandhi 2005; Guerette 2009; Meschia 2007) demonstrated no difference in prolapse symptoms when native tissue repair was compared to biological graft repair (RR 1.03, 95% CI 0.61 to 1.75; Analysis 6.1.8).
- The results from 12 trials (Ali 2006 abstract; Al-Nazer 2007; Altman 2011; Feldner 2010; Gandhi 2005; Hviid 2010; Menefee 2011; Meschia 2007; Nguyen 2008; Nieminen 2008; Sivaslioglu 2008; Vollebregt 2011) combined found more women had recurrence on examination (objective failure) with

anterior colporrhaphy (281/719, 39.0%) compared to graft repair (99/736, 13.4%) (RR 2.91, 95% CI 2.38 to 3.56; [Analysis 2.6.24](#)).

Anterior colporrhaphy had a significantly reduced operating time (MD -16.36 min, 95% CI -18.50 to -14.22; [Analysis 2.24.5](#)) ([Altman 2011](#); [Feldner 2010](#); [Hviid 2010](#); [Meschia 2007](#); [Nguyen 2008](#)) and blood loss (MD -35 ml, 95% CI -47 to -23; [Analysis 2.19.4](#)) ([Al-Nazer 2007](#); [Altman 2011](#); [Hviid 2010](#); [Meschia 2007](#); [Nieminen 2008](#)).

One type of graft (synthetic mesh or biological graft inlays) versus another type of graft (for midline cystocele defects) (see also [Comparison 7](#) below)

Two trials evaluated different mesh inlays:

- polyglactin versus Pelvicol ([De Ridder 2004 abstract](#)); and
- armed polypropylene mesh versus Pelvicol ([Natale 2009](#)).

Due to the nature of the different types of mesh used in the trials and the different inclusion criteria in [De Ridder 2004 abstract](#) and [Natale 2009](#), we considered the trials too dissimilar to combine them in a meta-analysis.

[De Ridder 2004 abstract](#) compared two types of absorbable mesh, polyglactin (Vicryl) inlay versus porcine dermis (Pelvicol). The objective failure rate at 25 months follow up was significantly worse in the Vicryl group: 19/62 (31%) compared with 6/63 (9.5%) for Pelvicol (RR 3.22, 95% CI 1.38 to 7.52; [Analysis 2.6.11](#)) ([De Ridder 2004 abstract](#)). Further prolapse surgery had to be performed in 3/63 versus 9/62 women respectively (RR 3.05, 95% CI 0.87 to 10.73; [Analysis 2.26.1](#)) ([De Ridder 2004 abstract](#)).

In another trial, [Natale 2009](#) compared polypropylene mesh (Gynemesh) with porcine dermis (Pelvicol). At two years, significantly fewer women had anterior vaginal wall recurrence: 28% (27/96) of the mesh group compared to 44% (41/94) of the porcine graft group (RR 0.64, 95% CI 0.43 to 0.96; [Analysis 2.6.13](#)). De novo SUI was seen in two women following the polypropylene mesh and in one after the porcine dermis graft ([Analysis 2.9:2](#)), and similar numbers of women reported dyspareunia (10 versus 12; [Analysis 2.18.3](#)). The difference in post-operative urgency urinary incontinence (more in the Pelvicol group despite less urinary frequency) did not reach statistical significance ([Analysis 2.10.7](#)). Comparing post-operative data in the two groups, the authors reported a better impact of surgery on sexuality with porcine dermis than with polypropylene mesh ($P = 0.03$) but data were not provided ([Natale 2009](#)).

Other comparisons for anterior vaginal wall prolapse

Five other trials were identified which compared different operations for anterior vaginal wall prolapse or different continence procedures for women with urinary incontinence or occult urinary incontinence as well as anterior vaginal wall prolapse ([Bump](#)

[1996](#); [Colombo 1996](#); [Colombo 1997](#); [Colombo 2000](#); [Meschia 2004](#)).

One small trial ([Colombo 2000](#)) comparing anterior repair with Burch colposuspension showed statistically significant lower rates of cystocele recurrence (RR 0.09, 95% CI 0.01 to 0.64; [Analysis 2.6.5](#)) but higher rates of persisting urinary incontinence (RR 3.39, 95% CI 1.40 to 8.22; [Analysis 2.8.3](#)). However, this was not reflected in differences in reoperation rates for either prolapse or incontinence ([Analysis 2.26.3](#); [Analysis 2.27.2](#)) ([Colombo 2000](#)). Another small trial ([Meschia 2004](#)) reported that more women were incontinent after endopelvic fascia plication than after tension free vaginal tape (TVT) supplementing prolapse surgery (RR 9, 95% CI 1.23 to 65.85; [Analysis 2.9.6](#)) but the data were too few to comment on the effect on prolapse or other clinical outcomes. However, operating time was 19 minutes shorter for the operation without the TVT (MD -19 min, 95% CI -29 to -9; [Analysis 2.24.2](#)) ([Meschia 2004](#)).

3. One type of posterior vaginal wall prolapse repair versus another (Comparison 3)

Three small trials compared vaginal and transanal approaches to the management of rectocele ([Farid 2010](#); [Kahn 1999](#); [Nieminen 2004](#)) and two others examined posterior repair with and without mesh reinforcement ([Paraiso 2006](#); [Sand 2001](#)). One of these trials compared three techniques to correct posterior vaginal compartment prolapse ([Paraiso 2006](#)). Two trials compared native tissue repair with tissue repair with a porcine small intestine submucosa graft ([Paraiso 2006](#); [Sung 2012](#)).

Posterior vaginal wall repair versus a transanal repair

Seven trials included women with posterior vaginal wall prolapse ([Farid 2010](#); [Kahn 1999](#); [Nieminen 2004](#); [Paraiso 2006](#); [Sand 2001](#); [Sung 2012](#); [Vijaya 2011 abstract](#)).

Three trials ([Farid 2010](#); [Kahn 1999](#); [Nieminen 2004](#)) compared vaginal and transanal approaches for the management of rectocele. In addition, another trial provided data for women with rectocele undergoing posterior repair with and without absorbable mesh ([Sand 2001](#)). A fourth trial compared rectocele repair using traditional posterior colporrhaphy ($n = 28$), site-specific repair ($n = 27$) and site-specific repair augmented with a porcine small intestine submucosa graft inlay (Fortagen, Organogenesis) ($n = 26$) ([Paraiso 2006](#)). The [Vijaya 2011 abstract](#) compared fascial and levator ani muscle plication. Finally [Sung 2012](#) evaluated native tissue posterior colporrhaphy with native tissue repair with porcine small intestine submucosa graft.

Several authors evaluated posterior wall native tissue repairs and polypropylene mesh repairs ([Carey 2009](#); [Iglesia 2010](#); [Withagen 2011](#)); however these trials included a wider range of operations. The inclusion criteria and outcome data were not specifically limited to the posterior compartment and will be fully evaluated in

Comparison 6 (no graft versus use of graft (synthetic mesh or biological graft)).

Many of the important outcome parameters were not reported thus limiting the data available and the ability to perform meta-analyses. The results for posterior vaginal wall repair were better than for transanal repair in terms of awareness of prolapse (subjective failure) (RR 0.36, 95% CI 0.13 to 1; Comparison 03.01.01) (Kahn 1999; Nieminen 2004) and recurrence on examination (objective failure) (RR 0.24, 95% CI 0.09 to 0.64; Analysis 3.2.3) (Kahn 1999; Nieminen 2004) failure rates (persistence of rectocele or enterocele, or both). Analysing women with rectocele alone showed that recurrent rectocele occurred in 2 out of 39 in the vaginal group and 7 out of 48 following the transanal repair, a difference that did not reach statistical significance (RR 0.32, 95% CI 0.07 to 1.34; Analysis 3.2.1) (Nieminen 2004). Post-operative enterocele was, however, significantly less common following the vaginal surgery as compared to the transanal group (RR 0.23, 95% CI 0.07 to 0.83; Analysis 3.2.2) (Kahn 1999; Nieminen 2004). Post-operative hospital stay was longer after vaginal surgery than after transanal surgery in one trial (MD 1 day, 95% CI 0.47 to 1.53; Analysis 3.15.1) (Kahn 1999) despite a shorter operating time (MD -7 min, 95% CI -12 to -2) (Kahn 1999). The operating times in the other trial (Nieminen 2004) were the same for both groups (35 minutes). When data for operating times were combined (MD -3.6 min; Analysis 3.14.1), there was significant heterogeneity ($P = 0.07$, $I^2 = 69\%$) and the difference was not significant if a random-effects model was used (95% CI -10.4 to 3.3 min). The vaginal approach was associated with a significantly higher blood loss (79 ml, 95% CI 40 to 119; Analysis 3.8.1) (Kahn 1999; Nieminen 2004) and post-operative narcotic use (Analysis 3.11.1) (Kahn 1999) compared to the transanal approach.

Nieminen reported that the mean depth of rectocele on post-operative defecography was 4.13 cm in the transanal group and this was significantly larger than the 2.73 cm in the vaginal group (MD -1.43, 95% CI -2.86 to 0, $P = 0.05$; data not shown). Post-operative difficulties in bowel evacuation were seen in 9 out of 31 in the vaginal group as compared to 14 out of 34 in the transanal group, a difference that was not significantly different (RR 0.73, 95% CI 0.37 to 1.42; Analysis 3.5.1) (Kahn 1999; Nieminen 2004). No significant differences were seen in the rate of incontinence to flatus or faeces post-operatively between the groups, nor in rates of post-operative dyspareunia, but the trials were too small for these data to be reliable. There were differences between the trials for the outcome post-operative complications: in one trial four women had a haematoma and one needed a blood transfusion in the vaginal arm (Kahn 1999); whereas in the other arm one woman had a wound infection after transanal operation (Nieminen 2004) (Analysis 3.12.1).

Farid 2010 also reported on outcomes on three types of rectocele repairs comparing transperineal repair (3.0 Vicryl, $n = 16$), levatorpasty (0.0 Vicryl, $n = 16$), and transanal repairs (2.0 Vicryl, Delorme, $n = 16$) at six months. This trial was not able to be

included in meta-analysis due to widely different methodology and outcome assessment although the conclusions were similar to the above meta-analysis. The size of rectocele of defecography was significantly lower after the transperineal repair (with or without levatorplasty) as compared to the transanal repair (MD -1.14 cm, 95% CI -1.96 to -0.32; Analysis 3.17). The functional outcome on a modified obstructed defecation syndrome patient questionnaire were also significantly lower (better outcome) after the transperineal repair as compared to transanal (MD -5.1, 96% CI -9.6 to -0.057; Analysis 3.18). There were no patients with de novo dyspareunia in either group and 3/32 (9%) reported wound infection in the transperineal group and all settled with conservative treatment.

Fascial plication posterior repair versus levator ani plication repair

In a single small trial Vijaya 2011 abstract reported at six months that superior support of the posterior vaginal wall was attained after the fascial plication as compared to levator ani repair (MD -0.68 cm, 95% CI -1.08 to -0.28; Analysis 3.19). The abstract states that quality of life assessment using a P-QOL questionnaire was significantly improved in both groups without any difference between the groups. No data were available. There was also no difference in sexual function pre and post-intervention between the groups.

Posterior vaginal wall repair versus an abdominal posterior repair

No trials were identified.

Posterior vaginal wall prolapse: a traditional posterior repair versus posterior repair with graft reinforcement

One trial compared posterior repair with and without mesh reinforcement (Sand 2001). Rectocele recurrence appeared equally with and without polyglactin (Vicryl) mesh augmentation (7 out of 67 versus 6 out of 65) but the CIs were wide (RR 1.13, 95% CI 0.40 to 3.19; Analysis 3.2.4) (Sand 2001). No trial reported mesh erosion.

Another trial compared posterior colporrhaphy, site-specific repair and site-specific repair augmented with porcine small intestine submucosa graft inlay for repairing rectocele (Paraiso 2006). There was no statistical difference in recurrence rate on examination (objective failure) between posterior colporrhaphy and site-specific repair (RR 0.64, 95% CI 0.20 to 2.03; Analysis 3.2.5) (Paraiso 2006). There was a lower objective failure rate at one year following the posterior colporrhaphy as compared to porcine graft inlay (RR 0.31, 95% CI 0.11 to 0.84; Analysis 3.2.6) (Paraiso 2006). However, there were no differences in subjective report of prolapse symptoms (Analysis 3.1.2; Analysis 3.1.3). Rates of post-operative dyspareunia were similar between posterior colporrhaphy and site-

specific repair (RR 1.65, 95% CI 0.71 to 3.81; [Analysis 3.7.2](#)) ([Paraiso 2006](#)) and between posterior colporrhaphy and porcine graft groups (RR 2.85, 95% CI 0.91 to 8.96; [Analysis 3.7.3](#)) ([Paraiso 2006](#)). There were no significant differences between the groups in operating time ([Analysis 3.14](#)), change in haematocrit, post-operative complications ([Analysis 3.12](#)), duration of hospital stay, post-operative bowel and sexual function or reoperation rate for prolapse recurrence ([Analysis 3.16](#)). The nature of the different grafts utilised in the Sand and Paraiso studies did not allow for meta-analysis.

[Sung 2012](#) compared native tissue repair (n = 70) (site-specific or fascial repair) as compared to native tissue repair with porcine small intestine submucosa (SIS) overlay (n = 67). At one year there was no difference in objective and subjective failure rate between the groups. The graft group had a slightly longer operating time and greater blood loss than the native tissue repair group. The rate of intra-operative complications reoperation and dyspareunia were low and similar between the groups. Meta-analysis was able to be performed for two trials ([Paraiso 2006](#); [Sung 2012](#)). Whilst the objective failure rate was significantly lower in the native tissue group (10% (10/98) as compared to 21% (20/93) in the SIS group) (RR 0.47, 95% CI 0.24 to 0.94; [Analysis 3.2.6](#)) the subjective failure rate was similar between the groups (RR 1.09, 95% CI 0.45 to 2.62; [Analysis 3.1.3](#)). There was no difference in the rate of post-operative dyspareunia between the groups (RR 1.26, 95% CI 0.59 to 2.68; [Analysis 3.7.3](#)).

For posterior vaginal wall prolapse: one type of graft (synthetic mesh or biological graft inlays) versus another type of graft

No trials were identified.

4. Any type of surgical prolapse repair versus conservative treatment (Comparison 4)

No trials addressed this comparison.

5. Any type of surgical prolapse repair versus mechanical devices (Comparison 5)

No trials addressed this comparison.

6. No graft versus use of graft (synthetic mesh or biological graft) in any prolapse surgery (Comparison 6)

Twenty-one trials compared standard (no graft or mesh) vaginal prolapse repairs with those which included mesh or graft material:

- polyglactin mesh (absorbable synthetic, Vicryl) ([Allahdin 2008](#); [Sand 2001](#); [Weber 2001](#));
- porcine dermis graft (biological, Pelvicol) ([Hviid 2010](#) (anterior compartment); [Meschia 2007](#));

- porcine small intestine submucosa graft inlay (SIS, Fortagen) ([Feldner 2010](#) (anterior compartment); [Paraiso 2006](#); [Sung 2012](#) (posterior compartment));
- cadaveric fascia lata graft (biological, Tutoplast) ([Gandhi 2005](#) (anterior compartment));
- bovine pericardium collagen matrix graft reinforcement (biological) ([Guerette 2009](#) (anterior compartment));
- non-absorbable synthetic mono-filament permanent polypropylene mesh ([Ali 2006 abstract](#); [Al-Nazer 2007](#); [Altman 2011](#); [Carey 2009](#); [Halaska 2012](#); [Iglesia 2010](#); [Nguyen 2008](#); [Nieminen 2008](#); [Sivaslioglu 2008](#); [Thijs 2010 abstract](#); [Vollebregt 2011](#); [Withagen 2011](#)).

The non-absorbable mesh category was further subdivided into:

- mesh overlay ([Ali 2006 abstract](#); [Al-Nazer 2007](#); [Carey 2009](#));
- self-styled or armed transobturator mesh ([Nieminen 2008](#); [Sivaslioglu 2008](#));
- transobturator mesh kits ([Altman 2011](#) (anterior Prolift mesh kit); [Halaska 2012](#) (total Prolift mesh kit); [Iglesia 2010](#) (anterior or total Prolift); [Nguyen 2008](#) (Perigee mesh kit); [Thijs 2010 abstract](#) (Perigee mesh kit); [Vollebregt 2011](#) (Avulta mesh kit); [Withagen 2011](#) (anterior, posterior, or total Prolift mesh kit).

In two trials outcome data were available for women who underwent a posterior vaginal wall repair ([Paraiso 2006](#); [Sand 2001](#)).

The data from five trials included women with multiple compartment prolapse who were undergoing repair with polypropylene mesh ([Carey 2009](#); [Iglesia 2010](#); [Withagen 2011](#)) and polyglactin ([Allahdin 2008](#); [Sand 2001](#)).

In the trials from [Allahdin 2008](#), [Carey 2009](#), [Iglesia 2010](#) and [Withagen 2011](#), outcomes were not differentiated for anterior and posterior pelvic organ prolapse.

No mesh versus biological graft

Seven trials used biological graft inlays for anterior or posterior repairs ([Feldner 2010](#); [Gandhi 2005](#); [Guerette 2009](#); [Hviid 2010](#); [Menefee 2011](#); [Meschia 2007](#); [Paraiso 2006](#)).

There were no statistically significant differences in prolapse symptoms in any of these trials, however the CIs were wide ([Analysis 6.1](#)).

Three of the trials compared anterior vaginal wall repair without and with porcine dermis graft (Pelvicol) ([Hviid 2010](#); [Menefee 2011](#); [Meschia 2007](#)) and one without and with cadaveric fascia lata (Tutoplast) ([Gandhi 2005](#)). Anterior colporrhaphy has a higher recurrence rate on examination as compared to Pelvicol inlay (RR 1.7, 95% CI 1.1 to 2.6; [Analysis 2.6.9](#)). While there were fewer women with objective recurrence of prolapse in the Tutoplast cadaveric fascia lata inlay this did not reach statistical significance ([Analysis 6.4.3](#)). There were too few data reported for the other outcomes to provide reliable estimates.

When native tissue repair was compared to SIS graft on the posterior vaginal wall the recurrence rate on examination was significantly less after native tissue repair (10/55 (18%) as compared to 12/26 (46%) in the SIS group) (RR 0.39, 95% CI 0.20 to 0.79) (Paraiso 2006). Interestingly in the anterior compartment the recurrence rate was significantly higher after anterior repair as compared to SIS graft (RR 2.95, 95% CI 1.07 to 8.17; Analysis 6.4.4) (Feldner 2010).

The objective failure rate was not significantly different after native tissue repair in anterior or posterior compartments (66/277, 24%) as compared to any biological graft (43/244, 18%) (RR 1.3, 95% CI 0.6 to 2.7; Analysis 6.7.2).

No mesh versus permanent synthetic mesh reinforcement

Absorbable synthetic mesh (polydioxanone (Vicryl) inlay

Three trials evaluated the effects of using absorbable polyglactin (Vicryl) mesh inlay to augment prolapse repairs (Allahdin 2008; Sand 2001; Weber 2001) and for full analysis readers should see Comparison 2 (anterior vaginal wall repair alone versus anterior vaginal wall repair with synthetic mesh reinforcement (for midline cystocele defects)).

Permanent mesh reinforcement (inlay, armed inlay or mesh kit)

A total of 13 studies evaluated native tissue repair at any site versus any transvaginal polypropylene mesh (Ali 2006 abstract; Al-Nazer 2007; Altman 2011; Carey 2009; Halaska 2012; Iglesia 2010; Menefee 2011; Nguyen 2008; Nieminen 2008; Sivaslioglu 2008; Thijs 2010 abstract; Vollebregt 2011; Withagen 2011).

Ten trials compared anterior repair to a variety of permanent transvaginal mesh repair techniques and were considered similar enough to combine in various meta-analyses (Ali 2006 abstract; Al-Nazer 2007; Altman 2011; Carey 2009; Menefee 2011; Nguyen 2008; Nieminen 2008; Sivaslioglu 2008; Thijs 2010 abstract; Vollebregt 2011) and for full analysis of comparison of permanent mesh in the anterior compartment readers should see Comparison 2 (anterior vaginal wall repair alone versus anterior vaginal wall repair with synthetic mesh reinforcement (for midline cystocele defects)).

The following three trials evaluated native repairs compared to transvaginal permanent mesh in the anterior, apical or posterior vaginal compartments and were similar enough to combine in various combinations using meta-analysis (Halaska 2012; Iglesia 2010; Withagen 2011).

Native tissue versus combined total, anterior or posterior compartment polypropylene mesh

- Data from three trials (Halaska 2012; Iglesia 2010; Withagen 2011) compared native tissue repairs with a variety of total, anterior or posterior polypropylene kit meshes. While no difference in awareness of prolapse was able to be identified between the groups (25/132, 19% versus 18/123, 15%) (RR 1.3, 95% CI 0.8 to 2.3; Analysis 6.1.9) in two trials (Iglesia 2010; Withagen 2011) the recurrence rate on examination was higher in the native tissue repair group as compared to the transvaginal polypropylene mesh (native tissue 103/18, 55% versus polypropylene mesh kits 74/194, 38%) (RR 1.40, 95% CI 1.0 to 2.0; Analysis 6.7.8). The mesh erosion rate was 35/194 (18%) (Analysis 6.19), and 18/194 (9%) (Analysis 6.20) underwent surgical correction for mesh erosion. The reoperation rate after native tissue repair was higher after the combined polypropylene mesh kits (22/194, 11%) compared with native tissue procedures (7/189, 3.7%) (RR 1.1, 95% CI 1.0 to 1.2; Analysis 6.25).

No mesh (native tissue) versus any graft (synthetic mesh or biological graft)

Meta-analysis of no mesh versus all types of grafts showed:

- the results from eight trials (Allahdin 2008; Altman 2011; Gandhi 2005; Carey 2009; Meschia 2007; Nieminen 2008; Paraiso 2006; Withagen 2011) comparing native tissue repair with any graft demonstrated that symptoms of awareness of prolapse are significantly greater after native tissue repair (162/682, 24%) as compared to graft repair (117/649, 18%) (RR 1.4, 95% CI 1.1 to 1.7; Analysis 6.1.7);
- results from three trials (Gandhi 2005; Guerette 2009; Meschia 2007) demonstrated no difference in awareness of prolapse when native tissue repair was compared to biological graft repair (RR 1.03, 95% CI 0.61 to 1.75; Analysis 6.1.8);
- the results from 17 trials (Ali 2006 abstract; Allahdin 2008; Al-Nazer 2007; Carey 2009; Feldner 2010; Gandhi 2005; Hviid 2010; Iglesia 2010; Meschia 2007; Nguyen 2008; Nieminen 2008; Paraiso 2006; Sand 2001; Sivaslioglu 2008; Vollebregt 2011; Weber 2001; Withagen 2011) combined found more women had objective failure with no mesh (346/905, 38%) as compared to any graft (180/856, 22%) (RR 1.8, 95% CI 1.4 to 2.5; Analysis 6.7);
- results from six trials (Feldner 2010; Gandhi 2005; Guerette 2009; Hviid 2010; Meschia 2007; Paraiso 2006) demonstrated no significant difference in prolapse recurrence on examination when comparing native tissue repair to biological graft repair (RR 1.3, 95% CI 0.7 to 2.5; Analysis 6.7.2). If the Paraiso 2006 trial, which was the only trial to evaluate posterior compartment prolapse, was excluded the benefits of utilising biological grafts as compared to native tissue anterior repair were

significant on objective examination (RR 1.7, 95% CI 1.2 to 2.5; [Analysis 6.7.2](#)).

7. One type of graft (synthetic mesh or biological graft) versus another type of graft (Comparison 7)

Three small trials in women having anterior repair compared two types of overlay:

- non-absorbable polypropylene (Prolene Soft) mesh versus absorbable porcine dermis graft (Pelvicol) (Cervigni 2005);
- non-absorbable armed mono-filament polypropylene (Gynemesh) versus absorbable porcine dermis graft (Pelvicol) (Natale 2009);
- absorbable porcine dermis graft (Pelvicol) versus absorbable polyglactin mesh (Vicryl) (De Ridder 2004 abstract).

Only one trial measured prolapse symptoms reported by women (Cervigni 2005): there was no statistically significant difference between the groups, albeit with wide CIs.

In the De Ridder trial (De Ridder 2004 abstract) fewer women had objective recurrence of prolapse when porcine dermis was used rather than polyglactin to reinforce an anterior repair (RR 3.22, 95% CI 1.38 to 7.52; [Analysis 7.2.1](#)), although this trial was small. In the Natale trial (Natale 2009) armed polypropylene mesh proved better than armed Pelvicol inlay regarding objective success (RR 0.64, 95% CI 0.43 to 0.96; [Analysis 7.2.2](#)) but women had more daytime urinary frequency (RR 4.24, 95% CI 1.83 to 9.84; [Analysis 7.5.1](#)).

The trials were too small to demonstrate other statistically significant differences and the CIs were wide.

8. One type of suture versus another type of suture (Comparison 8)

One trial addressed this comparison (Allahdin 2008), comparing polyglactin sutures (Vicryl) with polydioxanone (PDS). The study was too small to draw reliable conclusions and only included objective assessment at three months.

9. Pelvic organ prolapse (POP) surgery and bladder function (Comparison 9)

In general, after prolapse surgery 434 of 2125 women (20.4%) reported new subjective SUI after prolapse surgery in 16 trials (Altman 2011; Brubaker 2008; Bump 1996; Colombo 1996; Colombo 1997; Costantini 2008; de Tayrac 2008; Halaska 2012; Iglesia 2010; Maher 2004; Meschia 2004a; Natale 2010; Nieminen 2008; Sivaslioglu 2008; Wei 2011; Withagen 2011). New overactive bladder symptoms were noted in 119 of 1005 (12%) undergoing prolapse surgery in 11 trials (Al-Nazer 2007; Brubaker 2008; Bump 1996; Colombo 1996; Colombo 1997; Colombo 2000; de Tayrac 2008; Halaska 2012; Maher 2004; Natale 2009; Natale 2010). New voiding dysfunction was reported

in 109 of 1209 (9%) women undergoing prolapse surgery in 12 trials (Al-Nazer 2007; Bump 1996; Colombo 1996; Colombo 1997; de Tayrac 2008; Feldner 2010; Gandhi 2005; Maher 2004; Meschia 2004; Meschia 2007; Natale 2009; Natale 2010).

A. One type of pelvic organ prolapse (POP) surgery alone versus another type of POP surgery

Six trials comparing anterior native tissue repair with anterior transobturator mesh repair included only symptomatically continent women or provided separate data on pre-operatively continent women (Altman 2011; Halaska 2012; Iglesia 2010; Nieminen 2008; Sivaslioglu 2008; Withagen 2011). The meta-analysis evaluating de novo SUI demonstrated a reduced risk of developing SUI post-operatively in the anterior native tissue groups (50/449, 11%) as compared to polypropylene mesh repair (74/449, 17%) (RR 0.7, 95% CI 0.5 to 0.9; [Analysis 9.1.7](#)).

In two trials, women with prolapse and stress urinary incontinence pre-operatively who underwent prolapse surgery without concomitant continence surgery had significantly higher rates of persisting SUI than those that had continence surgery performed at the time of prolapse surgery (76/117, 65% versus 17/111, 15%) (RR 4.4, 95% CI 2.7 to 7.1; [Analysis 9.25](#)) (Borstad 2010; Costantini 2008).

B. Pelvic organ prolapse (POP) surgery alone versus POP surgery with an additional continence procedure

Additional continence procedures included Pereyra needle suspension, Burch colposuspension and suburethral tapes.

Needle suspension

- One trial demonstrated no difference in objective rate of new SUI after pubo-urethral ligament plication or Pereyra needle suspension (RR 1.2, 95% CI 0.8 to 1.9; [Analysis 9.2.1](#)) (Colombo 1997).

- Two studies did not demonstrate a subjective reduction in post-operative SUI in including a needle suspension as compared to bladder neck plication at vaginal prolapse surgery (RR 2.0, 95% CI 0.1 to 50.9; [Analysis 9.1.3](#)) (Bump 1996; Colombo 1997).

Colposuspension

- Two trials evaluated the impact of adding a colposuspension to sacral colposuspension in women who had prolapse and were continent pre-operatively and found conflicting results. While more women (who were continent at baseline) had become incontinent in the group who did not have

Burch colposuspension in addition to abdominal sacral colpopexy in Brubakers trial, Costantini described the opposite. The random-effects model meta-analysis did not reveal significant results (RR 1.04, 95% CI 0.4 to 2.8; [Analysis 9.1.4](#)) ([Brubaker 2008](#); [Costantini 2007](#)).

- Sacral colpopexy alone resulted in lower blood loss (MD -73 g, 95% CI -115 to -31; [Analysis 9.16.1](#)) ([Brubaker 2008](#)) and a shorter operating time (MD -20 min, 95% CI -33 to -7; [Analysis 1.33.5](#)) ([Brubaker 2008](#)) as compared to sacral colpopexy and colposuspension. Surprisingly, at two years symptoms of SUI were not significantly different between the groups (sacral colpopexy without colposuspension 68/186, 37% versus sacral colpopexy with colposuspension 47/178, 26%) (RR 1.0, 95% CI 0.4 to 2.8; [Analysis 9.1.4](#)) ([Brubaker 2008](#); [Costantini 2007](#)). A third article described in more detail the outcomes of stress continent women with a positive stress test after each undergoing two forms of prolapse reduction. To avoid doubling the cases and inappropriately increasing the sample size we halved the figures for de novo SUI and the number undergoing stress testing post-intervention ([Visco 2008](#)).

- Counter intuitively, [Costantini 2008](#) demonstrated no benefit in adding colposuspension to sacral colpopexy in those with prolapse and SUI. Persisting SUI post-operatively was similar whether without or with colposuspension (9/23, 39% versus 13/24, 54%) (RR 0.54, 95% CI 0.2 to 1.7; [Analysis 9.25.4](#)).

Suburethral tape

- Three trials evaluated vaginal prolapse surgery with and without suburethral tape (TVT) in women with occult SUI ([Meschia 2004](#); [Schierlitz 2007](#); [Wei 2011](#)). There was no difference in rates on post-operative assessment after prolapse repair without a tape as compared to prolapse repair with TVT in respect to both subjective SUI (43% versus 25%, RR 2.4, 95% CI 0.7 to 8.0; [Analysis 9.1.5](#)) ([Meschia 2004](#); [Wei 2011](#)) and objective SUI (41% versus 22%, RR 3.7, 95% CI 0.9 to 15.2; [Analysis 9.2.2](#)) ([Meschia 2004](#); [Schierlitz 2007](#); [Wei 2011](#)). However, subsequent continence surgery was required more frequently in those that underwent prolapse surgery without TVT as compared to prolapse surgery with TVT (5.7% versus 0.5%, RR 6.8, 95% CI 1.5 to 30.5; [Analysis 9.3.7](#)) ([Meschia 2004](#); [Schierlitz 2007](#)).

- One trial showed a higher rate of persisting SUI in women with prolapse and SUI undergoing prolapse surgery without suburethral tape (TVT) as compared to prolapse surgery with TVT (67/94, 71% versus 4/87, 5%) (RR 51, 96% CI 17 to 154; [Analysis 9.25](#)) ([Borstad 2010](#)). In this trial women were randomised to undergo a TVT concomitantly with prolapse repair or three months later. Success rates based on an 'on-treatment' analysis were 83/87 (95%) versus 47/53 (89%) three

months later ([Borstad 2010](#)). Twenty-seven of 94 women (29%) were cured of SUI after prolapse surgery alone and declined to have a TVT inserted ([Borstad 2010](#)).

Five meta-analyses were possible, as follows.

- Eight trials described the rate of objective SUI in all women undergoing prolapse surgery with and without continence surgery ([Brubaker 2008](#); [Bump 1996](#); [Colombo 1996](#); [Colombo 1997](#); [Costantini 2008](#); [Meschia 2004](#); [Schierlitz 2007](#); [Wei 2011](#)). Continence procedures employed included: pubo-urethral ligament plication ([Colombo 1996a](#)); needle suspension ([Bump 1996a](#); [Colombo 1997](#)); colposuspension ([Brubaker 2008](#); [Costantini 2008](#); [Visco 2008](#)); and suburethral tape ([Meschia 2004](#); [Schierlitz 2007a](#)). The studies demonstrated that not performing continence surgery at the time of prolapse surgery significantly increased the risk of SUI post-operatively (RR 1.6, 95% CI 1.3 to 2.1; [Analysis 9.7.1](#)).

- Six trials described the rate of de novo SUI after prolapse surgery without continence surgery and prolapse surgery with continence surgery ([Brubaker 2008](#); [Bump 1996](#); [Colombo 1996](#); [Meschia 2004a](#); [Schierlitz 2007](#); [Wei 2011](#)). The studies demonstrated an advantage of including continence surgery at the time of prolapse surgery in reducing the risk of de novo SUI (146/460, 32% versus 84/438, 19%) (RR 2.0, 95% CI 1.4 to 2.3; [Analysis 9.1.6](#)). In this group of 438 women, undergoing continence surgery at the time of prolapse prevented 62 (14%) women from developing de novo SUI post-prolapse surgery.

- Five trials described the rate of de novo SUI after prolapse surgery without continence surgery and prolapse surgery with continence surgery in a subgroup who had occult SUI pre-operatively ([Brubaker 2008](#); [Bump 1996](#); [Meschia 2004](#); [Schierlitz 2007](#); [Wei 2011](#)). The meta-analysis demonstrated a significantly higher rate of post-operative SUI in women who did not receive continence surgery (53/124, 43% versus 23/118, 19% with a continence procedure) at the time of prolapse surgery (RR 2.0, 95% CI 1.4 to 2.8; [Analysis 9.6.1](#)). Performing continence surgery at the time of prolapse surgery in 118 women with occult stress incontinence prevented 30 (25%) women developing SUI post-prolapse surgery.

- Two trials described the benefit of adding continence surgery to prolapse surgery in women who pre-operatively had no SUI and no occult stress incontinence (SUI with prolapse reduced) ([Brubaker 2008](#) colposuspension at sacral colpopexy; [Wei 2011](#) TVT at vaginal prolapse surgery). Women undergoing prolapse surgery who were without symptoms of SUI and had no SUI with the prolapse reduced and did not have continence surgery performed were more likely to develop post-operative SUI than if continence surgery was performed (94/235, 40% versus 52/220, 25%) (RR 2.2, 95% CI 1.4 to 3.3).

- Two trials demonstrated that in those with prolapse and SUI pre-operatively who underwent prolapse surgery without continence surgery had non-significantly higher rates of

persisting SUI than those that had continence surgery performed at the time of prolapse surgery (76/117, 65% versus 17/111, 15%) (RR 4.36, 95% CI 2.68 to 7.10; [Analysis 9.25](#)) ([Borstad 2010](#); [Costantini 2008](#)).

DISCUSSION

This is one of three reviews of interventions for pelvic organ prolapse and it should be viewed in that context ([Adams 2004](#); [Hagen 2011](#)). In the other two reviews, no randomised trials evaluating mechanical devices or pessaries ([Adams 2004](#)) and limited trials on conservative, physical or lifestyle interventions ([Hagen 2011](#)) were identified.

In total, 56 randomised controlled trials on the surgical management of pelvic organ prolapse were evaluated in this review. These were conducted in 12 countries (Italy, USA, Australia, the UK, the Netherlands, Taiwan, Finland, Belgium, Chile, Czech Republic, Egypt, France, Singapore and Sweden). The trials involved a total of 5649 women of which 1695 were new in this update and all of whom received a surgical intervention.

Amongst the 56 trials that addressed surgical management of pelvic organ prolapse, the quality of the trials was variable. All trials reported an objective evaluation of the specific pelvic floor defect that was repaired but full vaginal site-specific outcomes were available for only 13 trials ([Altman 2011](#); [Brubaker 2008](#); [Colombo 1996](#); [Colombo 1997](#); [Colombo 2000](#); [Costantini 2008](#); [Maher 2004](#); [Maher 2011](#); [Meschia 2004a](#); [Natale 2009](#); [Nguyen 2008](#); [Sivaslioglu 2008](#); [Weber 2001](#)). All but six trials ([Ali 2006 abstract](#); [Allahdin 2008](#); [Farid 2010](#); [Jeng 2005](#); [Pantazis 2011](#); [Schierlitz 2007](#)) reported a median follow up of greater than one year, and only four trials reported outcomes at greater than five years ([Colombo 1997](#); [Colombo 2000](#); [Culligan 2005](#); [Roovers 2004](#)).

Generally, the reporting of the impact of surgery on associated pelvic floor symptoms including bladder, bowel and sexual function; quality of life; cost; and patient satisfaction is improving. Validated pelvic floor questionnaires were reported in 14 trials ([Altman 2011](#); [Brubaker 2008](#); [Costantini 2008](#); [de Tayrac 2008](#); [Guerette 2009](#); [Halaska 2012](#); [Maher 2004](#); [Maher 2011](#); [Menefee 2011](#); [Nguyen 2008](#); [Paraiso 2011](#); [Roovers 2004](#); [Sivaslioglu 2008](#); [Thijs 2010 abstract](#)), cost issues by four trialists ([Benson 1996](#); [Maher 2004](#); [Maher 2011](#); [Paraiso 2011](#)) and impact of surgery on quality of life and patient satisfaction in six trials ([Brubaker 2008](#); [Halaska 2012](#); [Iglesia 2010](#); [Maher 2004](#); [Maher 2011](#); [Withagen 2011](#)). The variability in reporting largely reflects the difficulties associated with evaluating prolapse surgery. One of the principal aims of prolapse surgery is to correct the vaginal protrusion and any associated pelvic floor dysfunction, however the anatomical correction of the vaginal architecture does not ensure normal bladder, bowel and sexual function. Until recently, standardised history, validated pelvic organ prolapse (POP) and specific quality

of life questionnaires or other outcome assessment tools were not available.

It was disappointing that few trials were found which evaluated conservative, physical, lifestyle or mechanical means of prolapse treatment ([Adams 2004](#); [Hagen 2011](#)) and none which compared these interventions with surgery.

Summary of main results

Upper vaginal prolapse (Comparison 1)

The abdominal sacral colpopexy was associated with a lower rate of recurrent vault prolapse ([Benson 1996](#); [Maher 2004](#)), reduced grade of residual prolapse ([Lo 1998](#)), greater length of time taken to recurrence of prolapse ([Benson 1996](#)) and less dyspareunia ([Benson 1996](#); [Lo 1998](#); [Maher 2004](#)) as compared to vaginal sacrospinous colpopexy. However, the abdominal sacral colpopexy was associated with a longer operating time ([Benson 1996](#); [Lo 1998](#); [Maher 2004](#)), a longer time for recovery ([Maher 2004](#)), and it was more expensive ([Benson 1996](#); [Maher 2004](#)) than the vaginal approach. The finding of less post-operative stress urinary incontinence after the abdominal approach must be viewed with caution due to the different continence procedures performed in the two trials (as described in the Methodology section). Although there was a lower reoperation rate in the abdominal group, this did not reach statistical significance ([Benson 1996](#); [Maher 2004](#)). The data were too few to reliably assess possible differences in satisfaction, bowel outcomes or adverse effects. [Culligan 2005](#) reported that there were no recurrent vault prolapses using either abdominal sacral colpopexy with mono-filament polypropylene mesh or sacral colpopexy using cadaveric fascia lata graft inlay (Tutoplast) at one year. At five years they reported the polypropylene mesh as a superior graft to cadaveric fascia lata using objective anatomic outcomes at time of sacral colpopexy.

In a single study at one year, [Rondini 2011 abstract](#) demonstrated that the sacral colpopexy was superior to vaginal uterosacral colpopexy with a higher objective success rate and lower reoperation rate. The operating time, admission days and post-operative complication rate were all higher after sacral colpopexy as compared to vaginal uterosacral colpopexy. These findings mirror the outcomes of sacral colpopexy as compared to sacrospinous colpopexy.

In a small single study, [Pantazis 2011](#) compared open and laparoscopic sacral colpopexy and the outcomes were similar except for reduced blood loss and analgesic requirements in the laparoscopic group. Again, in a single trial, [Maher 2011](#) demonstrated that laparoscopic sacral colpopexy took longer to perform than total vaginal polypropylene mesh repair and had reduced blood loss, admission days and reoperation rate. The recurrent prolapse rate, both on examination and subjectively, was lower after the laparoscopic sacral colpopexy. [Paraiso 2011](#) demonstrated

that robotic sacral colpopexy had increased operating time, post-operative non-steroidal anti-inflammatory drug (NSAID) use and costs compared to laparoscopic sacral colpopexy, with no difference in anatomical or functional outcomes.

Two trials evaluated uterine preservation in at least one arm. [Roovers 2004](#) reported more women needed repeat prolapse surgery after abdominal sacral hysteropexy (without hysterectomy) and fewer women had pain, overactive bladder symptoms or obstructive micturition symptoms after vaginal surgery which included hysterectomy. At an eight year review, more women saw their primary physician for pelvic floor problems in the abdominal group as compared to the vaginal group. Non-statistically significant higher rates of prolapse symptoms and reoperation were seen after the sacral hysteropexy as compared to the vaginal group ([Roovers 2004](#)). A further trial in which women in one arm had uterine preservation reported few relevant outcomes ([Jeng 2005](#)). However, the clinical relevance of these trials, which compared different approaches and uterine preservation in one arm and hysterectomy in the other, is debatable.

Two small studies ([de Tayrac 2008](#); [Meschia 2004a](#)) were unable to demonstrate a difference in anatomical or functional outcomes between vaginal sacrospinous colpopexy and posterior intravaginal slingplasty. The posterior intravaginal sling was quicker to perform and showed reduced blood loss. It was associated with a 9% rate of mesh complications ([Meschia 2004a](#)). However, due to a high reported rate of adverse effects with the multi-filament polypropylene mesh used ([Baessler 2005](#)), the posterior intravaginal sling kit has now been withdrawn from the market and recruitment in the second trial stopped prematurely.

Anterior vaginal wall prolapse (Comparison 2)

There is increasing information available on the repair of the anterior vaginal compartment. Most new studies investigated anterior compartment operations.

There was some evidence from two small trials that absorbable polyglactin mesh (Vicryl) might reduce objective prolapse recurrence compared with anterior repair alone ([Sand 2001](#); [Weber 2001](#)). However, this type of mesh is not available in all countries any more. Two randomised controlled trials demonstrated that porcine dermis augmentation of the anterior vaginal wall might be beneficial in reducing recurrent anterior vaginal wall prolapse ([Hviid 2010](#); [Meschia 2007](#)). Neither cadaveric fascia lata (Tutoplast), bovine pericardium collagen, nor small intestine submucosa (SIS) augmentation of anterior vaginal wall was beneficial in reducing recurrent anterior vaginal wall prolapse ([Feldner 2010](#); [Gandhi 2005](#); [Guerette 2009](#)). Overall the anterior repair had a significantly higher rate of recurrent anterior wall prolapse on examination when compared to any biological graft. No differences in subjective outcomes were identified.

Two further RCTs compared biological grafts with various mesh augmentations. In a single RCT ([De Ridder 2004 abstract](#)) it

was demonstrated that porcine dermis reduces recurrent anterior vaginal wall prolapse compared to polyglactin augmentation. Armed porcine dermis overlays resulted in a non-statistically significant higher failure rate compared with armed mono-filament polypropylene mesh overlay in women with recurrent symptomatic cystocele ([Natale 2009](#)). In women with primary cystocele, simple porcine dermis and polypropylene overlays proved similar regarding success rates ([Cervigni 2005](#)). It is pertinent, however, that of these four types of mesh or grafts only polypropylene was non-absorbable. These four studies evaluated five interventions, anterior colporrhaphy and four different grafts, and primary and secondary cystoceles, which resulted in considerable variation making a meta-analysis inappropriate. Also, the heterogeneity of the grafts used made the comparison of complications impossible. There was a lack of information on functional (subjective) outcomes.

In one trial concerning women who had stress urinary incontinence as well as pelvic organ prolapse, Burch colposuspension was subjectively better at curing the incontinence and anterior repair was better for the prolapse ([Colombo 2000](#)). The trial was too small to judge whether this affected subsequent reoperation rates or the effect on other aspects of bladder, bowel or sexual function. Ten studies demonstrated that the polypropylene mesh anterior repair was superior to native tissue anterior colporrhaphy on objective evaluation, in reducing the risk of anterior compartment prolapse irrespective of whether an anterior colporrhaphy was performed concomitantly or not. Data from three studies also demonstrated that polypropylene mesh repair had a higher subjective success rate than native tissue anterior repair. No differences between the groups was identified in quality of life outcomes, rate of dyspareunia, or reoperation rates for prolapse or incontinence. The operating time, blood loss, rate of de novo stress urinary incontinence and subsequent prolapse in the posterior or apical compartment were less with the native tissue repair. Where polypropylene mesh was utilised in the anterior compartment, mesh erosion occurred in 11.6% with 6.8% undergoing surgery to correct the mesh exposure. The total reoperation rate for prolapse, stress urinary incontinence, mesh exposure or pain were significantly higher after transvaginal permanent mesh (10%) as compared to after anterior colporrhaphy (5%). Furthermore, two trials described more prolapse in the untreated compartments.

Prior to mesh being considered for standard repair in the anterior compartment a number of factors in the risk benefit analysis should be further explored, and they may only become apparent in studies with longer review times. The improved reduction in prolapse symptoms and anterior compartment prolapse on examination has at this stage not translated into reduced reintervention for prolapse, and in fact the reintervention rate is higher following transvaginal permanent mesh than after the native tissue repairs. It is also anticipated that the management of women undergoing subsequent surgical intervention for prolapse after permanent mesh placement would be significantly challenging and this factor

should be included in any risk benefit analysis. Finally, and interestingly, In this group no patient had mesh removed due to pain or dyspareunia, which is in contrast to the US Food and Drug Administration (FDA) report (FDA 2011) in which the leading cause of complaints was pain or dyspareunia (590/1503, 38.6%). If the complication of pain associated with the polypropylene mesh is further documented this would be an important factor in a risk benefit analysis regarding employment of transvaginal polypropylene mesh. Most recently some of the products evaluated in this section, including Bard Avaulta, Gynemesh overlay and Prolift Johnson & Johnson products, have been removed from the market leaving only the self-styled mesh (Parietene light, Sofradim) (Niemenen 2008; Sivaslioglu 2008) and Perigee mesh kit (Nguyen 2008) available for use that have been evaluated under the auspices of randomised controlled trials.

Posterior vaginal wall prolapse (Comparison 3)

Posterior vaginal wall repair performed better than the transanal repair of rectocele in terms of a significantly lower recurrence rate of posterior vaginal wall prolapse in two trials, despite a higher blood loss and greater use of pain relief (Kahn 1999; Niemenen 2004). However, the data were too few to comment on clinical outcomes such as flatus or faecal incontinence, or dyspareunia. More women had difficulties in bowel evacuation after transanal operation but this did not reach statistical significance. Farid 2010 also demonstrated that the size of the rectocele on defecography was significantly reduced after the transvaginal repair as compared to transanal repair. In total, eight serious adverse effects were reported amongst the 125 women in these three trials.

Two trials compared native tissue repair with porcine small intestine overlay and found that the objective recurrence rate was lower after the native tissue repairs as compared to the biological small intestine graft group on examination. There was no difference in awareness of prolapse or the rate of dyspareunia between the groups (Paraiso 2006; Sung 2012). Only one study (Sand 2001 absorbable mesh) reported on individual outcomes after any transvaginal mesh and the study was too small to draw any conclusions. A small study reported in abstract form only demonstrated a superior anatomical outcome after a fascial repair as compared to a levator ani plication posterior repair (Vijaya 2011 abstract).

Prolapse surgery and mesh augmentation (Comparison 6 and 7)

The use of mesh to augment repair surgery has been successful in other fields such as groin hernia repair (Scott 2001). Particular issues related to its use in vaginal repair are the effects on bowel, bladder and sexual function and the possibility of mesh erosion or infection. Therefore, evidence of an improved anatomical cure and subjective success of prolapse surgery in the anterior compartment using transvaginal polypropylene mesh remains insufficient

reason to advocate its routine use. At this time these benefits have to be weighed against the reduced blood loss, operating time, rate of de novo stress urinary incontinence and posterior and apical compartment prolapse, and lower total reoperation rate after the native tissue repair. Obviously improved patient satisfaction and quality of life outcomes with reduced reoperating rates are required prior to advocating the widespread use of permanent mesh in the anterior compartment. Clinicians must evaluate potential benefits and risks on an individual basis until more definitive patient algorithms of management are able to be determined.

In the upper or apical compartment, the use of mesh at open sacral colpopexy as compared to vaginal sacrospinous colpopexy significantly improves outcomes but with increased morbidity and cost. A small randomised controlled trial demonstrated that the peri-operative morbidity was similar between the open and laparoscopic approaches except for reduced blood loss in the laparoscopic procedure. Visco et al suggested that the mesh erosion or infection rate was increased four-fold when mesh was introduced vaginally as compared to via the abdominal route in the management of pelvic organ prolapse (Visco 2001). A single trial suggested that laparoscopic sacral colpopexy had better patient satisfaction and anatomical outcomes with reduced reoperation rate and cost as compared to the transvaginal permanent mesh (Maher 2011).

There is no evidence to suggest that the addition of any graft (biological or synthetic) material at the posterior compartment repair resulted in improved outcomes.

The impact of grafts (biological, and absorbable and non-absorbable meshes) in the anterior compartment has been described above.

Three trials (Halaska 2012; Iglesia 2010; Withagen 2011) evaluated a combination of total, anterior or posterior compartment polypropylene mesh kits as compared to native tissue repairs and demonstrated an improved anatomical outcome after the transvaginal permanent mesh, however no difference was found in symptoms or quality of life outcomes. The mesh exposure rate was 18%, with one half of these 9% requiring surgical intervention. The total reoperation rate was significantly higher after the transvaginal permanent mesh at 11% compared to 3.7% following native tissue repair. The evidence at this stage does not support the use of combined total, anterior or posterior mesh kits.

Thus the evidence is not sufficient to support the use of transvaginal permanent meshes or grafts at the time of vaginal apical or posterior compartment repair surgery except in the context of randomised controlled clinical trials. These trials must be adequately powered to evaluate the anatomic and functional outcomes and possible adverse events, with blinding of reviewers and preferably participants to minimise biases in reporting. It is quite extraordinary that after eight years of transvaginal mesh products no economic evaluation of these products in comparison to native tissue repairs is available and there is such a paucity of level one evidence available to aid clinicians in the decision making process regarding the appropriate interventions to assist and treat the women we

serve.

Unfortunately much of the data presented in this review fails to allay concerns outlined in the 2011 FDA transvaginal polypropylene mesh report (FDA 2011). One significant discrepancy exists between our findings and of adverse event reports to the FDA. Vaginal pain and dyspareunia accounted for 38.6% of complaints to the FDA however in our review only 3/536 (0.5%) had mesh removed for this indication. Possible explanations for this anomaly could be that only a small percentage of women are affected and due to being significantly distressed they account for a higher percentage of complaints. Alternatively the true incidence of vaginal pain may be under-reported in these trials. The incidence of vaginal pain associated with polypropylene meshes requires careful evaluation.

Prolapse surgery and bladder function (Comparison 9)

Prolapse surgery and bladder function

The results of performing continence surgery at the time of prolapse in those with prolapse and stress incontinence are conflicting and no recommendation can be made. Following prolapse surgery de novo stress incontinence occurs in 20% of women. This risk can be decreased by performing continence surgery at the time of prolapse surgery in the following subgroups:

- all women undergoing prolapse surgery (RR 2.1, 95% CI 1.5 to 2.7; Analysis 9.7.1) (Brubaker 2008; Bump 1996; Colombo 1996; Colombo 1997; Costantini 2008; Meschia 2004; Schierlitz 2007; Wei 2011);
- continent women undergoing prolapse surgery (146/460, 32% versus 84/438, 19%) (RR 2.0, 95% CI 1.5 to 2.8; Analysis 9.1.6) (Brubaker 2008; Bump 1996; Colombo 1996; Meschia 2004a; Schierlitz 2007; Wei 2011);
- continent women undergoing prolapse surgery who have demonstrated occult stress urinary incontinence (53/124, 43% versus 23/118, 19%) (RR 3.5, 95% CI 1.9 to 6.6; Analysis 9.6.1) (Brubaker 2008; Bump 1996; Meschia 2004; Schierlitz 2007; Wei 2011);
- continent women without occult stress incontinence (94/235, 40% versus 52/220, 25%) (RR 2.2, 95% CI 1.4 to 3.3) (Brubaker 2008; Wei 2011).

The benefits of reduced stress incontinence and a single intervention following prolapse surgery when combined with continence surgery need to be weighed against the potential risks of combining prolapse and continence surgery, which have been poorly reported but include longer operating time, greater voiding difficulties and cost.

Three trials evaluated de novo stress urinary incontinence in women undergoing anterior colporrhaphy as compared to transvaginal mesh for anterior compartment prolapse, who did not have stress urinary incontinence preoperatively (Al-Nazer 2007;

Altman 2011; Nieminen 2008). There is a lower rate of de novo stress urinary incontinence after anterior repair as compared to transvaginal polypropylene mesh (22/305, 7% versus 37/307, 12%) (RR 0.6, 95% CI 0.2 to 0.9; Analysis 2.9.1).

After prolapse surgery, new overactive bladder symptoms were noted in 119 of 1005 (12%) undergoing prolapse surgery in 11 trials (Al-Nazer 2007; Brubaker 2008; Bump 1996; Colombo 1996; Colombo 1997; Colombo 2000; de Tayrac 2008; Halaska 2012; Maher 2004; Natale 2009; Natale 2010). New voiding dysfunction was reported in 109 of 1209 (9%) women undergoing prolapse surgery in 12 trials (Al-Nazer 2007; Bump 1996; Colombo 1996; Colombo 1997; de Tayrac 2008; Feldner 2010; Gandhi 2005; Maher 2004; Meschia 2004; Meschia 2007; Natale 2009; Natale 2010).

Overall completeness and applicability of evidence

It was disappointing that few trials were found which evaluated conservative, physical, lifestyle or mechanical means of prolapse treatment (Adams 2004; Hagen 2011), and none which compared these interventions with surgery.

Loss to follow up (dropouts) ranged from 0% to 52%, and there was differential dropout from one arm in one trial. A description of the baseline characteristics of the groups showed that they were comparable in all except four trials. In one trial, 7% of women only had Stage 1 prolapse before operation, which would generally be regarded as a success if recorded post-operatively.

The majority of trials reported a follow up of between one and five years; it was less than one year in six trials and greater than five years in another four. However, the average time to failure of prolapse surgery requiring repeat operation is 12 years, suggesting that long-term follow up is required to fully assess new prolapse surgery techniques.

The majority of the trials failed to distinguish between women having primary or subsequent procedures. It is likely that the outcomes would be different in these two groups, not least because women having secondary surgery might have worse prolapse symptoms before agreeing to a further operation.

Quality of the evidence

Amongst the 56 trials that addressed surgical management of pelvic organ prolapse, the quality of the trials was variable. All trials reported an objective evaluation of the specific pelvic floor defect that was repaired, but full vaginal site-specific outcomes were available for only 12 trials (Altman 2011; Brubaker 2008; Colombo 1996; Colombo 1997; Colombo 2000; Costantini 2008; Maher 2004; Maher 2011; Menefee 2011; Meschia 2004a; Natale 2009; Nguyen 2008; Sivaslioglu 2008; Weber 2001). All but four trials (Ali 2006 abstract; Jeng 2005; Pantazis 2011; Schierlitz 2007) re-

ported a median follow up of greater than one year and four trials reported outcomes at greater than five years (Colombo 1997; Colombo 2000; Culligan 2005; Roovers 2004).

Generally the impact of surgery on associated pelvic floor symptoms including bladder, bowel and sexual function, quality of life, cost and patient satisfaction is improving. Validated pelvic floor questionnaires were reported in 13 trials (Altman 2011; Brubaker 2008; Costantini 2008; de Tayrac 2008; Iglesia 2010; Maher 2004; Maher 2011; Menefee 2011; Nguyen 2008; Roovers 2004; Sivaslioglu 2008; Thijs 2010 abstract; Withagen 2011), cost issues by three trialists (Benson 1996; Maher 2004; Paraiso 2011) and impact of surgery on quality of life and patient satisfaction in five trials (Brubaker 2008; Iglesia 2010; Maher 2004; Maher 2011; Withagen 2011). These variations generally reflect the difficulties associated with defining outcomes and reporting prolapse surgery. One of the principal aims of prolapse surgery is to correct the vaginal protrusion and any associated pelvic floor dysfunction, but the anatomical correction itself is likely to impact upon bladder, bowel and sexual function in unpredictable ways. Until recently, neither standardised history and validated pelvic organ prolapse nor specific quality of life questionnaires or other outcome assessment tools were available.

Only 28 out of 56 trials provided evidence of secure methods of allocation to randomised groups, and one trial which used an open number list was classed as quasi-randomised. In one trial four women were incorrectly analysed in the group opposite to their allocation, as they received the alternative treatment. Double blinded trials are difficult to perform, however they serve to minimise the risk of performance bias by participants and detection bias amongst assessors; double blinding was performed in eight trials (Allahdin 2008; Brubaker 2008; Culligan 2005; Iglesia 2010; Menefee 2011; Nguyen 2008; Paraiso 2006; Paraiso 2011). Outcome assessments were conducted by non-surgeons in 13 trials (Allahdin 2008; Benson 1996; Costantini 2008; Culligan 2005; Feldner 2010; Maher 2004; Maher 2011; Meschia 2007; Natale 2009; Paraiso 2006; Paraiso 2011; Roovers 2004; Weber 2001). It is preferable if surgeons designing studies do not have a financial relationship with the company whose product is being evaluated, to minimise the risk of bias. Unfortunately in several studies in this review this conflict was feasible and exacerbated by not ensuring reviewers were blinded, resulting in a possible heightened risk of bias in the outcomes reported (Altman 2011; Carey 2009; Withagen 2011).

AUTHORS' CONCLUSIONS

Implications for practice

The data from randomised trials are currently insufficient to guide practice.

The following conclusions from the review relate to the four areas of surgical management of pelvic organ prolapse where at least two randomised controlled trials have been completed.

- Abdominal sacral colpopexy was associated with a lower rate of recurrent vault prolapse and less dyspareunia than vaginal sacrospinous colpopexy. The abdominal sacral colpopexy had a longer operating time, longer recovery time and higher cost than the vaginal surgery. Data on the subjective success rate, patient satisfaction and impact of the surgery on quality of life were too few for reliable conclusions. In single studies the sacral colpopexy had a higher objective success rate and lower reoperation rate as compared to vaginal uterosacral ligament suspension and transvaginal polypropylene mesh. Small studies compared laparoscopic sacral colpopexy to open and robotic techniques without decisive outcomes.

- The evidence suggested that the use of absorbable polyglactin mesh overlay, absorbable porcine dermis or polypropylene mesh at the time of anterior vaginal wall repair reduces the risk of recurrent cystocele on examination, however improved outcomes including patient satisfaction, quality of life and reduced operations for recurrences have not yet been demonstrated. Furthermore, anterior polypropylene mesh alone demonstrated an improved subjective outcome as compared to native tissue anterior repair without any difference between the groups in the rate of dyspareunia. The operating time, blood loss, rate of apical or posterior compartment prolapse and de novo stress urinary incontinence were greater in the polypropylene mesh group, which was associated with a 11.4% rate of mesh erosion and 6.8% requiring surgical reintervention.

- The limited evidence suggested that posterior vaginal wall repair may have a better anatomical success rate than transanal repair in the management of posterior vaginal wall prolapse but the clinical effects are uncertain. There was no evidence to support the use of graft materials in the posterior compartment.

- The evidence at this stage does not support the use of transvaginal combined total, anterior or posterior mesh kits for multi-compartment prolapse. While three studies demonstrated an improved anatomical outcome after the transvaginal permanent mesh as compared to native tissue repair, no difference was found in symptoms or quality of life outcomes. The mesh exposure rate was 18%, with one half of these (9%) requiring surgical intervention. The total reoperation rate was significantly higher after the transvaginal permanent mesh at 11% compared to 3.7% following native tissue repair.

- Performing continence surgery at the time of prolapse surgery in women with stress urinary incontinence is likely to be beneficial. This benefit is also considerable in continent women undergoing prolapse who have demonstrated occult stress incontinence pre-operatively.

There was generally a lack of information on the cost of surgery.

Implications for research

None of the objectives pre-stated in the protocol for this review have been completely addressed, and all would benefit from testing in further good quality randomised controlled trials.

More broadly, further evidence on the surgical management of pelvic organ prolapse should include, but not be limited to, the following.

- Upper vaginal prolapse: vaginal surgery (e.g. vaginal hysterectomy, cervical amputation, uterosacral ligament plication, or sacrospinous colpopexy); abdominal surgery (e.g. open, laparoscopic or robotic sacral colpopexy, abdominal hysterectomy); laparoscopic pelvic floor repair; and the use of mesh or grafts.
- Anterior vaginal wall prolapse: vaginal surgery (e.g. anterior vaginal wall repair, vaginal paravaginal repair); open or laparoscopic abdominal surgery (e.g. paravaginal repair); and the use of mesh or grafts.
- Posterior vaginal wall prolapse: vaginal surgery (e.g. midline posterior vaginal wall repair, fascial repairs); the abdominal or laparoscopic approach to rectocele; and the use of mesh or grafts.

- The place for concomitant continence surgery alongside prolapse surgery.
- Evaluation of different types of sutures, mesh and grafts.

Other trials relating to pelvic organ prolapse should include comparisons with conservative treatment including, but not limited to, pelvic floor exercises, lifestyle changes and mechanical devices (pessaries).

The challenge in prolapse surgery is that while the prolapse itself may cause difficulties with bladder, bowel and sexual function, surgical correction may also affect these functions in unpredictable ways. Therefore, all trials need to include patient-reported and clinician-observed outcomes; and direct interaction with bladder, bowel and sexual function must be measured. The impact of interventions should also be assessed by utilising validated pelvic floor and quality of life questionnaires, morbidity and cost analyses. Ideally long-term outcomes should be reported, at least at two and five years after surgery.

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* Indicates the major publication for the study

CHARACTERISTICS OF STUDIES

Characteristics of included studies [ordered by study ID]

Al-Nazer 2007

Methods	Single centre RCT for stage 2 POP-Q prolapse PC generated randomisation 2 year follow up No CONSORT statement Blinding not stated power of 80% need sample size of 20 in each arm if subsequent prolapse surgery in one group 11% and 44% in mesh group	
Participants	40 randomised Inclusion criteria: stage 2 POP-Q cystocele with no plans of pregnancy in 12 months Exclusion criteria: contemplating pregnancy, patients with paravaginal defects, needing continence surgery, prior colposuspension, or vaginal surgery, immunocompromised or diabetics	
Interventions	A (n=23): anterior colporrhaphy AC 0 polyglactan vicryl suture B (n=21): self-styled armless soft polypropylene (Gynemesh) mesh without AC	
Outcomes	subjective persistence of symptom vaginal bulge Gp A 6/23 Gp B 1/21 improved objective assessment in Gp B as compared to Gp A in relation to POP-Q points Aa and Ba objective failure rate Stage 2 POPQ at Aa, Ba, Ap or Bp: Gp A 9/23 Gp B 2/21 de novo dyspareunia Gp A 1/23 Gp B 0/21 de novo SUI Gp A 2/20 Gp B 0/20 de novo OAB Gp A 2/20 Gp B 0/20 cystotomy Gp A 0/20 Gp B 0/20 mesh erosion Gp A 0/20 Gp B 1/20	
Notes	pre-operative data was supplied on 20 patients in each group and post-operative data related to Gp A 23 Gp B 21	
Risk of bias		
Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	PC generated randomisation
Allocation concealment (selection bias)	Low risk	sealed envelopes
Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	no data

Al-Nazer 2007 (Continued)

Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	No data
Incomplete outcome data (attrition bias) All outcomes	Low risk	Data seem complete
Other bias	Unclear risk	funding not stated authors no COI

Ali 2006 abstract

Methods	Single centre RCT Inclusion grade 3 or 4 cystourethrocele (BW halfway system) No exclusion No power Randomisation and concealment, blinding NS 6/12 follow up
Participants	No CONSORT N=108 Inclusion: women with grade 3 or 4 cystourethrocele (BW halfway system) There were no significant differences between the groups regarding pre-operative storage symptoms, urodynamics and degree of prolapse
Interventions	A (54): anterior colporrhaphy alone B (54): anterior colporrhaphy with tension-free polypropylene (Gynemesh PS) overlay
Outcomes	Failure was defined as grade 2 or worse anterior wall prolapse Objective failure at 6 months: A 5/43; B 3/46 (P>0.5) Blood loss: A 50.3±89 ml; B 64.5±70.4 Mesh erosion: A 0, B 3/46
Notes	

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	not stated
Allocation concealment (selection bias)	Unclear risk	not stated
Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	not stated

Ali 2006 abstract (Continued)

Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	not stated
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	not stated
Other bias	Unclear risk	not stated

Allahdin 2008

Methods	Single centre RCT comparing vaginal fascial repair with or without polyglactin mesh and with polydioxanone or polyglactin sutures, 2x2 factorial design PC randomisation, "secure" remote concealment Blinded patients, ward staff and follow-up assessor Follow up 3 months with exam, 6 months with non-validated questionnaire, 2 years with validated questionnaire
Participants	73 randomised, 7 ineligible after randomisation, 66 in trial Lost to follow up: 8 at 3 and 4 at 6 months, 12 at 2 years Inclusion: grade 2 or more prolapse (unclear examination technique), anterior and/or posterior prolapse Concomitant procedures: vaginal hysterectomy 14; cervical amputation (Manchester) 18; TVT 13
Interventions	A (32): repair with polyglactin mesh overlay B (34): repair without mesh C (33): repair of fascia with polydioxanone sutures D (33): repair of fascia with polyglactin sutures
Outcomes	At 3 months: 6/58 (10%) with residual stage 2 anterior vaginal wall prolapse (A 2/32, B 4/32, C 4/33, D 2/33) Questionnaire mean prolapse symptom score (POP-SS, 0-28) (mean, SD, n): At 6 months: A 4.4(4.8)29, B 4.3(5.4)33, C 5.1(5.1)29, D 3.6(5.0)33; At 2 years: A 4.3(4.2)25, B 4.3(6.3)29, C 5.5(6.3)26, D 3.2(4.2)28 No. of women with residual prolapse symptoms at 6 months: A 24/29, B 24/33, C 25/29 and D 23/33; at 2 years: A 19/25, B 21/29, C 21/26, D 19/28 Questionnaire mean prolapse QoL score (0-10) (mean, SD, n): At 6 months: A 1.6(2.9)28, B 1.5(2.8)33, C 2.0(3.1)28, D 1.2(2.5)33; At 2 years: A 1.5(3.0)23, B 1.8(3.5)29, C 2.5(4.1)24, D 0.9(2.1)28 No. of women with quality of life still affected by prolapse: At 6 months: A 10/28, B 13/33, C 11/28 and D 12/33 women; At 2 years: A 9/23, B 8/29, C 9/24, D 8/28 Number of women with urinary incontinence at 2 years: A 18/22, B 16/27, C 16/23, D 18/26 Urinary symptoms (ICI score 0-21): At 2 years: A 4.2(3.9)25, B 4.6(5.5)29, C 5.5(5.9)26, D 3.5(3.3)28 Dyspareunia at 2 years: A 3/9, B 3/12, C 2/11, D 4/10 Death: A 2/32, B 0/34, C 1/33, D 1/33

	Repeat prolapse surgery: A 2/32, B 4/34, C 3/33, D 3/33 Notes of all non-responders at 2 years obtained for follow up	
Notes	No CONSORT or power calculation as it was a feasibility study, no separate objective assessment in groups, validated prolapse symptom and urinary symptom questionnaires The authors randomised 66 women with grade 2 or more prolapse to receive anterior and/or posterior vaginal surgery with or without polyglactin mesh overlay and with polydioxanone or with polyglactin sutures for the repair of the pubocervical and rectovaginal fascia. At three months follow up with examination 6/58 women had stage 2 anterior vaginal prolapse without a significant difference between groups. At six months FU a postal questionnaire was completed by 62 women and at 2 years by 54 women. There were no differences between groups with prolapse symptoms The study is limited due to no power calculation, no objective report of prolapse examination separately in groups	
Risk of bias		
Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Computer generated
Allocation concealment (selection bias)	Low risk	Secure method of concealment of randomisation (remote computer allocation)
Blinding of participants and personnel (performance bias) All outcomes	Low risk	Not possible
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Participant-completed questionnaires, data entry blinded to randomisation
Incomplete outcome data (attrition bias) All outcomes	Low risk	Equal non-response between the groups, medical records seen for all non-responders
Other bias	Low risk	Unfunded study

Altman 2011

Methods	<p>Multi-centre RCT 53 centres, 58 surgeons 90% powered to detect 20% difference between groups with 1% type one error, central randomisation PC patient blinded reviews conducted 2 and 12 months by surgeon 1/3, non-surgeon 2/3 completed pre and 1 year Urogenital Distress Inventory (UDI) and Pelvic Organ Prolapse/Urinary Incontinence Sexual Questionnaire (PISQ-12)</p>
Participants	<p>1685 screened 389 randomised underwent surgery: A 182; B 191 lost to follow up A 7 B 14 (1 year: A 182; B 186) Inclusion: >18 yrs, ≥Stage 2 symptomatic cystocele POP-Q Exclusion: previous cancer of any pelvic organ, systemic glucocorticoid treatment, insulin-treated diabetes, an inability to participate or to provide consent, or need concomitant surgery</p>
Interventions	<p>A (182): anterior colporrhaphy slow absorption monofilament thread, sham skin markings, excessive trimming vagina discouraged B (191): Gynecare transvaginal anterior mesh (Prolift), absorbable sutures, excessive vaginal trimming discouraged, catheter care discretion surgeon</p>
Outcomes	<p>Primary outcome: composite score Ba <-1 and no symptoms on prolapse Q16 UDI Secondary outcomes: Ba<-1 on POPq; Q16 -ve: adverse events, UDI and sexual function Failure rate composite subjective and objective: A 114/174 (65%); B 69/176 (39%) Subjective failure: A 64/174; B 44/179 Objective failure anterior wall ≥Stage 2: A 96/183; B 33/186 Operating time (min, SD): A 33.5(10.5); B 52.6 (16.5) Blood loss (ml): A 35 (35); B 85 (163) Blood loss>500mls: A 0; B 5 Inpatient days: A 1.6(1.1); B 1.8(1.2) Cystotomy (bladder perforation at surgery) A 1; B 7 Genital pain: A 1/174; B 5/186 Surgery prolapse: A 1; B 0 De novo SUI: A 11/176; B 22/179 De novo dyspareunia: A 2/101; B 8/110 Point C and Point D significantly different post op between the groups: median point C: A -6 (-9 to 7); B -6(-10 to 6) median point D: A -7(-12 to -2); B -7.5(-12 to -1) No difference between the groups postoperatively with UDI and PISQ-12 UDI-S (stress symptoms, mean SD): A 17.7 (13.9-21.4); B 24.2 (20.5-28) UDI-O (obstructive symptoms, mean SD): A 12.3 (10.3-14.3); B 8.7 (6.7-10.7) Surgery SUI: A 0; B 5 Mesh exposure (Personnel communication) A 0; B 21/183 Surgery mesh exposure: A 0; B 6</p>
Notes	<p>Findings Anterior mesh decreases the recurrence rate on examination and subjectively at 1 year mesh surgery has longer operating time, greater blood loss, greater number with more than 500mls EBL, greater number cystotomies, greater number difficulty emptying</p>

bladder and inguinal pain in early post phase. No difference in reoperation rate for prolapse seen 1 year (i in AC Gp A) whereas reoperation rate higher in mesh group for SUI, and mesh exposure and possible higher rate de novo dyspareunia

The authors have not commented on sig difference between Point C and D between the groups. Some uncertainty surrounds veracity of POPQ measurements and how data was cleaned. Prior to surgery all symptomatic POP whereas 15% in each group reported asymptomatic

Very difficult to understand how women with large POP in all compartments i.e. C and D +6 were not offered surgery other than anterior compartment or meets exclusion criteria of not requiring surgery other than anterior compartment prolapse

(1) Subgroup analysis I: Ek et reported on urodynamic evaluation pre and two months post-surgery (A 27 women having anterior colporrhaphy and B 22 women having polypropylene mesh Prolift)

Objective de novo stress urinary incontinence was significantly less common: A 2/25; B 7/22

The maximum urethral closure pressure (MUCP) did not change significantly following intervention A, however in group B it reduced significantly from 44(6-69) preop to 29.5(14-79) postop in B

(2) Subgroup analysis II:

CLINICAL EFFICACY OF A TROCAR GUIDED MESH KIT FOR THE REPAIR OF ANTERIOR LATERAL DEFECTS

preop A 45 B 61

persistent lateral defect 1 year: A 12/37; B 1/44

1 year stage Aa/Ba \geq 0: A 18/43; B 4/60

In this abstract it is unclear why 6 in A and 14 in B: examined but no comment on lateral defects

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	computer generated randomisation
Allocation concealment (selection bias)	Low risk	secure concealment with remote computer
Blinding of participants and personnel (performance bias) All outcomes	Low risk	patients blinded (sham skin markings)
Blinding of outcome assessment (detection bias) All outcomes	High risk	reviewers surgeon 1/3, non-surgeon 2/3 participant-completed questionnaires
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	patient flow accounted for completely in both groups
Other bias	High risk	funded Karolinska institute and Ethicon: conflict of interest statements of members

	of Nordic transvaginal mesh group who were reviewers of surgery were not reported
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Benson 1996

Methods	Single centre RCT for uterine or vault prolapse Number table held by non-surgical co-author Follow up A+B 2.5 years
Participants	101 randomised 13 withdrawals (10 did not want surgery, 3 in A wanted vaginal surgery) 88 analysed 8 lost to follow up Inclusion: cervix to or beyond hymen, vaginal vault inversion >50% length and anterior wall to or beyond introitus Exclusion: uterus >12 weeks, adnexal mass, short vagina, central cystocele, >2 abdominal surgeries, obesity, prior inflammatory bowel or pelvic disease
Interventions	A (40): abdominal group: sacral colpopexy (mesh not specified), paravaginal repair, Halban, posterior vaginal wall repair with colposuspension or sling for stress urinary incontinence, non standardised continence surgery B (48): vaginal group: bilateral sacrospinous colpopexy, vaginal paravaginal repair, Mc-Call culdoplasty, needle suspension or sling; permanent sutures
Outcomes	Optimal: asymptomatic vaginal apex > levator plate: no vaginal tissue beyond the hymen A: 22/38, B: 12/42 Satisfactory: asymptomatic for prolapse and prolapse improved from preoperative: Symptomatic: prolapse apex descent >50% of its length or vaginal tissue beyond hymen Incontinence A: 10/38, B: 16/42 Dyspareunia A: 0/15, B: 15/26 Peri-operative outcome: Febrile: A 8% /38, B 4% /42 Hospital stay: A 5.4, B 5.1 days Incontinence: A 23% /38, B 44% /42 Cost: Hospital charge: A US\$8048, B US\$6537 Further prolapse surgery: A 6, B 14 Further continence surgery: A 1, B 5
Notes	After interim analysis study ceased early. Satisfactory randomisation 63% vaginal group underwent continence surgery as compared to 40% abdominal group: 21% slings vaginal group as compared to 5% abdominal group suggesting unequal randomisation. Women with a cystocele to the introitus postoperatively were considered to have optimal outcome when this was also part of inclusion criteria. Objective outcome not reported No stratification No blinding Standardised surgery, but continence surgery not standardised

Benson 1996 (Continued)

	No intention to treat No CONSORT statement No validated questionnaires No quality of life measures.	
Risk of bias		
Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	randomisation table held by non-surgeon
Allocation concealment (selection bias)	Unclear risk	no data
Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	no data
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	no data
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	no data
Other bias	Unclear risk	no data

Borstad 2010

Methods	RCT comparing prolapse surgery with TVT and prolapse surgery with delayed TVT at 3 months for women with POP and SUI No CONSORT statement Power calculation: 70 in each arm randomisation process and allocation concealment adequately described neither assessor or patients blinded Intention-to-treat analysis: yes
Participants	Inclusion criteria: non-consecutive women awaiting prolapse surgery with symptomatic and objective (provocation 300mls) SUI or occult SUI (SUI with pessary in position), Exclusion criteria not specified Randomised 194 (A 99; B 95) Lost to follow up A 5; B 8 Analysed A 94; B 87
Interventions	A (94): unspecified prolapse surgery without TVT (53 women underwent TVT at 3 months following initial surgery if required) B (87): unspecified prolapse surgery plus TVT

Borstad 2010 (Continued)

Outcomes	Objective success (no symptoms SUI or urethal leakage on examination): A 72/94 (77%) ; B 83/87 (95%) at 3 months New incontinence operation at 3 months: A 53/94; 0/87
Notes	in gp A 41 women elected not to have subsequent TVT at 3/12: 14 of these had some symptoms and not stated how many of these wished they had TVT at initial procedure Conclusion: it is difficult not to offer patients with pre-existing SUI continence surgery at time of vaginal prolapse surgery

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	PC generated randomisation
Allocation concealment (selection bias)	Low risk	Randomised, allocation concealment appropriate
Blinding of participants and personnel (performance bias) All outcomes	High risk	non-blinded
Blinding of outcome assessment (detection bias) All outcomes	High risk	non-blinded
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	clear assessment of patients
Other bias	Unclear risk	stated no authors conflict of interest, funding not stated

Braun 2007 abstract

Methods	Single centre RCT comparing abdominal and vaginal routs for surgically treating central compartment prolapse No CONSORT statement No power calculation No intention-to-treat analysis No data on type of randomisation, blinding strategy or allocation concealment No definition of cure or failure Follow up 33 months (20-41) both arms Prolapse assessment: POP-Q
Participants	Inclusion: POP-Q Stage 3-4 prolapse Exclusion: not specified Randomised: 47

	Analysed: 47
Interventions	A (23): TAH ± BSO + abdominal (open) sacral colpopexy B (24): vaginal hysterectomy + anterior & posterior colporrhaphy + Mayo McCall stitch Materials used: A: vypro mesh (combined absorbable - non-absorbable); prolene (non-absorbable) sutures to both sacrum and vagina B: delayed absorbable (PDS) sutures
Outcomes	Mean operating time: Gp A: 140 min (100-240); Gp B: 90 min (50-130) Mean days in hospital: Gp A: 3.8; Gp B: 2 Objective failure: A: 0/23; B: 2/24 (1 anterior and 1 vault) Further prolapse surgery: A: 0/23; B: 1/24 Total complication rate: A: 3/23 (13%); B: 0/24 Specific complications: A: haematoma 1/23, mesh erosion: 1/23, incisional hernia: 1/23
Notes	A quantitative definition for success or failure is not provided. The mean operating time, length of hospitalisation and rates of complications were higher in the sacral colpopexy group but in the absence of statistical comparisons to support these results, one cannot comment on their significance.

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	not stated
Allocation concealment (selection bias)	Unclear risk	not stated
Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	not stated
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	not stated
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	not stated
Other bias	Unclear risk	not stated

Brubaker 2008

Methods	<p>RCT (computer generated block stratification for surgeon and paravaginal repair), sealed envelopes opened at time of surgery after anaesthetic was administered)</p> <p>7 Site: Multi-centre study in USA</p> <p>Follow up: 3 months (data at 1 year for 231 women) 2 year data</p> <p>interviewers and examiners blinded</p> <p>imputation of 2-yr outcome data (those re-operated included outcome related to worse of score prior to 2nd intervention or after subsequent intervention)</p>
Participants	<p>322 women. CONSORT statement</p> <p>Inclusion criteria: POP-Q stage 2-4 prolapse (Aa must be -1 or worse) and stress continent based on responses of 'never' or 'rarely' to 6 of the 9 SUI questions of MESA. Despite these criteria, preoperatively 19.2% participants had SUI defined by PFDI, 10% had bothersome stress urinary incontinence (PFDI questionnaire) and 39% had a positive stress test with or without prolapse reduction prior to intervention. From table 2 of the 3 month data it appears these participants were equally distributed between the groups.</p> <p>Exclusion criteria: Immobile urethrovesical junction, pregnancy, anticipated move away after surgery</p> <p>Groups were comparable at baseline on age, race, ethnic group, marital status, education, parity, method of delivery, distribution of women with positive stress test, OAB, prior hysterectomy continence and prolapse surgery</p> <p>Surgeons were unaware of urodynamic findings including urodynamic stress incontinence or occult stress incontinence with or without the prolapse reduced</p>
Interventions	<p>A (157): abdominal sacral colpopexy with Burch colposuspension</p> <p>B (165): abdominal sacral colpopexy without Burch colposuspension (control group)</p> <p>Compliance: women treated according to randomised groups: A, 154/157; B, 164/165</p> <p>concomitant surgery paravaginal repair A 31/157 20% Gp B 34/165 20.6%</p> <p>hysterectomy GP A 29%; Gp B 28%</p> <p>standardised surgery for colposuspension: not standardised paravaginal repair or sacral colpopexy (17% biological grafts, 43% Mersilene and 39% polypropylene and minimal use of PTFE (Gore-tex) (6%)</p> <p>While surgery was standardised for colposuspension neither the paravaginal repair nor sacral colpopexy was standardised with variation in use of suture type and graft materials: 17% biological grafts, 43% Mersilene 39% polypropylene 6% Gore-tex. No data on further performed surgeries is provided in the publication</p>
Outcomes	<p>At 3 months: SUI composite end point defined as any of the following present:</p> <ol style="list-style-type: none"> 1. Symptoms, as defined by a "yes" response to any of three questions in the PFDI stress incontinence subscale assessing leakage with coughing, sneezing, or laughing; physical exercise; and lifting or bending over 2. Stress incontinence during a standardized stress test at maximum bladder capacity or 300 mL, whichever was less 3. Any treatment for stress incontinence after the study surgery <p>Composite SUI outcome at 3 months: A, 35/156; B, 67/164; 1 year: A, 42/155; B, 42/155; 24 months: A, 47/147, B, 70/155</p> <p>Composite OAB outcome at 3 months: A, 50/156; B, 59/164; 12 months: A, 51/155, B, 66/161; 24 months: A, 47/147, B, 69/155</p> <p>Urge urinary incontinence at 3 months: A, 10/143; B, 18/151; 12 months: A, 9/155, B, 17/158; 24 months: A, 10/147, B, 19/155</p>

	<p>Operation time (N, mean min, SD): A, 157, 190 (55); B, 165, 170 (60) Blood loss (N, mean ml, SD): A, 157, 265 (242); B, 165, 192 (125) Cumulative adverse effects at 24 months: A, 56/153; B, 64/158 Serious adverse effects: A, 7/157; B, 5/165</p> <p>At 2 years: Two year results were reported on Group A (n = 157) and B (n = 165) SUI symptoms (PFDI+ve): A 38/147, B 63/155 +ve cough stress test: A 11/116, B 9/134 Further surgery for SUI: A 19/147, B 31/155 Bothersome SUI: A 17/147, B 39/155 Bothersome UI: A 10/47, B 19/155 POP-Q outcomes, mean (SD): point C (cervix): A -8.0±1.5, B -8.2± 1.3 Ba (anterior): A -2.2±0.9, B -1.8±1.1 Bp (posterior): A -2.0±0.9, B -2.3±0.8 stage 0 24/117, 23/132; stage 1 43/117, 51/132; stage 2 46/117, 57/132; stage 3 4/117, 1/132</p>
Notes	<p>Study terminated after 322 women had been randomised because of significant differences in UI outcomes</p> <p>Results not reported separately according to whether concomitant hysterectomy performed</p> <p>Women remained in allocated groups for analysis (ITT) but analysis based on end-point data actually available</p> <p>Further data were made available in a new report depending upon status of occult stress incontinence (Visco 2008). The prolapse reduction during preoperative stress testing was performed with 5 different methods (swab, manual, speculum, pessary or forceps) with each woman undergoing two types of prolapse reduction. Data from all prolapse reductions (2 for each patient) were reported as a total at 3 months only. Visco concluded that none of the techniques to demonstrate occult urinary incontinence were able to predict which women would become incontinent or not with or without concomitant continence surgery, although women who did have occult incontinence were more likely to be incontinent afterwards regardless of randomised allocation. Data from all prolapse reductions (two for each patient) were reported as a total and in analysing the post intervention continence status of women who did and did not have occult stress incontinence pre-operatively a decision was made to half the reported total numbers for the analysis</p> <p>Stress continence at baseline was defined based on responses of 'never' or 'rarely' to six of the nine SUI questions on the MESA questionnaire (medical, epidemiological and social aspects of aging questionnaire). Preoperatively 19% of the participants had SUI defined by the PFDI (Pelvic Floor Distress Inventory), 10% had bothersome stress urinary incontinence according to the PFDI and 39% had a positive stress test with or without prolapse reduction prior to surgery</p> <p>Different and complicated definitions were used to categorise stress continence prior to and after the interventions making it more difficult to be classified as stress continent post interventions than prior to the intervention (see included studies tables). 39% classified as stress continent prior to surgery would have been classified as stress incontinent using the post-intervention definition</p> <p>The use of imputation in the two year results is to be applauded by the authors. The process utilised ensures that in women undergoing further continence surgery that the</p>

Brubaker 2008 (Continued)

	continence status prior to the second intervention or after the surgical intervention outcomes, whichever is worse, is included in the final outcome data	
Risk of bias		
Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	PC generated
Allocation concealment (selection bias)	Low risk	A - adequate
Blinding of participants and personnel (performance bias) All outcomes	Low risk	blinded patients
Blinding of outcome assessment (detection bias) All outcomes	Low risk	blinded patients
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	data accounted for equally
Other bias	Unclear risk	funded competitive research grants

Bump 1996

Methods	Dual centre RCT: needle suspension or plication of urethrovesical junction endopelvic fascia for cystocele and potential stress incontinence Computer generated randomisation, blocks of 4 to 6 Follow up A+B 2.9 years
Participants	32 women Withdrawals: 0 Inclusion: stage 3 or 4 anterior vaginal wall prolapse and bladder neck hypermobility Lost to follow up: 4
Interventions	A (14): needle suspension according to Muzsnai with non-absorbable sutures B (15): plication of urethrovesical junction endopelvic fascia according to Hurt with non-absorbable suture
Outcomes	Definition of cure: no stress urinary incontinence, no overactive bladder symptoms, no voiding dysfunction Postoperative urodynamic stress incontinence that was not present preoperatively: A 2/14, B 1/15 New overactive bladder symptoms: A 2/14, B 1/15 Describes site specific pelvic organ prolapse

Bump 1996 (Continued)

Notes	No blinding No stratification No intention to treat No CONSORT Potential stress incontinence was identified in 20/29 preoperatively The definition of potential stress urinary incontinence included a positive barrier test or pressure transmission ratio of <90% for proximal 3/4 of the urethra Validated questionnaires.
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Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	computer generated
Allocation concealment (selection bias)	Unclear risk	NS
Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	NS
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	validated questionnaires assessments not stated
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	NS
Other bias	Unclear risk	not stated

Carey 2009

Methods	Single centre RCT CONSORT no Randomisation computer generated Allocation concealment N/S subjects, surgeons and reviewers not blinded 12 months follow up
Participants	Inclusion criteria: women recommended vaginal surgery for anterior and posterior compartment with \geq grade 2 prolapse Exclusion criteria: only requiring anterior or posterior compartment surgery, apical prolapse beyond the hymen or those requiring abdominal mesh surgery Randomised: 139 (A: 70, B: 69) 10 women breached study protocol and 11 more recruited. All were analysed Lost to follow up: A: 6, B 9 Analysed 12 months : A 63, B 61

Interventions	A (70): traditional anterior and posterior fascial plication using polydioxanone sutures B (69): anterior and posterior repair with Gynemesh PS augmentation	
Outcomes	Definition of cure: less than stage 2 prolapse at all sites Objective failure stage 2 or greater POP-Q at any site: A 21/61, 34%, B 12/63, 18% P=0.07 Subjective failure (not satisfied with surgery, VAS <80): A 12/63 19%, B 14/59 9% p=0.12 Dyspareunia A 13/33 39% B 12/30 (40%) De novo dyspareunia A 5/12 42%, B 5/18 28% p=.46 Mesh erosion: A 0, B 4/63 (6.5%) 3 of 4 surgery subsequent prolapse surgery Gp A 2 Gp B 0	
Notes	Pre-operatively there was significant limitation in data recording with prior prolapse surgery and dyspareunia rate being recorded in only 51 of 70 recruited in Gp A. With both the preoperative dyspareunia rate and prior prolapse surgery approaching a statistically significant level missing such rudimentary preoperative data is disappointing	
Risk of bias		
Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	computer generated
Allocation concealment (selection bias)	High risk	no information on allocation concealment. significant pre-operative data missing as above
Blinding of participants and personnel (performance bias) All outcomes	High risk	no blinding
Blinding of outcome assessment (detection bias) All outcomes	High risk	no blinding
Incomplete outcome data (attrition bias) All outcomes	Low risk	clear follow up of patients both groups
Other bias	High risk	funding not stated: authors conflict of interest financial agreement with Ethicon manufacturer of product evaluated in study

Colombo 1996

Methods	Single centre RCT (computer generated, unclear if allocation concealed) Cystopexy or cystopexy and pubo-urethral ligament plication for cystocele Follow up: A 2.6 years, B 2.9 years
Participants	107 randomised Lost to follow up: 4, 1 died 102 analysed Inclusion: cystocele grade 2 or more Exclusion: positive stress test with or without prolapse reduced, overactive bladder symptoms, MUCP <30, previous incontinence surgery
Interventions	A (52): cystopexy alone: interrupted non-absorbable sutures of fascia B (50): cystopexy and pubo-urethral ligament plication according to Hurt with absorbable suture McCall culdoplasty and posterior repair in all women
Outcomes	Objective cure of cystocele less than grade 2: A: 50/52, B: 48/50 Reduction in voiding symptoms: Successful prevention stress urinary incontinence: A: 48/52, B 46/50 Dyspareunia: A 2/24, B 13/23 New postoperative overactive bladder symptoms Voiding dysfunction Days in hospital
Notes	No blinding No intention to treat Power calculation post hoc No CONSORT No validated symptom or QOL questionnaire Informed consent not required before randomisation Surgery standardised Who reviewed outcomes was unclear.

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	not stated
Allocation concealment (selection bias)	Unclear risk	B - unclear
Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	not stated
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	not stated

Colombo 1996 (Continued)

Incomplete outcome data (attrition bias) All outcomes	Unclear risk	not stated
Other bias	Unclear risk	not stated

Colombo 1997

Methods	Single centre RCT (computer generated, allocation concealment unclear) Follow up: A 6.3 years, B 6.7 years
Participants	109 randomised 109 analysed for 5 years postoperatively 9 died 3-7 years postoperatively Inclusion: positive stress test with or without prolapse reduced, cystourethrocele > grade 2 Exclusion: negative stress test, overactive bladder symptoms, MUCP <30, previous incontinence surgery
Interventions	A (55): Cystopexy with interrupted non-absorbable sutures of fascia pubo-urethral ligament plication with absorbable sutures B (54): Pereyra with non-absorbable sutures McCall culdoplasty and posterior colporrhaphy in all women
Outcomes	Objective cure of cystocele less than grade 2: A 55/55, B 52/54 Subjective cure SUI: A 43/55, B 48/54 Objective cure SUI: A 24/55, B 37/54 Objective cure of occult SUI: A 20/40, B 25/43 New post-operative overactive bladder symptoms, voiding dysfunction, days in hospital
Notes	No blinding No intention to treat Power calculation performed post hoc No CONSORT No validated symptom or quality of life measures Informed consent not required before randomisation Surgery standardised Who reviewed outcomes unclear.

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	not stated
Allocation concealment (selection bias)	Unclear risk	B - unclear

Colombo 1997 (Continued)

Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	not stated
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	not stated
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	not stated
Other bias	Unclear risk	not stated

Colombo 2000

Methods	Single centre RCT (computer generated open number list) Burch or anterior repair for pelvic organ prolapse and stress urinary incontinence PC-open list Follow up: A 14.2, B 13.9 years
Participants	71 randomised Lost to follow up: 3 (A 2, B 1) 68 analysed Inclusion: USI, cystocele >2 or 3, swab test >30% Exclusion: detrusor overactivity, previous pelvic floor surgery, high risk for abdominal operation
Interventions	A (35): Burch group: total abdominal hysterectomy and vault to uterosacral ligament, Moschcowitz, Burch with 3-4 Ethibond B (33): anterior colporrhaphy: vaginal hysterectomy, Pouch of Douglas obliteration and anchoring of vaginal cuff to uterosacral ligament, catgut plication
Outcomes	Definition of cure: no subjective stress urinary incontinence, or no positive stress test Objective cure cystocele: A 23/35, B 32/33 Subjective cure stress urinary incontinence: A 30/35, B 17/32 Objective cure stress urinary incontinence: A 26/35, B 14/32 Overactive bladder symptoms, voiding, dyspareunia Total vaginal length: A 7.9 cm, B 4.7 cm
Notes	No blinding No intention to treat No CONSORT No stratification No power calculation No validated symptom or QOL questionnaire Surgery standardised.

Risk of bias

Colombo 2000 (Continued)

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	computer generated
Allocation concealment (selection bias)	High risk	C - inadequate
Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	NS
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	NS
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	NS
Other bias	Unclear risk	NS

Costantini 2007

Methods	Single centre RCT Randomisation not stated Allocation concealment not stated Blinding of outcome assessors not stated No CONSORT
Participants	6 women Inclusion: continent women (women with negative stress test before and after prolapse reduction, no preoperative symptoms of urinary incontinence, negative symptom questionnaire and no leakage during urodynamics) with 'severe' uterovaginal and vault prolapse (not clearly defined) Exclusion: N/S 66 randomised 66 analysed
Interventions	A (32): sacral colpopexy (open) B (34): sacral colpopexy + Burch (open) concomitant surgeries: abdominal hysterectomy
Outcomes	Length of F/U: A 38±19 mo (range 15-71); B 42±18 mo (range 12-74) Overall de novo incontinence: A 3/32 (9%); B 12/34 (35%) p< 0.05 De novo stress incontinence: A 1/32 (3%); B 9/34 (27%)
Notes	Primary continence assessments were based on a non-defined stress test, and symptoms from the UDI questionnaire. Urinary incontinence was clinically classified "on the basis of the ICS definition and graded on the Ingelman Sunderberg scale". Pre-operative UDI

Costantini 2007 (Continued)

	scores were given but no postoperative UDI scores were available	
Risk of bias		
Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	not stated
Allocation concealment (selection bias)	Unclear risk	not stated
Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	not stated
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	not stated
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Not stated
Other bias	Unclear risk	no conflict of interest statement or funding statement

Costantini 2008

Methods	Single site RCT Blinded assessors Intention to treat NS Power calculation adequate Sample size 47
Participants	CONSORT statement: yes Inclusion: women age 18-75, POP>St. 2 (BW and POPQ), urinary incontinence defined by ICS Exclusion: uterine fibroids, uterine/cervical malignancy, active PID, allergy to synthetic graft/suture materials, pregnancy/lactation, significant illnesses, inability to provide informed consent or comply with study protocol 47 randomised A 23; B 24 No loss to follow up Distribution of POP between groups not clear: 24 uterovaginal, 13 vault, 8 cystocele and 2 cystocele and rectocele
Interventions	A (23): sacral colpopexy 17, sacral hysteropexy 6, no colposuspension B (24): sacral colpopexy + Burch 14, sacral hysteropexy + Burch 10 Pre-operatively incontinence defined by urodynamics: 13 USI, 30 mixed, 4 occult (incontinence with coughing or Valsalva manoeuvre with the prolapse reduced). Distribution of patients with prolapse and incontinence pre-operatively between the groups is

	unclear	
Outcomes	<p>Primary incontinence outcome: combination of bladder diary, number of pads and stress test without clear definition: A 9/23, B 13/24 (P=0.46)</p> <p>Secondary outcomes included quality of life (IIQ and UDI) VAS and subjective symptoms</p> <p>Median pads/day (range): A pre 1 (0-5) post 0 (0-3); B pre 1 (0-5) post 1 (0-3)</p> <p>Median IIQ score(range): A pre18 (1-53) post 2 (0-17); B pre 16 (3-33) post 2 (0-11) (P=0.33)</p> <p>Median UDI score (range): A pre 16 (0-45) post 3 (0-10); B 16 pre (6-45) post 3 (0-10) (P=0.77)</p> <p>Median VAS* satisfaction score (range): A 9 (3-10); B 8 (4-10)</p> <p>POP was a primary outcome without clear definition failure: no differences were detected in anatomical outcome (POP-Q measurements given in paper for 7 POP-Q measurements)</p>	
Notes	<p>The authors' conclusion that colposuspension at time of sacral colpopexy has little positive benefit seems valid. There are methodological problems with this paper, including lack of clear and equal distribution of prolapse grading and incontinence between the groups pre-operatively, inconsistency of pre and post-operative incontinence classifications (urodynamics pre-operatively and symptoms post-operatively) and lack of definition of success of prolapse grading and data relating to peri-operative parameters and complications.</p>	
Risk of bias		
Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	not stated
Allocation concealment (selection bias)	Unclear risk	not stated
Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	not stated
Blinding of outcome assessment (detection bias) All outcomes	Low risk	blinded assessors
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	unclear
Other bias	Unclear risk	COI or funding statement not included

Culligan 2005

Methods	Single centre RCT (computer generated, blocked, opaque envelopes, double blind) Fascia lata versus polypropylene mesh for sacral colpopexy Follow up: 1 year
Participants	100 randomised Lost to follow up: 11 (A 2, B 9) Inclusion: post-hysterectomy vault prolapse Groups comparable at baseline on age, weight, height, parity, incontinence severity, POP-Q measurements, prolapse stage, previous prolapse or incontinence surgery (A 19/46, B 24/54) Randomised group compared with women who declined randomisation (101 women), no statistically significant differences found
Interventions	A (46): abdominal sacral colpopexy with cadaveric fascia lata graft (Tutoplast) attached with Goretex to anterior and posterior vaginal wall and to S1-S2, covered with peritoneum B (54): abdominal sacral colpopexy as above, using polypropylene mesh (Trex) Concomitant surgery: TVT, paravaginal and rectocele repair; conditions not defined
Outcomes	Definition of failure: POP-Q stage 2 or greater at any site: A 14/44, B 4/45 Recurrent vault prolapse at point C: A 0/44, B 0/45 Blood loss N, mean ml (SD): A 46, 265 (261), B 54, 47 (148) Operating time N, mean min (SD): A 46, 233 (7), B 54, 227 (63) Ileus: A 0/46, B 2/54 Adverse effects: fever: A 2/46, B 2/54; wound breakdown: A 5/46, B 8/54; graft erosion: A 0/46, B 2/54 Total adverse effects: A 7/46, B 12/54 5 year update Objective success Gp A 18/29 Gp B 27/29 Clinical definition Gp A 26/29 Gp B 28/29
Notes	4 women randomised to fascia (A) actually received mesh (B) and were analysed in the mesh group, therefore NOT true ITT. One single blinded examiner No ITT Only mean values of POPQ given for sites apart from point C No analysis of questionnaires, bladder, bowel and sexual function

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	computer generated
Allocation concealment (selection bias)	Low risk	A - adequate

Culligan 2005 (Continued)

Blinding of participants and personnel (performance bias) All outcomes	Low risk	patients blinded
Blinding of outcome assessment (detection bias) All outcomes	Low risk	blinded assessor nurse
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	low risk
Other bias	Unclear risk	authors had COI with Bard whose mesh was assessed. Funding study not stated

De Ridder 2004 abstract

Methods	RCT (unclear randomisation and concealment) Pelvicol versus Vicryl for stage III cystocele repair Follow up: 25/26 months
Participants	134 included A 65, B 69 Inclusion: stage III cystocele
Interventions	A (65): Raz 4 defect cystocele repair reinforced with porcine dermis overlay (Pelvicol) B (69): as above, reinforced with Vicryl Concomitant surgery: vaginal hysterectomy and rectocele repair
Outcomes	Primary outcome: recurrence of cystocele stage II: A 6/63, B 19/62 (p=.002) Number having repeat prolapse surgery: A 3/63, B 9/62 No differences in questionnaires
Notes	Abstract, limited information though requested No subjective outcome, no analysis of bladder, bowel and sexual function

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	NS
Allocation concealment (selection bias)	Unclear risk	B - unclear
Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	NS

Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	NS
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	NS
Other bias	Unclear risk	NS

de Tayrac 2008

Methods	Mulicentre RCT comparing Infracoccygeal sacropexy and sacrospinous suspension for uterine or vaginal vault prolapse No CONSORT statement Power calculation: yes, 77 required in each arm. Recruitment stopped after change in mesh material (multi-filament mesh replaced by monofilament) No intention-to-treat analysis No data on type of randomisation, blinding strategy or allocation concealment No definition of cure or failure Mean follow up 16.8 months (range 1.5 - 32) both arms Prolapse assessment: POP-Q Validated questionnaires: PFDI, PFIQ, PISQ-12, French version
Participants	Inclusion: symptomatic uterine or vaginal vault prolapse (stage 2 or higher) Exclusion: isolated cystocele, stage 1 prolapse, rectal prolapse, and intestinal inflammatory disease 49 randomised 4 lost to follow up 45 analysed
Interventions	A (21): infracoccygeal sacropexy (multi-filament Polypropylene tape, posterior IVS) B (24): sacrospinous suspension Concomitant surgery: cystocele repair, posterior repair, hysterectomy, suburethral tape. Types of repair and indications for repair were not described
Outcomes	Primary outcome measure: post-operative day 1 pain assessed by a VAS Secondary outcome measures: peri-operative data, quality of life, anatomical results and erosion rates Anatomical failure (not defined): A 1/21 (4.8%); B 0/24; p=0.94 Post-op uterine/vault prolapse (stage>1): A 1/21 (4.8%); B 0/24; p=0.94 Post-op cystocele (stage>1): A 1/21 (4.8%); B 6/24 (25%); p=0.14 Post-op rectocele (stage>1): A 0/21; B 1/24 (4.2%); p=0.94 Further prolapse surgery: A 2/21 (9.5%); B 2/24 (8.3%) Day 1 post-op pain (VAS 0 to 10, 0=no pain): A 1.3+/-1.6; B 3.2+/-2.7; p=0.01 Operating time mean (min): A 13.2+/-5.2; B 20.0+/-8.1; p=0.002 Days in hospital mean: A 4.9+/-1.8; B 3.9+/-1.2; p=0.06 Patients' satisfaction: A 18/21 (86%); B 19/24 (79%)

Notes	<p>Power calculations were unusually based on the parameter of day 1 pain scores and necessitated 77 women in each group</p> <p>While the pain on day 1 VAS was significantly greater ($p=0.01$) in the sacrospinous group, no differences were seen on days 0, 2 or at follow up</p> <p>PISQ-12, PFDI and PFIQ scores were not significantly different between groups but absolute values were not given for the latter two</p> <p>The authors concluded the posterior IVS was equivalent to the sacrospinous suspension with a decreased rate of post-operative pain and cystocele recurrence. The higher recurrent cystocele rate was non-statistically significant and difficult to evaluate given the lack of documentation of anterior compartment surgery. The conclusion regarding decreased pain is also misleading as it only relates to day 1 scores and not supported by data on days 0, 2 and post-operative follow up</p>
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Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	not stated
Allocation concealment (selection bias)	Unclear risk	not stated
Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	not stated
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	participant completed questionnaires
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	not stated
Other bias	Unclear risk	COI or funding unstated

Dietz 2010

Methods	<p>RCT</p> <p>1 yr review</p> <p>Inclusion: stage 2 or greater uterine prolapse</p> <p>CONSORT</p> <p>Not blinded, sample size calculation bases upon recovery time</p> <p>Randomisation and concealment appropriate.</p> <p>Concomitant surgery anterior and posterior repair, TVT if required</p>
Participants	<p>71 randomised Gp A 34 Gp B 37</p> <p>Withdrew 3, 2</p> <p>Surgery 31, 35</p>

	<p>Lost to follow up 0 2 Analysed 31, 33 the article results quote 34 SS hysteropexy group Groups were comparable at baseline</p>
Interventions	<p>A (31) vaginal hysterectomy with uterosacral suspension B (34) vaginal sacrospinous hysteropexy with uterine preservation</p>
Outcomes	<p>POPQ stage 2 or greater objective failure: apical (vault / uterine) A 1/31, B 7/34 Ba (anterior, cystocele) A 20/31, B 17/34 Bp (posterior, rectocele) A 9/31, B 6/34 hospital stay median A 4 days, B 3 days (P=0.03) further prolapse surgery A 2/31, B 4/34 days to return to activities of daily life A 33±21, B 34±13 days to return to work A 66±34, B 43±21. No differences were reported in domain scores on quality of life and urogenital symptoms UDQ and IIQ between the two procedures one year after the surgery. Functional outcomes and quality of life did not differ between the procedures. TVL cm Gp A 7.3(1.5) Gp B 8.8(1.3) point D (behind cervix or vault) Gp A -5.7(1.9) Gp B -7.4(2.6)</p>
Notes	<p>The authors concluded that more recurrent apical prolapses were found after the sacrospinous hysteropexy as compared to vaginal hysterectomy at one year. Sacrospinous hysteropexy quicker return to work and longer vagina than hysterectomy group</p>

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	computer generated
Allocation concealment (selection bias)	Low risk	via research nurse mail
Blinding of participants and personnel (performance bias) All outcomes	High risk	no
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	participant-completed questionnaires
Incomplete outcome data (attrition bias) All outcomes	Low risk	reported last data carried forward and worse case scenario
Other bias	Unclear risk	COI none: no statement on funding

Farid 2010

Methods	multi-surgeon dual centre RCT randomisation: nurse taking card from envelope allocation concealment poorly described reviewers blinded
Participants	participants not described re blinding inclusion criteria a rectocele larger than 2 cm with one or more of the following symptoms: need for digital manipulation during defecation, sense of incomplete evacuation, excessive straining, or sexual dyspareunia exclusion criteria: Patients with recurrent rectocele, rectal intussusception, anismus, diabetes, previous anal surgery, systemic steroid treatment, connective tissue disease, slow-transit constipation (diagnosed by The SITZMARKS radiopaque marker if it appear in X-ray of the abdomen after 5 days), compromised anal sphincter function (diagnosed by fecal soiling or RAP\40), or abnormal thyroid function were excluded from the study.
Interventions	Gp A (n=16) transperineal repair (3.0 vicryl) with levatorplasty (0.0 vicryl) Gp B (n=16) transperineal repair alone gp C (n=16) transanal approach 2.0 vicryl) (Delorme procedure)
Outcomes	6 month assessment pre and post patient completed modified obstructed defecation syndrome patient questionnaire pre and post anal manometry rectocele size on defecography A 0.94±0.74 B 0.94±0.75 C 2.08±1.58 functional score A 3.8±1.7 B 7.7±2.5 C 12.8±8.9 no cases de novo dyspareunia wound infection transperineal groups 3/32, 9%
Notes	the authors conclude that transperineal repair is superior to transanal repair in structural and functional outcome

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	unclear, nurse taking card from envelope
Allocation concealment (selection bias)	Low risk	opaque envelopes
Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	not stated
Blinding of outcome assessment (detection bias) All outcomes	Low risk	examiners blinded

Farid 2010 (Continued)

Incomplete outcome data (attrition bias) All outcomes	Unclear risk	all patients accounted for
Other bias	Unclear risk	not stated

Feldner 2010

Methods	A single centre RCT randomisation and allocation concealment was described evaluated 1 year after anterior colporrhaphy (AC) as compared to small intestine submucosa graft blinded reviewers
Participants	Inclusion criteria was women with Point Ba \geq -1 and those with hypertension, prior radiation, pelvic sepsis, diabetes and chronic illness were excluded concomitant surgery allowed including vaginal hysterectomy if greater than stage 2 uterine prolapse
Interventions	Gp A (27) anterior colporrhaphy with interrupted 0 vicryl sutures GP B (29) a non-cross linked xenograft porcine small intestine submucosa 7x10cm with dissection to suprapubic arch fixed with 0 prolene x3 each side
Outcomes	operating time minutes GP A 30.0 \pm 19.4mins as compared to 46.3 \pm 16.1mins in Gp B (SIS) P=.02 Objective failure rate(defined as point Ba \geq -1) Gp A 9/27 Gp B 4/29 mesh exposure nil both groups total complications Gp a 9/27 less than Gp B 20/29 P=.01 dyspareunia post intervention A 4/27 B 5/20 reoperations A 0 B 0 P-QOL improved post-operatively Gp A and B postoperatively with no significant difference between the groups at 12 months

Notes

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	computer generated
Allocation concealment (selection bias)	Low risk	allocation concealment appropriate
Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	not stated

Feldner 2010 (Continued)

Blinding of outcome assessment (detection bias) All outcomes	Low risk	blinded reviewers and patient-completed validated questionnaires
Incomplete outcome data (attrition bias) All outcomes	Low risk	data well described
Other bias	Low risk	no COI and no external funding

Gandhi 2005

Methods	Single centre RCT (computer generated, opaque envelopes, adequate concealment) Anterior colporrhaphy with and without fascia lata for primary or recurrent anterior vaginal wall prolapse	
Participants	162 signed consent form 154 randomised A 76, B 78 Loss to follow up 2 in B but in results 78 and 77 analysed Inclusion: anterior vaginal wall prolapse to hymen or beyond on straining; >18 years of age; willing to comply with return visits Concomitant surgery: vaginal hysterectomy in 49%/47%; sacrospinous fixation in 43%/42% (all cases with vaginal vault prolapse to mid-vagina or beyond); posterior repair in 99%/94%, Coopers' ligament sling in 67%/55%, mid-urethral sling 13%/10% Enterocoele: A 75%, B 73% Baseline voiding dysfunction (slow stream): A 48/68, B 42/65	
Interventions	A (76): "ultra-lateral" midline plication of anterior endopelvic connective tissue using Vicryl buttress sutures (as described by Weber 2001), plus additional cadaveric fascia lata patch (Tutoplast) anchored at the lateral limits of the colporrhaphy B (78) as above without allograft	
Outcomes	Definition of failure: recurrent stage II cystocele: A 16/76; B 23/78 Subjective failure (vaginal bulging): A 6/55, B 6/57 (note: the denominator is different to objective outcome) Postoperative voiding dysfunction: A 21/72, B 28/76 Persistent voiding dysfunction: A 19/53, B 22/52 De novo voiding dysfunction: A 3/19, B 6/24	
Notes	Unclear patient numbers (disparity with loss to follow up) Questionnaires not used in all patients.	

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	computer generated

Gandhi 2005 (Continued)

Allocation concealment (selection bias)	Low risk	A - adequate
Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	not stated
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	not stated
Incomplete outcome data (attrition bias) All outcomes	Low risk	data complete
Other bias	Unclear risk	no COI or funding statement

Guerrero 2009

Methods	Multi-centre RCT 24 month follow up randomisation computer generated allocation concealment without blinding of patients or surgeon not according consort	
Participants	randomised Gp A 47 Gp B 47 2 years Gp A 33 Gp B 26 examination A 27 B 17 Inclusion criteria was point Ba ≥ -1 and those with TVL < 6cm, severe atrophy, isolated paravaginal defect, allergic bovine material, prior vaginal implant surgery or with ulceration were excluded	
Interventions	A (n=46): anterior colporrhaphy B (n=44): anterior colporrhaphy with bovine pericardium collagen matrix graft reinforcement	
Outcomes	failure rate 2 years defined as point Ba ≥ -1 A 10/27 B 4/17 reoperations prolapse A 10/27 B 4/17 de novo dyspareunia at 1 year A 1/20 B 0/17 Qol: UDI-6 and PISO-12 reported as improving both groups post intervention with no significant difference between the groups with numerical values not supplied	
Notes	underpowered study with less than 50% completing 2 year review	
<i>Risk of bias</i>		
Bias	Authors' judgement	Support for judgement

Guerette 2009 (Continued)

Random sequence generation (selection bias)	Low risk	computer generated
Allocation concealment (selection bias)	Low risk	opaque envelopes
Blinding of participants and personnel (performance bias) All outcomes	High risk	no blinding
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	no blinding assessors, patient completed questionnaire
Incomplete outcome data (attrition bias) All outcomes	High risk	equal losses in both groups only 50% at 2 year review
Other bias	High risk	extensive COI reported: study part funded Synovis life technology whose product was being evaluated Bovine pericardium

Halaska 2012

Methods	multi-centre randomised trial computer generated randomisation table allocation concealment not defined 70% power to detect 20% difference in groups
Participants	included; central post-hysterectomy vault prolapse: POP-Q greater or equal Stage 2 POP greater or equal excluded pelvic malignancy, <18 years, prior radiotherapy, those requiring hysterectomy allocated group A 83 Gp B (TVM) 85 1 year Gp A 72 Gp B 79 recurrence defined as stage 2 or greater POP-Q not clear who performed assessments
Interventions	tGp A (83) anterior repair(Sutures? type?) R sacrospinous colpopexy (2x non-absorbable sutures Nurolen) ±Posterior repair (approximation of levator muscles) and moderate excision of redundant vagina gP B (85) Total prolift mesh secured with 2.0 PDS sutures intervention performed by surgeons with greater than 20 cases experience of each type surgery
Outcomes	recurrence prolapse 1 year Gp A 28/72 Gp B 13/79 mesh exposure Gp B 16/79 (20%) 10/79 (12.6%)surgery 6 resolved with local oestrogens Bladder injury Gp A 1/73 Gp B3 (3.8%) blood loss Gp A 110 (10-528ml range) and Gp B 120ml (10-814) denovo SUI Gp A 18/72 (25%) Gp B 27/79 (35%)

Halaska 2012 (Continued)

	<p>denovo OAB Gp A 8/72 Gp B 8/79 dyspareunia Gp A 2/72 93.7% Gp B 6/79 (8%) Pelvic pain Gp A 3/72 5.5% Gp B 6/79 (8.1%) reoperation prolapse Gp A 3/72 Gp B 1/79 No difference in Qol outcomes reported between th 2 groups including PISQ, UIQ, CRAIQ, POPIQ and results reported as mean and no standard deviation</p>	
Notes		
Risk of bias		
Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	computer generated
Allocation concealment (selection bias)	Unclear risk	NS
Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	NS
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	NS
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	all participants accounted for in flow study
Other bias	Low risk	funded by grant from Czeck ministry health care, authors no COI

Hviid 2010

Methods	<p>single centre RCT computer generated randomisation and allocation concealment was appropriate with sealed envelopes opened in operating room reviews by non blinded surgeon no concomitant surgery 80% power to detect 20% difference 5% type 1 error</p>
Participants	<p>inclusion criteria symptomatic prolapse Point Ba \geq -1: and those with defects posterior or apical compartment, prior pelvic surgery, history collagen or endocrine disorders were excluded allocated Gp A 31 Gp B 30 1 year A 26 Gp B 28</p>

Hviid 2010 (Continued)

Interventions	A (31): 2.0 interrupted Vicryl plication B (30): no plication, Pelvicol porcine dermis 4x7cm anchored with 2.0 Vicryl sutures no concomitant surgery
Outcomes	failure rate defined as point Ba >-1: A 4/26; B 2/28 operating time minutes: A 23.9 (9.8) B 32 (8.6) blood loss (ml): A 56 (27,2) B 70 (71) recurrent POP surgery A 2 B 3 continence surgery A 1 B1 P-QOL improved both groups post-surgery with no difference between the groups
Notes	irregularities exist: methods failure defined as ϵ Ba \geq -1 results >-1 in table 2 Gp a range Ba 2-8 and states in table 3 that 4 had Stage 2 prolapse

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	computer generated
Allocation concealment (selection bias)	Low risk	sealed envelopes
Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	not stated
Blinding of outcome assessment (detection bias) All outcomes	High risk	reviewers non blinded, participant-completed questionnaires
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	lost to follow up accounted for
Other bias	Unclear risk	no COI declared: no statement funding

Iglesia 2010

Methods	Multi-centre RCT double blinded power calculation included randomisation computer generated stratified for presence uterine prolapse, allocation concealment, CONSORT guidelines met
Participants	173 excluded variety reasons Gp A 33 Gp B 32 lost to follow up A 0 B 0 prior to surgery all demographic details similar between the 2 groups: except Gp b lower

	<p>POPDI-6 score than group A</p> <p>Inclusion criteria included ≥ 21 yrs, grade 2-4 (POP-Q) uterovaginal or vaginal prolapse who agreed to undergo vaginal surgery, available 12months review and can complete questionnaires</p> <p>Exclusion criteria included multiple medical contraindications, short vagina, uterus >12weeks size, desire future fertility and postpartum</p>
Interventions	<p>Gp A uterosacral colpopexy with polytetrafluoroethylene sutures or sacrospinous colpopexy (Gortex sutures) and hysterectomy performed if uterus present</p> <p>Gp B: B if point C or D on POPq was ≥ -3 apical suspension with Total vaginal mesh (prolift) and if Cor D was < -3 anterior Prolift utilised. No T incisions were performed and hysterectomy performed if uterus present</p>
Outcomes	<p>objective failure rate 1 year (any stage 2 or greater prolapse) Gp A 23/33 B 20/32</p> <p>subjective failure A 3/33 B 1/26</p> <p>reoperations prolapse A o B 3 2 sacral colpopexy and 1 iliococygeus fixation</p> <p>mesh exposure A o B 5/32</p> <p>surgery mesh exposure A 0 B 2</p> <p>de novo dyspareunia A 3/14 1/11</p> <p>transfused A 0 B 1</p> <p>cystotomy (bladder perforation) A 0 B 2</p> <p>de novo USI A 3 B 6</p> <p>No differences were seen between the groups in any of the validated outcome tools at 12 months including SF-12 PCS, SF-12 MCS, PISQ, POPDI-6, CRADI-8, UDI-6, PFDI, UIQ-7, CRAIQ-7, POPIQ-7, PFIQ, PGI-I, or PGI-S scores</p>
Notes	<p>The ethics committee stopped the study prior to completion due to pre-determined stopping criteria of mesh erosion rate of >15% being reached with 65 of the desired sample size of 90 having undergone interventions</p>

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	computer generated
Allocation concealment (selection bias)	Low risk	sealed envelopes
Blinding of participants and personnel (performance bias) All outcomes	Low risk	double blinded
Blinding of outcome assessment (detection bias) All outcomes	Low risk	double blinded

Iglesia 2010 (Continued)

Incomplete outcome data (attrition bias) All outcomes	Low risk	equal assessment groups
Other bias	Low risk	funded American Urogynecology Society foundation and Medstar research; authors reported no conflict of interest

Jeng 2005

Methods	RCT (unclear randomisation and concealment) Total vaginal hysterectomy versus transvaginal sacrospinous uterine suspension Follow up: 6 months
Participants	158 women Dropouts: 0 Inclusion: age <50 years; Grade 2-3 uterine or cervical prolapse; sexually active Exclusion: previous anterior or posterior vaginal wall repair, or oophorectomy Groups comparable at baseline on age, parity, height, weight, partners' health status, sexual functioning
Interventions	A (80): transvaginal sacrospinous uterine suspension (without hysterectomy) B (78): total vaginal hysterectomy All operations done by one surgeon
Outcomes	Adverse effects: UTI: A, 1/80; B, 2/78 Buttock pain: A, 12/80; B, 0/78 Acute urinary retention: A, 0/80; B, 1/78 Dyspareunia after surgery: A, 4/80; B, 4/78 Vaginal dryness after surgery: A, 4/80; B, 4/78 Time to resumption of intercourse (mean weeks, range): A, 8 (4-16 weeks); B, 8 (5-16) Sexual functioning: no differences between the groups after surgery (P>0.05)
Notes	No prolapse or incontinence outcomes reported (study was aimed at evaluation of sexual functioning)

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	not stated
Allocation concealment (selection bias)	Unclear risk	B - Unclear
Blinding of participants and personnel (performance bias)	Unclear risk	not stated

Jeng 2005 (Continued)

All outcomes		
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	not stated
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	unclear
Other bias	Unclear risk	COI and funding not stated

Kahn 1999

Methods	Single centre RCT (number table randomisation, concealment unclear) Follow up: 25 months (8-37) A+B
Participants	63 randomised Withdrawal: 4 (A 2, B 2) Excluded: 2 (one no rectocele surgery because posterior vaginal wall cyst, one did not get the surgery performed) Inclusion: symptomatic rectocele or sense of impaired rectal emptying with >15% trapping on isotope defecography
Interventions	A (24): posterior colporrhaphy with levator plication, enterocele repair, hysterectomy, anterior repair as required B (33): transanal repair by single colorectal surgeon, circular muscle plicated longitudinally, permanent suture
Outcomes	Objective cure of recto/enterocele: A: 21/24, B: 23/33 Change in POP-Q (Ap or Bp) score: A: 1 stage, B: 0 Improved or cured obstructed defecation A: 12/20, B: 14/24 Need for vaginal digitation
Notes	No blinding No stratification No CONSORT Who reviewed outcomes unclear No validated symptom or QoL questionnaires.

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	number table randomisation
Allocation concealment (selection bias)	Unclear risk	B - unclear

Kahn 1999 (Continued)

Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	not stated
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	not stated
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	not stated
Other bias	Unclear risk	COI not stated

Lo 1998

Methods	Single centre RCT (using random number tables) Follow up: 1 to 5.2 years (median 2.1)
Participants	138 randomised, 20 withdrew due to age or not willing to be followed up Inclusion: prolapse at least Grade III (ICS classification) Exclusion: urinary incontinence Past medical history: previous pelvic surgery A: 19, B: 22 Sexually active: A: 11, B: 18
Interventions	A (52): abdominal sacral colpopexy with Mersilene mesh: + 7 posterior repair; + 12 posterior repair and abdominal hysterectomy; + 21 abdominal hysterectomy B (66): vaginal sacrospinous colpopexy with 1-0 nylon: + 20 anterior and posterior repair and vaginal hysterectomy; + 44 anterior and posterior repair Post-operatively, all women had oestrogen treatment
Outcomes	Success defined as ICS grade II or less Objective success rate (all prolapse): A: 49/52, B: 53/66 Operation time (min): A: 157 (SD 35), B: 141 (37) Blood loss (ml): A: 150 (137), B: 448 (258) Hospital stay (days): A: 7.24 (2.07), B: 8.77 (3.8) Prolonged catheter use: A: 0/52, B: 17/66 Post-operative UTI: A: 2/52, B: 4/66 Dyspareunia: A: 1/11, B: 11/18 (4 of the 11 severe) New urinary incontinence requiring later operation: A: 2/52, B: 1/66 Adverse effects requiring re-operation: A: 4/52, B: 7/66 Adverse effects A: 2 continence operations, 1 retroperitoneal infection and mesh removal, 1 ureteral injury Adverse effects B: 1 continence operation, 1 rectovaginal fistula, 2 vaginal vault strictures, 3 perineal infections
Notes	Groups stated to be comparable at baseline on age, parity, weight and previous pelvic surgery No blinding

Lo 1998 (Continued)

	No CONSORT Who reviewed outcomes unclear No validated symptom or QoL questionnaires.
Risk of bias	
Bias	Authors' judgement
Random sequence generation (selection bias)	Low risk
Allocation concealment (selection bias)	Unclear risk
Blinding of participants and personnel (performance bias) All outcomes	Unclear risk
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk
Incomplete outcome data (attrition bias) All outcomes	Unclear risk
Other bias	Unclear risk
	random number list
	B - unclear
	not stated
	not stated
	not stated
	no COI or funding statement

Maher 2004

Methods	RCT (stratified by SUI) Multi-centre, multi-surgeon Computer generated randomisation held by non-surgical co-author Follow up: A: 24 months, B: 22
Participants	95 women Withdrawals: 0 Lost to follow up: 6 (A: 1, B: 5) Inclusion: vault prolapse to introitus Exclusion: prior sacral colpopexy, unfit for general anaesthetic, foreshortened vagina
Interventions	A (46): abdominal group = sacral colpopexy prolene mesh, paravaginal repair, Moschowitz, posterior vaginal repair and colposuspension for SUI B (43): vaginal group: R sided sacrospinous colpopexy, enterocele and anterior and post repair, colposuspension for SUI, PDS (slowly absorbable sutures) Both groups: colposuspension for occult or potential SUI
Outcomes	Subjective cure (no prolapse symptoms): A: 43/46, B: 39/43 Objective cure (site specific stage 2 or greater failure at any site) : A: 35/46: B: 29/42

	<p>Satisfied with surgery: A: 39/46, B: 35/43 Number of women sexually active: A: 19/42, B: 17/37 Dyspareunia: A: 6/19, B: 7/17 Dyspareunia (de novo): A: 2/19, B: 3/17 Preoperative SUI cured: A: 11/14, B: 13/15 De novo SUI postoperatively: A: 2/22, B: 8/24 Preoperative voiding dysfunction cured A 7/9: B 4/5 Peri-operative outcomes: Blood loss (ml): A: n=47, mean=362 (SD 239), B: 48, 306 (201) Operating time (minutes): A: 47, 106 (37), B: 48, 76 (42) Postoperative complications: A: 1 mesh infection requiring removal, 2 incisional hernia, B: 0 Further prolapse surgery: Further prolapse or continence surgery: A: 4/46, B: 5/43 Cost: (US dollars) A: 4515: B: 3202 Hospital stay (days): A: 47, 5.4 (2.2), B: 48, 4.8 (1.4) Time to return to normal activity: A: 47, 34 (12), B: 48, 25.7 (9.7)</p>	
Notes	<p>No blinding Intention to treat Non surgeon follow up No CONSORT Validated symptom and QoL questionnaires.</p>	
Risk of bias		
Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	random number list
Allocation concealment (selection bias)	Low risk	A - adequate
Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	not possible
Blinding of outcome assessment (detection bias) All outcomes	High risk	non-blinded reviewers, participant-completed validated questionnaires
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	adequately accounted for
Other bias	Low risk	funded by competitive research grant RANZCOG:

Maher 2011

Methods	<p>single centre RCT appropriate randomisation, stratified urinary stress incontinence allocation concealment blinded non surgeon reviewer allocation concealment intention to treat analysis consort compliant 80% power to detect 30% difference between the groups with 5% type error with 47 in each group</p>
Participants	<p>Inclusion criteria were consecutive women with symptomatic stage 2 or greater (point C \geq -1 POP-Q) vault prolapse Excluded with Age < 18, inability to comprehend questionnaires, to give informed consent or to return for review, vault prolapse < St. 2, unable to undergo general anesthesia, BMI > 35, \geq5 previous laparotomies, prior sacral colpopexy, or vaginal mesh prolapse procedure, vaginal length < 6cm suitable participate 142 randomised and surgery A 53 B 55 lost to full follow up 2 years A 2 B 3</p>
Interventions	<p>Gp A laparoscopic sacral colpopexy Gp B TVM Prolift concomitant surgery yes SUI or occult sui A lap colposuspension B TVT-O posterior repair and paravaginal surgery if required in A</p>
Outcomes	<p>objective success (less than point -1cm any point POPq) A 41/53 B 23/55 subjective success (awareness prolapse) A52/53 B 51/55 A B Aa -2.09 +- 0.56 -1.44 +-1.24 Ba -2.17 +-0.51 -1.50 +- 1.19 C -7.48 +-2.62 -6.11 +- 2.72 TVL 8.83 +- .55 7.81 +-1.4 Ap -2.32 +- .61 -1.65 +-1.05 Bp -2.3 +-0.64 -1.63 +-1.05 Urodynamic findings A B voiding dysfunction 5/53 4/55 OAB 20/53 14/55 USI 7/53 14/55 mesh exposure A 1 B 7 operation mesh exposure A 0 B 5 reoperation Prolapse A 0 B 3 reoperation related primary surgery A 3 B 12 mesh contraction surgery A 0 B 4 complications</p>

Maher 2011 (Continued)

	A cystotomy 1 enterotomy 1: B hematoma infected peri-operative results reported median and range operating time A greater than B and A reduced blood loss, inpatient time and time to return to activities of daily living QOL Australian Pelvic floor questionnaire improved outcome in both groups P-QoL questionnaire; again reduced in both groups and no difference between groups	
Notes		
Risk of bias		
Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	computer generated
Allocation concealment (selection bias)	Low risk	central randomisation
Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	not possible
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	blinded non-surgeon reviewers validated patient completed questionnaires
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	flow patients accounted for
Other bias	Low risk	funded by competitive research grant Australian Gynaecology Endoscopy Society authors no conflict of interest reported

Menefee 2011

Methods	double blinded triple arm RCT randomisation, allocation concealment, NS power 33 in each group 80% power to detect 35% difference with 5% type 2 error 2 year review
Participants	inclusion: Women ≥ 18 years of age with a Pelvic Organ Prolapse Quantification (POP-Q) point Ba of ≥ 0 exclusion NS concomitant surgery: hysterectomy, colpopexy, posterior repair, continence at surgeons discretion
Interventions	99 randomised A 32: standard anterior colporrhaphy using midline plication with delayed absorbable suture

	B 31 vaginal paravaginal repair using free-hand formed porcine dermis graft (Pelvicol™) C 36 vaginal paravaginal repair using free formed polypropylene mesh (M). All graft material was secured to the arcus tendineus fascia pelvis using a Capio™ device with permanent mono-filament suture	
Outcomes	success rate definition stage 0 and 1 anterior compartment A 10/19 B 12/23 C 25/29 symptomatic failure: A 3/19 B 3/23 C 1/29 reoperation A 0 B 2 C 0 graft erosion: A 0 B 1/23 C 4/29 QOL outcomes All three groups had a reduction in their prolapse and urinary symptom severity and degree of bother without significant differences between groups	
Notes		
Risk of bias		
Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	computer generated sequence
Allocation concealment (selection bias)	Low risk	opaque envelopes
Blinding of participants and personnel (performance bias) All outcomes	Low risk	double blinded
Blinding of outcome assessment (detection bias) All outcomes	Low risk	double blinded
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	all data accounted for
Other bias	High risk	authors report COI with companies producing product evaluated and funded by Boston whose product capio was being evaluated

Meschia 2004

Methods	<p>RCT (sealed envelopes with numbers assigned from a computer generated random number list)</p> <p>Comparing TVT and plication of urethrovesical junction endopelvic fascia in addition to prolapse repair</p> <p>Single centre (Milan, Italy)</p> <p>Follow up (median): A: 26 months (range 15 to 31 months), B: 24 (15 to 31)</p>	
Participants	<p>50 women</p> <p>Inclusion: severe symptomatic genital prolapse and occult stress urinary incontinence</p> <p>Exclusion: age >70 years, BMI > 30, diabetes, previous pelvic or continence surgery, symptoms of SUI, detrusor overactivity, cotton-swab test > 30 degrees</p> <p>Age: mean 65 years (SD 8)</p> <p>Parity: 2.2 (0.8)</p> <p>BMI: 25 (3)</p>	
Interventions	<p>A (25): prolapse repair and TVT (with prolene tape)</p> <p>B (25): prolapse repair and urethrovesical plication (with 2-0 permanent-braided polyester sutures)</p> <p>All women also had vaginal hysterectomy, McCall culdoplasty and cystocele repair</p> <p>Cystocele (anterior repair) with 2-0 delayed absorbable sutures (polydioxanone)</p> <p>No sacrospinous ligament fixation performed</p> <p>Rectocele repair: A: 20/25, B: 23/25</p>	
Outcomes	<p>Subjective prolapse symptoms, failure rate: A: 4/25, B: 8/25</p> <p>Objective failure (overall): A: 8/25, B: 7/25</p> <p>Objective failure (anterior): A: 6/25, B: 7/25</p> <p>Objective failure (posterior): A: 3/25, B: 3/25</p> <p>Objective failure (apex): A: 0/25, B: 3/25</p> <p>Further prolapse surgery: offered to 2 women but groups not specified</p> <p>Further continence surgery: A: 0/25, B: 3/25</p> <p>SUI subjective: A: 1/25, B: 9/25</p> <p>SUI objective: A: 2/25, B: 11/25</p> <p>OAB de novo (new): A: 3/25, B: 1/25</p> <p>Voiding dysfunction and recurrent UTIs: A: 3/25, B: 1/25</p> <p>Adverse effects: A: 2 (bladder perforation, retropubic hematoma), B: 0</p> <p>Peri-operative outcomes</p> <p>Operation time (minutes): A: 131 (SD 13), B: 112 (21)</p> <p>Blood loss (ml): 188 (77), B: 177 (102)</p> <p>Hb change: A: 1.8 (1.6), B: 1 (1.2)</p> <p>Days in hospital: A: 6.4 (1.5), B: 6.1 (1.5)</p> <p>Time to spontaneous voiding (days): A: 4.4 (1.7), B: 3.8 (2)</p>	
Notes	<p>Power calculation provided</p> <p>Groups comparable at baseline.</p>	
<i>Risk of bias</i>		
Bias	Authors' judgement	Support for judgement

Meschia 2004 (Continued)

Random sequence generation (selection bias)	Low risk	PC generated randomisation
Allocation concealment (selection bias)	Low risk	A - adequate
Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	not stated
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	not stated
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	all data accounted
Other bias	Unclear risk	no statement

Meschia 2004a

Methods	RCT (computer generated number table, opaque envelopes) on posterior IVS and sacrospinous fixation for vault prolapse Median follow up: A 19, B 17 months
Participants	66 randomised A 33, B 33 No withdrawals or losses to follow up Inclusion: vault (vaginal cuff) prolapse ICS stage II or more Baseline stress urinary incontinence: A 11/33, B 7/33 Baseline overactive bladder: A 14/33, B 11/33 Baseline voiding dysfunction: A 19/33, B 18/33 Women in Group A were significantly younger than in group B (63 years vs 68 yrs, P<0.05)
Interventions	A (33): infracoccygeal sacropexy (posterior IVS) using multifilament Polypropylene tape B (33): sacrospinous ligament fixation (vaginal sacrospinous colpopexy) Concomitant surgery: anterior (A 64% B 66%) and posterior (70%, 88%) repair, high closure of pouch of Douglas if indicated (36%, 42%)
Outcomes	Primary outcome: recurrence of prolapse at any site (data not provided) Subjective prolapse sensation: A 3/33, B 2/33 VAS prolapse sensation (0-10) N, mean (SD): A 33, 2.4 (3.3), B 33, 1.8 (2.1) Vault prolapse at ICS point C stage II: A 1/33, B 0/33 Anterior vaginal wall prolapse stage II or more: A 9/33, B 11/33 Posterior vaginal wall prolapse stage II or more: A 4/33, B 6/33 Operative time mean min, (SD): A 58 (17), B 69 (17) Blood loss mean ml (SD): A 56 (35), B 126 (21) Days in hospital mean (SD): A 3 (1.1), B 4 (1.7)

Meschia 2004a (Continued)

	<p>Complications: Pararectal abscess A: 1/33, B 0/33; Vaginal vault erosion: A 3/33, B 0/33; Buttock pain: A 0/33, B 4/33 Postoperative voiding dysfunction: A 6/33, B 8/33 Stress urinary incontinence: A 5/33, B 5/33 Overactive bladder: A 9/33, B 10/33 Dyspareunia: A 0/33, B 1/33 Constipation: A 3/33, B 2/33 Faecal incontinence: A 1/33, B 1/33</p>	
Notes	<p>Abstract and further data from authors No stratification No CONSORT statement No intention to treat No power analysis No validated QoL or pelvic floor questionnaires.</p>	
Risk of bias		
Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	PC generated randomisation
Allocation concealment (selection bias)	Low risk	A - adequate
Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	not stated
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	not stated
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	data complete
Other bias	Unclear risk	no statement

Meschia 2007

Methods	Multicentre RCT (computer generated) on primary surgery anterior vaginal wall prolapse Allocation concealed Power calculation: 90 in each arm required Follow up: 2 years Intention-to-treat analysis: yes, including those women with missing data at two years but with 1 year follow up completed
Participants	206 randomised Lost to follow up 5: A 2 B 3 Inclusion: primary anterior prolapse POP-Q Point Ba -1 (\geq stage II) Exclusion: none Baseline stress urinary incontinence: A 22/100, B 18/106 Baseline overactive bladder: A 44/100, B 35/106 Baseline sexually active: A 65/100, B 74/106; with dyspareunia: A 12/65, B 11/74 No differences between the two groups with respect to demographic and clinical characteristics At two years number available for analysis: 176 (A 91; B 85) Intention-to-treat analysis: 201 analysed (A 103; B 98)
Interventions	A (100) interrupted fascial plication Vicryl 00 WITH Pelvicol overlay fixed with PDS suburethrally and uterosacral cardinal ligament distally B (106): surgery as above WITHOUT Pelvicol overlay Concomitant surgery standardised Vaginal hysterectomy McCall culdoplasty, posterior compartment defect fascial plication
Outcomes	Objective (POP-Q point Ba -1): A 7/98 (7%) B 20/103 P=0.0019, OR 3.13 CI 1.26-1.78 Subjective symptoms of prolapse: A 9/98 (9%) B 13/103 (13%) VAS prolapse severity: (SD): A 1.5 (1.7), B 1.5 (1.6) Adverse effects: haematoma: A 3/98, B 0/98 Length of stay, mean days (SD): A 4.4 (1.5), B 4.7 (1.3) Blood loss ml (SD): A 151 (112), B 167 (96) Time to voiding mean days (SD): A 3 (3.2), B 3.5 (3) Voiding dysfunction: A 15/98 (15%), B 16/103 (15%) Overactive bladder: A 15/98 (15%), B 18/103 (17%) Stress urinary incontinence: A 10/98 (10%), B 14/103 (13%) Sexually active: A 47, B 48 Dyspareunia: A 7/47 (15%), B 5/48 (10%) At 2 years: primary outcome measure = rate of anterior vaginal prolapse recurrence Anatomic outcomes were defined according to the ICS recommendations Overall subjective failure (both groups): 20/176 (11%) Objective failure (unsatisfactory anatomic outcome point Ba): A 9/85 (11%); B 20/91 (22%); P=0.07 Intention-to-treat analysis (including women with missing data at two years but with 1 year follow-up completed): Objective failure (ITT): A 11/98 (11%); B 24/103 (23%); P=0.04 Graft rejection necessitating removal: A 1/98, B 0/103

Meschia 2007 (Continued)

Notes	Number of patients approached or declined unclear No CONSORT The authors concluded that the use of Pelvicol implant can improve anatomic outcomes in the anterior vaginal compartment	
Risk of bias		
Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	computer generated randomisation
Allocation concealment (selection bias)	Low risk	A - dequate
Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	not stated
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	no patient completed questionnaires
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	not stated
Other bias	Unclear risk	no statement

Minassian 2010 abstract

Methods	single centre 2 surgeon RCT randomisation list PC generated and sealed opaque envelopes 32 in each group had 80% power to detect 25% difference with 5% type 1 error blinding and who reviewed NS
Participants	Inclusion criteria were women over the age of 18 with symptomatic cystoceles scheduled for reconstructive surgery. Patients were excluded if they were pregnant or planning to have a future pregnancy, two previous failed anterior vaginal wall repairs
Interventions	A 34 AC , plication of the cystocele in the midline was performed with 0-polydioxanone interrupted mattress sutures over a polyglactin 910 (vicryl) mesh within the imbricated fold of vaginal muscularis and adventitia; B 35 paravaginal defect repair, 0-polydioxanone sutures were used to attach the pubovesical fascia to that of the obturator and pubococcygeus muscle, also over a vicryl mesh 2 surgeons concomitant POP and continence surgery allowed majority undergoing sacral colpopexy

Minassian 2010 abstract (Continued)

Outcomes	objective failure \geq stage II POP anterior wall A 12/34 B 10/35 subjective awareness of bulge: A 1/34 B 3/35	
Notes	the impact of sacral colpopexy on point Ba would be significant and we await full publication only 1/3 of patients currently at 2 years	
Risk of bias		
Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	computer generated randomisation
Allocation concealment (selection bias)	Low risk	sealed envelopes
Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	not stated
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	not stated
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	data incomplete
Other bias	Unclear risk	no statement

Natale 2009

Methods	CONSORT statement: No Power calculation: 100 in each arm Type of randomisation: computer generated Blinding strategy: not specified Allocation concealment: not specified Definition of cure: point Ba<-1 (i.e. stage 0 or 1 according to the POP-Q system) Follow up: 24 months Prolapse assessment: POP-Q update of Cervigni 2005 abstract
Participants	Inclusion: recurrent, symptomatic stage 2 or greater anterior vaginal wall prolapse (point Ba \geq -1) planning to undergo secondary pelvic reconstructive surgery Exclusion: patients needing a concomitant anti-incontinence procedure and patients with diabetes mellitus or collagen disease Randomised: 190 Analysed: 190

	Women were comparable at baseline on demographic data, degree of POP, and clinical or urodynamic findings. Previous hysterectomy: A 60/96, B 54/94
Interventions	A (96): cystocele repair with armed monofilament polypropylene mesh (Gynemesh) B (94): cystocele repair with armed porcine dermis graft (Pelvicol) Concomitant surgery: not specified. Prophylactic antibiotic cover All underwent tension-free cystocele repair (TCR) and levator myorrhaphy and vaginal hysterectomy if required The sheets of both the Pelvicol graft and the synthetic mesh were trimmed to an identical rounded shape, with two lateral wings/arms. In each operation, the central, rounded part of the graft was positioned under the urinary bladder in a tension-free fashion, while its arms were inserted deep into the periurethral tissue on both sides towards the pubic bone. A single fixating monocryl 2/0 suture was performed at the base of one wing of the mesh, at the periurethral level
Outcomes	Objective failure: A 27/96; B 41/94; P=0.06 Stress Urinary Incontinence de novo: A 2/96; B 1/94 Increased daytime urinary frequency: A pre 33, post 26/96; B pre 42, post 6/94 Dyspareunia: A pre 20, post 10; B pre 29, post 12; not significant PISQ-12: A: No change between pre-op and post-op scores P=0.31; B: Significant improvement between pre-op and post-op scores p=0.03 P-QoL (post-op scores): B superior to A in social limitations P=0.04 and emotions P=0.02 In both groups significant and equal reduction in slow urinary stream and incomplete bladder emptying following intervention In both groups non-significant but equal reduction in urinary urgency, urge incontinence and nocturia Mesh erosion over-sewing: A 6/96; B 0/94 3 Year outcomes Objective failure rate (Aa or Ba A)
Notes	The trialists concluded that Gynemesh was not statistically significantly superior to porcine graft in the management of anterior compartment prolapse at 2 years. Sexuality and P-QOL was superior in the porcine graft group as compared to the Gynemesh PS

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	computer generated
Allocation concealment (selection bias)	Unclear risk	not stated
Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	not stated

Natale 2009 (Continued)

Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	not stated
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	unclear
Other bias	Unclear risk	no statement

Natale 2010

Methods	<p>Single centre multiple surgeon RCT on vaginal vault suspension at time of vaginal hysterectomy</p> <p>No CONSORT statement, and allocation concealment not mentioned, PC generated randomisation list</p> <p>Power calculation: 80% power, 110 patients in each study arm to detect a 15% reduction in vaginal vault prolapse. In order to allow for a 10% dropout rate, sought to enrol 120 subjects in each study arm</p> <p>POPQ, urodynamics, Q-tip test</p> <p>PQoL, Wexner score for constipation and PISQ-12</p>
Participants	<p>229 women with apical POP stage 2 or more</p> <p>excluded sui, prior hysterectomy or prolapse or continence surgery</p> <p>All completed one-year follow up</p> <p>Demographic parameters and previous prolapse surgeries did not differ between the two groups</p>
Interventions	<p>A: n= 116 high levator myorrhaphy</p> <p>B: n= 113 uterosacral vault suspension</p> <p>Concomitant surgery in all women: vaginal hysterectomy and “tension-free” cystocele repair with self-styled monofilament polypropylene mesh Gp A113 and Gp B 106.</p> <p>Operations performed by three different surgeons</p>
Outcomes	<p>Demographic, urodynamic and prolapse data at baseline similar in groups</p> <p>Apical stage 2 recurrent prolapse in A 6/116 (5%) and B 5/113 (4%);</p> <p>Anterior stage 2 prolapse in A 34/116 (29%) and B 40/113 (35%);</p> <p>Posterior stage 2 prolapse in A 12/116 (10%) and B 11/113 (10%)</p> <p>Mean post-operative total vaginal length in A 7.9 cm and B 9.1 cm; p=0.03</p> <p>No difference in first desire to void, bladder capacity, pressure at maximum flow, maximum flow. Detrusor overactivity present in A 17/116 (25%) and B 55/113 (49%)</p> <p>De novo symptoms in abstract only (different patient numbers):</p> <p>stress urinary incontinence in A 5 (9%), B 8 (14%)</p> <p>urge incontinence in A 0 and B 7 (12%)</p> <p>urgency in A 2 (3%) and B 5 (9%)</p> <p>Increased daytime frequency in A 3 (5%) and B 9 (16%)</p> <p>nocturia in A 6 (10%) and B 7 (12%)</p> <p>slow stream in A 11 (19%) and B 5 (9%)</p> <p>de novo dyspareunia in Gp A 7 (6.1%) and Gp B 9 (7.6%) groups</p>

	<p>constipation in A 7 (12%) and B 8 (14%).</p> <p>Complications:</p> <p>angulation of ureter with hydronephrosis in 10 patients (8%) in group B</p> <p>mesh erosion in A 12 (10%) and B 16 (14%);</p> <p>significant improvement in PQOL scores in both groups</p> <p>No differences in symptoms, PISQ-12-scores, Wexner score for constipation, urodynamic data or prolapse degrees between groups</p>
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Notes	<p>Natale et al (ICS 2007, abstract) assessed two procedures for suspension of the vaginal vault: High Levator Myorrhaphy (HLM; 58) and Uterosacral Vaginal Vault Suspension (UVVS; 58) in patients with stage 2 prolapse. All women underwent anterior repair with polypropylene mesh and vaginal hysterectomy concomitantly. Demographic parameters and previous prolapse surgeries did not differ between the two groups</p> <p>At follow up, apical compartment recurrence rate was lower although not significantly in the LM group as compared to the UVVS group (2/58 versus 15/58) but the mean total vaginal length (TVL) was significantly smaller (7.2 versus 8.9 cm). Post-operative detrusor overactivity was less prevalent among patients in the LM arm (17/58 versus 22/58, P=0.05) although figures for bladder function pre-operatively are not given. Post-operative unilateral ureteric angulation leading to hydronephrosis was identified in 5/58 patients in the UVVS group and required a further surgical intervention for removal of a suture. Mesh erosion rates were comparable between the two groups. Weaknesses of this study include the lack of exclusion criteria, length of follow up, peri-operative data and a clear definition for success or failure</p>
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Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	computer generated randomisation
Allocation concealment (selection bias)	Unclear risk	not stated
Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	not stated
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	not stated
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	data complete
Other bias	Unclear risk	no COI statement

<p>Methods</p>	<p>Single centre RCT on anterior vaginal prolapse CONSORT statement: yes Power calculation: 38 in each arm Type of randomisation: computer generated Blinding strategy: primary surgeon - till the surgery day; patients, research nurse and medical assistant remained blinded Allocation concealment: sealed opaque envelopes Definition of cure: Ant wall POP-Q St. < 2, 'Optimal support' = Aa and Ba at St. 0, 'Satisfactory' = Aa and Ba at St.1 and improved from pre-op staging Follow up: 12 months (full publication) and 24 months (abstract only) Prolapse assessment: POP-Q</p>
<p>Participants</p>	<p>Inclusion: 21 years and older with POP-Q stage 2 or greater anterior prolapse requiring surgical correction Exclusion: pregnancy (present or contemplated), prior repair with graft, systemic infection, compromised immune system, uncontrolled diabetes mellitus, previous pelvic irradiation/cancer, polypropylene allergy, scheduled for concomitant Burch or pubovaginal sling Randomised: 76 Withdrawals: 1 Lost to follow up: 1 Analysed: 76</p>
<p>Interventions</p>	<p>A (38): anterior colporrhaphy (AC) with delayed absorbable (PDS) sutures B (38): AC + polypropylene four armed mesh kit repair (Perigee, American Medical Systems) Concomitant surgery: vaginal hysterectomy, bilateral salpingo-oophorectomy, uterosacral suspension, mid-urethral tape, site-specific rectocele repair, perineoplasty, Apogee mesh kit repair Concomitant prolapse and suburethral tape surgeries were performed in both groups</p>
<p>Outcomes</p>	<p>Definition of failure: POP-Q stage 2 anterior prolapse. Objective failure: A 20/38 (53%); B 5/38 (14%); p=0.01 Hb change at day 1 post-op (median): A 1.8 (g/dl); Gp B 2.4 (g/dl); p=0.02 Blood transfusion: A 1/38, B 1/38 Further prolapse surgery: A 1/38; B 0/38 Further continence surgery: A 1/38; B 0/38 Validated questionnaires: A pre PFDI-20 109±58; post PFDI-20 45±32 B pre PFDI-20 108±45; post PFDI-20 34±31 A pre PFIQ-7 45±32; post PFIQ-20 23±34 B pre PFIQ-7 82±54; post PFIQ-20 14±23 In both groups the change in PFDI and PFIQ scores after surgery is highly significant P=0.001 Mesh erosion: A 0, B 2/38 Definition of dyspareunia: 'usually' or 'always' to item 5 at the PISQ-12 Dyspareunia de novo: A 4/26 (15.4%), B 2/22 (9.1%)</p>

Nguyen 2008 (Continued)

Notes	Data regarding study methodology was obtained from the full published article, follow up at 12 months PFDI - pelvic floor distress quality of life measure PFIQ - pelvic floor incontinence questionnaire (quality of life measure)	
Risk of bias		
Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	computer generated randomisation
Allocation concealment (selection bias)	Low risk	sealed envelopes
Blinding of participants and personnel (performance bias) All outcomes	Low risk	participants blinded
Blinding of outcome assessment (detection bias) All outcomes	Low risk	assessors blinded; participant-completed questionnaires
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	data set complete
Other bias	Unclear risk	not statement

Nieminen 2004

Methods	Single centre RCT (nurse took card from envelope with 15 vaginal and 15 transanal cards) Follow up: A 12 months, B 12 months
Participants	30 women Inclusion: symptomatic rectocele Exclusion: any other prolapse or compromised anal sphincter function 42 eligible women participated 12 excluded due to compromised anal sphincter function 30 analysed No loss to follow up
Interventions	A (15): midline rectovaginal fascia plication Vicryl repair B (15): transanal repair performed by 2 colorectal surgeons Vertical and horizontal Vicryl sutures, enterocele repaired
Outcomes	Improvement symptoms A: 14/15: B 11/15 (P=0.08) Postoperative mean reduction Ap A 2.7: B 1.3 (P=0.01) Depth rectocele defecography

	<p>Recurrent posterior wall prolapse (rectocele or enterocele): A 1/15, B 10/15 (P=0.01) Continuing need to digitally assist rectal emptying postoperatively A: 1/11, B 4/10 Sexually active: A 12/15, B 11/15 Dyspareunia: A 4/12, B 2/11 Incontinence to flatus: A 4/15, B 3/15 Incontinence to faeces: A 0/15, B 0/15 Peri-operative outcomes: Operating time: A 35 minutes: B 35 minutes Blood loss ml: A 120, B 60 Discharged from hospital in 48 hours: A 13/15: B 11/15.</p>	
Notes	<p>Full text No intention to treat No CONSORT.</p>	
Risk of bias		
Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	not stated
Allocation concealment (selection bias)	Unclear risk	B - unclear
Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	not stated
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	not stated
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	not stated
Other bias	Unclear risk	no statement

Methods	<p>Muti-centre RCT on anterior vaginal prolapse CONSORT statement: yes Power calculation: 101 in each arm Type of randomisation: computer generated Allocation concealment: opaque envelopes Blinding strategy: not specified, but lack of a non-surgical blinded outcome reviewer Definition of cure: less than stage 2 prolapse at Aa or Ba Follow up: 24 months Prolapse assessment: POP-Q</p>
Participants	<p>Inclusion: post-menopausal women with symptomatic anterior vaginal wall prolapse to the hymen or beyond Exclusion: apical defect indicating vaginal fixation or stress urinary incontinence necessitating surgery or the main symptomatic prolapse component was in the posterior vaginal wall. Also patients with gynaecological tumour or malignancy calling for laparotomy or laparoscopy and those with untreated vaginal infection Randomised: 202 Withdrawals: 1 Lost to follow up: 1 Analysed: 200 No significant differences in baseline demographics, prior hysterectomy or prolapse surgeries between the two groups</p>
Interventions	<p>A (96): anterior colporrhaphy (AC) using a 0 or 2/0 multifilament suture B (104): AC + self-tailored (from a 6 x 11 cm mesh patch) 4 armed low-weight polypropylene mesh Type of mesh: non-absorbable monofilament polypropylene (Parietene light, Sofradim, France) Sutures for AC: absorbable 0 or 2/0 multifilament suture Concomitant surgery: vaginal hysterectomy, posterior repair, culdoplasty as required, no concomitant continence surgeries were performed</p>
Outcomes	<p>Objective failure: A 39/96; B 12/104 Symptomatic prolapse: A 35/96; B 27/104; P=0.11 Awareness of bulge at 1 year: A 6/93, B 7/107 Awareness of bulge at 2 years: A 17/96; B 5/104; P=0.003 Further prolapse surgery: A 1/96; B 1/104 Further continence surgery: A 6/96; B 5/104 Operating time mean (min): A 58+/-26; B 73+/-26; P<0.001 Blood loss mean (ml): A 114+/-109; B 190+/-23; P=0.004 Stress incontinence de novo: A 9/96; B 15/104 Mesh erosion: A 0, B 8/104 (at 1 year follow up erosion rate was reported as 18/104) 3 year outcomes objective failure rate (Aa or Ba \geq -1) A 40/97 B 14/105 awareness bulge A 18/96 B 10/104 reoperation prolapse A 10 (9 anterior compartment 1 anterior & posterior) B 6(0 anterior compartment 6 posterior or apical) continence surgery A 9 B 5 mesh exposures Ao B 20</p>

	reoperation mesh exposure B 14 adverse sexual function A 9 B 7 de novo stress urinary incontinence A 5/96 B7/104
Notes	<p>Niemenen and colleagues compared anterior colporrhaphy alone and anterior colporrhaphy plus a self styled mono-filament mesh (Parietene light, Sofradim, France) in postmenopausal women with symptomatic anterior compartment prolapse at the hymen or beyond. Women were excluded if they had an apical defect indicating concomitant vaginal fixation or stress urinary incontinence necessitating surgery or the main symptomatic prolapse component was in the posterior vaginal wall. Also patients with gynaecologic tumor or malignancy calling for laparotomy or laparoscopy and those with untreated vaginal infection were excluded</p> <p>Concomitant surgeries including a vaginal hysterectomy and posterior repair were performed as required. No concomitant continence surgeries were performed</p> <p>In the mesh group a four armed graft was tailored from a 6 x11 cm mesh patch</p> <p>The anterior colporrhaphy was performed using a 0 or 2/0 multi-filament suture</p> <p>There were no significant differences in baseline demographics, prior hysterectomy or prolapse surgeries between the two groups</p> <p>At two years, the objective failure rates were significantly higher in those undergoing the anterior colporrhaphy alone (39/96) as compared to the anterior colporrhaphy with the self styled Sofradim Paritene polypropylene mesh (12/104). As pointed out by the authors, there was no difference in subjective awareness of prolapse between the two interventions (AC 35/96; mesh 27/104; P=0.11) although the operating time and blood loss were significantly greater in the AC + mesh group and eighteen patients (17%) in this group developed mesh erosion at one year and at two years the authors interestingly reported eight percent mesh exposures. At one and two years respectively, the number of women aware of bulge in the AC group was 6/93, 17/96 as compared to 7/107, 5/104 in the mesh group, which is highly significant (P=0.003). De novo stress urinary incontinence occurred in nine (9/96, 9%) from the AC group of which six underwent TVT and in 15 (15/104, 14%) from the AC + mesh group of which four underwent TVT. One subsequent prolapse surgery was required in each group (Cystocele in AC group and apical repair in the AC + mesh group). The weaknesses of the study included the lack of a non-surgical blinded reviewer</p> <p>There were two inconsistencies between the one year and two year data. The reduction in mesh exposures from 17% at one year to 8% at two years is difficult to explain. Furthermore, the percentage of patients having undergone previous prolapse surgery at one year was 27% in the AC group and 18% in the mesh group while the two year report quotes 20% and 14% respectively</p> <p>There is also a further discrepancy. At one year the denovo SUI was A 9/96 as compared to 15/104 and at three years the reported rate is lower at 5/96, versus 7/104 rate. Even if some of these underwent continence surgery they should still be recorded as having de novo stress urinary incontinence</p>

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	computer generated randomisation

Nieminen 2008 (Continued)

Allocation concealment (selection bias)	Low risk	sealed envelopes
Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	not stated
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	not stated
Incomplete outcome data (attrition bias) All outcomes	Low risk	data complete
Other bias	Unclear risk	not clear

Pantazis 2011

Methods	RCT pilot comparing abdominal open and laparoscopic sacral colpopexy CONSORT statement: No Power calculation: commenced as pilot and completed 80% power to detect 1cm change in point C a sample size of 25 in each group was required Type of randomisation: blocked computer generated. Patients randomised by procedure not by the surgeon with blocking to ensure that surgeons performed equal numbers of procedures Blinding strategy: Not specified Allocation concealment: No Definition of cure/failure: Not specified. Primary outcome is the level of the vaginal apex (change of point C) Follow up: 12 weeks Prolapse assessment: POP-Q
Participants	Inclusion: symptomatic vault prolapse stage ≥ 2 POP Exclusion: medical unfitness for a sacral colpopexy, and the need for any concomitant pelvic or continence surgery, BMI > 35, prior prolapse surgery Randomised: 30 Analysed: 30 Demographic characteristics were similar in both groups
Interventions	A (24): abdominal (open) sacral colpopexy B (23): laparoscopic sacral colpopexy No concomitant surgeries in either group
Outcomes	Median length of admission A 4.1 (1.6) days, B 3.2 (1.1) (P=0.07) Point C mean in cm (SD): A -6.6 (1.4); B -6.7 (1.2) (P=0.71) patients very much better Patient Global Impression - Improvement) Gp a 16/24 Gp B 13/23 PQoI, PGI-I and Point C similar both groups 12 months Hb drop day 2 post-op mean (g/dl): A 2.45 (n=15); B 1.35 (n=15); P=0.01, 95% CI 0.

Pantazis 2011 (Continued)

	304 to 1.882 A 27 B 26 Operating time (mean min, SD, N): A 131 (44) 27, B 143 (28) 26 Estimated blood loss (mean ml, SD, N): A 240 (231) 27; B 56 (34) 26 reoperation prolapse Gp A 2/24 Gp B 2/23	
Notes		
Risk of bias		
Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	computer generated blocked to ensure similar number patients per surgeon
Allocation concealment (selection bias)	Unclear risk	not stated
Blinding of participants and personnel (performance bias) All outcomes	High risk	not blinded
Blinding of outcome assessment (detection bias) All outcomes	High risk	not blinded 1 year
Incomplete outcome data (attrition bias) All outcomes	Low risk	full data set described
Other bias	Unclear risk	competitive grant Plymouth surgical services trust; COI for some authors in products being evaluated

Paraiso 2006

Methods	Single centre RCT (computer generated randomisation by sealed envelopes with blinded research nurse) 106 randomised to posterior colporrhaphy (37), site-specific repair (37), site specific repair augmented with porcine small intestine submucosa (32: Fortagen, Organogenesis) study funded unrestricted research grant Organogenesis
Participants	106 women Inclusion: grade II or greater posterior vaginal wall prolapse with or without other prolapse or incontinence or gynaecological procedures Exclusion: concomitant colorectal procedures, allergy to pork
Interventions	A (37): posterior colporrhaphy as per Maher 2-0 Ethibond B (37): site-specific repair Cundiff 2-0 Ethibond C (32): as in B with 4x8 cm porcine small intestine submucosa graft inlay (Fortagen)

Outcomes	<p>Objective failure (Bp greater or equal to -2 at 1 year): A: 4/28, B: 6/27, C: 12/26</p> <p>Subjective (functional) failure (worsening prolapse or colorectal symptoms at 1 year): A: 5/31, B: 4/29, C: 6/28</p> <p>Operating time mean mins (SD): A: 150 (68), B: 151 (69), C: 169 (62)</p> <p>Estimated blood loss mean (range): A: 150 (50-950), B: 150 (50- 600), C: 200 (50-3500)</p> <p>Length hospital stay median days (range): A: 2 (1-19), B: 2 (1-6), C: 2 (1-6)</p> <p>Intraoperative complications: A: 1/37 (3%), B: 2/37 (5%), C: 2/31 (6%)</p> <p>Postoperative complications: A: 21/37, B: 14/37, C: 16/31</p> <p>Reoperation for prolapse at 1 year: A: 1/33, B: 2/37, C: 3/29</p> <p>Dyspareunia: A: 9/20, B: 6/22, C: 3/19</p> <p>No differences between groups in condition-related quality of life outcomes (PFDI-20, PFIQ-7, PISQ-12)</p>
Notes	<p>Ongoing study: initial full text review after 1 year</p> <p>Intention-to-treat basis</p> <p>Consort statement</p> <p>Independent nurse review</p> <p>Limited sample size.</p>

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	computer generated
Allocation concealment (selection bias)	Low risk	A - adequate
Blinding of participants and personnel (performance bias) All outcomes	Low risk	blinded
Blinding of outcome assessment (detection bias) All outcomes	Low risk	blinded non surgeon reviewer
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	data complete
Other bias	Unclear risk	unrestricted research grant from Organogenesis whose product was being evaluated

Paraiso 2011

Methods	<p>single centre single blinded RCT randomisation stratified by surgeon: process computer generated list and allocation concealment using opaque envelopes reviewers blinded non-surgeons participants blinded primary outcome operating time from skin to closure sample size 90% power to detect 30 minute difference in operating time with 5% type 1 error cost to the healthcare system in 2011 US\$ reported 1 year reviews with validated questionnaires Pelvic Floor distress inventory-20, Pelvic floor Impact questionnaire-7, Prolapse Incontinence sexual questionnaire total operating time: skin incision to skin closure concomitant surgery performed at surgeons discretion</p>
Participants	<p>inclusion: >21 years, Stages 2-4 apical post hysterectomy vaginal prolapse Subjects were excluded if they were not candidates for general anesthesia, underwent a prior sacral colpopexy or rectopexy, had a suspicious adnexal mass or other factors that may indicate pelvic malignancy, reported a history of pelvic inflammatory disease, were morbidly obese (body mass index > 40 kg/m²), or were scheduled for a concomitant laparoscopic rectopexy with or without sigmoid resection concomitant continence and prolapse surgery at surgeons discretion</p>
Interventions	<p>A (32): laparoscopic SC B (35): robotic assisted laparoscopic sacral colpopexy</p>
Outcomes	<p>A 199 ± 46minutes B 265 ± 50minutes no difference length of stay or hospital pain medication, narcotic use or return to normal activities A median non-steroidal anti-inflammatory use days 11 B 20 conversion to laparotomy or vaginal surgery A 2 cystotomy, B 3 2 cystotomy, enterotomy cost A \$14,324±2941 B \$16,278±3326</p>
Notes	

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	computer generated
Allocation concealment (selection bias)	Low risk	adequate opaque envelopes
Blinding of participants and personnel (performance bias)	Low risk	patients blinded 12 months

Paraiso 2011 (Continued)

All outcomes		
Blinding of outcome assessment (detection bias) All outcomes	Low risk	assessors blinded
Incomplete outcome data (attrition bias) All outcomes	Low risk	data complete
Other bias	Low risk	funded Cleveland clinic research institute and authors report no conflict of interest

Rondini 2011 abstract

Methods	RCT randomisation, allocation concealment and blinding NS power of 80% to detect 20% difference in cures rates between groups with 5% type 1 error
Participants	apical defects point C>3 inclusion objective success point c <2 Demographics and PFDI-20, P-QOL, and PISQ-12 equal both groups pre-operatively randomised A 63 B 61 declined surgery A 9 B 5
Interventions	A (54): sacral colpopexy B (56): High uterosacral vault suspension
Outcomes	12 months objective success (point C<stage 2): A 54/54; B 46/56 failure in anterior or posterior compartment (Ba or Bp≥ stage 3): A 3/54; B 19/56 reoperation for prolapse: A 3/54; B 10/56 operating time (min, SD): A 102 (27) B 80(24) hospital stay (days, SD): A 3.7 (0.5); B 2.1 (0.7) intra-operative complications: A 3.7%; B 0% p=0.15 post-operative complications: A 11/54; B4/56 (p=0.047)
Notes	

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	not stated
Allocation concealment (selection bias)	Unclear risk	not stated

Rondini 2011 abstract (Continued)

Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	not stated
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	not stated
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	not stated
Other bias	Unclear risk	no statement

Roovers 2004

Methods	<p>RCT (computer generated random number table, allocation concealed) comparing abdominal and vaginal surgery for uterine prolapse Follow up: A 12, B 12 months Multi-centre RCT comparing abdominal and vaginal surgery for uterine prolapse CONSORT statement: yes Power calculation: 38 in each arm Type of randomisation: computer generated random number table, allocation concealed Blinding strategy: participating gynaecologists and study co-ordinator were kept blinded Allocation concealment: sealed envelopes Definition of cure/failure: failure defined as recurrent prolapse stage ≥ 2 plus symptoms of pelvic floor dysfunction Follow up (mean): 94 months (range 84 - 120) Prolapse assessment: POP-Q</p>
Participants	<p>82 women Inclusion: uterine prolapse stage 2-4 on POP-Q Exclusion: uterus size > 12 weeks gestation, prior hysterectomy, adnexal mass, previous abdominal pelvic surgeries > 2, body mass index >35, prior inflammatory bowel or pelvic disease, faecal incontinence d/t sphincter defect Offered participation: 124, 3 excluded, 39 refused to participate, 2 withdrew from abdominal group as wanted vaginal surgery Randomised: 82 (41 in each arm) Analysed: 82 At 8 years follow up: 74 of the original 84 patients were alive and able to be contacted. 60/74 (81%) completed questionnaires and 31/74 (42%) were examined</p>
Interventions	<p>A (41): abdominal: sacral colpopexy with preservation of uterus: colposuspension for SUI B (41): vaginal: vaginal hysterectomy with vaginal repair and uterosacral ligament plication: bladder neck needle suspension for SUI Concomitant surgery: anterior colporrhaphy, posterior colporrhaphy, Burch colposuspension, Pereyra or Raz needle bladder neck suspension</p>

Outcomes	<p>Reoperation performed or planned: A 9/41, B 1/41</p> <p>Urogenital distress inventory: no significant mean differences between A and B in domain score for genital prolapse (mean difference 4.1, 95% CI -5.4 to 13.6)</p> <p>Scores on the UDI for: discomfort/pain domain (mean difference 7.1, 95% CI 1.1 to 13.2); overactive bladder domain (mean difference 8.7, 95% CI 0.5 to 16.9); or obstructed micturition domain (mean difference 10.3, 95% CI 0.6 to 20.1) were significantly higher in A than in B</p> <p>Peri-operative outcomes:</p> <p>operating time: A 97 (SD 3.6) min, B 107 (SD 4.7) min</p> <p>blood loss: A 244 (51.5) ml, B 248 (34.1) ml</p> <p>days in hospital: A 7.7 (0.2) B 7.6 (0.3)</p> <p>Eight year follow up:</p> <p>74/84 participants alive and contacted, 60 (71%) completed questionnaires, 31 (37%) were examined. No data provided about numbers in each randomised group at follow up therefore denominator is from original randomisation (and has increased to 42 in each group)</p> <p>Women visiting a physician after surgery for pelvic floor symptoms: A 18/42 (43%); B 8/42 (19%) P=0.03</p> <p>Women reporting on improvement in prolapse symptoms post-op: A 29/42 (68%); B 37/42 (87%) P=0.09</p> <p>Re-operation rate: A 11/42 (26%); B 6/42 (14%) P=0.28</p> <p>IIQ scores and POP-Q scores were similar for both groups</p> <p>Defecation symptoms had more adverse effect on quality of life in A than B. The difference in the constipation obstruction domain of the DDI was statistically significant</p>				
Notes	<p>RCT compared vaginal hysterectomy in vaginal group with uterine preservation in abdominal group</p> <p>No blinding</p> <p>No stratification</p> <p>Intention to treat</p> <p>According to CONSORT</p> <p>Non surgeon review</p> <p>Validated questionnaire: UDI+IIQ</p> <p>No sexual and bowel function outcomes</p> <p>The authors concluded that long-term results of this RCT were consistent with short term results and demonstrated that vaginal hysterectomy with anterior and/or posterior colporrhaphy is preferable to abdominal sacral colpopexy with preservation of the uterus, as surgical correction of uterine prolapse</p> <p>We do not agree with these conclusions as there were no statistically significant differences in subjective or anatomical outcomes, reoperation rates or IIQ scores demonstrated. The statistically significant greater number of women visiting a physician with pelvic floor symptoms and recording an adverse effect on quality of life of the constipation/obstruction domain of DDI in the abdominal group as compared to the vaginal group would not be sufficient to support the authors' conclusion</p>				
<i>Risk of bias</i>					
Bias	<table border="1"> <thead> <tr> <th data-bbox="612 1738 1023 1797">Authors' judgement</th> <th data-bbox="1023 1738 1436 1797">Support for judgement</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> </tr> </tbody> </table>	Authors' judgement	Support for judgement		
Authors' judgement	Support for judgement				

Roovers 2004 (Continued)

Random sequence generation (selection bias)	Low risk	random number chart
Allocation concealment (selection bias)	Low risk	A - adequate
Blinding of participants and personnel (performance bias) All outcomes	High risk	unblinded
Blinding of outcome assessment (detection bias) All outcomes	Low risk	non-surgeon review
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	incomplete data set
Other bias	Unclear risk	no statement

Sand 2001

Methods	Single centre RCT (computer generated number table) Vaginal repair with or without Vicryl mesh overlay for cystocele and rectocele Follow up: A 12, B 12 months
Participants	143 women Inclusion: cystocele to or beyond hymenal ring on standing Exclusion: less than 18 years of age, pregnancy, contemplating pregnancy within one year, paravaginal defect only, anterior enterocele 161 randomised 1 excluded (anterior enterocele) 17 lost to follow up
Interventions	A (70): no mesh: Vicryl plication of anterior endopelvic fascia B (73): mesh: as above with Vicryl mesh folded underneath trigone and cuff and secured Vicryl to fascia: also added to posterior wall if posterior repair performed Posterior repair performed: A: 67/70, B: 65/73
Outcomes	Cure: POP-Q less than grade 2 Objective cure of cystocele: A 40/70, B 55/73 (P=0.02) Objective failure for rectocele: A 7/67, B 6/65 Mesh erosion: A, 0/70 (not applicable); B, 0/73
Notes	No subjective success No urinary, bowel or sexual function data No peri-operative data No intention-to-treat analysis No CONSORT No blinding

Sand 2001 (Continued)

	Standardised concomitant surgery Review by surgeon.	
Risk of bias		
Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	not stated
Allocation concealment (selection bias)	Unclear risk	B - unclear
Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	not stated
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	not stated
Incomplete outcome data (attrition bias) All outcomes	Low risk	data complete
Other bias	Unclear risk	no coi statement

Schierlitz 2007

Methods	Multi-centre RCT Randomisation concealment NS Intention to treat NS Blinding assessors NS 6 month review
Participants	inclusion: symptomatically continent women with urodynamically demonstrable stress incontinence with or without reduction of prolapse (POP-Q stage 3 or greater) exclusion NS 69 eligible 52 randomised No loss to follow up
Interventions	A (27) non-standardised prolapse surgery without TVT B (25) non-standardised prolapse surgery with TVT No women had bladder neck plications
Outcomes	primary outcome repeat continence surgery A 1/27 B 0/25 Urodynamic stress incontinence A 9/27 B 1/25 Median subjective VAS < 80 (0-100) failure A 95; B 80 P=0.81 no range SD so unable to calculate UDI, IIQ, PISQ questionnaires stated no difference no figures

Schierlitz 2007 (Continued)

	I hour pad test stated no difference in figures
Notes	Occult SUI was defined as symptomatically continent women with urodynamically demonstrable stress incontinence with or without reduction of the prolapse (POP-Q Stage 3 or greater) The authors calculated a clinician would have to insert 26 TVT slings unnecessarily to prevent one woman needing a sling post-operatively and concluded routine insertion of a suburethral sling where occult stress urinary incontinence has been demonstrated prior to prolapse repair can not be recommended

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	not stated
Allocation concealment (selection bias)	Unclear risk	not stated
Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	not stated
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	not stated
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	unclear
Other bias	Unclear risk	no statement

Sivaslioglu 2008

Methods	Single centre RCT comparing polypropylene mesh surgery with site-specific surgery in the treatment of cystocele CONSORT statement: Yes Power calculation: 45 in each arm Type of randomisation: computer generated Blinding strategy: No (assessment was performed by non-blinded reviewers) Allocation concealment: not specified Definition of cure/failure: 'Acceptable cure' defined as cystocele less than -1 cm (stage 1 POP-Q) Follow up: mean 12 months (range 8-16) Prolapse assessment: POP-Q
Participants	Inclusion: primary cystocele Exclusion: stress urinary incontinence, concomitant rectocele or enterocele or recurrent cystocele

	Randomised: 90 (45 to each arm) Analysed: 85 Lost to follow up: 5
Interventions	A (42): site-specific Polyglactin 910 anterior repair B (43): self-styled four armed polypropylene (Parietene, Sofradim, France) mesh, no anterior repair Concomitant surgery not standardised, management of concomitant apical prolapse was not specified in either group
Outcomes	Objective failure (stage 2 or more POP-Q): A 12/42; B 4/43; P<0.05 PQoL score post-op (mean±SD): A 7.5±6.2; B 6.2±5.5 No further prolapse surgery in either group Stress urinary incontinence de novo: A 3/42; B 0/43 Dyspareunia de novo: A 0/42; B 2/43 Mesh erosion: A 0/42, B 3/43
Notes	Sivaslioglu and colleagues evaluated a site-specific Polyglactin 910 repair and self-styled four armed polypropylene (Parietene, Sofradim) mesh The management of concomitant apical prolapse was not specified in either group and assessment was performed by non-blinded reviewers. Three patients in the AC group developed de-novo SUI and two in the mesh group developed de-novo dyspareunia. Operating time and blood loss are not described

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	computer generated
Allocation concealment (selection bias)	Unclear risk	not stated
Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	not stated
Blinding of outcome assessment (detection bias) All outcomes	High risk	non-blinded reviewers objective assessment patient completed questionnaires
Incomplete outcome data (attrition bias) All outcomes	Low risk	flow diagram: equal numbers and lost to follow up
Other bias	Low risk	no funding and no COI

Sung 2012

Methods	2 centre double blinded randomised control trial: allocation concealment sealed envelopes randomisation block and stratified site patients and assessors blinded (patients unblinded 12 months)	
Participants	Inclusion criteria: women with stage 2 or greater symptomatic rectocele (defined as vaginal bulge, defecatory symptoms, or both) electing surgical repair were eligible. Exclusion criteria: <18years, women undergoing concomitant sacrocolpopexy, or colorectal procedures, history of porcine allergy, connective tissue disease, pelvic malignancy, pelvic radiation, inability to understand English, or unable or unwilling to consent or comply with follow up. All other vaginal prolapse repairs and anti-incontinence procedures were included	
Interventions	Gp A 70 controls midline plication or site-specific repair Gp B 67 midline plication or site-specific repair with 4x7cm subintestinal submucosal graft over the repair and secured to levator ani fascia using interrupted No. 2-0 polyglycolic acid and inferiorly to the perineal body using No. 2-0 polyglycolic acid sutures Excess vaginal tissue was trimmed in all women and the posterior vaginal incision was closed using 2-0 polyglycolic acid sutures The deep and superficial transverse perineal muscles and bulbocavernosus muscles were re-approximated using No. 0 polyglycolic acid sutures and concomitant perineorrhaphy was performed in all women	
Outcomes	1 year review objective failure Ap or Bp -1 or greater Gp A 6/70 Gp B SIS + repair 8/67 p=0.5 subjective failure: (defined as no improvement or worsening in both or de novo symptoms) for vaginal bulge or any of the three defecatory symptoms)straining or splinting with bowel movements, sensation incomplete evacuation vaginal bulge Gp A 4/58 GP B 2/64 defecatory symptoms GP A 26/58 GP B 28/64 operating time and blood loss slightly greater Gp B reported as median and range complications Gp A 1 rectal injury: Gp B 1 cystotomy vaginal stricture Gp A 1/70 Gp B 1/67 return to OT GP A 1 evacuate haematoma Gp B 1 oversow separated vaginal incision 2 weeks Dyspareunia Gp A 4/57 Gp B 7/56 p=0.3	
Notes		
<i>Risk of bias</i>		
Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	computer generated random sequence

Allocation concealment (selection bias)	Low risk	sealed opaque envelopes
Blinding of participants and personnel (performance bias) All outcomes	Low risk	blinded
Blinding of outcome assessment (detection bias) All outcomes	Low risk	blinded reviewers
Incomplete outcome data (attrition bias) All outcomes	Low risk	flow diagram complete
Other bias	Low risk	no financial conflict of interest and grant funding national institute of child and human health

Thijs 2010 abstract

Methods	Multi-centre and multi-national RCT randomisation and allocation concealment NS 90% power to detect 20% difference urinary distress inventory prolapse domain at 1 year with 5% type 1 error with 38 in each group
Participants	A (48): anterior colporrhaphy B (48): Perigee transobturator polypropylene mesh A 35Ac only, 5 SSF, 5 hysterectomy, 6 midurethral sling B 34 perigee only, 4 ssF, 8 hysterectomies, 1 mid-urethral sling
Interventions	inclusion stage 2 or more cystocele excluded if anterior was not the leading prolapse concomitant surgery allowed stage 2 or more uterine prolapse hysterectomy or sacrospinous ligament fixation (SSF) SUI mid-urethral sling
Outcomes	A median 50 B median 100 blood loss >500mls A1 B 1 UDI: A versus B at baseline discomfort: 27(24) 27(23) overactive bladder: 34(30) 41(33) obstructive micturition: 28(32) 19(20) prolapse: 56(30) 58(35) incontinence: 23(24) 19(20) UDI:A vs B at 1 year discomfort: 13 (19) 8 (12) overactive bladder: 16(25) 15(23) obstructive micturition: 15(23) 11(19) prolapse : 12(22) 1(4)

Thijs 2010 abstract (Continued)

	incontinence: 18(29) 16(23) B mesh erosion 9/48 B surgery mesh exposure 4/48	
Notes		
Risk of bias		
Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	not stated
Allocation concealment (selection bias)	Unclear risk	not stated
Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	not stated
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	not stated
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	not clear
Other bias	Unclear risk	no statement

Vijaya 2011 abstract

Methods	RCT with block randomisation allocation concealment, power and consort NS Pre and 6 months post-operatively anatomical outcome was assessed utilising the POP-Q and for the assessment of the subjective outcome the PQOL for quality of life, the FSFI for the sexual dysfunction and BBUSQ-22 for the bowel associated symptoms was utilised
Participants	inclusion: symptomatic posterior wall prolapse exclusion: and concomitant surgery NS
Interventions	A (26): standard posterior colporrhaphy (with plication of the levator ani muscle) B (26): fascial and vaginal plication repair.
Outcomes	A mean difference pre and post-op -0.1.33(0.73) less than B mean difference: -2.01(0.73) PQOL significantly different both groups post-operatively with no values given no difference sexual function pre and post-intervention between the groups Stated that Gp B significant improvement bowel evacuation post intervention although table compares pre-operative GP A with post-operative GP B

Notes		
Risk of bias		
Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	not stated
Allocation concealment (selection bias)	Unclear risk	not stated
Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	not stated
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	not stated
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	unclear
Other bias	Unclear risk	not stated

Vollebregt 2011

Methods	<p>mutli-centre RCT</p> <p>Randomisation was computerised and stratification was performed for the presence of uterine descent ≥ 2. No blinding of group assignment was performed</p> <p>allocation concealment NS</p> <p>power 80 to detect 25% difference in groups with 5% type 1 error from sample size of 50 in each group</p>
Participants	<p>inclusions: \geq stage 2 cystocele</p> <p>exclusion: history of urogynaecological surgery for pelvic organ prolapse or incontinence, cancer of COPD, concomitant urinary stress incontinence with an indication for surgical correction, recurrent lower urinary tract infections (> 3 culture proven infections/year), maximum bladder capacity < 300 ml, an indication for hysterectomy, and women with childbearing potential and inadequate birth control measures</p> <p>randomised A 64 B 61</p> <p>withdrawals prior to surgery A2 B2</p> <p>12 months A 51 B 53</p>
Interventions	A AC B trocar guided transobturator synthetic mesh AVULTA
Outcomes	<p>objective failure rate (\geq stage 2) A33/51 B 5/53</p> <p>erosions B 2/53</p>

	reoperation erosion B 2/53 reoperation prolapse A2/51 de novo dyspareunia A 2/21 B 3/20 median (p25-p75) results no difference between groups UDI (Urogenital distress inventory) and IIQ Incontinence Impact questionnaire	
Notes		
Risk of bias		
Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	computer generated
Allocation concealment (selection bias)	Low risk	research nurse from online list
Blinding of participants and personnel (performance bias) All outcomes	High risk	no
Blinding of outcome assessment (detection bias) All outcomes	Low risk	reviewers blinded by strapping thighs prior to review
Incomplete outcome data (attrition bias) All outcomes	Low risk	flow diagram accounts all patients
Other bias	Low risk	no funding and no COI

Weber 2001

Methods	RCT (computer generated random number tables. Sealed envelopes concealed assignment) comparing 3 surgical techniques 3 arms, 1 centre Length of follow up: A+B+C, 23.3 months
Participants	83 women Inclusion: all women undergoing cystocele repair Exclusion: continence surgery i.e. colposuspension or sling 114 randomised 5 withdrawals 26 lost to follow up (A 2:B 15: C 9) leaving 83 in trial
Interventions	A (33): anterior repair: midline plication without tension 0 PDS B (24): ultralateral: dissection to pubic rami laterally, plication paravaginal with tension 0 PDS interrupted C: (26) anterior repair plus mesh: standard plication midline Vicryl mesh overlay, Vicryl sutures

Weber 2001 (Continued)

Outcomes	Objective Aa and Ba less than or at 1 cm from introitus: A 10/33, B 11/24, C 11/26 Remaining data reported related to 83 women as a whole and did not differentiate between groups
Notes	Number and level of surgeons unknown Adequate power Non-standardised concomitant surgery Intention to treat yes No CONSORT No stratification Significant disparity in total numbers in Table 1 and actual numbers with prolapse reported Except for point Aa POP-Q, no individual outcome data reported in the 3 groups

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	computer generated
Allocation concealment (selection bias)	Low risk	A - adequate
Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	not stated
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	not stated
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	NS
Other bias	Unclear risk	NS

Wei 2011

Methods	RCT Multi-centre single blinded, sham controlled at 7 clinical sites Randomisation computer generated stratified by surgeon and type of prolapse concealment NS who conducted reviewers 80% power to detect 15% difference between the groups with 5% type 1 error intention-to-treat analysis with missing data considered as treatment failures
Participants	vaginal prolapse surgery (colpocleisis, apical suspension, anterior repair with Gp A sham procedure 172 Gp B Gynecare TVT 165 12 month review

	inclusion criteria: vaginal prolapse surgery for symptomatic stage 2 anterior compartment prolapse and a negative response to 3 questions from PFDI relating to stress incontinence exclusions prior sling placement, prior urethral surgery or radiation, planing pregnancy, 2 or more hospitalisations in the prior year, at 3 months and 12 months patients reviewed and UI treated with medical or a variety of surgical options	
Interventions	Gp A vaginal prolapse surgery without TVT Gp B vaginal prolapse surgery with TVT	
Outcomes	<p>urinary incontinence defined at 3 months (stress, urge or mixed defined as +ve cough stress test, bothersome incontinence symptoms on 4 questions from the PFDI-3 relating to stress incontinence and 1 to urge incontinence or any treatment for incontinence)</p> <p>12 month urinary incontinence stress, urge or mixed defined as +ve cough stress test, bothersome incontinence symptoms on 4 questions from the PFDI-3 relating to stress incontinence and 1 to urge incontinence</p> <p>Positive cough stress test 12 months Gp A 31/151 Gp B (with TVT) 5/143</p> <p>Symptoms of incontinence Gp A 30/160 Gp B 18/158</p> <p>subsequent continence surgery Gp A 8/160 Gp B 1/158</p> <p>Subsequent surgery for voiding dysfunction Gp A 0/160 Gp B 4/158</p> <p>Mean operative time was 11.4 mins longer and mean blood loss 24ml higher Gp B TVT as compared to Gp A prolapse surgery without TVT</p> <p>Major bleeding Gp A 0/172 Gp B 5/164</p> <p>Incomplete bladder emptying 6 weeks Gp A 0/170 Gp B 6/162</p> <p>in those with preoperative occult stress incontinence (positive prolapse reduction stress test) had urinary incontinence 12months Gp A 34/57 Gp B 19/54</p> <p>in those with -ve pre-operative occult stress incontinence had urinary incontinence Gp A 46/113 Gp B 30/107</p> <p>Pelvic Floor Urinary Impact Questionnaire (PFUIQ) Gp a -48.0 (65.9) Gp B -50.3 (71.3)</p>	
Notes	OPUS trial: a significant weakness of the evaluation is that the definitions for inclusion as stress continent (-ve answer to 3 PFDI questions relating to sui) were less stringent than the definition of UI positive as outcome includes +ve stress test, questions relating to stress or urge incontinence, or treatment for any incontinence. Actually as 108 (Gp A 57 and Gp B 54) women had +ve prolapse reduction stress test prior to intervention they would have been deemed positive stress incontinence post-intervention and were -ve stress incontinence preoperatively on the criteria defined	
Risk of bias		
Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	computer generated block design stratified by surgeon and type of prolapse surgery
Allocation concealment (selection bias)	Unclear risk	allocation concealment not discussed

Wei 2011 (Continued)

Blinding of participants and personnel (performance bias) All outcomes	Low risk	sham dressings
Blinding of outcome assessment (detection bias) All outcomes	Low risk	outcomes were questionnaires by blinded reviewers: cough stress test doesn't say who performed and were they blinded
Incomplete outcome data (attrition bias) All outcomes	Low risk	intention to treat and failure of review counted as failure
Other bias	Low risk	grants from Eunice Kennedy Shriver National Institute of Child Health and Human Development and National Institute of Health Office of research on Women Health

Withagen 2011

Methods	<p>mult-centre randomised controlled trial</p> <p>13 centres 22 surgeons</p> <p>randomisation list computer generated for each 13 centres. allocation concealment not discussed and neither patient, surgeon or assessor (surgeons) were blinded</p> <p>surgeons underwent specific Prolift mesh training</p> <p>Full power calculation completed</p>
Participants	<p>randomised GP A 99 Gp B 95</p> <p>1 year examination A 84 B 83</p> <p>inclusion criteria included recurrent stage II or higher anterior and or posterior wall prolapse and those with pregnancy, future pregnancy, prior vaginal mesh repair, a compromised immune system or any other condition that would compromise healing, previous pelvic irradiation or cancer, blood coagulation disorders, renal failure, upper urinary tract obstruction, renal failure and upper urinary tract obstruction, or presence of large ovarian cysts or myomas where excluded</p>
Interventions	<p>Gp A conventional surgery was performed at the discretion of the surgeon although absorbable sutures were specified and hysterectomies permitted</p> <p>Gp B standardised and structured in the Tension-free vaginal mesh: performed as described by Fattouh (Fattouh 2007) previously and no hysterectomies were performed or T incisions allowed</p>
Outcomes	<p>definition success is unorthodox and different in methodology (\geq grade 2 prolapse in the treated site) and results section (\geq grade 2 POP in treated compartment or subsequent prolapse surgery) Furthermore definition treated compartment varies in each group. A includes all surgical sites B excludes sites where mesh was not utilised</p> <p>objective failure rate or repeat prolapse surgery A 56/84 B 41/83</p> <p>reoperation rates prolapse A 4/84 B 0/83</p> <p>mesh exposure B 14/83</p>

	<p>reoperation mesh exposure B 5/83 de novo dyspareunia A 3/29 B 3/37 de novo SUI A 8/89 B 8/81 cystotomy A 0 B 2 haematoma A 1 B 6</p> <p>On POP-Q assessment both groups improved significantly with Gp B (mesh) improving significantly more in Aa, Ba, Ap and Bp. Patients global Impresion of Improvement (PGII) were similar in both groups at 1 year</p> <p>Gp B demonstrated a significant postoperative improvement in domain of pain and incontinence</p> <p>Sexual function following trocar guided mesh or vaginal native tissue repair in recurrent prolapse 2011 J Sexual medicine</p> <p>Gp A 28 Gp B 32 who were sexually active pre surgery and completed PISQ pre and 12 months</p> <table border="1"> <thead> <tr> <th></th> <th>pre</th> <th>post</th> </tr> </thead> <tbody> <tr> <td>Total PISQ</td> <td></td> <td></td> </tr> <tr> <td>A:</td> <td>31.5(7.2)</td> <td>34.7(7.2)</td> </tr> <tr> <td>B:</td> <td>35.0(5.7)</td> <td>34.3(6.7)</td> </tr> <tr> <td>behavioral/emotive</td> <td></td> <td></td> </tr> <tr> <td>A</td> <td>12.5(3.9)</td> <td>12.7(3.5)</td> </tr> <tr> <td>B:</td> <td>13.8(3.1)</td> <td>12.5(3.9)</td> </tr> <tr> <td>physical</td> <td></td> <td></td> </tr> <tr> <td>A</td> <td>11.8(2.3)</td> <td>13.3(2.1)</td> </tr> <tr> <td>B:</td> <td>13.1(3.1)</td> <td>13.8(2.4)</td> </tr> <tr> <td>Partner-related</td> <td></td> <td></td> </tr> <tr> <td>A</td> <td>7.8(1.9)</td> <td>8.7(1.6)</td> </tr> <tr> <td>B:</td> <td>8.0(1.9)</td> <td>7.8(2.2)</td> </tr> </tbody> </table> <p>sexual function improved (higher PISQ score) Gp A native tissue repair and deteriorated significantly in Gp B mesh post-surgery</p>		pre	post	Total PISQ			A:	31.5(7.2)	34.7(7.2)	B:	35.0(5.7)	34.3(6.7)	behavioral/emotive			A	12.5(3.9)	12.7(3.5)	B:	13.8(3.1)	12.5(3.9)	physical			A	11.8(2.3)	13.3(2.1)	B:	13.1(3.1)	13.8(2.4)	Partner-related			A	7.8(1.9)	8.7(1.6)	B:	8.0(1.9)	7.8(2.2)
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Notes	<p>The authors conclude that at 12months anatomic failure is lower in Gp B (prolift mesh) as compared to Gp A. These findings are overshadowed by the two groups being significantly different prior to intervention on important findings. The lack of allocation concealment in the randomisation process, variability and unorthodox definitions of success and non blinded surgeons reviewing their own surgery are significant limitations of the manuscript</p>
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Risk of bias		
Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	computer generated
Allocation concealment (selection bias)	High risk	allocation concealment not described. Pre-operatively unfortunately group A is significantly different to the mesh group B as demonstrated by having greater degree prolapse at Ap, Bp and GH in table 4, having

		significantly higher number with \geq stage II apical compartment prolapse in those in Table I undergoing prior apical surgery, 36% (16/45) in the non mesh versus 18% (10/56) in the mesh group (P= 0.04, OR 2.54) and finally prior sacral colpopexy was three times as frequent in the mesh group. Only the final anomaly is acknowledged and summatively these differences point to a systematic failure in the randomization process which potentially discredits the remaining findings
Blinding of participants and personnel (performance bias) All outcomes	High risk	non-blinded
Blinding of outcome assessment (detection bias) All outcomes	High risk	non-blinded reviewers: patient completed questionnaires
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	no statement
Other bias	High risk	funded university research fund: all authors reported financial support from Ethicon company manufacturing product being evaluated by non-blinded reviewers

BMI = Body mass index

Hb = Haemoglobin

ICS = International Continence Society

IVS = intravaginal slingplasty

MUCP = Maximum urethral catheter pressure

OAB = Overactive bladder

PDS = Absorbable polydioxanone surgical suture (PDS)

PFDI = Pelvic Floor Distress Inventory

PFIQ = Pelvic Floor Impact Questionnaire

PISQ = Pelvic organ prolapse/urinary Incontinence Sexual Questionnaire

PGI-I= Patient Global Impression of Improvement

POP = Pelvic organ prolapse

POP-Q = Pelvic organ prolapse quantification (according to ICS)

P-QOL= Prolapse Quality of Life Questionnaire

QoL = Quality of Life

RCT = Randomised controlled trial

SUI = Stress Urinary Incontinence (symptom diagnosis)

TVT = Tension-free vaginal tape

UDI = Urogenital Distress Inventory

UI = Urinary incontinence
 UTI = Urinary tract infection
 VAS = visual analogue scale

Characteristics of excluded studies *[ordered by study ID]*

Study	Reason for exclusion
Aka 2004	Unclear study design (participants having a hysterectomy are divided into 2 groups; not all participants had prolapse). Outcome was markers of tissue trauma (acute phase reactants)
Barber 2006	Barber and colleagues compared two independent population cohorts. Arm one was the pessary group in which women were randomly allocated between two pessary types and arm two that underwent a surgical intervention. As patients were not randomly allocated between the pessary and surgery groups, this paper failed to meet the criteria of being a randomised controlled trial and was excluded
Bergman 1989	RCT on anterior colporrhaphy, Pereyra or Burch colposuspension, no data on pelvic organ prolapse given
Biller 2008	Biller and colleagues evaluated inclusion and exclusion of anal purse string suture to minimise contamination during prolapse surgery. This study was excluded from the review as it failed to evaluate pelvic organ prolapse surgical procedures
Boccasanta 2004	RCT on two transanal stapled techniques for outlet obstruction. Outlet obstruction caused not only by rectoceles but also by descending perineum and intussusception. Prolapse data not explicitly presented
Carramao 2008a	Carramao and colleagues compared vaginal hysterectomy with sacrospinous fixation (14) with hysteropexy and mesh pelvic floor repair (14) in women with stage 3 or more pelvic organ prolapse. Peri-operative data and objective success were recorded at 6 months and was identical between the groups. Although Camarro and colleagues present the full and detailed results in a full manuscript in 2009 with 15 women in the hysterectomy and 16 in the hysteropexy group this paper was excluded due to the poor sample size and lack of data regarding functional outcomes, quality of life and complications.
Choe 2000	RCT on mesh versus vaginal wall sling for stress incontinence. Not all women had pelvic organ prolapse before the operation
Colombo 1996b	RCT on Burch colposuspension and paravaginal defect repair for stress incontinence, no report on treatment of associated anterior vaginal wall prolapse
Cruikshank 1999	RCT on three operations for prevention of enterocele. Study does not include treatment of prolapse
Das 2004	RCT on posterior intravaginal sling versus sacrospinous ligament fixation. Poster abstract only, very limited data, no results presented
Debodinance 1993	Comparison of two different procedures for stress incontinence and prolapse but no results on pelvic organ prolapse are reported post-operatively

(Continued)

Del Roy 2010 abstract	Del Roy compared in a single centre RCT anterior colporrhaphy versus NACA TC™, marcoporous polypropylene mesh, in surgical treatment to greater (grade III and IV) anterior vaginal prolapse. 78 women were included in this study. This study was excluded from this review due to paucity of data regarding distribution of patients within the the two procedures. The author only stated the overall success rate in percentage for the two groups (92% in the mesh versus 66% in the colporrhaphy group) without information of numbers within groups
Di Palumbo 2003	RCT non-balanced on stress urinary incontinence and urethro-cystocele grade 3-4 (Baden-Walker). Very limited prolapse data supplied (mean grading rather than numbers and percentages, failure rates not presented). No clear definition of success or failure
Dixon 2010	Dixon and colleagues compared in a randomised controlled trial the use of intermittent urethral catheterisation with indwelling suprapubic catheterization in women undergoing surgery for urodynamic stress incontinence or uterovaginal prolapse. 75 women were randomised. This study was excluded from this review. Catheter issues only at the time of prolapse surgery will be reviewed as separate subgroup analysis within the surgical management of pelvic organ prolapse review
Duggan 2010	Duggan and Barry assessed short-term results in a RCT comparing traditional colporrhaphy (n=16) and mesh repair (n=19) for anterior compartment prolapse. Due to a predefined decision that papers with less than 20 in each treatment group would not be included in the review the manuscript was excluded
Glavind 2007	Glavind and colleagues compared 3 hours and 24 hours post-operative catheter removal following pelvic organ prolapse surgery. While this study was very interesting, it was excluded from the review as it failed to evaluate pelvic organ prolapse surgical procedures
Guvenal 2002	Unclear study design (participants divided into 3 groups): vaginal hysterectomy + sacrospinous fixation; abdominal hysterectomy and sacral colpopexy; vaginal hysterectomy alone
Heinonen 2011	Heinonen and Nieminen evaluate outcomes of anterior vaginal wall mesh augmentation with concomitant sacrospinous ligament fixation (SSLF) (n=14) or with concomitant posterior intravaginal slingplasty (IVS) (n=8) for uterovaginal or vaginal vault prolapse. Due to a predefined decision that papers with less than 20 in each treatment group would not be included in the review the manuscript was excluded
Huang 2011	Huang and colleagues compared in a RCT the duration of urethral catheterisation during and after pelvic reconstructive surgery. Ninety patients were randomly divided into 2, 3 and 4 days urinary catheterization groups. This study was excluded from this review. Catheter issues only at the time of prolapse surgery will be reviewed as separate subgroup analysis within the surgical management of pelvic organ prolapse review
Juneja 2010	Juneja and colleagues compared in a pilot randomised study hysterectomy (n=9) versus no hysterectomy (n=7) for uterine prolapse in conjunction with posterior infracoccygeal colpopexy. Due to a pre-defined decision that papers with less than 20 in each treatment group would not be included in the review the manuscript was excluded
Kamilya 2010	Kamilya and colleagues compared in a RCT short versus long-term catheterisation after uncomplicated vaginal prolapse surgery. Two hundred patients planned for vaginal prolapse surgery were included and randomly assigned into 1 day or 4 days catheterisation. The early removal of catheter seems more advantageous, with lower incidence of urinary tract infection and a shorter hospital stay although associated with an increased risk of re-catheterisation

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	This study was excluded from this review. Catheter issues only at the time of prolapse surgery will be reviewed as separate subgroup analysis within the surgical management of pelvic organ prolapse review
Kokabi 2010	Kokabi and colleagues compared in a RCT the best time of removal of the urinary catheter (Foley) after anterior or posterior colporrhaphy. One hundred and eighty nine patients who have been undergone colporrhaphy have been selected randomly and divided into three groups' as 1, 2 and 4 days of catheter removal. The authors suggest that the best time to remove the urinary Foley catheter is the day four. This study was excluded from this review. Catheter issues only at the time of prolapse surgery will be reviewed as separate subgroup analysis within the surgical management of pelvic organ prolapse review
Kringel 2010	Kringel and colleagues compared in a three arm RCT (indwelling urinary catheter for 24 hours or 96 hours or suprapubic catheter for 96hours) after a anterior colporrhaphy. The authors concluded that the optimal removal of an indwelling urinary catheter was after 24 hours. This study was excluded from this review. Catheter issues only at the time of prolapse surgery will be reviewed as separate subgroup analysis within the surgical management of pelvic organ prolapse review
Kwon 2002	Poster presentation at ICS 2002. Preliminary data, subgroup of an ongoing RCT on additional transvaginal sling for prevention of recurrent anterior vaginal wall prolapse
Lopes 2010	Lopes et al reported on a multi-centre RCT comparing sacrospinous ligament fixation with mono-filament polypropylene mesh kit (Nazca R®, Promedon®,Cordoba, Argentina) for stage 3-4 uterine prolapse. This study was excluded from the review as the sample size of 16 in each group was less than our pre-determined group minimum of 20
Lundarelli 2009	Lundarelli and colleagues compared in a RCT polypropylene mesh versus site-specific repair in the treatment of stage III or IV or recurrent prolapse of the anterior vaginal wall prolapse. This study was excluded from the review as the sample size of 16 in each group was less than our pre-determined group minimum of 20
Martan 2010	Martan and colleagues compared in a three arm RTC the correlation between stress urinary incontinence or urgency and anterior compartment defect before and after surgery. Women were randomly assigned into anterior colporrhaphy group (n=18), individualised Gynemesh repair (n=33) or to Prolift anterior group (n=36). Incontinence specific issues will be reviewed in a subgroup review
Mattos 2004	Unclear study design (participants divided into 2 groups): following vaginal hysterectomy, the vault was repaired with (a), Richter's technique or (b) titanium staples to sacrospinous tendon
Meschia 2007a	Meschia and colleagues reported preliminary data comparing anterior and posterior mesh repair (Perigee and Apogee) without hysterectomy and fascial reconstructive surgery with hysterectomy in women with at least POP-Q stage 3 anterior compartment prolapse and stage 2 uterine descent. The abstract reports on 3 months outcomes with 21 women in the mesh group and 17 in non mesh group Due to the short follow-up time, small numbers and the preliminary nature of the study this abstract was excluded and we are awaiting the full data set which the authors were not able to supply at this time
Mouritsen 2009	Conference abstract only with limited sample size and data.
Quadri 1985	Conference abstracts with unclear numbers and definitions, limited prolapse data

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Rane 2004	RCT of 3 different operations (vaginal sacrospinous fixation SSF, posterior intravaginal slingplasty IVS, sacral colpopexy SCP (abdominal or laparoscopic)) but presented MRI findings of anatomical results only. SSF said to increase anatomical distortion relative to the other 2 operations
Rudnicki 2010	Rudnicki and colleagues compared in a RCT anterior colporrhaphy (n=40) versus Avaulta mesh repair for anterior compartment prolapse. Due to short follow up (3 months) this study was excluded from this review
Segal 2007	Segal and colleagues compared the feasibility of local anesthesia with IV sedation versus general anesthesia in women undergoing vaginal surgery for pelvic organ prolapse. This trial was excluded from the review as it failed to evaluate pelvic organ prolapse surgical procedures
Svabik 2010	Svabik and colleagues evaluated and quantified early and late changes in mesh length after anterior vaginal repair with implants (Gynemesh) with ultrasound. 35 patients were randomized in two groups with or without mesh augmented repair. The authors stated a tissue reaction expressed as shrinkage of mesh with 16-20%. This study was excluded from the review as the sample size of 17 and 18 respectively in each group was less than our predetermined group minimum of 20 and the full article was in Czech
Tincello 2009	Tincello et al report a pilot randomised patient preference study comparing colposuspension or TVT for urinary incontinence at time of anterior repair for prolapse. Thirty-one women were recruited however only 4, 2 in each arm being randomised. Due to a pre-defined decision that papers with less than 20 in each treatment group would not be included in the review the manuscript was excluded
Van Der Steen 2011	Van der Steen compared in a prospective randomised control trial 1-day or 3-days suprapubic catheter in women undergoing anterior colporrhaphy to determine the optimal duration of catheterisation. One-hundred and seventy-nine patients were randomly allocated into the two groups. This study was excluded from this review. Catheter issues only at the time of prolapse surgery will be reviewed as separate subgroup analysis within the surgical management of pelvic organ prolapse review
Weemhoff 2011	Weemhoff and colleagues compared the number of temporary catheter replacements and urinary tract infections after indwelling catheterisation for 2 versus 5 days following an anterior colporrhaphy. Two hundred and forty-six patients were randomly assigned to 2 or 5 days of indwelling catheterisation. This study was excluded from this review. Catheter issues only at the time of prolapse surgery will be reviewed as separate subgroup analysis within the surgical management of pelvic organ prolapse review

RCT = Randomised Controlled Trial

ICS = International Continence Society

Characteristics of ongoing studies [ordered by study ID]

Cortesse 2010

Trial name or title	ATHENA
Methods	RCT
Participants	women with occult UI
Interventions	POP+SUI surgery vs POP surgery alone
Outcomes	
Starting date	
Contact information	
Notes	

Glazener 2009

Trial name or title	PROSPECT (PROlapse Surgery: Pragmatic Evaluaiton and randomised Controlled Trials)
Methods	RCT
Participants	women having prolapse surgery
Interventions	anterior and posterior repair (colporrhaphy) with or without non-absorbable or biological mesh inlay, or mesh kit
Outcomes	Prolapse symptoms (POP-SS); prolapse stage (POP-Q), economic outcomes
Starting date	01 09 2009
Contact information	c.glazener@abdn.ac.uk
Notes	HTA funded study in UK

van der Steen 2010

Trial name or title	CUPIDO 1 and CUPIDO 2
Methods	RCT
Participants	women with SUI (CUPIDO 1) and women with occult SUI (CUPIDO 2)
Interventions	POP+SUI surgery vs POP surgery alone
Outcomes	

van der Steen 2010 (Continued)

Starting date	
Contact information	
Notes	

Verleyen 2004

Trial name or title	Porcine dermis versus Vicryl plug in Raz cystocele repair
Methods	
Participants	79 women (76 with concomitant prolapse)
Interventions	RCT, porcine dermis versus Vicryl
Outcomes	UDI, IIQ, urinary urgency, recurrent cystocele
Starting date	2003?
Contact information	Dr P Verleyen, University Hospitals, Gassthuisberg
Notes	Abstract of ongoing study reported ICS/IUGA Paris 2004

TVT = tension-free vaginal tape

DATA AND ANALYSES

Comparison 1. Surgery for upper vaginal (vault or uterine) prolapse

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Number of women with prolapse symptoms (subjective failure)	6		Risk Ratio (M-H, Random, 95% CI)	Subtotals only
1.1 abdominal sacral colpopexy vs vaginal sacrospinous colpopexy	2	169	Risk Ratio (M-H, Random, 95% CI)	0.52 [0.25, 1.09]
1.2 abdominal sacro-hysteropexy versus vaginal hysterectomy plus anterior and/or posterior colporrhaphy at 1 year	1	82	Risk Ratio (M-H, Random, 95% CI)	3.2 [1.29, 7.92]
1.3 abdominal sacro-hysteropexy versus vaginal hysterectomy plus anterior and/or posterior colporrhaphy at 8 years	1	84	Risk Ratio (M-H, Random, 95% CI)	2.6 [1.02, 6.65]
1.4 vaginal sacrospinous colpopexy vs posterior intravaginal slingplasty	1	66	Risk Ratio (M-H, Random, 95% CI)	0.67 [0.12, 3.73]
1.5 laparoscopic sacral colpopexy vs total vaginal polypropylene mesh	1	108	Risk Ratio (M-H, Random, 95% CI)	0.26 [0.03, 2.25]
1.6 uterosacral colpopexy vs vaginal polypropylene mesh	1	59	Risk Ratio (M-H, Random, 95% CI)	2.36 [0.26, 21.42]
2 Number of women unsatisfied with surgery	2		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
2.1 abdominal sacral colpopexy vs vaginal sacrospinous colpopexy	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
2.2 vaginal sacrospinous colpopexy vs posterior intravaginal slingplasty	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
3 Number of women who visited a physician after surgery because of pelvic floor symptoms	1		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
3.1 abdominal sacro-hysteropexy versus vaginal hysterectomy plus anterior and/or posterior colporrhaphy	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
4 Patient global impression Improvement PGI-I (very much better)	1	47	Risk Ratio (M-H, Fixed, 95% CI)	0.96 [0.65, 1.42]

4.1 open versus laparoscopic sacral colpopexy	1	47	Risk Ratio (M-H, Fixed, 95% CI)	0.96 [0.65, 1.42]
5 Number of women with any prolapse (objective failure)	8		Risk Difference (M-H, Fixed, 95% CI)	Totals not selected
5.1 abdominal sacral colpopexy vs vaginal sacrospinous colpopexy (failed)	1		Risk Difference (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
5.2 abdominal sacral colpopexy vs vaginal sacrospinous colpopexy (not improved)	1		Risk Difference (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
5.3 abdominal sacral colpopexy vs vaginal McCall	1		Risk Difference (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
5.4 cadaveric fascia lata (Tutoplast) vs polypropylene (Trelex)	1		Risk Difference (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
5.5 vaginal sacrospinous colpopexy vs posterior intravaginal slingplasty	1		Risk Difference (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
5.6 sacral colpopexy without colposuspension versus sacral colpopexy with colposuspension	1		Risk Difference (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
5.7 uterosacral colpopexy versus vaginal polypropylene mesh	1		Risk Difference (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
5.8 laparoscopic sacral colpopexy versus total vaginal polypropylene mesh kit	1		Risk Difference (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
6 Number of women with recurrent vault/uterine prolapse (objective)	8		Risk Ratio (M-H, Random, 95% CI)	Subtotals only
6.1 abdominal sacral colpopexy vs vaginal sacrospinous colpopexy	2	169	Risk Ratio (M-H, Random, 95% CI)	0.23 [0.07, 0.77]
6.2 vaginal sacrospinous colpopexy vs posterior intravaginal slingplasty	2	111	Risk Ratio (M-H, Random, 95% CI)	0.31 [0.03, 2.91]
6.3 cadaveric fascia lata (Tutoplast) vs polypropylene (Trelex)	1	89	Risk Ratio (M-H, Random, 95% CI)	0.0 [0.0, 0.0]
6.4 hysterectomy versus sacrospinous hysterectomy	1	65	Risk Ratio (M-H, Random, 95% CI)	0.16 [0.02, 1.20]
6.5 High levator myorrhaphy vs uterosacral vag vault suspension	1	229	Risk Ratio (M-H, Random, 95% CI)	1.17 [0.37, 3.72]
6.6 sacral colpopexy versus high uterosacral colpopexy	1	110	Risk Ratio (M-H, Random, 95% CI)	0.05 [0.00, 0.82]
7 Vault distance from hymen (cm) POPQ point C after surgery	5		Mean Difference (IV, Fixed, 95% CI)	Subtotals only

7.1 sacral colpopexy without colposuspension versus sacral colpopexy with colposuspension	2	358	Mean Difference (IV, Fixed, 95% CI)	0.41 [0.13, 0.69]
7.2 laparoscopic sacral colpopexy versus total vaginal polypropylene mesh kit	1	108	Mean Difference (IV, Fixed, 95% CI)	-1.39 [-2.39, -0.39]
7.3 cadaveric fascia at sacral colpopexy versus monofilament polypropylene mesh at sacral colpopexy	1	58	Mean Difference (IV, Fixed, 95% CI)	0.31 [-0.41, 1.03]
7.4 open versus laparoscopic sacral colpopexy	1	47	Mean Difference (IV, Fixed, 95% CI)	0.0 [-0.74, 0.74]
8 Total vaginal length (cm) after surgery	3		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
8.1 sacral colpopexy without colposuspension versus sacral colpopexy with colposuspension	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
8.2 laparoscopic sacral colpopexy versus total vaginal polypropylene mesh kit	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
8.3 cadaveric fascia at sacral colpopexy versus monofilament polypropylene mesh at sacral colpopexy	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
9 Number of women with recurrent cystocele (objective)	4		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
9.1 abdominal sacral colpopexy vs vaginal sacrospinous colpopexy	1	89	Risk Ratio (M-H, Fixed, 95% CI)	0.47 [0.12, 1.75]
9.2 vaginal sacrospinous colpopexy vs posterior intravaginal slingplasty	2	111	Risk Ratio (M-H, Fixed, 95% CI)	1.65 [0.83, 3.27]
9.3 High levator myorrhaphy vs uterosacral vag vault suspension	1	229	Risk Ratio (M-H, Fixed, 95% CI)	0.83 [0.57, 1.21]
10 Objective anterior compartment prolapse after surgery	3		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
10.1 vaginal sacrospinous colpopexy vs posterior intravaginal slingplasty	2	111	Risk Ratio (M-H, Fixed, 95% CI)	1.65 [0.83, 3.27]
10.2 hysterectomy versus sacrospinous hysteropexy	1	65	Risk Ratio (M-H, Fixed, 95% CI)	1.29 [0.84, 1.97]
11 Anterior vaginal wall distance from hymen (cm) POPQ point Ba after surgery	4		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
11.1 sacral colpopexy without colposuspension versus sacral colpopexy with colposuspension	2	296	Mean Difference (IV, Fixed, 95% CI)	0.44 [0.26, 0.63]
11.2 laparoscopic sacral colpopexy versus total vaginal polypropylene mesh kit	1	108	Mean Difference (IV, Fixed, 95% CI)	-0.70 [-1.04, -0.36]

11.3	cadaveric fascia at sacral colpopexy versus monofilament polypropylene mesh at sacral co	1	58	Mean Difference (IV, Fixed, 95% CI)	0.8 [0.20, 1.40]
12	Number of women with recurrent rectocele (objective)	4		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
12.1	abdominal sacral colpopexy vs vaginal sacrospinous colpopexy	1	89	Risk Ratio (M-H, Fixed, 95% CI)	2.49 [0.71, 8.79]
12.2	vaginal sacrospinous colpopexy vs posterior intravaginal slingplasty	2	111	Risk Ratio (M-H, Fixed, 95% CI)	1.63 [0.55, 4.88]
12.3	High levator myorrhaphy vs uterosacral vag vault suspension	1	229	Risk Ratio (M-H, Fixed, 95% CI)	1.06 [0.49, 2.31]
13	Objective posterior compartment prolapse after surgery	3		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
13.1	vaginal sacrospinous colpopexy vs posterior intravaginal slingplasty	2	111	Risk Ratio (M-H, Fixed, 95% CI)	1.63 [0.55, 4.88]
13.2	hysterectomy versus sacrospinous hysterectomy	1	65	Risk Ratio (M-H, Fixed, 95% CI)	1.65 [0.66, 4.09]
14	Posterior vaginal wall distance from hymen (cm) POPQ point Bp after surgery	4		Mean Difference (IV, Random, 95% CI)	Subtotals only
14.1	sacral colpopexy without colposuspension versus sacral colpopexy with colposuspension	2	296	Mean Difference (IV, Random, 95% CI)	0.09 [-0.69, 0.87]
14.2	laparoscopic sacral colpopexy versus total vaginal polypropylene mesh kit	1	108	Mean Difference (IV, Random, 95% CI)	-0.70 [-1.03, -0.37]
14.3	cadaveric fascia at sacral colpopexy versus monofilament polypropylene mesh at sacral co	1	58	Mean Difference (IV, Random, 95% CI)	0.20 [-0.11, 0.51]
15	Number of women with post-operative stress urinary incontinence	7		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
15.1	abdominal sacral colpopexy vs vaginal sacrospinous colpopexy	2	155	Risk Ratio (M-H, Fixed, 95% CI)	0.55 [0.32, 0.95]
15.2	vaginal sacrospinous colpopexy vs posterior intravaginal slingplasty	2	111	Risk Ratio (M-H, Fixed, 95% CI)	1.33 [0.47, 3.74]
15.3	abdominal sacrocolpopexy alone vs abdominal sacrocolpopexy with Burch colposuspension	1	299	Risk Ratio (M-H, Fixed, 95% CI)	1.85 [1.32, 2.60]
15.4	High levator myorrhaphy vs uterosacral vag vault suspension	1	116	Risk Ratio (M-H, Fixed, 95% CI)	0.57 [0.18, 1.85]

15.5 laparoscopic sacral colpopexy versus total vaginal polypropylene mesh kit	1	108	Risk Ratio (M-H, Fixed, 95% CI)	0.52 [0.23, 1.18]
16 Number of women with de novo stress incontinence	3	226	Risk Ratio (M-H, Fixed, 95% CI)	1.94 [1.10, 3.43]
16.1 vaginal sacrospinous colpopexy vs posterior intravaginal slingplasty	1	45	Risk Ratio (M-H, Fixed, 95% CI)	2.64 [0.11, 61.54]
16.2 high levator myorrhaphy vs uterosacral vag vault suspension	1	116	Risk Ratio (M-H, Fixed, 95% CI)	3.0 [1.47, 6.12]
16.3 uterosacral colpopexy versus vaginal polypropylene mesh	1	65	Risk Ratio (M-H, Fixed, 95% CI)	0.48 [0.13, 1.78]
17 Number of women with urgency, detrusor overactivity or overactive bladder	6		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
17.1 abdominal sacral colpopexy vs vaginal sacrospinous colpopexy	1	83	Risk Ratio (M-H, Fixed, 95% CI)	1.36 [0.78, 2.38]
17.2 vaginal sacrospinous colpopexy vs posterior intravaginal slingplasty	2	111	Risk Ratio (M-H, Fixed, 95% CI)	1.28 [0.67, 2.45]
17.3 abdominal sacrocolpopexy alone vs abdominal sacrocolpopexy with Burch colposuspension	1	304	Risk Ratio (M-H, Fixed, 95% CI)	1.18 [0.87, 1.59]
17.4 high levator myorrhaphy vs uterosacral vag vault suspension	1	229	Risk Ratio (M-H, Fixed, 95% CI)	0.93 [0.65, 1.32]
17.5 laparoscopic sacral colpopexy versus total vaginal polypropylene mesh kit	1	108	Risk Ratio (M-H, Fixed, 95% CI)	1.48 [0.84, 2.62]
18 Number of women with de novo (new) urgency, detrusor overactivity or overactive bladder	4	527	Risk Ratio (M-H, Fixed, 95% CI)	1.23 [0.84, 1.80]
18.1 abdominal sacral colpopexy vs vaginal sacrospinous colpopexy	1	62	Risk Ratio (M-H, Fixed, 95% CI)	1.61 [0.68, 3.81]
18.2 abdominal sacrocolpopexy alone vs abdominal sacrocolpopexy with Burch colposuspension	1	304	Risk Ratio (M-H, Fixed, 95% CI)	1.36 [0.87, 2.15]
18.3 vaginal sacrospinous colpopexy vs posterior intravaginal slingplasty	1	45	Risk Ratio (M-H, Fixed, 95% CI)	2.64 [0.11, 61.54]
18.4 high levator myorrhaphy vs uterosacral vag vault suspension	1	116	Risk Ratio (M-H, Fixed, 95% CI)	0.29 [0.06, 1.32]

19	Number of women with persistent voiding dysfunction	1		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
	19.1 abdominal sacral colpopexy vs vaginal sacrospinous colpopexy	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
20	Number of women with new voiding dysfunction	3	236	Risk Ratio (M-H, Fixed, 95% CI)	1.94 [0.87, 4.32]
	20.1 abdominal sacral colpopexy vs vaginal sacrospinous colpopexy	1	75	Risk Ratio (M-H, Fixed, 95% CI)	1.03 [0.07, 15.82]
	20.2 vaginal sacrospinous colpopexy vs posterior intravaginal slingplasty	1	45	Risk Ratio (M-H, Fixed, 95% CI)	1.75 [0.36, 8.61]
	20.3 High levator myorrhaphy vs uterosacral vag vault suspension	1	116	Risk Ratio (M-H, Fixed, 95% CI)	2.2 [0.82, 5.94]
21	Number of women with de novo nocturia	1		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
	21.1 High levator myorrhaphy vs uterosacral vag vault suspension	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
22	Postoperative voiding dysfunction symptoms	2		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
	22.1 vaginal sacrospinous colpopexy vs posterior intravaginal slingplasty	2	111	Risk Ratio (M-H, Fixed, 95% CI)	1.68 [0.81, 3.50]
23	Number of women with faecal incontinence	2		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
	23.1 abdominal sacral colpopexy vs vaginal sacrospinous colpopexy	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
	23.2 vaginal sacrospinous colpopexy vs posterior intravaginal slingplasty	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
24	Number of women with constipation	3		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
	24.1 abdominal sacral colpopexy vs vaginal sacrospinous colpopexy	1	89	Risk Ratio (M-H, Fixed, 95% CI)	1.40 [0.64, 3.10]
	24.2 vaginal sacrospinous colpopexy vs posterior intravaginal slingplasty	2	111	Risk Ratio (M-H, Fixed, 95% CI)	2.10 [0.66, 6.64]
25	Number of women with de novo constipation	1		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
	25.1 High levator myorrhaphy vs uterosacral vag vault suspension	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
26	Number of women with obstructed defecation	1		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected

26.1 abdominal sacral colpopexy vs vaginal sacrospinous colpopexy	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
27 Postoperative dyspareunia	6		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
27.1 abdominal sacral colpopexy vs vaginal sacrospinous colpopexy	3	106	Risk Ratio (M-H, Fixed, 95% CI)	0.39 [0.18, 0.86]
27.2 vaginal sacrospinous colpopexy vs posterior intravaginal slingplasty	1	66	Risk Ratio (M-H, Fixed, 95% CI)	3.0 [0.13, 71.07]
27.3 vaginal sacrospinous uterine suspension vs vaginal hysterectomy	1	158	Risk Ratio (M-H, Fixed, 95% CI)	0.98 [0.25, 3.76]
27.4 High levator myorrhaphy vs uterosacral vag vault suspension	1	229	Risk Ratio (M-H, Fixed, 95% CI)	0.83 [0.51, 1.36]
28 Women with de novo (new) postoperative dyspareunia	3		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
28.1 abdominal sacral colpopexy vs vaginal sacrospinous colpopexy	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
28.2 High levator myorrhaphy vs uterosacral vag vault suspension	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
28.3 uterosacral colpopexy versus vaginal polypropylene mesh	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
29 Postoperative sexual function score (PISQ-12)	2		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
29.1 vaginal sacrospinous colpopexy vs posterior intravaginal slingplasty	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
29.2 sacral colpopexy without colposuspension versus sacral colpopexy with colposuspension	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
30 Blood loss (ml)	7	836	Mean Difference (IV, Random, 95% CI)	17.94 [-54.02, 89.90]
30.1 abdominal sacral colpopexy vs vaginal sacrospinous colpopexy	2	213	Mean Difference (IV, Random, 95% CI)	-121.97 [-468.88, 224.94]
30.2 abdominal sacrohysteropexy with Gore-Tex vs vaginal hysterectomy, vaginal repair, uterosacral ligament plicati	1	82	Mean Difference (IV, Random, 95% CI)	-4.0 [-22.91, 14.91]
30.3 vaginal sacrospinous colpopexy vs posterior intravaginal slingplasty	1	66	Mean Difference (IV, Random, 95% CI)	70.0 [56.07, 83.93]

30.4 cadaveric fascia lata (Tutoplast) vs polypropylene (Trelex)	1	100	Mean Difference (IV, Random, 95% CI)	218.0 [132.87, 303.13]
30.5 abdominal sacrocolpopexy alone vs abdominal sacrocolpopexy with Burch colposuspension	1	322	Mean Difference (IV, Random, 95% CI)	-73.0 [-115.39, -30.61]
30.6 open sacral colpopexy versus laparoscopic sacral colpopexy	1	53	Mean Difference (IV, Random, 95% CI)	184.0 [95.89, 272.11]
31 Postoperative decrease in Hb (gm/dl)	2		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
31.1 abdominal sacral colpopexy vs vaginal sacrospinous colpopexy	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
31.2 Open sacral-colpopexy versus laparoscopic sacral-colpopexy	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
32 Adverse effects	13		Risk Ratio (M-H, Random, 95% CI)	Subtotals only
32.1 abdominal sacral colpopexy vs vaginal sacrospinous colpopexy	3	287	Risk Ratio (M-H, Random, 95% CI)	1.44 [0.40, 5.19]
32.2 abdominal sacrohysteropexy with Gore-Tex vs vaginal hysterectomy, vaginal repair, uterosacral ligament plicati	1	82	Risk Ratio (M-H, Random, 95% CI)	1.2 [0.40, 3.62]
32.3 vaginal sacrospinous colpopexy vs posterior intravaginal slingplasty	2	111	Risk Ratio (M-H, Random, 95% CI)	0.73 [0.29, 1.82]
32.4 cadaveric fascia lata (tutoplast) vs polypropylene (Trelex)	1	100	Risk Ratio (M-H, Random, 95% CI)	0.68 [0.29, 1.59]
32.5 abdominal sacrocolpopexy alone vs abdominal sacrocolpopexy with Burch colposuspension	1	322	Risk Ratio (M-H, Random, 95% CI)	0.99 [0.59, 1.68]
32.6 vaginal sacrospinous uterine suspension vs vaginal hysterectomy	1	158	Risk Ratio (M-H, Random, 95% CI)	4.23 [1.25, 14.25]
32.7 abdominal sacral colpopexy vs vaginal McCall	1	47	Risk Ratio (M-H, Random, 95% CI)	7.29 [0.40, 133.82]
32.8 High levator myorrhaphy vs uterosacral vag vault suspension	1	229	Risk Ratio (M-H, Random, 95% CI)	0.05 [0.00, 0.87]
32.9 Open sacral-colpopexy versus laparoscopic sacral-colpopexy	1	30	Risk Ratio (M-H, Random, 95% CI)	0.0 [0.0, 0.0]
32.10 sacral colpopexy versus uterosacral colpopexy	1	110	Risk Ratio (M-H, Random, 95% CI)	2.85 [0.97, 8.41]
33 Operating time (minutes)	11		Mean Difference (IV, Fixed, 95% CI)	Subtotals only

33.1 abdominal sacral colpopexy vs vaginal sacrospinous colpopexy	3	293	Mean Difference (IV, Fixed, 95% CI)	21.04 [12.15, 29.94]
33.2 abdominal sacrohysteropexy with Gore-Tex vs vaginal hysterectomy, vaginal repair, uterosacral ligament plicati	1	82	Mean Difference (IV, Fixed, 95% CI)	-10.0 [-11.81, -8.19]
33.3 vaginal sacrospinous colpopexy vs posterior intravaginal slingplasty	2	111	Mean Difference (IV, Fixed, 95% CI)	7.58 [4.04, 11.13]
33.4 cadaveric fascia lata (Tutoplast) vs polypropylene (Trelex)	1	100	Mean Difference (IV, Fixed, 95% CI)	6.0 [-10.92, 22.92]
33.5 abdominal sacrocolpopexy alone vs abdominal sacrocolpopexy with Burch colposuspension	1	322	Mean Difference (IV, Fixed, 95% CI)	-20.0 [-32.56, -7.44]
33.6 Open sacral-colpopexy versus laparoscopic sacral-colpopexy	1	47	Mean Difference (IV, Fixed, 95% CI)	-12.0 [-31.00, 9.00]
33.7 laparoscopic sacral colpopexy versus robotic sacral colpopexy	1	67	Mean Difference (IV, Fixed, 95% CI)	-66.0 [-88.99, -43.01]
33.8 sacral colpopexy versus uterosacral colpopexy	1	110	Mean Difference (IV, Fixed, 95% CI)	22.0 [12.44, 31.56]
34 Length of stay in hospital (days)	8		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
34.1 abdominal sacral colpopexy vs vaginal sacrospinous colpopexy	3	293	Mean Difference (IV, Fixed, 95% CI)	0.14 [-0.25, 0.53]
34.2 abdominal sacrohysteropexy with Gore-Tex vs vaginal hysterectomy, vaginal repair, uterosacral ligament plicati	1	82	Mean Difference (IV, Fixed, 95% CI)	0.10 [-0.01, 0.21]
34.3 vaginal sacrospinous colpopexy vs posterior intravaginal slingplasty	2	111	Mean Difference (IV, Fixed, 95% CI)	0.27 [-0.28, 0.82]
34.4 Open sacral-colpopexy versus laparoscopic sacral-colpopexy	1	47	Mean Difference (IV, Fixed, 95% CI)	0.90 [0.12, 1.68]
34.5 sacral colpopexy versus uterosacral colpopexy	1	110	Mean Difference (IV, Fixed, 95% CI)	1.6 [-0.67, 3.87]
35 Time to return to normal activity ADL (days)	2		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
35.1 abdominal sacral colpopexy vs vaginal sacrospinous colpopexy	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
35.2 hysterectomy versus sacrospinous hysterectomy	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
36 Days to return to work	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected

36.1 hysterectomy versus sacrospinous hysterectomy	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
37 Cost (US dollars)	3		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
37.1 abdominal sacral colpopexy vs vaginal sacrospinous colpopexy	2	169	Mean Difference (IV, Fixed, 95% CI)	1333.95 [1027.24, 1640.65]
37.2 laparoscopic sacral colpopexy versus robotic sacral colpopexy	1	68	Mean Difference (IV, Fixed, 95% CI)	-1954.0 [-3444.31, -463.69]
38 Time to recurrence of prolapse (months)	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
38.1 abdominal sacral colpopexy vs vaginal sacrospinous colpopexy	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
39 Women having further prolapse surgery	11		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
39.1 abdominal sacral colpopexy vs vaginal sacrospinous colpopexy	2	169	Risk Ratio (M-H, Fixed, 95% CI)	0.46 [0.19, 1.11]
39.2 abdominal sacrohysterectomy with Gore-Tex vs vaginal hysterectomy, vaginal repair, uterosacral ligament plicati	1	82	Risk Ratio (M-H, Fixed, 95% CI)	9.0 [1.19, 67.85]
39.3 hysterectomy versus sacrospinous hysterectomy	1	65	Risk Ratio (M-H, Fixed, 95% CI)	0.55 [0.11, 2.79]
39.4 abdominal sacral colpopexy vs vaginal McCall	1	47	Risk Ratio (M-H, Fixed, 95% CI)	0.35 [0.01, 8.11]
39.5 vaginal sacrospinous colpopexy vs posterior intravaginal slingplasty	1	45	Risk Ratio (M-H, Fixed, 95% CI)	0.88 [0.13, 5.68]
39.6 sacral colpopexy without colposuspension versus sacral colpopexy with colposuspension	1	311	Risk Ratio (M-H, Fixed, 95% CI)	2.91 [0.60, 14.17]
39.7 uterosacral colpopexy versus polypropylene mesh	1	65	Risk Ratio (M-H, Fixed, 95% CI)	0.14 [0.01, 2.58]
39.8 laparoscopic sacral colpopexy versus total vaginal polypropylene mesh kit	1	108	Risk Ratio (M-H, Fixed, 95% CI)	0.15 [0.01, 2.80]
39.9 sacral colpopexy versus high uterosacral ligament	1	110	Risk Ratio (M-H, Fixed, 95% CI)	0.31 [0.09, 1.07]
39.10 open versus laparoscopic sacral colpopexy	1	47	Risk Ratio (M-H, Fixed, 95% CI)	0.96 [0.15, 6.25]
40 Women having further continence surgery	4		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
40.1 abdominal sacral colpopexy vs vaginal sacrospinous colpopexy	3	287	Risk Ratio (M-H, Fixed, 95% CI)	0.60 [0.21, 1.73]

40.2 laparoscopic sacral colpopexy versus total vaginal polypropylene mesh kit	1	108	Risk Ratio (M-H, Fixed, 95% CI)	0.35 [0.04, 3.22]
41 Women having further related to primary surgery (prolapse, continence or mesh complications)	4		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
41.1 abdominal sacral colpopexy vs vaginal sacrospinous colpopexy	2	169	Risk Ratio (M-H, Fixed, 95% CI)	0.47 [0.23, 0.97]
41.2 Abdominal sacro-hysteropexy versus vaginal hysterectomy plus anterior and/or posterior colporrhaphy at 8 years	1	84	Risk Ratio (M-H, Fixed, 95% CI)	1.83 [0.75, 4.50]
41.3 laparoscopic sacral colpopexy versus total vaginal polypropylene mesh kit	1	108	Risk Ratio (M-H, Fixed, 95% CI)	0.26 [0.08, 0.87]
42 mesh exposure	2	155	Risk Ratio (M-H, Fixed, 95% CI)	0.15 [0.02, 1.16]
42.1 laparoscopic sacral colpopexy versus total vaginal polypropylene mesh kit	1	108	Risk Ratio (M-H, Fixed, 95% CI)	0.15 [0.02, 1.16]
42.2 open versus laproscopic sacral colpopexy	1	47	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
43 surgery for mesh exposure	1	108	Risk Ratio (M-H, Fixed, 95% CI)	0.09 [0.01, 1.66]
43.1 laparoscopic sacral colpopexy versus total vaginal polypropylene mesh kit	1	108	Risk Ratio (M-H, Fixed, 95% CI)	0.09 [0.01, 1.66]
44 Prolapse Quality of Life questionnaire (P-QOL)	1	47	Mean Difference (IV, Fixed, 95% CI)	0.70 [-19.04, 20.44]
44.1 open versus laparoscopic sacral colpopexy	1	47	Mean Difference (IV, Fixed, 95% CI)	0.70 [-19.04, 20.44]

Comparison 2. One method of anterior prolapse repair versus another surgical method

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Number of women with prolapse symptoms (subjective failure)	11		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
1.1 anterior colporrhaphy vs cadaveric fascia lata (Tutoplast)	1	112	Risk Ratio (M-H, Fixed, 95% CI)	0.96 [0.33, 2.81]
1.2 traditional anterior colporrhaphy vs abdominal Burch colposuspension	1	68	Risk Ratio (M-H, Fixed, 95% CI)	0.08 [0.00, 1.39]
1.3 prolapse repair + urethrovesical plication vs prolapse repair + needle colposuspension	1	23	Risk Ratio (M-H, Fixed, 95% CI)	2.18 [0.23, 20.84]

1.4 polypropylene mesh (Prolene soft) vs Pelvicol	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
1.5 anterior colporrhaphy vs armed transobturator mesh	2	555	Risk Ratio (M-H, Fixed, 95% CI)	1.77 [1.32, 2.37]
1.6 prolapse repair + urethrovesical endopelvic fascia repair vs prolapse repair + TVT	1	50	Risk Ratio (M-H, Fixed, 95% CI)	2.0 [0.69, 5.80]
1.7 fascial plication vs fascial plication with Pelvicol inlay	1	201	Risk Ratio (M-H, Fixed, 95% CI)	1.37 [0.62, 3.07]
1.8 armed polypropylene mesh (Gynemesh) vs Pelvicol	1	190	Risk Ratio (M-H, Fixed, 95% CI)	0.98 [0.20, 4.73]
1.9 anterior colporrhaphy versus any transvaginal polypropylene mesh	4	712	Risk Ratio (M-H, Fixed, 95% CI)	1.64 [1.24, 2.16]
1.10 Anterior colporrhaphy versus porcine Small Intestine Submucosa (SIS)	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
1.11 anterior colporrhaphy versus pericardial bovine collagen graft	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
1.12 anterior colporrhaphy with vivryl mesh versus vaginal paravaginal repair with vicryl mesh	1	69	Risk Ratio (M-H, Fixed, 95% CI)	0.34 [0.04, 3.14]
1.13 anterior colporrhaphy versus repair with biological or permanent graft	5	903	Risk Ratio (M-H, Fixed, 95% CI)	1.47 [1.16, 1.86]
1.14 anterior colporrhaphy versus biological graft	2	313	Risk Ratio (M-H, Fixed, 95% CI)	1.21 [0.64, 2.30]
2 number of women with posterior or apical prolapse	2	300	Risk Ratio (M-H, Fixed, 95% CI)	1.85 [1.01, 3.37]
3 Severity of prolapse symptoms (measured using visual analogue scale)	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
3.1 fascial plication vs Pelvicol overlay	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
4 Prolapse Quality of Life after surgery (P-QOL)	2	141	Std. Mean Difference (IV, Fixed, 95% CI)	0.09 [-0.24, 0.42]
4.1 anterior colporrhaphy versus armed transobturator polypropylene mesh	1	85	Std. Mean Difference (IV, Fixed, 95% CI)	0.22 [-0.21, 0.65]
4.2 Anterior colporrhaphy versus porcine Small Intestine Submucosa (SIS)	1	56	Std. Mean Difference (IV, Fixed, 95% CI)	-0.10 [-0.63, 0.42]
5 Number of women with prolapse (objective failure any site)	4		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
5.1 prolapse repair + urethrovesical plication vs prolapse repair + needle colposuspension	2	138	Risk Ratio (M-H, Fixed, 95% CI)	0.66 [0.34, 1.27]

5.2 prolapse repair + urethrovesical endopelvic fascia repair vs prolapse repair + TVT	1	50	Risk Ratio (M-H, Fixed, 95% CI)	0.88 [0.37, 2.05]
5.3 AC versus polypropylene mesh	1	40	Risk Ratio (M-H, Fixed, 95% CI)	6.0 [0.79, 45.42]
6 Number of women with anterior prolapse / cystocele (objective failure)	23		Risk Ratio (M-H, Random, 95% CI)	Subtotals only
6.1 anterior colporrhaphy vs polypropylene mesh overlay	3	181	Risk Ratio (M-H, Random, 95% CI)	3.01 [1.51, 5.98]
6.2 traditional anterior colporrhaphy vs ultralateral anterior colporrhaphy	1	57	Risk Ratio (M-H, Random, 95% CI)	1.29 [0.84, 1.98]
6.3 traditional anterior colporrhaphy vs anterior colporrhaphy + polyglactin mesh reinforcement	2	202	Risk Ratio (M-H, Random, 95% CI)	1.41 [0.98, 2.05]
6.4 ultralateral anterior colporrhaphy vs anterior colporrhaphy + polyglactin mesh reinforcement	1	50	Risk Ratio (M-H, Random, 95% CI)	0.94 [0.57, 1.54]
6.5 traditional anterior colporrhaphy vs abdominal Burch colposuspension	1	68	Risk Ratio (M-H, Random, 95% CI)	0.09 [0.01, 0.64]
6.6 prolapse repair + urethrovesical plication vs prolapse repair + needle colposuspension	2	138	Risk Ratio (M-H, Random, 95% CI)	0.60 [0.26, 1.42]
6.7 cystopexy vs cystopexy + pubourethral ligament plication	1	102	Risk Ratio (M-H, Random, 95% CI)	0.96 [0.14, 6.57]
6.8 prolapse repair + urethrovesical endopelvic fascia repair vs prolapse repair + TVT	1	50	Risk Ratio (M-H, Random, 95% CI)	1.17 [0.46, 2.98]
6.9 fascial plication vs Porcine dermis Pelvicol overlay	3	305	Risk Ratio (M-H, Random, 95% CI)	1.57 [1.05, 2.35]
6.10 anterior colporrhaphy vs cadaveric fascia lata (Tutoplast)	1	154	Risk Ratio (M-H, Random, 95% CI)	1.40 [0.80, 2.44]
6.11 Vicryl vs Pelvicol	1	125	Risk Ratio (M-H, Random, 95% CI)	3.22 [1.38, 7.52]
6.12 polypropylene mesh (Prolene soft) vs Pelvicol	0	0	Risk Ratio (M-H, Random, 95% CI)	0.0 [0.0, 0.0]
6.13 armed polypropylene mesh (Gynemesh) vs Pelvicol	1	190	Risk Ratio (M-H, Random, 95% CI)	0.64 [0.43, 0.96]
6.14 anterior colporrhaphy versus any transvaginal polypropylene mesh	7	976	Risk Ratio (M-H, Random, 95% CI)	3.23 [2.55, 4.10]
6.15 anterior colporrhaphy versus commercial transobturator polypropylene mesh kits	3	549	Risk Ratio (M-H, Random, 95% CI)	3.83 [2.34, 6.26]

6.16 anterior colporrhaphy versus self styled transobturator polypropylene mesh	2	285	Risk Ratio (M-H, Random, 95% CI)	3.41 [2.05, 5.68]
6.17 anterior colporrhaphy versus armed transobturator polypropylene mesh	5	834	Risk Ratio (M-H, Random, 95% CI)	3.39 [2.62, 4.38]
6.18 AC versus polypropylene mesh plus AC	3	365	Risk Ratio (M-H, Random, 95% CI)	3.38 [2.14, 5.34]
6.19 anterior colporrhaphy versus pericardial bovine collagen graft	1	44	Risk Ratio (M-H, Random, 95% CI)	1.57 [0.59, 4.23]
6.20 Anterior colporrhaphy versus porcine Small Intensine Submucosa (SIS)	1	56	Risk Ratio (M-H, Random, 95% CI)	2.95 [1.07, 8.17]
6.21 anterior colporrhaphy with vivryl mesh versus vaginal para	1	69	Risk Ratio (M-H, Random, 95% CI)	1.24 [0.62, 2.47]
6.22 AC versus polypropylene mesh repair without AC	4	598	Risk Ratio (M-H, Random, 95% CI)	3.59 [2.38, 5.40]
6.23 anterior colporrhaphy versus any biological graft	5	490	Risk Ratio (M-H, Random, 95% CI)	1.56 [1.13, 2.14]
6.24 anterior colporrhaphy versus repair with any graft (synthetic, or allografts)	12	1455	Risk Ratio (M-H, Random, 95% CI)	2.82 [2.19, 3.62]
7 Number of women with posterior prolapse / rectocele (objective failure)	3		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
7.1 traditional anterior colporrhaphy vs anterior colporrhaphy + polyglactin mesh reinforcement	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
7.2 Gynemesh vs Pelvicol	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
7.3 prolapse repair + urethrovesical endopelvic fascia repair vs prolapse repair + TVT	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
8 Number of women with postoperative stress urinary incontinence	4		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
8.1 fascial plication vs fascial plication with Pelvicol overlay	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
8.2 anterior colporrhaphy versus armed transobturator polypropylene mesh	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
8.3 traditional anterior colporrhaphy vs abdominal Burch colposuspension	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
8.4 prolapse repair + urethrovesical plication vs prolapse repair + needle colposuspension	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]

9	Number of women with de novo (new) stress urinary incontinence	9		Risk Ratio (M-H, Random, 95% CI)	Subtotals only
	9.1 anterior colporrhaphy versus armed transobturator polypropylene mesh	4	644	Risk Ratio (M-H, Random, 95% CI)	0.58 [0.36, 0.94]
	9.2 Gynemesh vs Pelvicol	1	190	Risk Ratio (M-H, Random, 95% CI)	1.96 [0.18, 21.23]
	9.3 cystopexy vs cystopexy + pubourethral ligament plication	1	102	Risk Ratio (M-H, Random, 95% CI)	0.96 [0.25, 3.64]
	9.4 prolapse repair + urethrovesical plication vs prolapse repair + needle colposuspension	2	102	Risk Ratio (M-H, Random, 95% CI)	2.02 [0.08, 50.63]
	9.5 prolapse repair + urethrovesical endopelvic fascia repair vs prolapse repair + TVT	1	50	Risk Ratio (M-H, Random, 95% CI)	9.00 [1.23, 65.85]
10	Number of women with urgency, detrusor overactivity or overactive bladder	7	749	Risk Ratio (M-H, Fixed, 95% CI)	0.79 [0.53, 1.19]
	10.1 fascial plication vs fascial plication with Pelvicol overlay	1	201	Risk Ratio (M-H, Fixed, 95% CI)	1.14 [0.61, 2.14]
	10.2 Prolene soft vs Pelvicol	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
	10.3 traditional anterior colporrhaphy vs abdominal Burch colposuspension	1	68	Risk Ratio (M-H, Fixed, 95% CI)	1.06 [0.07, 16.27]
	10.4 prolapse repair + urethrovesical plication vs prolapse repair + needle colposuspension	2	138	Risk Ratio (M-H, Fixed, 95% CI)	0.96 [0.20, 4.49]
	10.5 cystopexy vs cystopexy + pubourethral ligament plication	1	102	Risk Ratio (M-H, Fixed, 95% CI)	0.96 [0.06, 14.96]
	10.6 prolapse repair + urethrovesical endopelvic fascia repair vs prolapse repair + TVT	1	50	Risk Ratio (M-H, Fixed, 95% CI)	0.33 [0.04, 2.99]
	10.7 armed polypropylene mesh (Gynemesh) vs Pelvicol	1	190	Risk Ratio (M-H, Fixed, 95% CI)	0.56 [0.29, 1.07]
11	De novo overactive bladder symptoms	1		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
12	Postoperative voiding dysfunction symptoms	2	349	Risk Ratio (M-H, Fixed, 95% CI)	1.16 [0.79, 1.69]
	12.1 fascial plication vs fascial plication with Pelvicol overlay	1	201	Risk Ratio (M-H, Fixed, 95% CI)	1.01 [0.53, 1.94]
	12.2 prolene soft vs Pelvicol	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
	12.3 anterior colporrhaphy vs cadaveric fascia lata (Tutoplast)	1	148	Risk Ratio (M-H, Fixed, 95% CI)	1.26 [0.79, 2.01]
13	Urodynamic voiding dysfunction	0		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
	13.1 Prolene soft vs pelvicol	0		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
14	Persistent voiding dysfunction	8	553	Risk Ratio (M-H, Fixed, 95% CI)	0.93 [0.64, 1.36]

14.1 anterior colporrhaphy vs cadaveric fascia lata (Tutoplast)	1	105	Risk Ratio (M-H, Fixed, 95% CI)	1.18 [0.73, 1.91]
14.2 traditional anterior colporrhaphy vs abdominal Burch colposuspension	1	68	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
14.3 prolapse repair + urethrovesical plication vs prolapse repair + needle colposuspension	2	138	Risk Ratio (M-H, Fixed, 95% CI)	1.05 [0.49, 2.26]
14.4 cystopexy vs cystopexy + pubourethral ligament plication	1	102	Risk Ratio (M-H, Fixed, 95% CI)	0.09 [0.00, 1.54]
14.5 prolapse repair + urethrovesical endopelvic fascia repair vs prolapse repair + TVT	1	50	Risk Ratio (M-H, Fixed, 95% CI)	0.33 [0.04, 2.99]
14.6 anterior colporrhaphy versus transvaginal polypropylene mesh	1	40	Risk Ratio (M-H, Fixed, 95% CI)	3.0 [0.13, 69.52]
14.7 anterior colporrhaphy versus SIS graft	1	50	Risk Ratio (M-H, Fixed, 95% CI)	0.72 [0.11, 4.74]
15 Time to return to spontaneous voiding (days)	2		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
15.1 fascial plication vs fascial plication with Pelvicol overlay	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
15.2 prolapse repair + urethrovesical endopelvic fascia repair vs prolapse repair + TVT	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
16 Pelvic Floor Incontinence Questionnaire-7 after surgery	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
16.1 anterior colporrhaphy versus armed transobturator polypropylene mesh	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
17 Number of women with worse bowel function / constipation	1		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
17.1 prolapse repair + urethrovesical plication vs prolapse repair + needle colposuspension	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
17.2 Prolene soft vs Pelvicol	0		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
18 Number of women with dyspareunia	8		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
18.1 fascial plication vs fascial plication with Pelvicol overlay	1	95	Risk Ratio (M-H, Fixed, 95% CI)	0.70 [0.24, 2.05]
18.2 Prolene Soft vs Pelvicol	0	0	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
18.3 armed polypropylene mesh (Gynemesh) vs Pelvicol	1	190	Risk Ratio (M-H, Fixed, 95% CI)	0.82 [0.37, 1.80]
18.4 traditional anterior colporrhaphy vs abdominal Burch colposuspension	1	47	Risk Ratio (M-H, Fixed, 95% CI)	6.78 [1.72, 26.81]

18.5 cystopexy vs cystopexy + pubourethral ligament plication	1	47	Risk Ratio (M-H, Fixed, 95% CI)	0.15 [0.04, 0.58]
18.6 anterior colporrhaphy versus any vaginal polypropylene mesh	3	457	Risk Ratio (M-H, Fixed, 95% CI)	0.87 [0.45, 1.69]
18.7 Anterior colporrhaphy versus porcine Small Intestine Submucosa (SIS)	1	56	Risk Ratio (M-H, Fixed, 95% CI)	1.16 [0.35, 3.89]
19 Blood loss (ml)	6		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
19.1 fascial plication vs Pelvicol overlay	2	258	Mean Difference (IV, Fixed, 95% CI)	0.56 [-19.57, 20.70]
19.2 anterior colporrhaphy versus armed transobturator polypropylene mesh	2	569	Mean Difference (IV, Fixed, 95% CI)	-64.04 [-80.39, -47.69]
19.3 prolapse repair + urethrovesical endopelvic fascia repair vs prolapse repair + TVT	1	50	Mean Difference (IV, Fixed, 95% CI)	-11.0 [-61.10, 39.10]
19.4 anterior colporrhaphy versus repair with any graft (permanent or biological)	5	871	Mean Difference (IV, Fixed, 95% CI)	-35.32 [-47.55, -23.09]
20 Haemoglobin change	2		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
20.1 anterior colporrhaphy versus armed transobturator polypropylene mesh	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
20.2 prolapse repair + urethrovesical endopelvic fascia repair vs prolapse repair + TVT	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
21 Number of women with postoperative complications	7		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
21.1 fascial plication vs fascial plication with Pelvicol overlay	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
21.2 traditional anterior colporrhaphy vs ultra-lateral anterior colporrhaphy	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
21.3 traditional anterior colporrhaphy vs anterior colporrhaphy + polyglactin mesh reinforcement	2		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
21.4 ultralateral anterior colporrhaphy vs anterior colporrhaphy + polyglactin mesh reinforcement	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
21.5 traditional anterior colporrhaphy vs abdominal Burch colposuspension	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
21.6 prolapse repair + urethrovesical plication vs prolapse repair + needle colposuspension	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]

21.7 cystopexy vs cystopexy + pubourethral ligament plication	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
21.8 prolapse repair + urethrovesical endopelvic fascia repair vs prolapse repair + TVT	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
21.9 Prolene soft vs Pelvicol	0		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
22 Mesh erosion	10		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
22.1 anterior colporrhaphy versus polypropylene mesh	9	1110	Risk Ratio (M-H, Fixed, 95% CI)	0.07 [0.03, 0.18]
22.2 armed polypropylene mesh (Gynemesh) vs Pelvicol	1	190	Risk Ratio (M-H, Fixed, 95% CI)	12.73 [0.73, 222.87]
23 Death	1		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
23.1 traditional anterior colporrhaphy vs ultralateral anterior colporrhaphy	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
23.2 traditional anterior colporrhaphy vs anterior colporrhaphy + polyglactin mesh reinforcement	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
23.3 ultralateral anterior colporrhaphy vs anterior colporrhaphy + polyglactin mesh reinforcement	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
24 Operating time (minutes)	6		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
24.1 anterior colporrhaphy versus armed transobturator polypropylene mesh	2	569	Mean Difference (IV, Fixed, 95% CI)	-18.57 [-21.16, -15.98]
24.2 prolapse repair + urethrovesical endopelvic fascia repair vs prolapse repair + TVT	1	50	Mean Difference (IV, Fixed, 95% CI)	-19.0 [-28.68, -9.32]
24.3 anterior colporrhaphy versus pelvicol overlay	1	57	Mean Difference (IV, Fixed, 95% CI)	-9.0 [-13.57, -4.43]
24.4 Anterior colporrhaphy versus porcine Small Intensine Submucosa (SIS)	1	56	Mean Difference (IV, Fixed, 95% CI)	-16.0 [-25.35, -6.65]
24.5 anterior colporrhaphy versus any type of graft (biological or synthetic)	6	776	Mean Difference (IV, Fixed, 95% CI)	-14.58 [-16.60, -12.55]
24.6 anterior colporrhaphy versus polypropylene synthetic mesh repair	3	613	Mean Difference (IV, Fixed, 95% CI)	-15.75 [-18.15, -13.35]
25 Length of stay in hospital (days)	6		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
25.1 fascial plication vs fascial plication with Pelvicol overlay	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
25.2 prolapse repair + urethrovesical plication vs prolapse repair + needle colposuspension	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]

25.3 cystopexy vs cystopexy + pubourethral ligament plication	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
25.4 prolapse repair + urethrovesical endopelvic fascia repair vs prolapse repair + TVT	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
25.5 anterior colporrhaphy versus transvaginal polypropylene mesh	2		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
26 Number of women having further prolapse surgery	15		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
26.1 Vicryl vs Pelvicol	1	125	Risk Ratio (M-H, Fixed, 95% CI)	3.05 [0.87, 10.73]
26.2 anterior colporrhaphy versus transobturator mesh	6	930	Risk Ratio (M-H, Fixed, 95% CI)	2.18 [0.93, 5.10]
26.3 traditional anterior colporrhaphy vs abdominal Burch colposuspension	1	68	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
26.4 prolapse repair + urethrovesical plication vs prolapse repair + needle colposuspension	2	138	Risk Ratio (M-H, Fixed, 95% CI)	0.41 [0.06, 2.71]
26.5 cystopexy vs cystopexy + pubourethral ligament plication	1	102	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
26.6 anterior colporrhaphy versus pelvicol overlay	2	107	Risk Ratio (M-H, Fixed, 95% CI)	0.46 [0.11, 1.95]
26.7 Anterior colporrhaphy versus porcine Small Intestine Submucosa (SIS)	1	56	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
26.8 anterior colporrhaphy versus pericardial bovine collagen graft	1	44	Risk Ratio (M-H, Fixed, 95% CI)	1.57 [0.59, 4.23]
27 Number of women having further incontinence surgery	8		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
27.1 anterior colporrhaphy versus armed transobturator polypropylene mesh	4	748	Risk Ratio (M-H, Fixed, 95% CI)	1.29 [0.63, 2.63]
27.2 traditional anterior colporrhaphy vs abdominal Burch colposuspension	1	68	Risk Ratio (M-H, Fixed, 95% CI)	3.18 [0.35, 29.08]
27.3 cystopexy vs cystopexy + pubourethral ligament plication	1	102	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
27.4 prolapse repair + urethrovesical plication vs prolapse repair + needle colposuspension	1	109	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
27.5 prolapse repair + urethrovesical endopelvic fascia repair vs prolapse repair + TVT	1	50	Risk Ratio (M-H, Fixed, 95% CI)	7.0 [0.38, 128.87]

28 number of women with denovo dyspareunia	5	429	Risk Ratio (M-H, Fixed, 95% CI)	0.61 [0.28, 1.32]
29 Prolapse quality of life (PFDI-20)	1	74	Mean Difference (IV, Fixed, 95% CI)	11.0 [-3.36, 25.36]
29.1 anterior colporrhaphy versus polypropylene mesh kit	1	74	Mean Difference (IV, Fixed, 95% CI)	11.0 [-3.36, 25.36]
30 quality of life (PFDI-7)	1	68	Mean Difference (IV, Fixed, 95% CI)	9.0 [-3.86, 21.86]
30.1 anterior colporrhaphy versus polypropylene mesh kit	1	68	Mean Difference (IV, Fixed, 95% CI)	9.0 [-3.86, 21.86]
31 urinary distress inventory (UDI)	1	369	Mean Difference (IV, Fixed, 95% CI)	0.0 [-1.57, 1.57]
31.1 anterior colporrhaphy versus transvaginal mesh	1	369	Mean Difference (IV, Fixed, 95% CI)	0.0 [-1.57, 1.57]
32 mesh erosion surgical correction	6	931	Risk Ratio (M-H, Fixed, 95% CI)	0.09 [0.03, 0.29]
32.1 anterior colporrhaphy versus transvaginal polypropylene mesh	6	931	Risk Ratio (M-H, Fixed, 95% CI)	0.09 [0.03, 0.29]
33 new urinary stress incontinence postoperative	5	684	Risk Ratio (M-H, Fixed, 95% CI)	0.62 [0.40, 0.98]
33.1 native tissue vaginal repair versus transvaginal polypropylene mesh	5	684	Risk Ratio (M-H, Fixed, 95% CI)	0.62 [0.40, 0.98]
34 cystotomy	4	647	Risk Ratio (M-H, Fixed, 95% CI)	0.19 [0.04, 1.06]
34.1 anterior colporrhaphy versus transvaginal polypropylene mesh	4	647	Risk Ratio (M-H, Fixed, 95% CI)	0.19 [0.04, 1.06]
35 PISQ-12 Prolapse and Incontinence Sexual Questionnaire	2	463	Mean Difference (IV, Fixed, 95% CI)	0.08 [-0.18, 0.35]
36 Point Ba	1	44	Mean Difference (IV, Fixed, 95% CI)	0.9 [0.25, 1.55]
37 Point Aa	1	44	Mean Difference (IV, Fixed, 95% CI)	0.70 [0.25, 1.15]
38 Point C	1	44	Mean Difference (IV, Fixed, 95% CI)	0.60 [0.06, 1.14]
39 Point Bp	1	44	Mean Difference (IV, Fixed, 95% CI)	0.0 [-0.62, 0.62]
40 POPQ Total vaginal length in cm	1	44	Mean Difference (IV, Fixed, 95% CI)	0.0 [-0.43, 0.43]
41 Subsequent surgery (prolapse, incontinence, mesh exposure, pain)	9	1273	Risk Difference (M-H, Random, 95% CI)	-0.05 [-0.08, -0.03]

Comparison 3. One method of posterior prolapse repair versus another surgical method

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Number of women with prolapse symptoms (subjective failure)	4		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
1.1 posterior vaginal colporrhaphy vs transanal repair	2	87	Risk Ratio (M-H, Fixed, 95% CI)	0.36 [0.13, 1.00]

1.2 posterior vaginal colporrhaphy vs site specific repair	1	60	Risk Ratio (M-H, Fixed, 95% CI)	1.17 [0.35, 3.93]
1.3 posterior vaginal colporrhaphy vs site specific repair with porcine small intestine graft inlay	2	181	Risk Ratio (M-H, Fixed, 95% CI)	1.09 [0.45, 2.62]
2 Number of women with prolapse (objective failure)	5		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
2.1 posterior vaginal colporrhaphy vs transanal repair (rectocele)	2	87	Risk Ratio (M-H, Fixed, 95% CI)	0.32 [0.07, 1.34]
2.2 posterior vaginal colporrhaphy vs transanal repair (enterocele)	2	87	Risk Ratio (M-H, Fixed, 95% CI)	0.23 [0.07, 0.83]
2.3 posterior vaginal colporrhaphy vs transanal repair (rectocele or enterocele))	2	87	Risk Ratio (M-H, Fixed, 95% CI)	0.24 [0.09, 0.64]
2.4 posterior vaginal colporrhaphy vs posterior colporrhaphy with mesh reinforcement for rectocele	1	132	Risk Ratio (M-H, Fixed, 95% CI)	1.13 [0.40, 3.19]
2.5 posterior vaginal colporrhaphy vs site specific repair	1	55	Risk Ratio (M-H, Fixed, 95% CI)	0.64 [0.20, 2.03]
2.6 posterior vaginal colporrhaphy vs site specific repair with porcine small intestine graft inlay	2	191	Risk Ratio (M-H, Fixed, 95% CI)	0.47 [0.24, 0.94]
3 Number of women with faecal incontinence after operation	1		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
3.1 posterior vaginal colporrhaphy vs transanal repair	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
4 Number of women with anal incontinence to flatus after operation	1		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
4.1 posterior vaginal colporrhaphy vs transanal repair	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
5 Number of women with obstructed defecation / constipation after surgery	2		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
5.1 posterior vaginal colporrhaphy vs transanal repair	2	65	Risk Ratio (M-H, Fixed, 95% CI)	0.73 [0.37, 1.42]
6 Number of women with sexual function not improved after operation	1		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected

6.1 posterior vaginal colporrhaphy vs transanal repair	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
7 Number of women with dyspareunia	4		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
7.1 posterior vaginal colporrhaphy vs transanal repair	2	80	Risk Ratio (M-H, Fixed, 95% CI)	3.13 [0.87, 11.23]
7.2 Posterior colporrhaphy vs site specific repair	1	42	Risk Ratio (M-H, Fixed, 95% CI)	1.65 [0.71, 3.81]
7.3 posterior colporrhaphy vs site specific augmented with porcine small intestine submucosa graft	2	152	Risk Ratio (M-H, Fixed, 95% CI)	1.26 [0.59, 2.68]
8 Blood loss (ml)	2		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
8.1 posterior vaginal colporrhaphy vs transanal repair	2	87	Mean Difference (IV, Fixed, 95% CI)	79.38 [39.69, 119.08]
9 Change in hematocrit	1	142	Mean Difference (IV, Fixed, 95% CI)	-0.48 [-1.64, 0.68]
9.1 posterior colporrhaphy vs site specific repair	1	74	Mean Difference (IV, Fixed, 95% CI)	0.0 [-1.61, 1.61]
9.2 posterior colporrhaphy vs site specific with porcine small intestine submucosa graft	1	68	Mean Difference (IV, Fixed, 95% CI)	-1.0 [-2.67, 0.67]
10 Difference in haemoglobin	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
10.1 posterior vaginal colporrhaphy vs transanal repair	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
11 Postoperative narcotic (morphine) use	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
11.1 posterior vaginal colporrhaphy vs transanal repair	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
12 Number of women with postoperative complications	3		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
12.1 posterior vaginal colporrhaphy vs transanal repair	2	87	Risk Ratio (M-H, Fixed, 95% CI)	3.56 [0.80, 15.74]
12.2 posterior vaginal colporrhaphy vs site specific repair	1	74	Risk Ratio (M-H, Fixed, 95% CI)	1.38 [0.87, 2.17]
12.3 posterior vaginal colporrhaphy vs site specific repair with porcine small intestine graft inlay	1	68	Risk Ratio (M-H, Fixed, 95% CI)	1.02 [0.69, 1.53]
13 Persistent postoperative pain	1		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
13.1 posterior vaginal colporrhaphy vs transanal repair	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
14 Operating time (minutes)	3		Mean Difference (IV, Fixed, 95% CI)	Subtotals only

14.1 posterior vaginal colporrhaphy vs transanal repair	2	87	Mean Difference (IV, Fixed, 95% CI)	-3.64 [-7.43, 0.15]
14.2 posterior colporrhaphy vs site specific repair	1	74	Mean Difference (IV, Fixed, 95% CI)	-1.0 [-32.22, 30.22]
14.3 posterior colporrhaphy versus site specific and porcine small intestine submucosa graft	1	69	Mean Difference (IV, Fixed, 95% CI)	-19.0 [-49.68, 11.68]
15 Length of stay in hospital (days)	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
15.1 posterior vaginal colporrhaphy vs transanal repair	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
16 Number of women having further prolapse surgery	1		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
16.1 posterior vaginal colporrhaphy vs site specific repair	1	70	Risk Ratio (M-H, Fixed, 95% CI)	0.56 [0.05, 5.90]
16.2 posterior vaginal colporrhaphy vs site specific repair with porcine small intestine graft inlay	1	62	Risk Ratio (M-H, Fixed, 95% CI)	0.29 [0.03, 2.66]
17 rectocele size (centimetres) on defecography	1	48	Mean Difference (IV, Fixed, 95% CI)	-1.14 [-1.96, -0.32]
18 modified obstructed defecation syndrome patient questionnaire	1	32	Mean Difference (IV, Fixed, 95% CI)	-5.10 [-9.63, -0.57]
19 rectocele on examination (point Ap)	1	52	Mean Difference (IV, Fixed, 95% CI)	-0.68 [-1.08, -0.28]

Comparison 6. No graft versus use of graft (synthetic mesh or biological graft)

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Number of women with prolapse symptoms (subjective failure)	10		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
1.1 anterior and posterior colporrhaphy versus colporrhaphy with Vicryl mesh overlay	1	54	Risk Ratio (M-H, Fixed, 95% CI)	0.95 [0.70, 1.31]
1.2 fascial plication vs fascial plication with Pelvicol overlay	1	201	Risk Ratio (M-H, Fixed, 95% CI)	1.37 [0.62, 3.07]
1.3 anterior colporrhaphy vs cadaveric fascia lata (Tutoplast)	1	112	Risk Ratio (M-H, Fixed, 95% CI)	0.96 [0.33, 2.81]
1.4 posterior colporrhaphy or site specific repair versus site specific repair with porcine intestine graft inlay	1	88	Risk Ratio (M-H, Fixed, 95% CI)	0.7 [0.28, 1.78]

1.5 anterior or posterior repair versus repair with polypropylene mesh	6	930	Risk Ratio (M-H, Fixed, 95% CI)	1.44 [1.15, 1.80]
1.6 uterosacral vaginal repair versus polypropylene mesh kit	1	59	Risk Ratio (M-H, Fixed, 95% CI)	2.36 [0.26, 21.42]
1.7 native tissue repair versus repair with any graft (synthetic, or allografts)	9	1331	Risk Ratio (M-H, Fixed, 95% CI)	1.36 [1.10, 1.67]
1.8 colporrhaphy vs biological graft repair	3	401	Risk Ratio (M-H, Fixed, 95% CI)	1.03 [0.61, 1.75]
1.9 native tissue versus combined total or anterior or posterior vaginal mesh	2	218	Risk Ratio (M-H, Fixed, 95% CI)	1.06 [0.59, 1.93]
2 Prolapse symptom score at 1 to 5 years	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
2.1 anterior and posterior colporrhaphy versus colporrhaphy with Vicryl mesh overlay	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
3 Quality of life (VAS) for severity of prolapse symptoms	2		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
3.1 fascial plication vs fascial plication with Pelvicol overlay	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
3.2 anterior or posterior repair alone versus repair with polyglactin (Vicryl) mesh inlay	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
4 Number of women with anterior prolapse / cystocele (objective failure)	6		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
4.1 traditional or ultralateral anterior colporrhaphy vs anterior colporrhaphy + polyglactin mesh reinforcement	2	226	Risk Ratio (M-H, Fixed, 95% CI)	1.39 [1.02, 1.90]
4.2 fascial plication vs fascial plication with Pelvicol overlay	2	230	Risk Ratio (M-H, Fixed, 95% CI)	2.09 [1.08, 4.06]
4.3 anterior colporrhaphy vs cadaveric fascia lata (Tutoplast)	1	154	Risk Ratio (M-H, Fixed, 95% CI)	1.40 [0.80, 2.44]
4.4 Anterior colporrhaphy versus porcine Small Intestine Submucosa (SIS)	1	56	Risk Ratio (M-H, Fixed, 95% CI)	2.95 [1.07, 8.17]
5 Objective failure all sites	4	420	Risk Ratio (M-H, Fixed, 95% CI)	1.32 [1.07, 1.64]
5.1 anterior and posterior colporrhaphy versus colporrhaphy with Vicryl mesh overlay	1	66	Risk Ratio (M-H, Fixed, 95% CI)	1.88 [0.37, 9.58]
5.2 anterior and posterior colporrhaphy versus colporrhaphy with polypropylene mesh overlay	2	289	Risk Ratio (M-H, Fixed, 95% CI)	1.38 [1.07, 1.79]

5.3 uterosacral colpopexy versus vaginal polypropylene mesh	1	65	Risk Ratio (M-H, Fixed, 95% CI)	1.12 [0.79, 1.58]
6 Number of women with posterior prolapse / rectocele (objective failure)	2		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
6.1 traditional anterior colporrhaphy vs anterior colporrhaphy + polyglactin mesh reinforcement	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
6.2 posterior colporrhaphy or site specific repair versus site specific repair with porcine intestine graft inlay	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
7 Objective failure, any site, no mesh versus any mesh	20	6003	Risk Ratio (M-H, Random, 95% CI)	1.95 [1.66, 2.28]
7.1 No mesh versus any absorbable synthetic mesh	3	292	Risk Ratio (M-H, Random, 95% CI)	1.35 [0.94, 1.95]
7.2 No mesh versus any biological mesh	6	565	Risk Ratio (M-H, Random, 95% CI)	1.35 [0.74, 2.46]
7.3 No mesh versus any non-absorbable polypropylene mesh	11	1155	Risk Ratio (M-H, Random, 95% CI)	2.45 [1.64, 3.67]
7.4 native tissue repair versus any graft (biological, absorbable or permanent mesh)	18	1912	Risk Ratio (M-H, Random, 95% CI)	1.84 [1.37, 2.46]
7.5 native tissue repair versus any transobturator mesh	7	848	Risk Ratio (M-H, Random, 95% CI)	2.47 [1.46, 4.18]
7.6 native tissue repair versus self-styled transobturator mesh	2	285	Risk Ratio (M-H, Random, 95% CI)	3.41 [2.05, 5.68]
7.7 native tissue repair versus commercial transobturator mesh kit	5	563	Risk Ratio (M-H, Random, 95% CI)	2.22 [1.22, 4.03]
7.8 native tissue versus combined total or anterior or posterior vaginal mesh	3	383	Risk Ratio (M-H, Random, 95% CI)	1.39 [0.97, 2.00]
8 Number of women having repeat prolapse surgery	15		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
8.1 anterior or posterior repair alone versus repair with polyglactin (Vicryl) mesh inlay	1	66	Risk Ratio (M-H, Fixed, 95% CI)	1.88 [0.37, 9.58]
8.2 native tissue vaginal repair versus transvaginal polypropylene mesh kit	10	1365	Risk Ratio (M-H, Fixed, 95% CI)	1.95 [1.00, 3.81]
8.3 native tissue vaginal repair versus biological graft repair	5	306	Risk Ratio (M-H, Fixed, 95% CI)	0.82 [0.41, 1.63]
8.4 native tissue versus combined total or anterior or posterior vaginal mes	3	383	Risk Ratio (M-H, Fixed, 95% CI)	1.62 [0.54, 4.85]

9	Number of women with urgency, detrusor overactivity or overactive bladder	1		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
	9.1 fascial plication vs fascial plication with Pelvicol overlay	1	201	Risk Ratio (M-H, Fixed, 95% CI)	1.14 [0.61, 2.14]
10	Number of women with postoperative urinary incontinence	2		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
	10.1 fascial plication vs fascial plication with Pelvicol overlay	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
	10.2 anterior or posterior repair alone versus repair with polyglactin (Vicryl) mesh inlay	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
11	Postoperative voiding dysfunction symptoms	2		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
	11.1 fascial plication vs fascial plication with Pelvicol overlay	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
	11.2 anterior colporrhaphy vs cadaveric fascia lata (Tutoplast)	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
12	Persistent voiding dysfunction	1		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
	12.1 anterior colporrhaphy vs cadaveric fascia lata (Tutoplast)	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
13	Number of women with dyspareunia	6		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
	13.1 fascial plication vs fascial plication with Pelvicol overlay	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
	13.2 posterior colporrhaphy or site specific repair versus site specific repair with porcine intestine graft inlay	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
	13.3 anterior and posterior colporrhaphy versus Anterior and posterior polypropylene Mesh overlay	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
	13.4 anterior or posterior repair alone versus repair with polyglactin (Vicryl) mesh inlay	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
	13.5 native tissue vaginal repair versus transvaginal polypropylene mesh	2		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
14	De novo dyspareunia	9	851	Risk Ratio (M-H, Fixed, 95% CI)	1.24 [0.86, 1.77]
	14.1 anterior and posterior colporrhaphy versus Anterior and posterior polypropylene Mesh overlay	2	188	Risk Ratio (M-H, Fixed, 95% CI)	1.23 [0.64, 2.36]
	14.2 native tissue repair vs mesh repair	9	663	Risk Ratio (M-H, Fixed, 95% CI)	1.24 [0.80, 1.90]
15	Number of women with postoperative complications	4		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
	15.1 fascial plication vs fascial plication with Pelvicol overlay	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]

15.2 traditional or ultralateral anterior colporrhaphy vs anterior colporrhaphy + polyglactin mesh reinforcement	2		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
15.3 posterior colporrhaphy or site specific repair versus site specific repair with porcine intestine graft inlay	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
16 Death	2		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
16.1 traditional or ultralateral anterior colporrhaphy vs anterior colporrhaphy + polyglactin mesh reinforcement	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
16.2 anterior or posterior repair alone versus repair with polyglactin (Vicryl) mesh inlay	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
17 Length of stay in hospital (days)	3		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
17.1 fascial plication vs fascial plication with Pelvicol overlay	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
17.2 native tissue versus transvaginal polypropylene mesh	2		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
18 new urinary stress incontinence postoperative	4	326	Risk Ratio (M-H, Fixed, 95% CI)	1.07 [0.96, 1.19]
18.1 native tissue vaginal repair versus transvaginal polypropylene mesh kit	4	326	Risk Ratio (M-H, Fixed, 95% CI)	1.07 [0.96, 1.19]
19 mesh erosion	13	1998	Risk Ratio (M-H, Fixed, 95% CI)	0.06 [0.03, 0.12]
19.1 native tissue vaginal repair versus transvaginal polypropylene mesh	13	1615	Risk Ratio (M-H, Fixed, 95% CI)	0.06 [0.03, 0.14]
19.2 native tissue versus combined total or anterior or posterior vaginal mesh	3	383	Risk Ratio (M-H, Fixed, 95% CI)	0.04 [0.01, 0.21]
20 surgery for mesh erosion	3	383	Risk Ratio (M-H, Fixed, 95% CI)	0.08 [0.02, 0.42]
20.1 native tissue versus combined total or anterior or posterior vaginal mesh	3	383	Risk Ratio (M-H, Fixed, 95% CI)	0.08 [0.02, 0.42]
21 cystotomy	6	1361	Risk Ratio (M-H, Fixed, 95% CI)	0.24 [0.09, 0.59]
21.1 native tissue versus combined total or anterior or posterior vaginal mesh	4	427	Risk Ratio (M-H, Fixed, 95% CI)	0.26 [0.06, 1.19]
21.2 native tissue vaginal repair versus transvaginal polypropylene mesh	5	934	Risk Ratio (M-H, Fixed, 95% CI)	0.22 [0.07, 0.70]
22 Patient global impression of improvement (PGI-I) very much or much better	2	235	Risk Ratio (M-H, Fixed, 95% CI)	1.03 [0.87, 1.23]
22.1 native tissue vaginal repair versus transvaginal polypropylene mesh kit	2	235	Risk Ratio (M-H, Fixed, 95% CI)	1.03 [0.87, 1.23]

23 PISQ-12 Prolapse and Incontinence Sexual Questionnaire	4	588	Mean Difference (IV, Fixed, 95% CI)	0.09 [-0.17, 0.36]
24 number undergoing further continence surgery	5	808	Risk Ratio (M-H, Fixed, 95% CI)	1.18 [0.59, 2.33]
25 Subsequent surgery (prolapse, incontinence, mesh exposure, pain)	3	383	Risk Ratio (M-H, Fixed, 95% CI)	1.09 [1.02, 1.15]
26 Blood loss (ml)	5		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
26.1 fascial plication vs Pelvicol overlay	2	258	Mean Difference (IV, Fixed, 95% CI)	0.56 [-19.57, 20.70]
26.2 native tissue versus armed transobturator polypropylene mesh	2	569	Mean Difference (IV, Fixed, 95% CI)	-64.04 [-80.39, -47.69]
26.3 native tissue versus repair with any graft (permanent or biological)	5	871	Mean Difference (IV, Fixed, 95% CI)	-35.32 [-47.55, -23.09]
27 Point Ba	1	44	Mean Difference (IV, Fixed, 95% CI)	0.9 [0.25, 1.55]
28 Point Aa	1	44	Mean Difference (IV, Fixed, 95% CI)	0.70 [0.25, 1.15]
29 Point C	1	44	Mean Difference (IV, Fixed, 95% CI)	0.60 [0.06, 1.14]
30 Point Bp	1	44	Mean Difference (IV, Fixed, 95% CI)	0.0 [-0.62, 0.62]
31 POPQ Total vaginal length in cm	1	44	Mean Difference (IV, Fixed, 95% CI)	0.0 [-0.43, 0.43]

Comparison 7. One type of graft (synthetic mesh or biological graft) versus another type of graft

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Number of women with prolapse symptoms (subjective failure)	0		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
1.1 Prolene soft vs Pelvicol	0		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
2 Number of women with anterior prolapse / cystocele (objective failure)	2		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
2.1 Vicryl vs Pelvicol	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
2.2 Monofilament Polypropylene Mesh versus Porcine Dermis Graft	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
3 Number of women having further prolapse surgery	2		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
3.1 Vicryl vs Pelvicol	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
3.2 Monofilament Polypropylene Mesh versus Porcine Dermis Graft	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
4 Stress urinary incontinence de novo	1		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected

4.1 Monofilament Polypropylene Mesh versus Porcine Dermis Graft	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
5 Increased daytime urinary frequency post-op	1		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
5.1 Monofilament Polypropylene Mesh versus Porcine Dermis Graft	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
6 Dyspareunia post-op	1		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
6.1 Monofilament Polypropylene Mesh versus Porcine Dermis Graft	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
7 Vaginal mesh erosion	1		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
7.1 Monofilament Polypropylene Mesh (Prolene soft) versus Porcine Dermis Graft	0		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
7.2 armed polypropylene mesh versus porcine dermis graft	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
8 Hospital stay (days)	1	190	Mean Difference (IV, Fixed, 95% CI)	-0.40 [-0.90, 0.10]
8.1 Monofilament Polypropylene Mesh versus Porcine Dermis Graft	1	190	Mean Difference (IV, Fixed, 95% CI)	-0.40 [-0.90, 0.10]

Comparison 8. One suture type versus another type of suture

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Number of women with prolapse symptoms up to 1 year (subjective failure)	1		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
1.1 Polydioxanone (PDS) suture versus polyglactin (Vicryl) suture	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
2 Number of women with prolapse symptoms at 1 to 5 years (subjective failure)	1		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
2.1 Polydioxanone (PDS) suture versus polyglactin (Vicryl) suture	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
3 Prolapse symptom score up to 1 year	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
3.1 Polydioxanone (PDS) suture versus polyglactin (Vicryl) suture	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
4 Prolapse symptom score at 1 to 5 years	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected

4.1 Polydioxanone (PDS) suture versus polyglactin (Vicryl) suture	1	Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
5 Quality of life score due to prolapse (VAS) up to 1 year	1	Mean Difference (IV, Fixed, 95% CI)	Totals not selected
5.1 Polydioxanone (PDS) suture versus polyglactin (Vicryl) suture	1	Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
6 Quality of life score due to prolapse (VAS) at 1 to 5 years	1	Mean Difference (IV, Fixed, 95% CI)	Totals not selected
6.1 Polydioxanone (PDS) suture versus polyglactin (Vicryl) suture	1	Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
7 Objective failure all sites	1	Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
7.1 Polydioxanone (PDS) suture versus polyglactin (Vicryl) suture	1	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
8 Number of women with urinary incontinence at 1 to 5 years	1	Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
8.1 Polydioxanone (PDS) suture versus polyglactin (Vicryl) suture	1	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
9 ICI Urinary symptom score at 1 to 5 years	1	Mean Difference (IV, Fixed, 95% CI)	Totals not selected
9.1 Polydioxanone (PDS) suture versus polyglactin (Vicryl) suture	1	Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
10 Number of women with dyspareunia at 1 to 5 years	1	Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
10.1 Polydioxanone (PDS) suture versus polyglactin (Vicryl) suture	1	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
11 Death	1	Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
11.1 Polydioxanone (PDS) suture versus polyglactin (Vicryl) suture	1	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
12 Number of women having repeat prolapse surgery	1	Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
12.1 Polydioxanone (PDS) suture versus polyglactin (Vicryl) suture	1	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]

Comparison 9. Prolapse surgery and bladder function

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 number with de novo (new) stress urinary incontinence	15	2731	Risk Ratio (M-H, Random, 95% CI)	1.16 [0.86, 1.56]
1.1 sacral colpopexy versus vaginal colpopexy	1	46	Risk Ratio (M-H, Random, 95% CI)	0.27 [0.06, 1.15]
1.2 cystopexy versus cystopexy with pubourethral ligament plication	1	102	Risk Ratio (M-H, Random, 95% CI)	0.96 [0.25, 3.64]
1.3 prolapse repair with urethrovesical plication versus prolapse repair with needle suspension	2	102	Risk Ratio (M-H, Random, 95% CI)	2.02 [0.08, 50.63]
1.4 sacral colpopexy versus sacral colpopexy and colposuspension	2	364	Risk Ratio (M-H, Random, 95% CI)	1.04 [0.38, 2.82]
1.5 prolapse repair versus prolapse repair +suburethral tape (TVT)	2	387	Risk Ratio (M-H, Random, 95% CI)	2.44 [0.75, 7.95]
1.6 prolapse surgery without continence surgery versus prolapse surgery with continence surgery	6	832	Risk Ratio (M-H, Random, 95% CI)	1.81 [1.21, 2.71]
1.7 native tissue repair versus armed transobturator polypropylene mesh	6	898	Risk Ratio (M-H, Random, 95% CI)	0.67 [0.48, 0.93]
2 Number with de novo (new) stress urinary incontinence (objective)	4	522	Risk Ratio (M-H, Random, 95% CI)	1.81 [1.02, 3.22]
2.1 prolapse repair +urethrovesical plication versus prolapse repair + needle suspension	1	83	Risk Ratio (M-H, Random, 95% CI)	1.19 [0.75, 1.91]
2.2 Prolapse repair without TVT versus prolapse repair and suburethral tape	3	439	Risk Ratio (M-H, Random, 95% CI)	3.72 [0.91, 15.20]
3 Further continence surgery	9	1491	Risk Ratio (M-H, Fixed, 95% CI)	4.04 [2.69, 6.07]
3.1 Prolapse surgery without continence surgery versus prolapse surgery with continence surgery	3	456	Risk Ratio (M-H, Fixed, 95% CI)	1.97 [1.20, 3.23]
3.2 prolapse surgery (continent women) versus prolapse surgery with TVT	1	52	Risk Ratio (M-H, Fixed, 95% CI)	2.79 [0.12, 65.38]
3.3 cystopexy versus cystopexy with pubourethral ligament plication	1	102	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]

3.4 sacral colpopexy versus vaginal sacrospinous colpopexy	2	207	Risk Ratio (M-H, Fixed, 95% CI)	1.05 [0.28, 3.95]
3.5 prolapse repair + urethrovesical plication versus prolapse repair and needle suspension	1	73	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
3.6 prolapse surgery (incontinent women) +urethrovesical plication versus prolapse surgery and suburethral tape (TVT)	1	181	Risk Ratio (M-H, Fixed, 95% CI)	99.12 [6.21, 1581.10]
3.7 Prolapse repair +urethrovesical fascial repair versus prolapse repair +TVT	3	420	Risk Ratio (M-H, Fixed, 95% CI)	6.37 [1.46, 27.72]
4 Number with denovo (new) urgency, detrusor overactivity or overactive bladder	10	1005	Risk Ratio (M-H, Fixed, 95% CI)	1.12 [0.80, 1.55]
4.1 sacral colpopexy versus vaginal colpopexy	1	62	Risk Ratio (M-H, Fixed, 95% CI)	1.61 [0.68, 3.81]
4.2 cystopexy versus cystopexy with pubourethral ligament plication	1	102	Risk Ratio (M-H, Fixed, 95% CI)	0.96 [0.06, 14.96]
4.3 prolapse repair with urethrovesical plication versus prolapse repair with needle suspension	2	138	Risk Ratio (M-H, Fixed, 95% CI)	0.96 [0.20, 4.49]
4.4 Prolene soft versus Pevicol	1	37	Risk Ratio (M-H, Fixed, 95% CI)	0.47 [0.05, 4.78]
4.5 prolapse repair versus prolapse repair +suburethral tape (TVT)	1	50	Risk Ratio (M-H, Fixed, 95% CI)	0.33 [0.04, 2.99]
4.6 native tissue repair versus transvaginal mesh	1	151	Risk Ratio (M-H, Fixed, 95% CI)	1.10 [0.43, 2.77]
4.7 abdominal sacrocolpopexy alone vs abdominal sacrocolpopexy with Burch colposuspension	1	304	Risk Ratio (M-H, Fixed, 95% CI)	1.36 [0.87, 2.15]
4.8 vaginal sacrospinous colpopexy vs posterior intravaginal slingplasty	1	45	Risk Ratio (M-H, Fixed, 95% CI)	2.64 [0.11, 61.54]
4.9 high levator myorrhaphy vs uterosacral vag vault suspension	1	116	Risk Ratio (M-H, Fixed, 95% CI)	0.29 [0.06, 1.32]
5 Longterm voiding dysfunction	12	1209	Risk Ratio (M-H, Fixed, 95% CI)	0.93 [0.67, 1.28]
5.1 sacral colpopexy versus vaginal colpopexy	1	75	Risk Ratio (M-H, Fixed, 95% CI)	1.03 [0.07, 15.82]
5.2 cystopexy versus cystopexy with pubourethral ligament plication	1	102	Risk Ratio (M-H, Fixed, 95% CI)	0.09 [0.00, 1.54]

5.3 prolapse repair with urethrovaginal plication versus prolapse repair with needle suspension	2	138	Risk Ratio (M-H, Fixed, 95% CI)	1.05 [0.49, 2.26]
5.4 High levator myorrhaphy vs uterosacral vag vault suspension	1	116	Risk Ratio (M-H, Fixed, 95% CI)	2.2 [0.82, 5.94]
5.5 prolapse repair versus prolapse repair +suburethral tape (TVT)	2	368	Risk Ratio (M-H, Fixed, 95% CI)	0.20 [0.04, 1.12]
5.6 vaginal sacrospinous colpopexy vs posterior intravaginal slingplasty	1	45	Risk Ratio (M-H, Fixed, 95% CI)	1.75 [0.36, 8.61]
5.7 anterior colporrhaphy vs cadaveric fascia lata (Tutoplast)	1	105	Risk Ratio (M-H, Fixed, 95% CI)	1.18 [0.73, 1.91]
5.8 traditional anterior colporrhaphy vs abdominal Burch colposuspension	1	68	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
5.9 cystopexy vs cystopexy + pubourethral ligament plication	1	102	Risk Ratio (M-H, Fixed, 95% CI)	0.09 [0.00, 1.54]
5.10 anterior colporrhaphy versus transvaginal polypropylene mesh	1	40	Risk Ratio (M-H, Fixed, 95% CI)	3.0 [0.13, 69.52]
5.11 anterior colporrhaphy versus SIS graft	1	50	Risk Ratio (M-H, Fixed, 95% CI)	0.72 [0.11, 4.74]
6 Number with new or denovo SUI who had occult SUI pre-operatively	4	242	Risk Ratio (M-H, Random, 95% CI)	2.61 [0.81, 8.42]
7 post prolapse surgery SUI objective	10	1582	Risk Ratio (M-H, Random, 95% CI)	1.92 [1.23, 3.00]
7.1 Prolapse surgery with and without continence surgery	8	1010	Risk Ratio (M-H, Random, 95% CI)	1.63 [1.07, 2.47]
7.2 Prolapse surgery no TVT versus prolapse surgery with TVT	1	52	Risk Ratio (M-H, Random, 95% CI)	8.33 [1.14, 61.15]
7.3 sacral colpopexy without colposuspension in continent women versus sacral colpopexy + colposuspension	1	292	Risk Ratio (M-H, Random, 95% CI)	1.83 [1.29, 2.61]
7.4 Prolapse surgery alone (incontinent women) versus prolapse surgery with continence surgery	2	228	Risk Ratio (M-H, Random, 95% CI)	3.29 [0.09, 115.01]
8 Incontinence Impact Questionnaire IIQ post	1	47	Mean Difference (IV, Fixed, 95% CI)	0.0 [-1.96, 1.96]
8.1 sacral colpopexy without colposuspension versus sacral colpopexy with colposuspension	1	47	Mean Difference (IV, Fixed, 95% CI)	0.0 [-1.96, 1.96]

9 Urinary Distress Inventory (UDI-6)	2	358	Mean Difference (IV, Fixed, 95% CI)	0.35 [-1.06, 1.76]
9.1 sacral colpopexy without colposuspension (continent women) versus sacral colpopexy with colposuspension	1	311	Mean Difference (IV, Fixed, 95% CI)	10.7 [2.93, 18.47]
9.2 sacral colpoopexy without colpopsuspension (incontinent women) versus sacral colpopexy with colpsuspension	1	47	Mean Difference (IV, Fixed, 95% CI)	0.0 [-1.43, 1.43]
10 Bothersome SUI (PFDI) post-operative	2	483	Risk Ratio (M-H, Fixed, 95% CI)	4.74 [3.05, 7.37]
10.1 Prolapse surgery without TVT versus prolapse surgery with TVT	1	181	Risk Ratio (M-H, Fixed, 95% CI)	15.50 [5.90, 40.72]
10.2 sacral colpopexy without colpsuspension versus sacral colpopexy with colposuspension	1	302	Risk Ratio (M-H, Fixed, 95% CI)	2.18 [1.29, 3.67]
11 satisfaction (VAS 0-10)	1	47	Mean Difference (IV, Fixed, 95% CI)	1.0 [0.07, 1.93]
11.1 sacral colpopexy without colposuspension versus sacral colpopexy with colposuspension	1	47	Mean Difference (IV, Fixed, 95% CI)	1.0 [0.07, 1.93]
12 Pelvic Floor Incontinence questionnaire (PFIQ) bladder domain	1	311	Mean Difference (IV, Fixed, 95% CI)	2.90 [0.16, 5.64]
12.1 sacral colpopexy without colpsuspension versus sacral colpopexy with colposuspension	1	311	Mean Difference (IV, Fixed, 95% CI)	2.90 [0.16, 5.64]
13 Pelvic organ Prolapse/Urinary incontinence Sexual Function Questionnaire (PISQ)	1	194	Mean Difference (IV, Fixed, 95% CI)	0.10 [-1.38, 1.58]
13.1 Sacral colpopexy without continence surgery versus sacral colpopexy with colposuspension	1	194	Mean Difference (IV, Fixed, 95% CI)	0.10 [-1.38, 1.58]
14 further Prolapse surgery	1	311	Risk Ratio (M-H, Fixed, 95% CI)	2.91 [0.60, 14.17]
14.1 Sacral colpopexy with colposuspension versus sacral colpopexy with colposuspension	1	311	Risk Ratio (M-H, Fixed, 95% CI)	2.91 [0.60, 14.17]
15 De novo Stress urinary incontinence women with negative preoperative stress test	2	455	Risk Ratio (M-H, Random, 95% CI)	1.68 [1.22, 2.32]
16 blood loss (mls)	1	311	Mean Difference (IV, Fixed, 95% CI)	-70.0 [-113.02, -26.98]

16.1 sacral colpopexy without colposuspension versus sacral colpopexy with colposuspension	1	311	Mean Difference (IV, Fixed, 95% CI)	-70.0 [-113.02, -26.98]
17 POPQ point Aa	1	47	Mean Difference (IV, Fixed, 95% CI)	0.0 [-0.43, 0.43]
17.1 sacral colpopexy without colposuspension versus sacral colpopexy with colposuspension	1	47	Mean Difference (IV, Fixed, 95% CI)	0.0 [-0.43, 0.43]
18 Point Ap	1	47	Mean Difference (IV, Fixed, 95% CI)	0.0 [-0.43, 0.43]
18.1 sacral colpopexy without colposuspension versus sacral colpopexy with colposuspension	1	47	Mean Difference (IV, Fixed, 95% CI)	0.0 [-0.43, 0.43]
19 POP-Q Point Ba	2	296	Std. Mean Difference (IV, Fixed, 95% CI)	0.48 [0.25, 0.71]
19.1 sacral colpopexy without colposuspension versus sacral colpopexy with colposuspension	2	296	Std. Mean Difference (IV, Fixed, 95% CI)	0.48 [0.25, 0.71]
20 POPQ point Bp	2	296	Mean Difference (IV, Fixed, 95% CI)	-0.01 [-0.23, 0.21]
20.1 sacral colpopexy without colposuspension versus sacral colpopexy with colposuspension	2	296	Mean Difference (IV, Fixed, 95% CI)	-0.01 [-0.23, 0.21]
21 POPQ point C	2	358	Mean Difference (IV, Fixed, 95% CI)	0.41 [0.13, 0.69]
21.1 sacral colpopexy without colposuspension versus sacral colpopexy with colposuspension	2	358	Mean Difference (IV, Fixed, 95% CI)	0.41 [0.13, 0.69]
22 POPQ point D	1	47	Mean Difference (IV, Fixed, 95% CI)	-0.5 [-0.86, -0.14]
22.1 sacral colpopexy without colposuspension versus sacral colpopexy with colposuspension	1	47	Mean Difference (IV, Fixed, 95% CI)	-0.5 [-0.86, -0.14]
23 Total vaginal length (TVL cm)	1	47	Mean Difference (IV, Fixed, 95% CI)	0.5 [-0.09, 1.09]
23.1 sacral colpopexy without colposuspension versus sacral colpopexy with colposuspension	1	47	Mean Difference (IV, Fixed, 95% CI)	0.5 [-0.09, 1.09]
24 Pelvic Floor Urinary Impact Questionnaire (PFUIQ)	1	301	Mean Difference (IV, Fixed, 95% CI)	2.30 [-13.21, 17.81]
25 Number with persisting stress urinary incontinence after prolapse and continence surgery	4	312	Risk Ratio (M-H, Fixed, 95% CI)	3.42 [2.37, 4.92]
25.1 Anterior colporrhaphy versus colposuspension	1	67	Risk Ratio (M-H, Fixed, 95% CI)	2.19 [1.15, 4.15]
25.2 Anterior colporrhaphy versus biological graft	1	17	Risk Ratio (M-H, Fixed, 95% CI)	1.79 [0.73, 4.36]
25.3 prolapse surgery without TVT versus prolapse surgery with TVT	1	181	Risk Ratio (M-H, Fixed, 95% CI)	15.50 [5.90, 40.72]

25.4 sacral
colpopexy/hysteropexy no
colposuspension versus sacral
colpopexy/ hysteropexy with
colposuspension

1

47

Risk Ratio (M-H, Fixed, 95% CI)

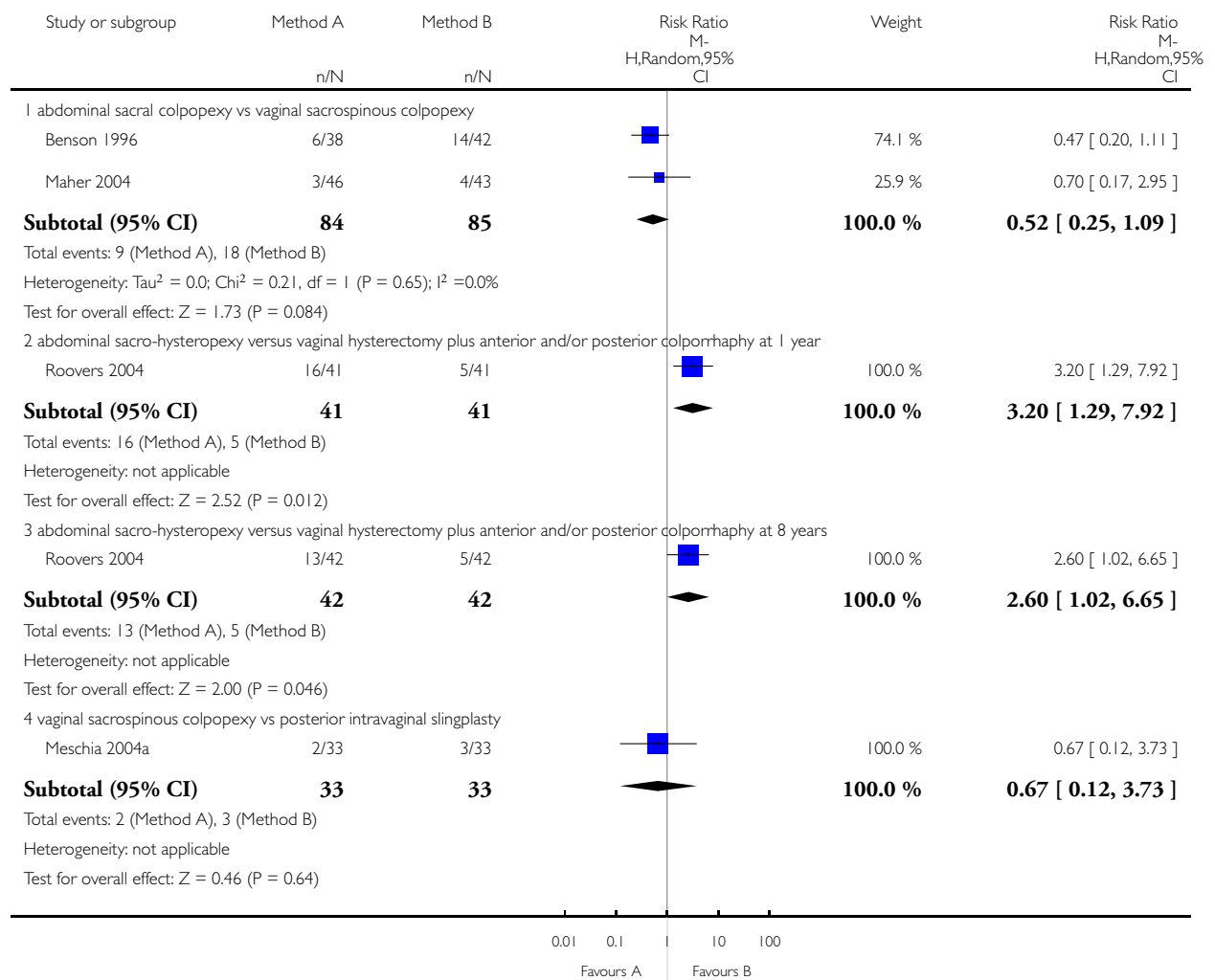
0.72 [0.39, 1.35]

Analysis 1.1. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 1 Number of women with prolapse symptoms (subjective failure).

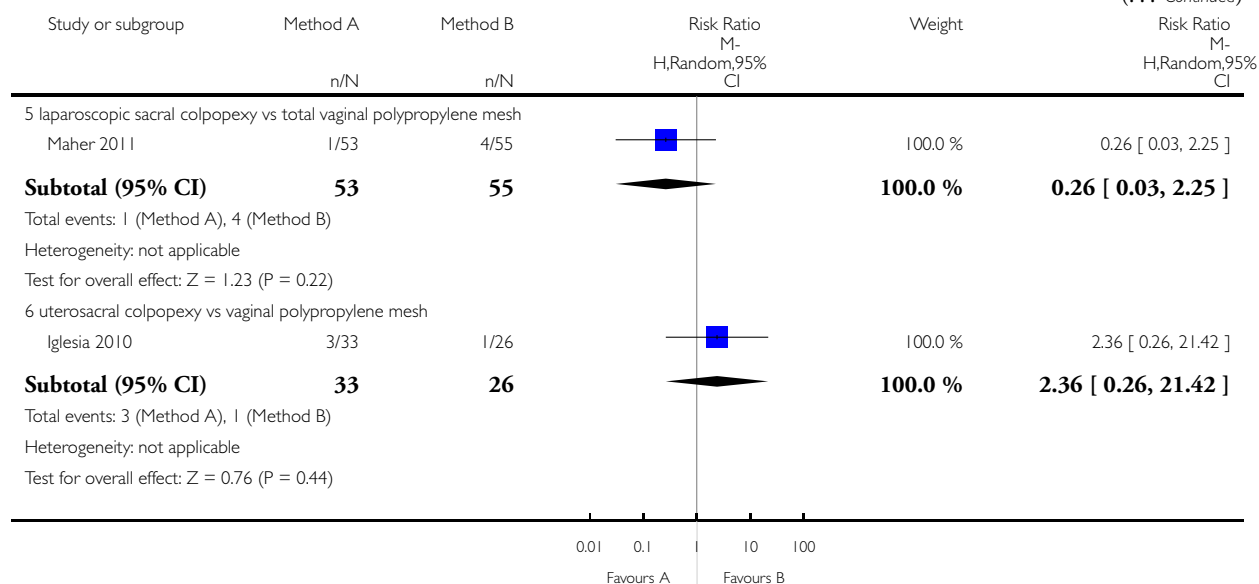
Review: Surgical management of pelvic organ prolapse in women

Comparison: 1 Surgery for upper vaginal (vault or uterine) prolapse

Outcome: 1 Number of women with prolapse symptoms (subjective failure)



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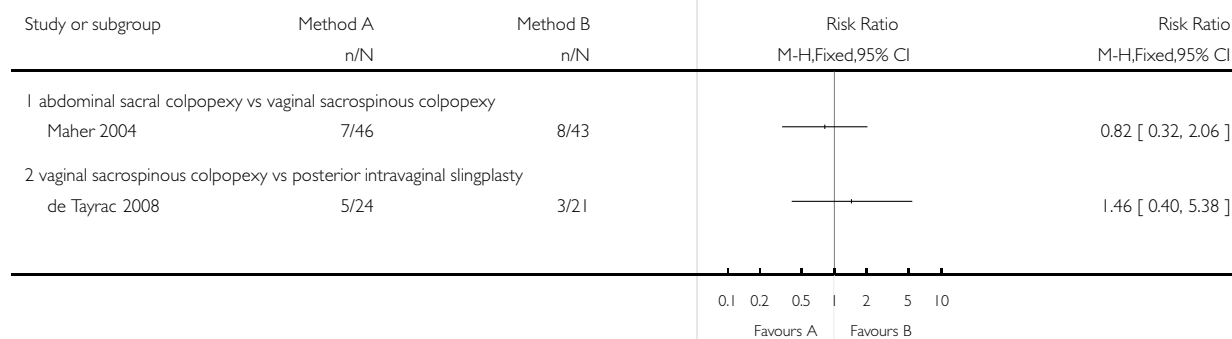


Analysis 1.2. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 2 Number of women unsatisfied with surgery.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 1 Surgery for upper vaginal (vault or uterine) prolapse

Outcome: 2 Number of women unsatisfied with surgery

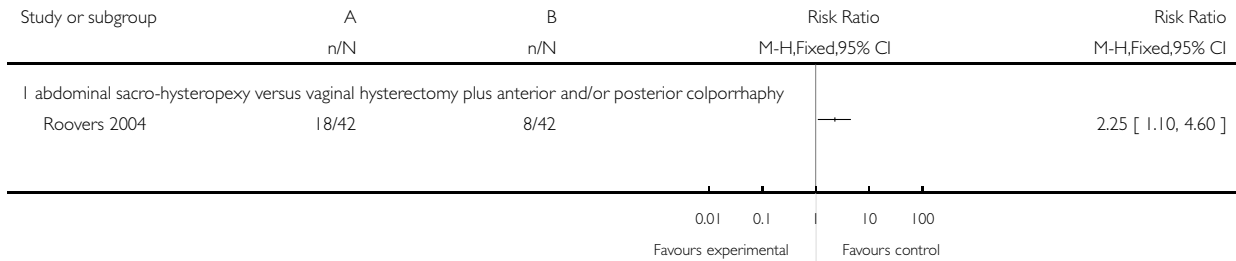


Analysis 1.3. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 3 Number of women who visited a physician after surgery because of pelvic floor symptoms.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 1 Surgery for upper vaginal (vault or uterine) prolapse

Outcome: 3 Number of women who visited a physician after surgery because of pelvic floor symptoms

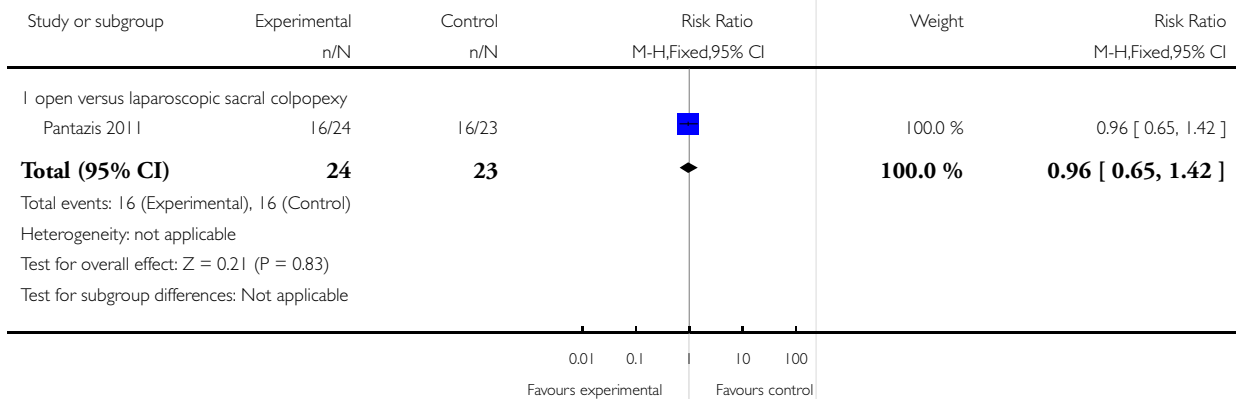


Analysis 1.4. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 4 Patient global impression Improvement PGI-I (very much better).

Review: Surgical management of pelvic organ prolapse in women

Comparison: 1 Surgery for upper vaginal (vault or uterine) prolapse

Outcome: 4 Patient global impression Improvement PGI-I (very much better)

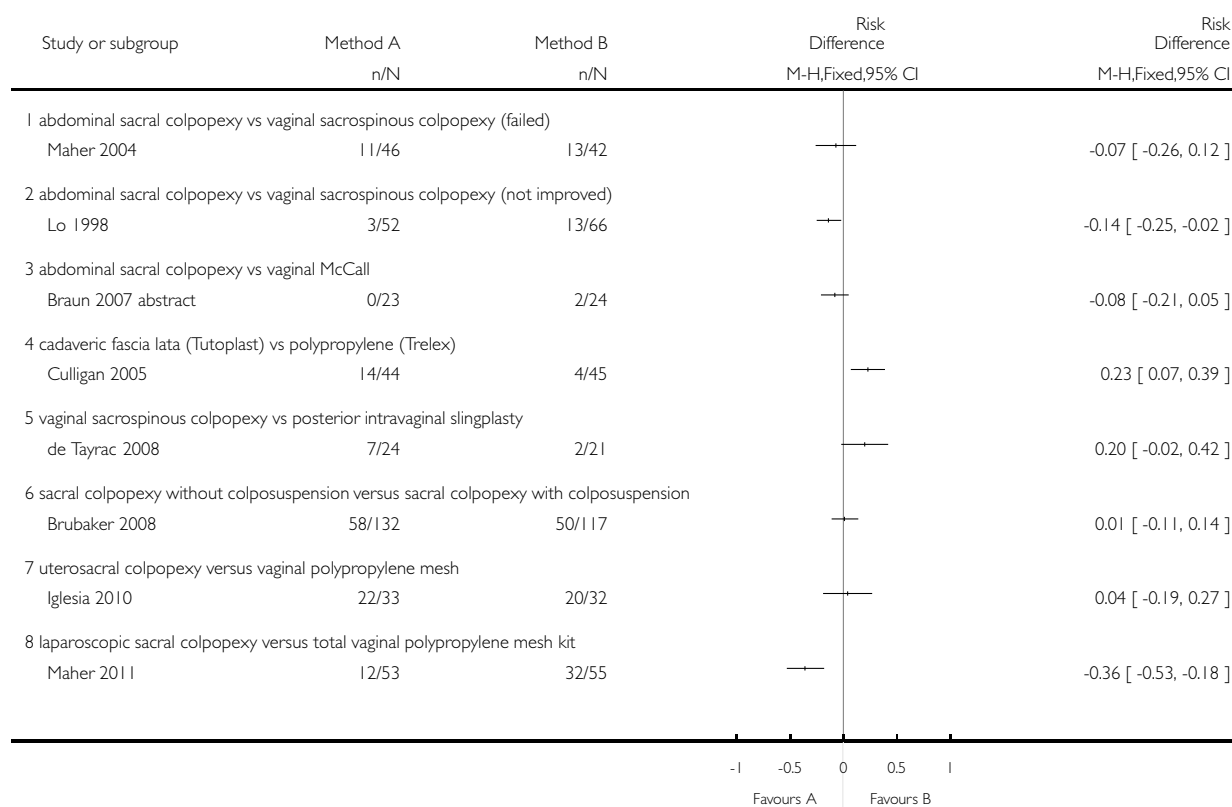


Analysis 1.5. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 5 Number of women with any prolapse (objective failure).

Review: Surgical management of pelvic organ prolapse in women

Comparison: 1 Surgery for upper vaginal (vault or uterine) prolapse

Outcome: 5 Number of women with any prolapse (objective failure)

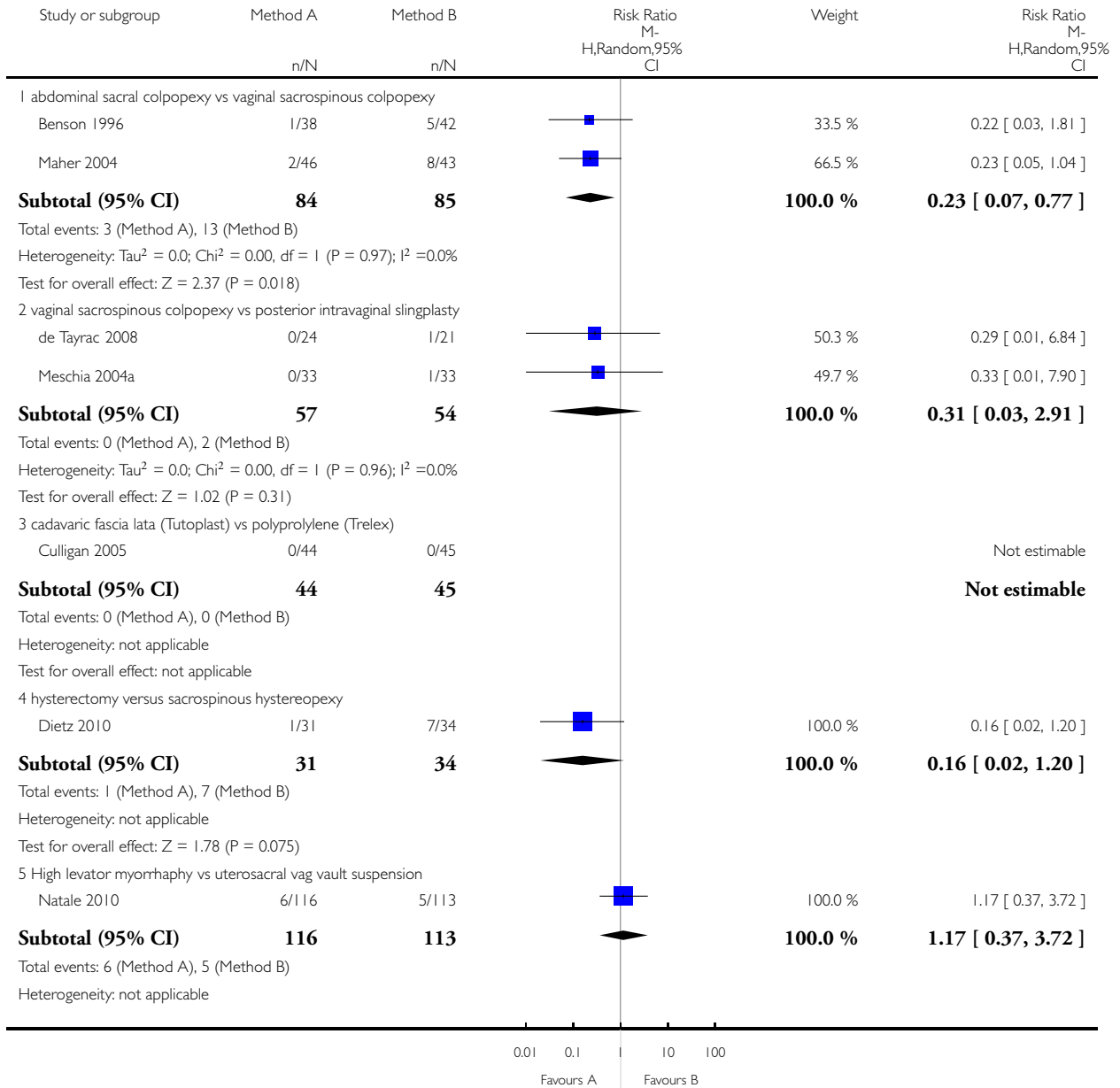


Analysis 1.6. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 6 Number of women with recurrent vault/uterine prolapse (objective).

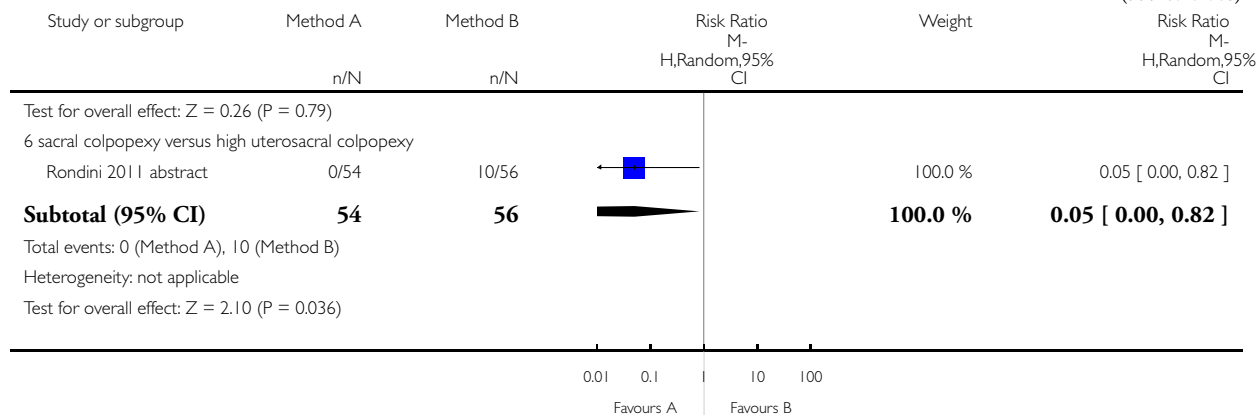
Review: Surgical management of pelvic organ prolapse in women

Comparison: 1 Surgery for upper vaginal (vault or uterine) prolapse

Outcome: 6 Number of women with recurrent vault/uterine prolapse (objective)



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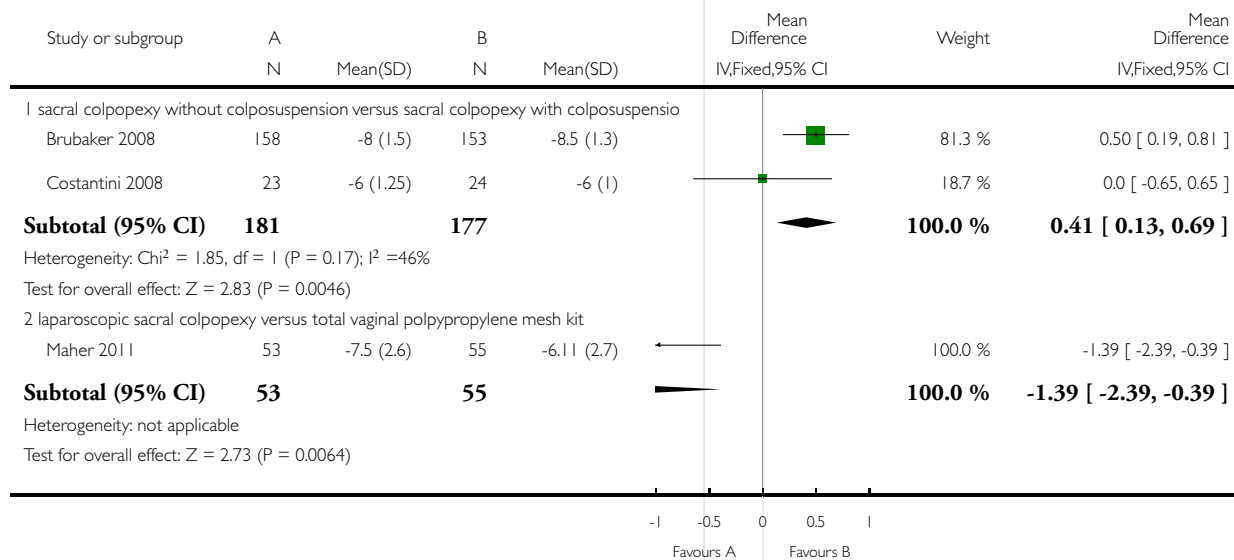


Analysis 1.7. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 7 Vault distance from hymen (cm) POPQ point C after surgery.

Review: Surgical management of pelvic organ prolapse in women

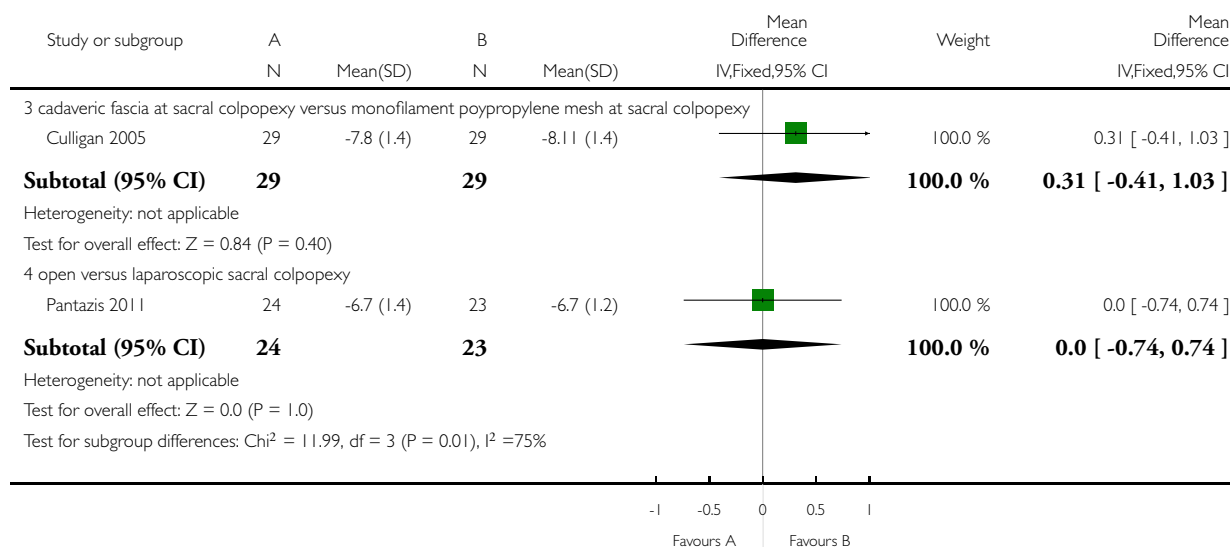
Comparison: 1 Surgery for upper vaginal (vault or uterine) prolapse

Outcome: 7 Vault distance from hymen (cm) POPQ point C after surgery



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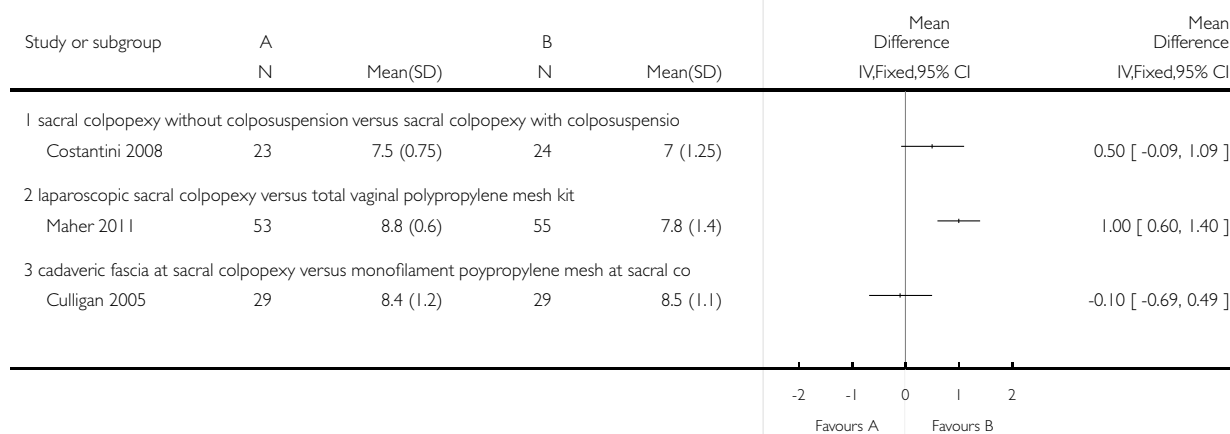


Analysis 1.8. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 8 Total vaginal length (cm) after surgery.

Review: Surgical management of pelvic organ prolapse in women

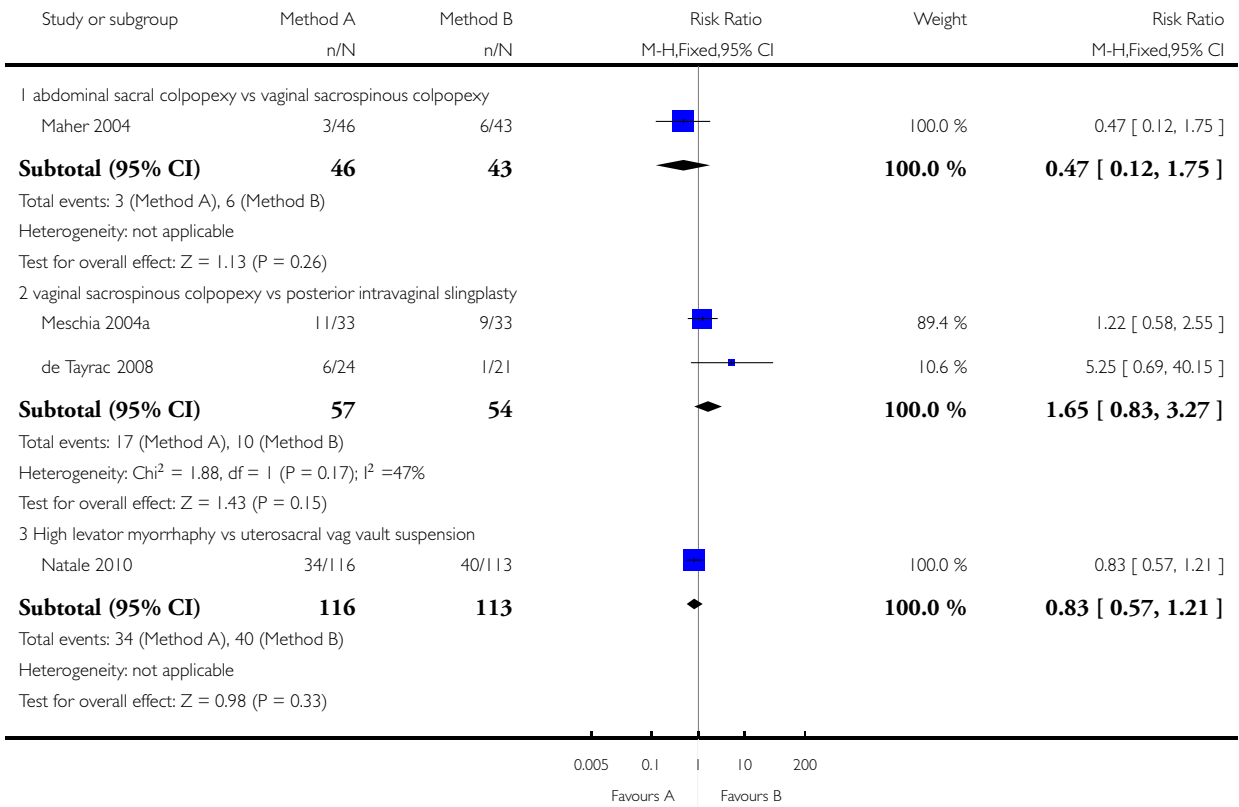
Comparison: 1 Surgery for upper vaginal (vault or uterine) prolapse

Outcome: 8 Total vaginal length (cm) after surgery



Analysis 1.9. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 9 Number of women with recurrent cystocele (objective).

Review: Surgical management of pelvic organ prolapse in women
 Comparison: 1 Surgery for upper vaginal (vault or uterine) prolapse
 Outcome: 9 Number of women with recurrent cystocele (objective)

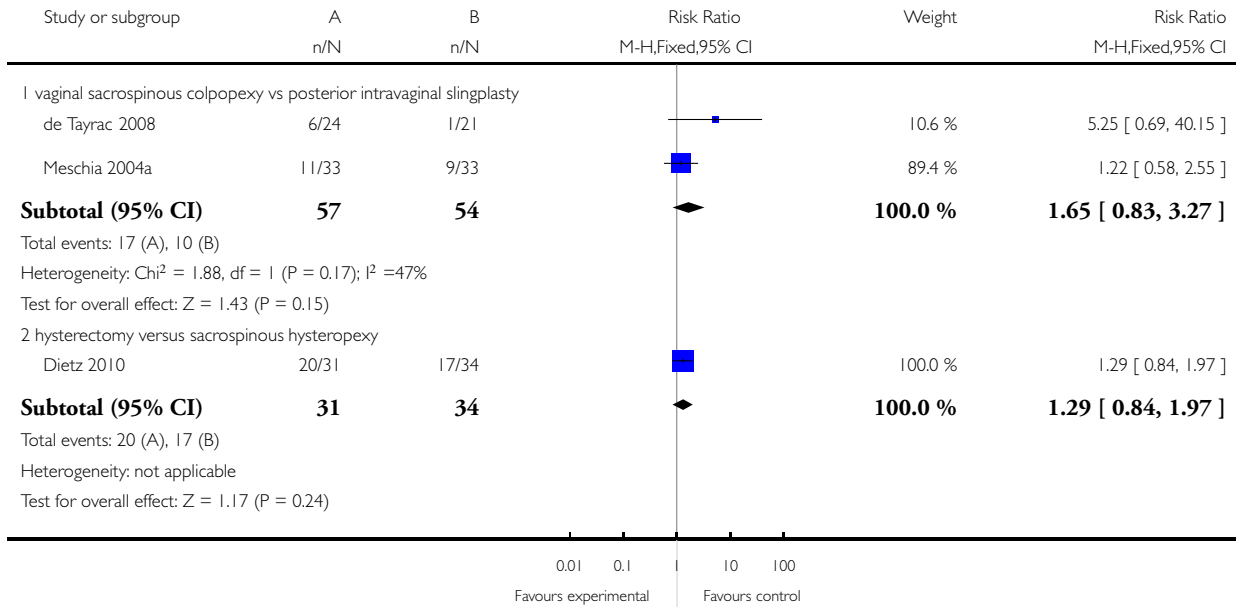


Analysis 1.10. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 10 Objective anterior compartment prolapse after surgery.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 1 Surgery for upper vaginal (vault or uterine) prolapse

Outcome: 10 Objective anterior compartment prolapse after surgery

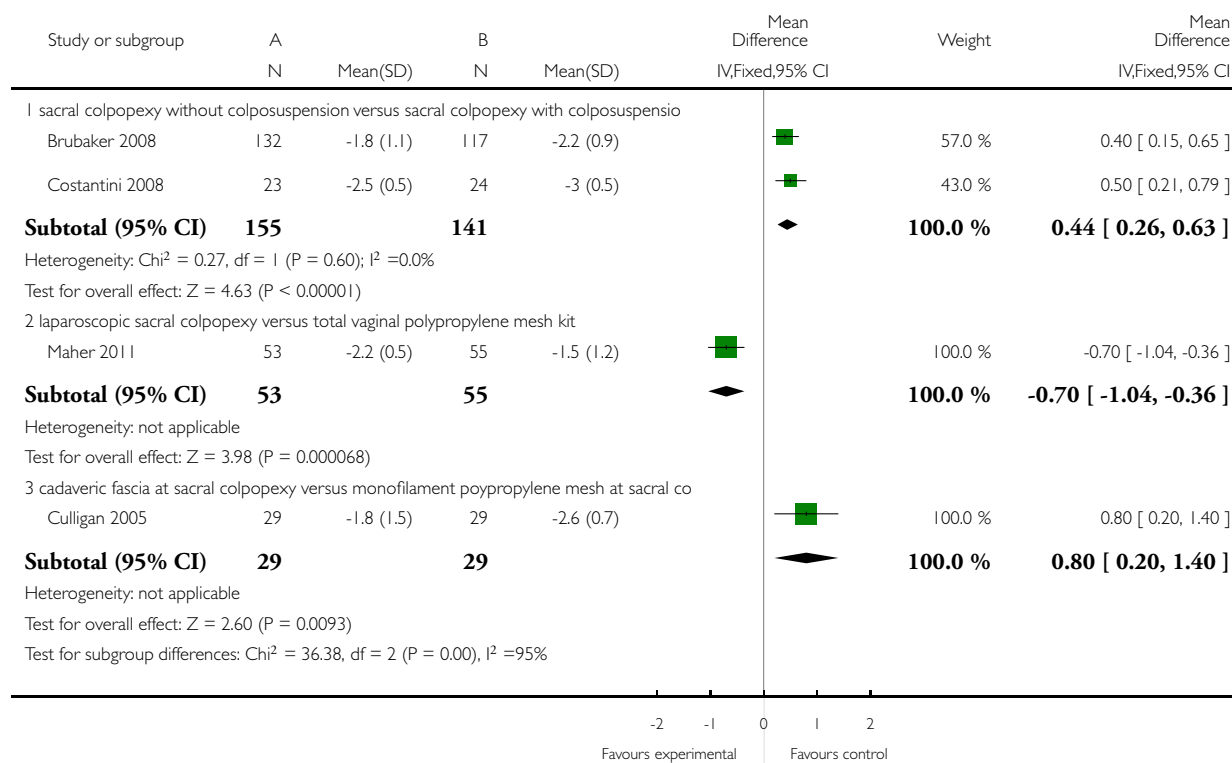


Analysis 1.11. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 11 Anterior vaginal wall distance from hymen (cm) POPQ point Ba after surgery.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 1 Surgery for upper vaginal (vault or uterine) prolapse

Outcome: 11 Anterior vaginal wall distance from hymen (cm) POPQ point Ba after surgery

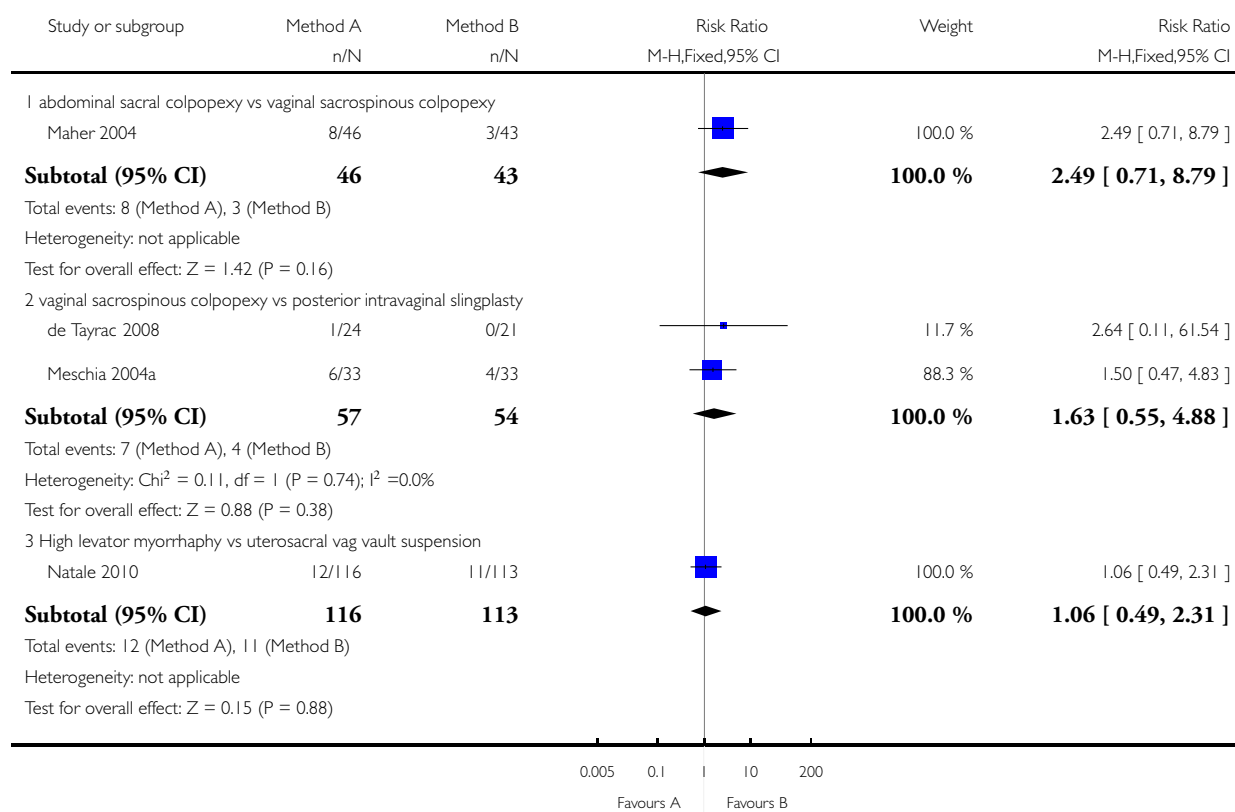


Analysis 1.12. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 12 Number of women with recurrent rectocele (objective).

Review: Surgical management of pelvic organ prolapse in women

Comparison: 1 Surgery for upper vaginal (vault or uterine) prolapse

Outcome: 12 Number of women with recurrent rectocele (objective)

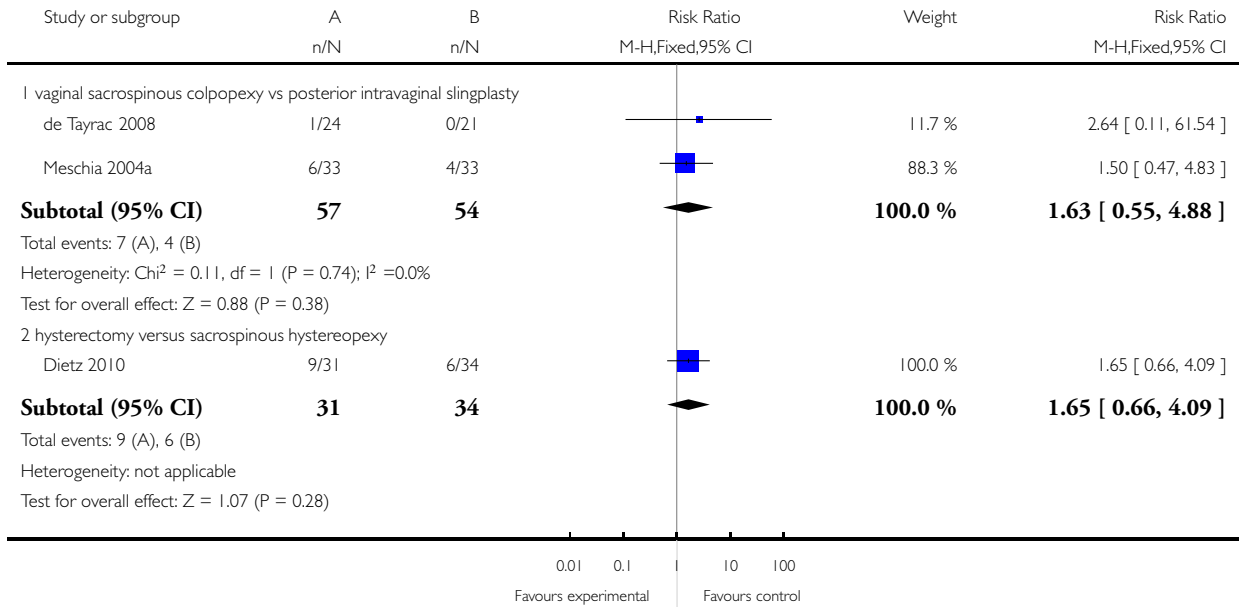


Analysis 1.13. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 13 Objective posterior compartment prolapse after surgery.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 1 Surgery for upper vaginal (vault or uterine) prolapse

Outcome: 13 Objective posterior compartment prolapse after surgery

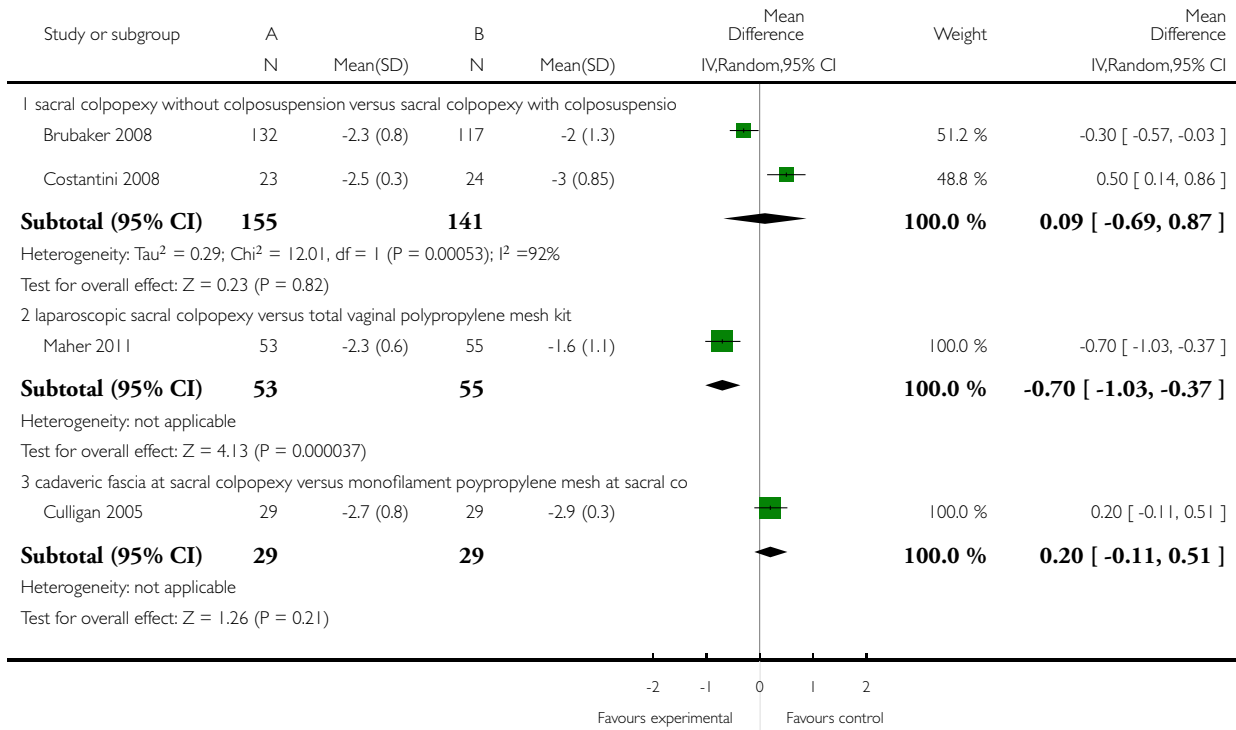


Analysis 1.14. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 14 Posterior vaginal wall distance from hymen (cm) POPQ point Bp after surgery.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 1 Surgery for upper vaginal (vault or uterine) prolapse

Outcome: 14 Posterior vaginal wall distance from hymen (cm) POPQ point Bp after surgery

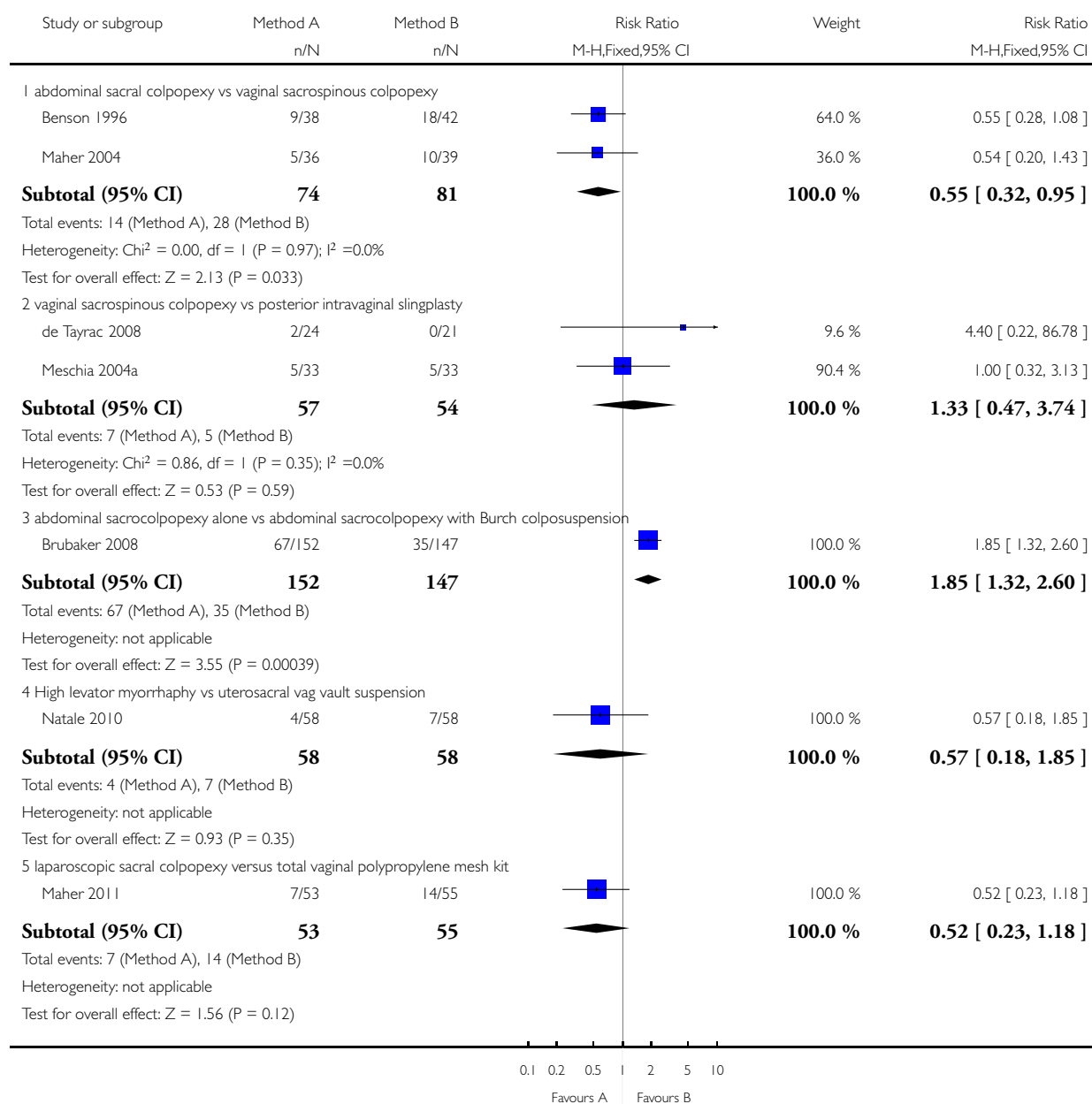


Analysis 1.15. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 15 Number of women with post-operative stress urinary incontinence.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 1 Surgery for upper vaginal (vault or uterine) prolapse

Outcome: 15 Number of women with post-operative stress urinary incontinence

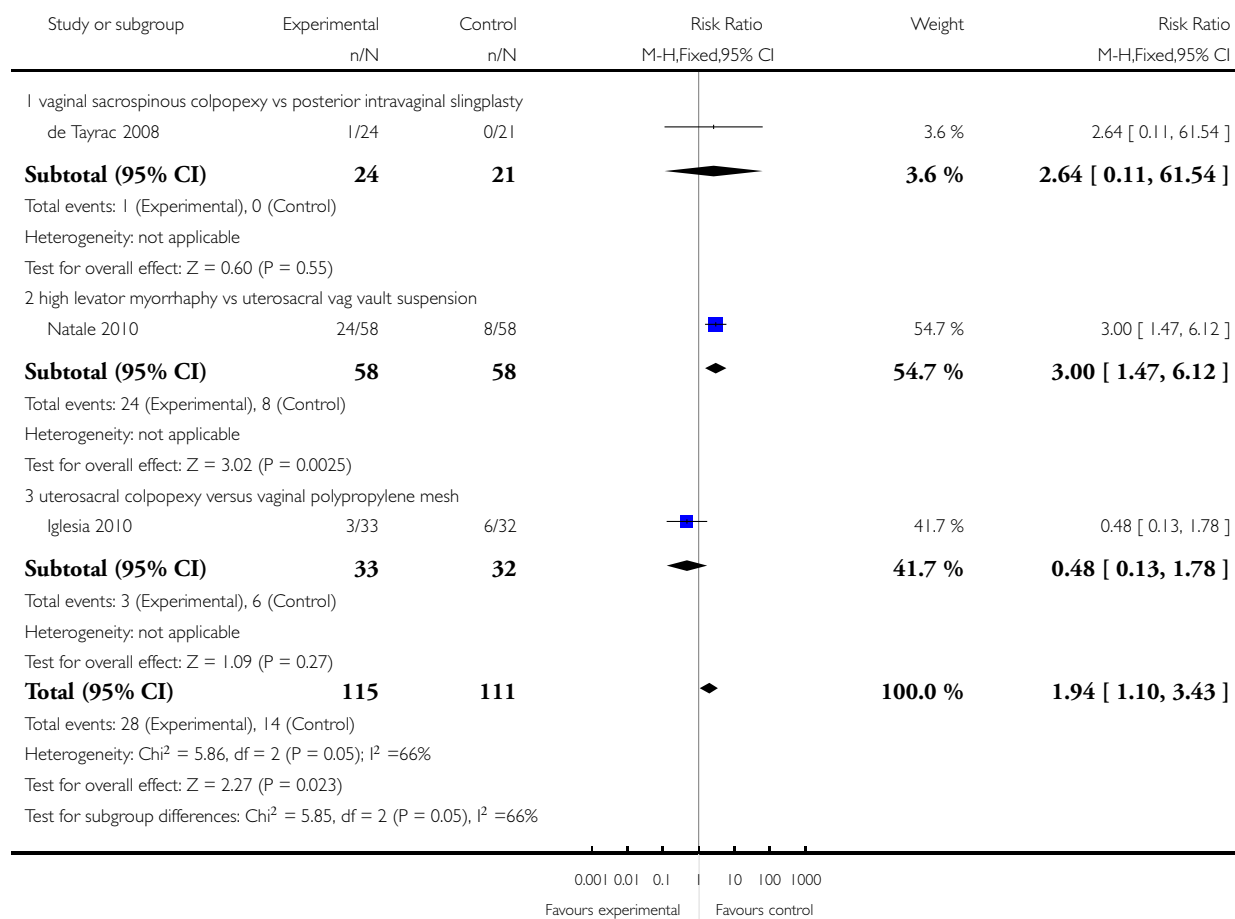


Analysis 1.16. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 16 Number of women with de novo stress incontinence.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 1 Surgery for upper vaginal (vault or uterine) prolapse

Outcome: 16 Number of women with de novo stress incontinence

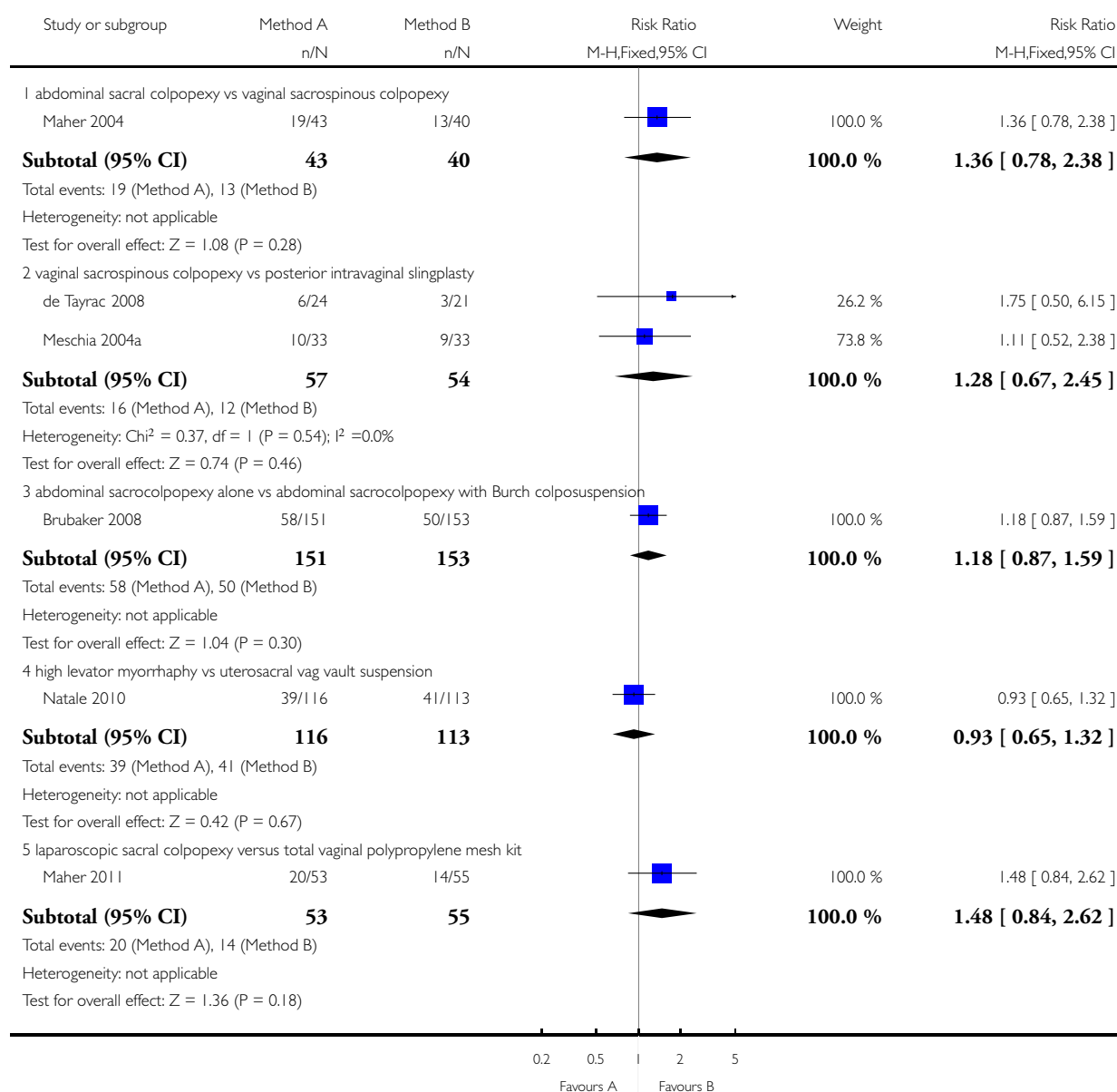


Analysis 1.17. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 17 Number of women with urgency, detrusor overactivity or overactive bladder.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 1 Surgery for upper vaginal (vault or uterine) prolapse

Outcome: 17 Number of women with urgency, detrusor overactivity or overactive bladder

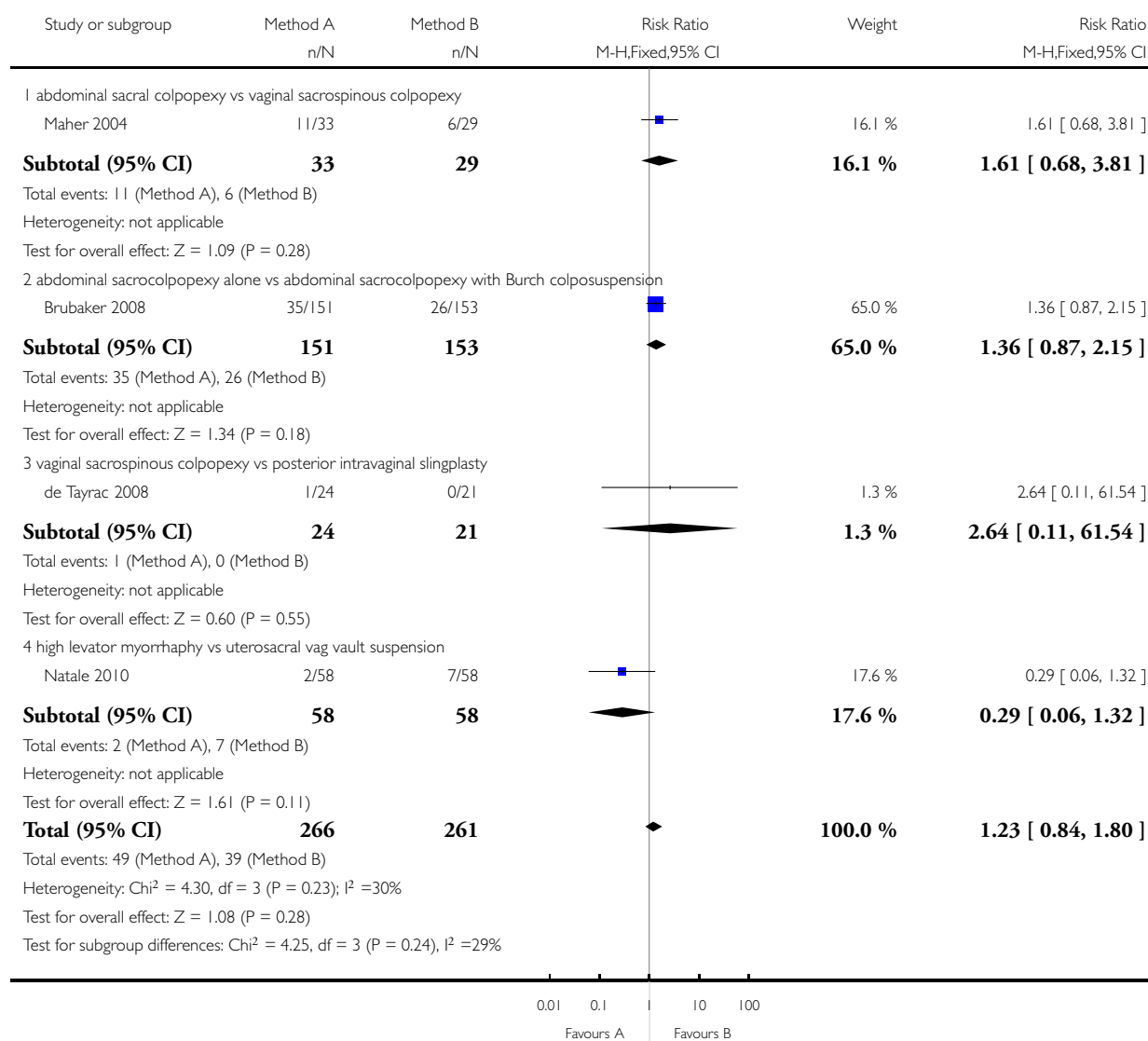


Analysis 1.18. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 18 Number of women with de novo (new) urgency, detrusor overactivity or overactive bladder.

Review: Surgical management of pelvic organ prolapse in women

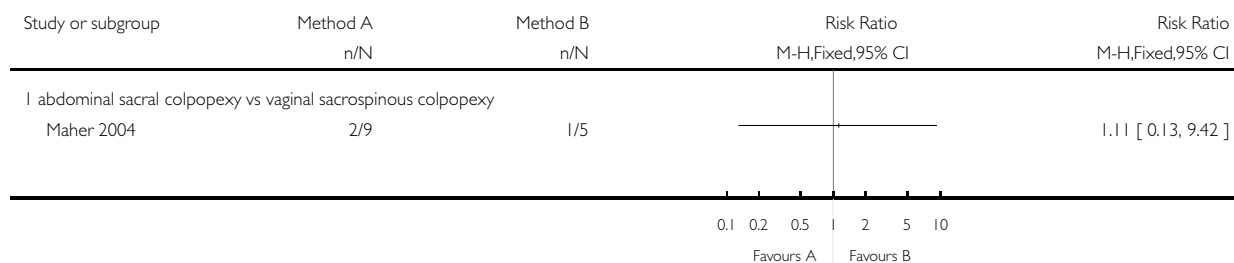
Comparison: 1 Surgery for upper vaginal (vault or uterine) prolapse

Outcome: 18 Number of women with de novo (new) urgency, detrusor overactivity or overactive bladder



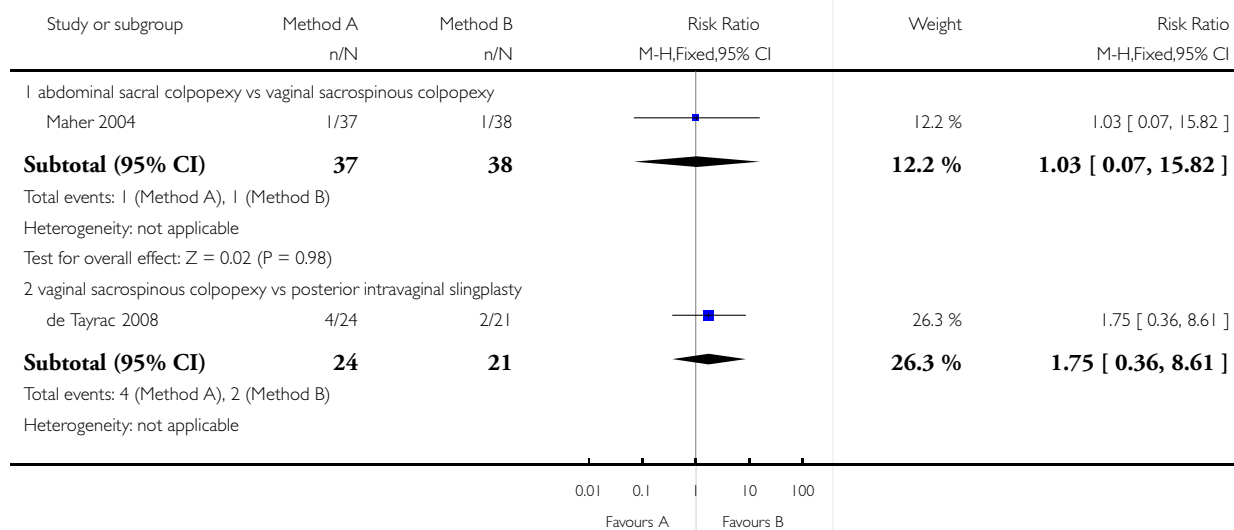
Analysis 1.19. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 19 Number of women with persistent voiding dysfunction.

Review: Surgical management of pelvic organ prolapse in women
 Comparison: 1 Surgery for upper vaginal (vault or uterine) prolapse
 Outcome: 19 Number of women with persistent voiding dysfunction

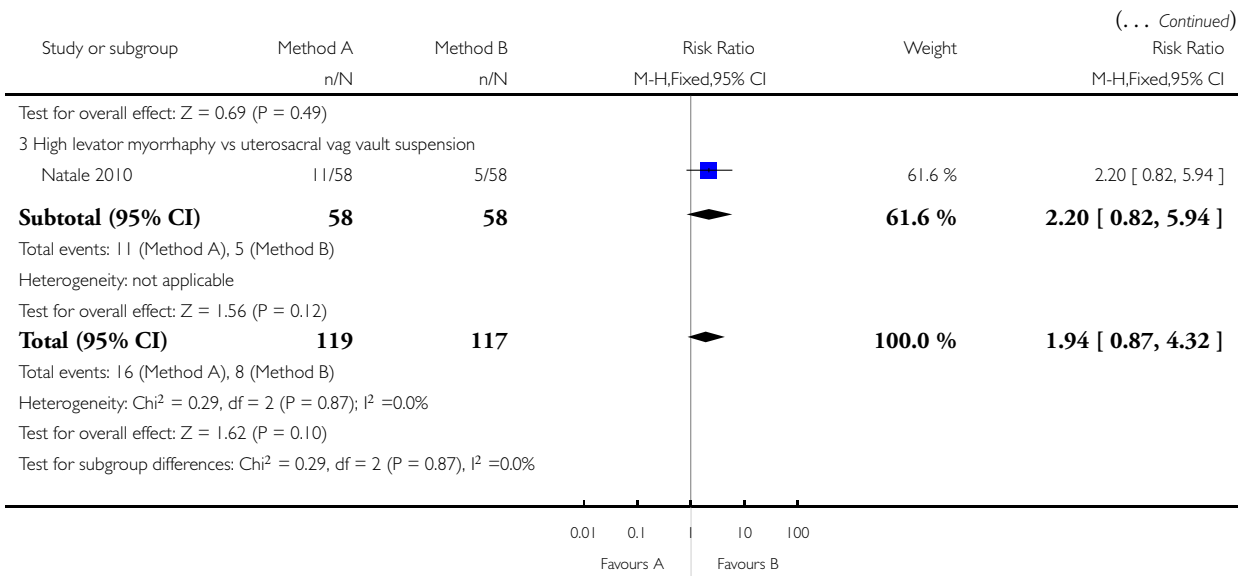


Analysis 1.20. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 20 Number of women with new voiding dysfunction.

Review: Surgical management of pelvic organ prolapse in women
 Comparison: 1 Surgery for upper vaginal (vault or uterine) prolapse
 Outcome: 20 Number of women with new voiding dysfunction



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Analysis 1.21. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 21 Number of women with de novo nocturia.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 1 Surgery for upper vaginal (vault or uterine) prolapse

Outcome: 21 Number of women with de novo nocturia

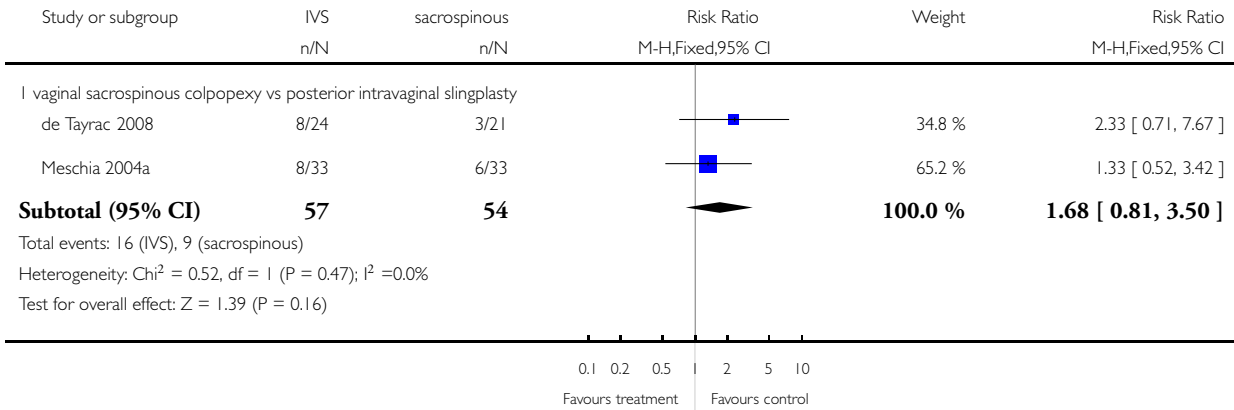


Analysis 1.22. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 22 Postoperative voiding dysfunction symptoms.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 1 Surgery for upper vaginal (vault or uterine) prolapse

Outcome: 22 Postoperative voiding dysfunction symptoms

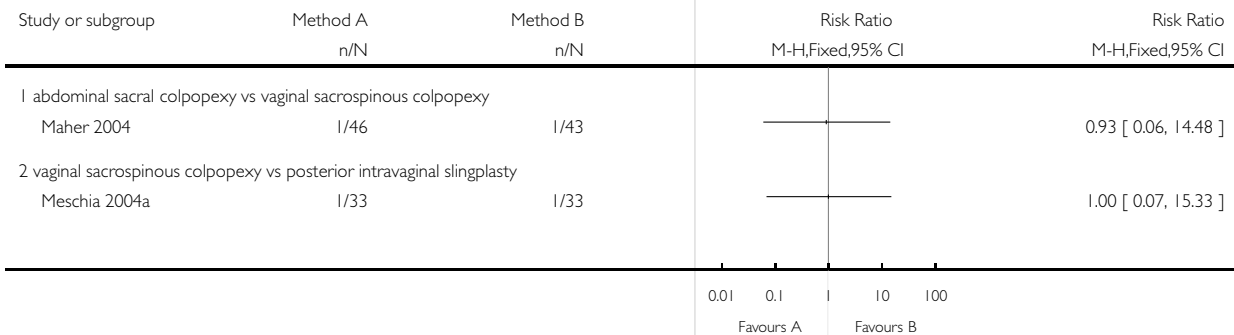


Analysis 1.23. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 23 Number of women with faecal incontinence.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 1 Surgery for upper vaginal (vault or uterine) prolapse

Outcome: 23 Number of women with faecal incontinence

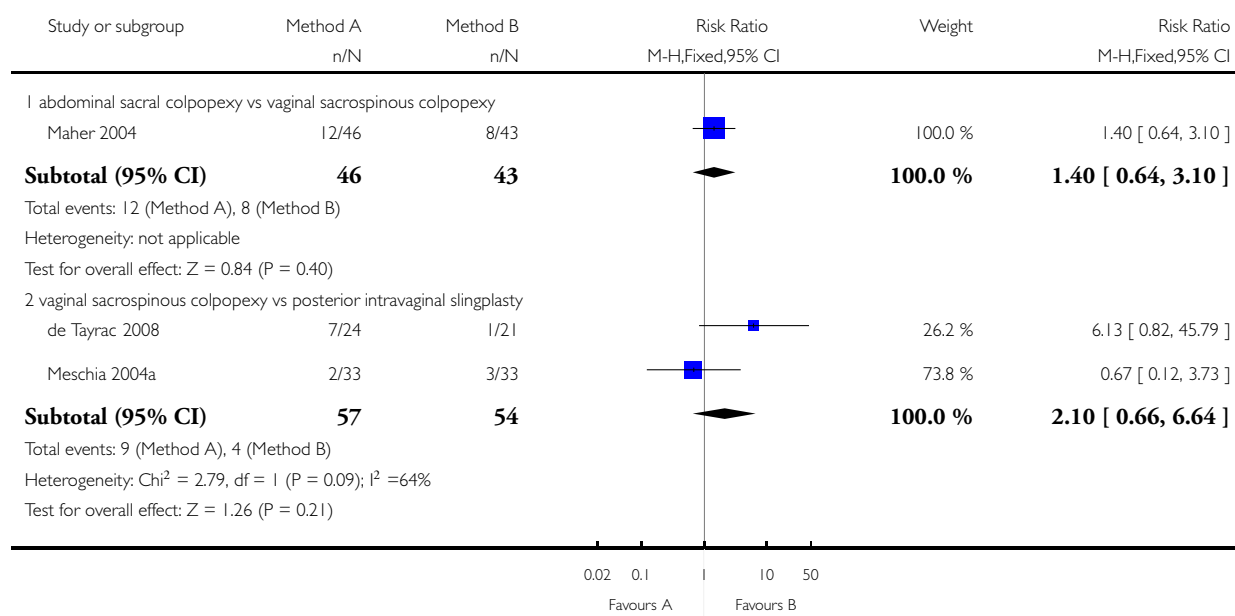


Analysis 1.24. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 24 Number of women with constipation.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 1 Surgery for upper vaginal (vault or uterine) prolapse

Outcome: 24 Number of women with constipation

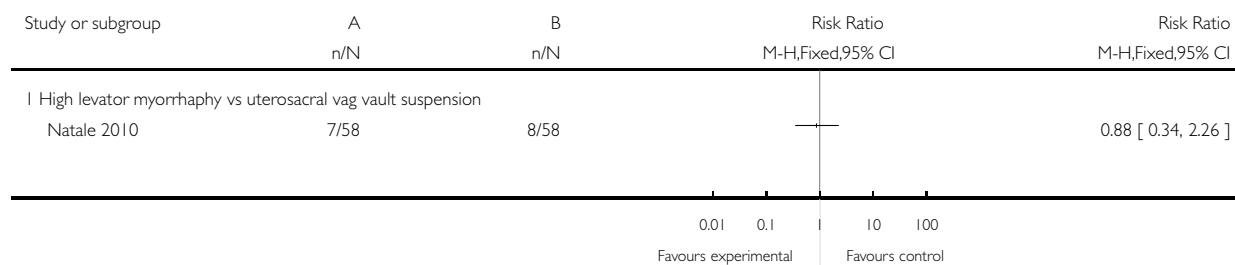


Analysis 1.25. Comparison I Surgery for upper vaginal (vault or uterine) prolapse, Outcome 25 Number of women with de novo constipation.

Review: Surgical management of pelvic organ prolapse in women

Comparison: I Surgery for upper vaginal (vault or uterine) prolapse

Outcome: 25 Number of women with de novo constipation

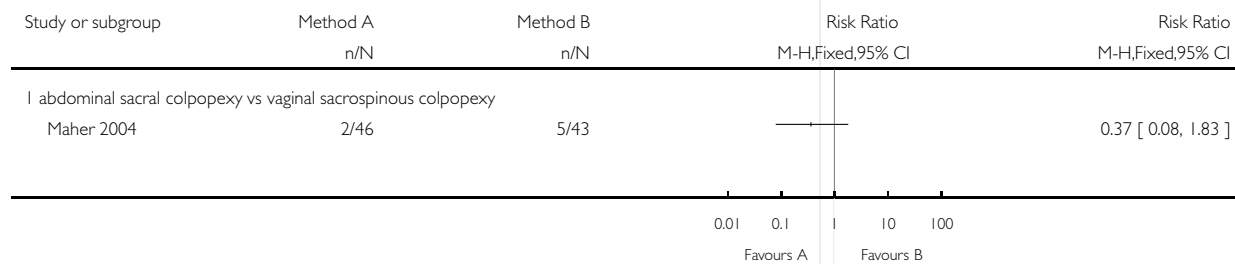


Analysis 1.26. Comparison I Surgery for upper vaginal (vault or uterine) prolapse, Outcome 26 Number of women with obstructed defecation.

Review: Surgical management of pelvic organ prolapse in women

Comparison: I Surgery for upper vaginal (vault or uterine) prolapse

Outcome: 26 Number of women with obstructed defecation

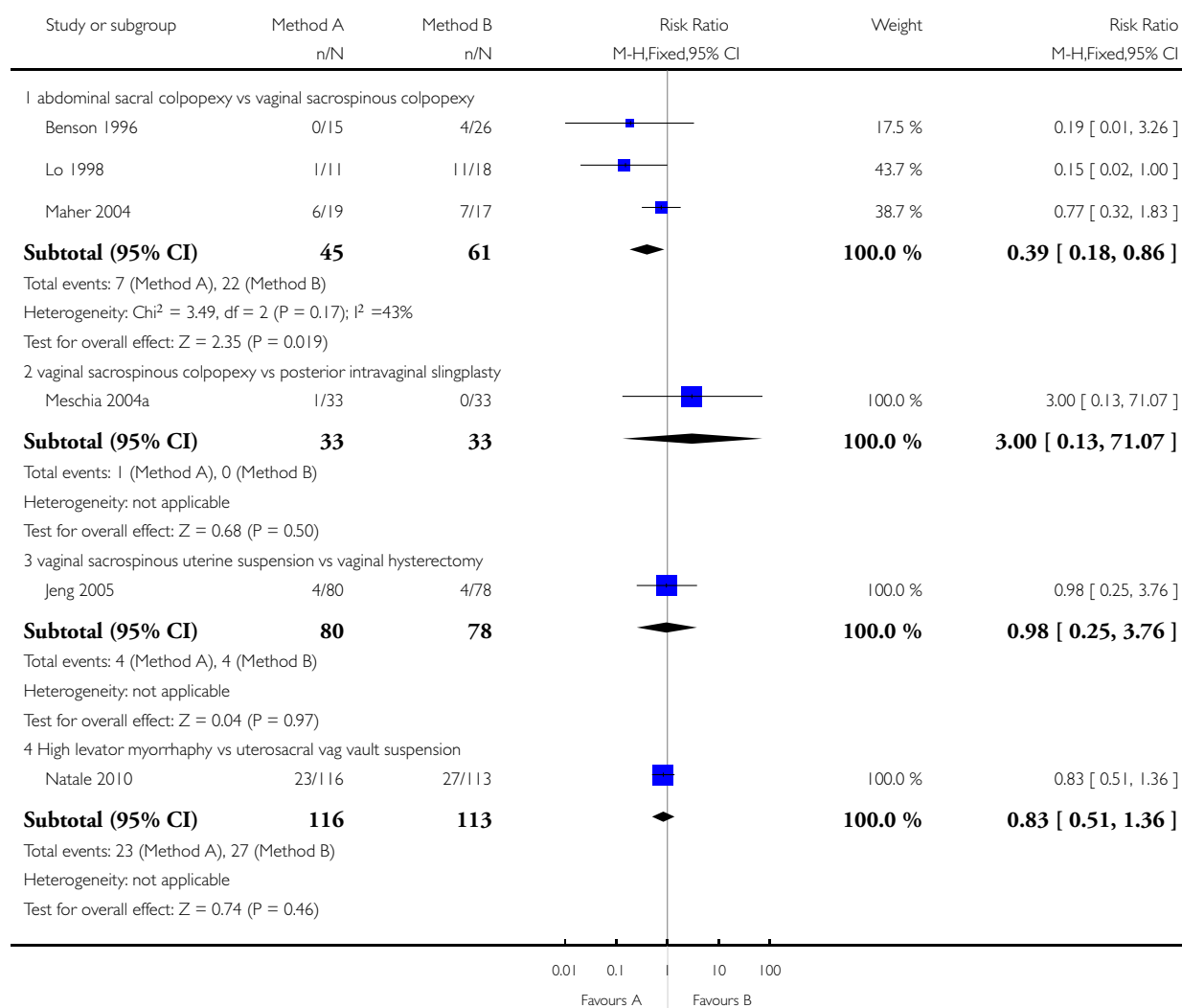


Analysis 1.27. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 27 Postoperative dyspareunia.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 1 Surgery for upper vaginal (vault or uterine) prolapse

Outcome: 27 Postoperative dyspareunia

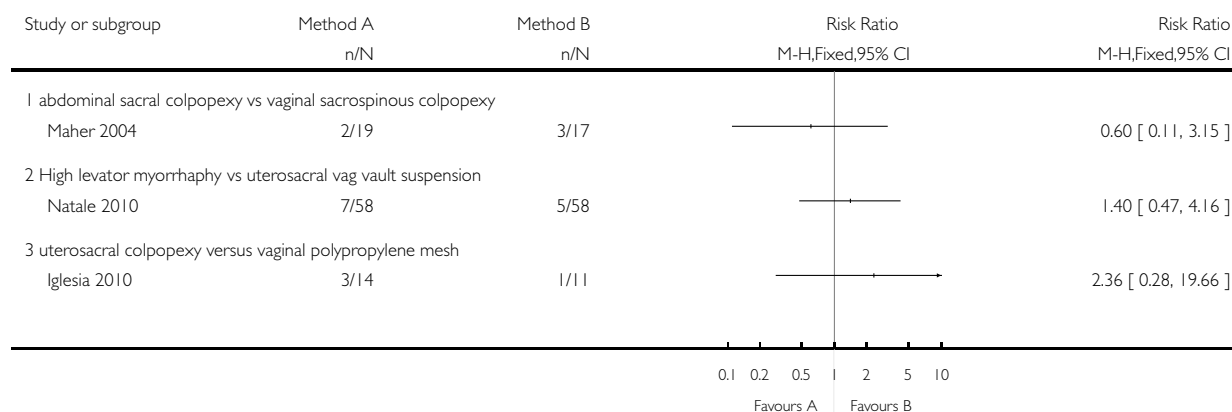


Analysis 1.28. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 28 Women with de novo (new) postoperative dyspareunia.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 1 Surgery for upper vaginal (vault or uterine) prolapse

Outcome: 28 Women with de novo (new) postoperative dyspareunia

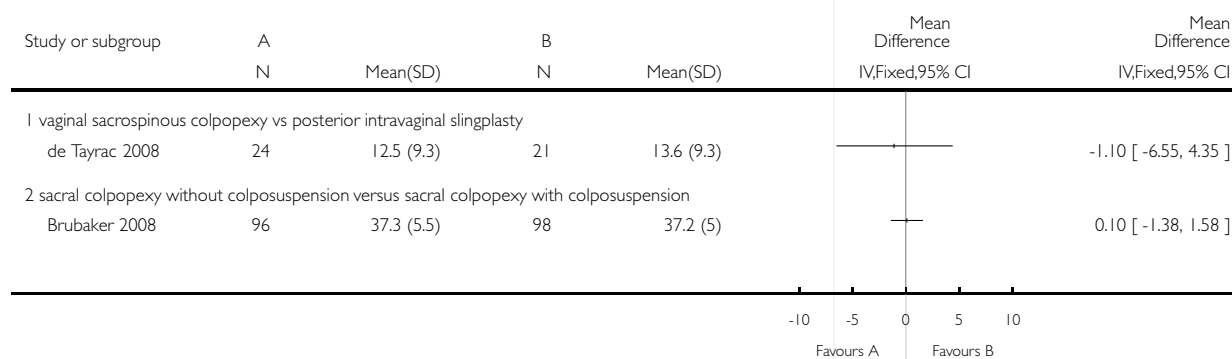


Analysis 1.29. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 29 Postoperative sexual function score (PISQ-12).

Review: Surgical management of pelvic organ prolapse in women

Comparison: 1 Surgery for upper vaginal (vault or uterine) prolapse

Outcome: 29 Postoperative sexual function score (PISQ-12)

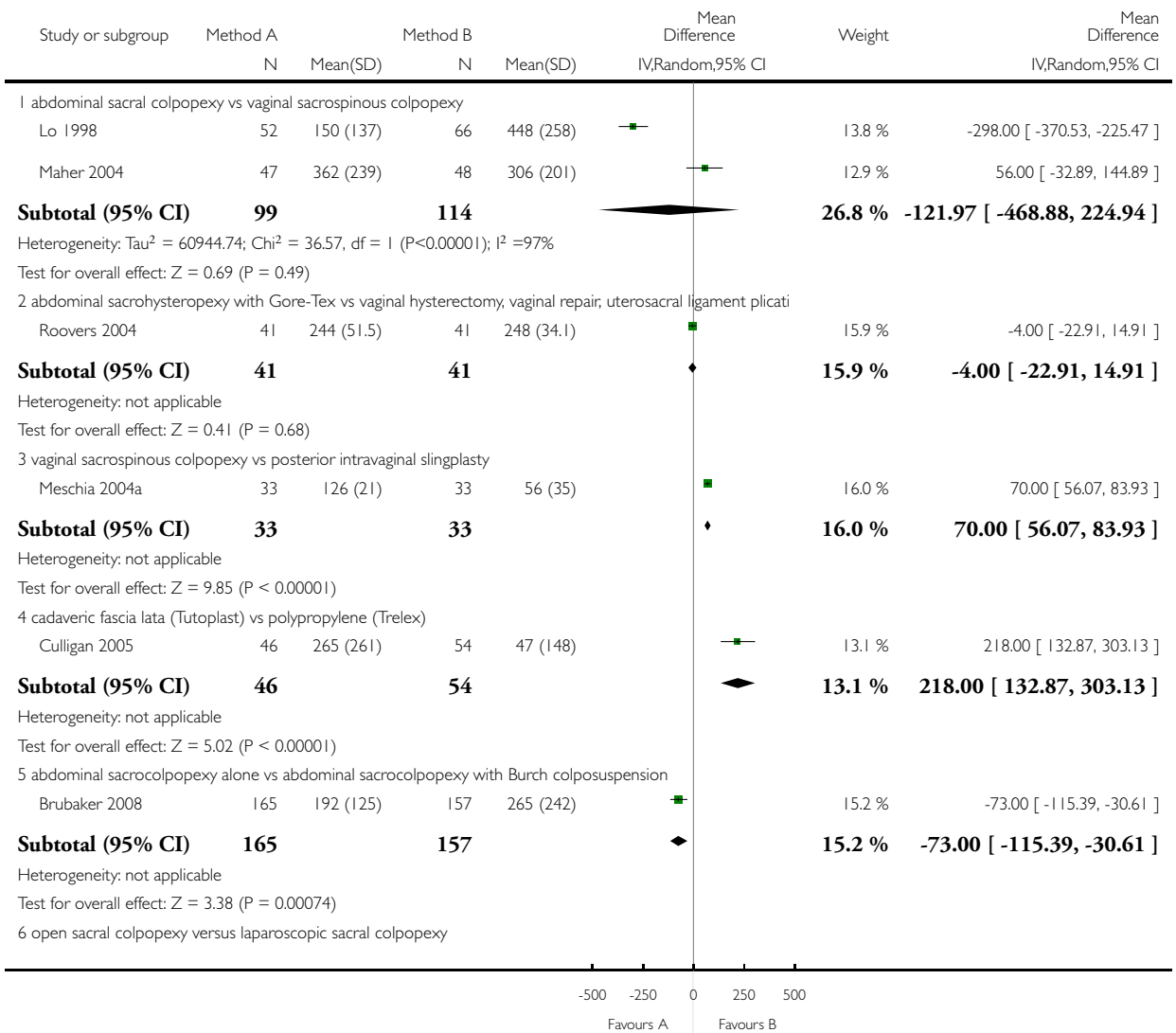


Analysis 1.30. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 30 Blood loss (ml).

Review: Surgical management of pelvic organ prolapse in women

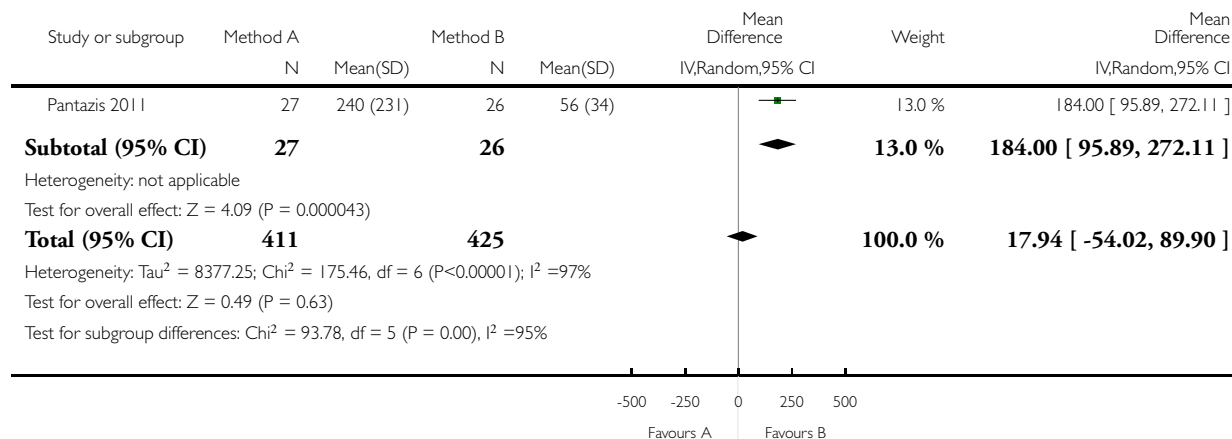
Comparison: 1 Surgery for upper vaginal (vault or uterine) prolapse

Outcome: 30 Blood loss (ml)



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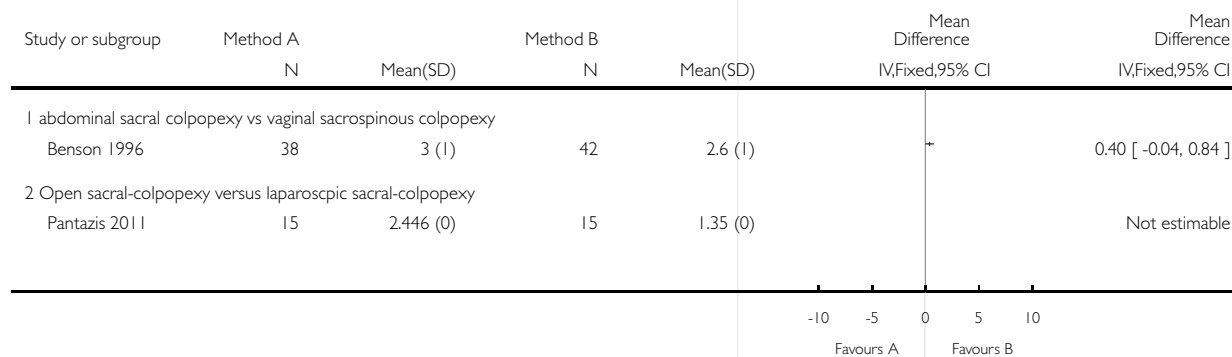


Analysis 1.31. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 31 Postoperative decrease in Hb (gm/dl).

Review: Surgical management of pelvic organ prolapse in women

Comparison: 1 Surgery for upper vaginal (vault or uterine) prolapse

Outcome: 31 Postoperative decrease in Hb (gm/dl)

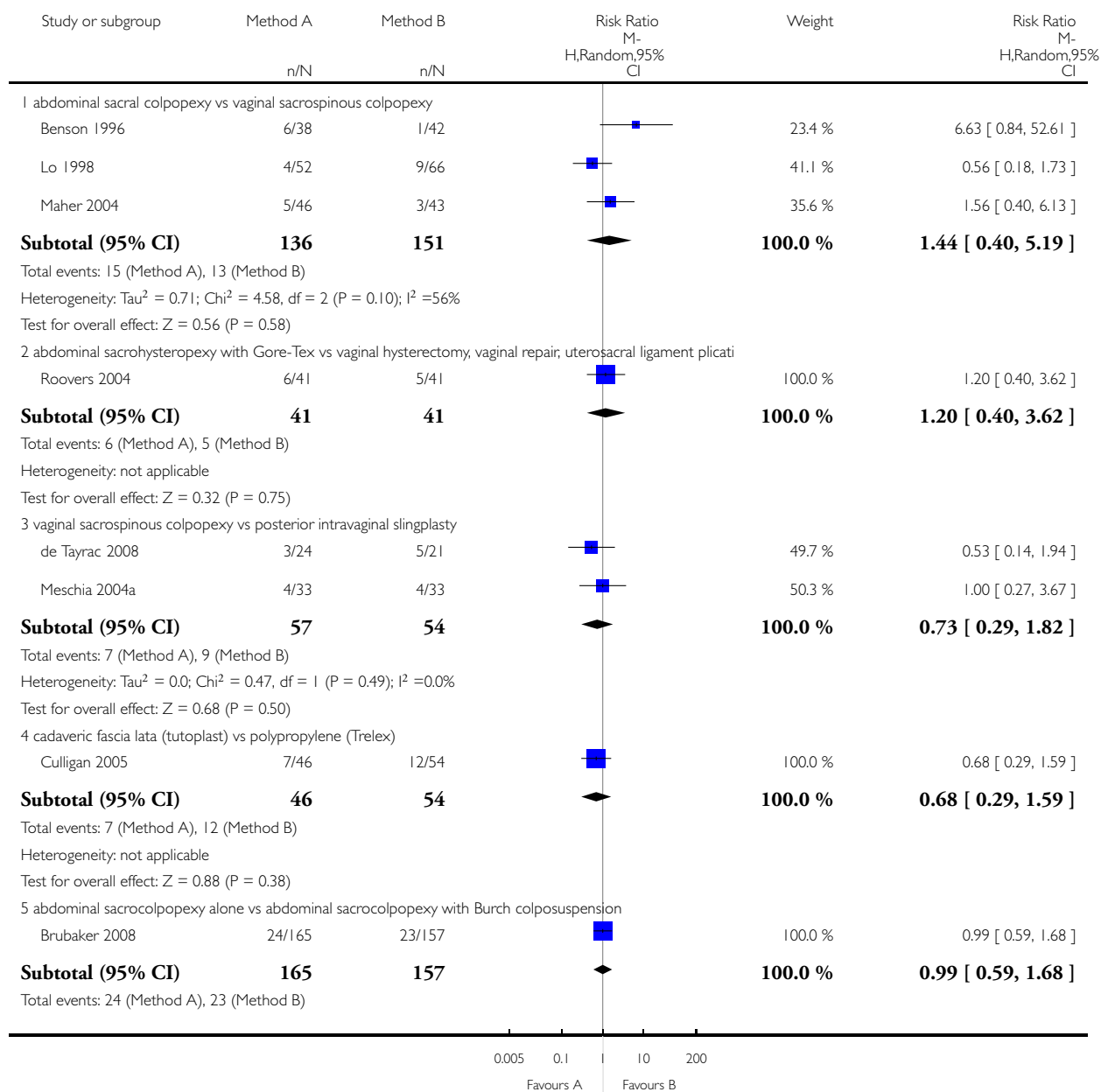


Analysis 1.32. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 32 Adverse effects.

Review: Surgical management of pelvic organ prolapse in women

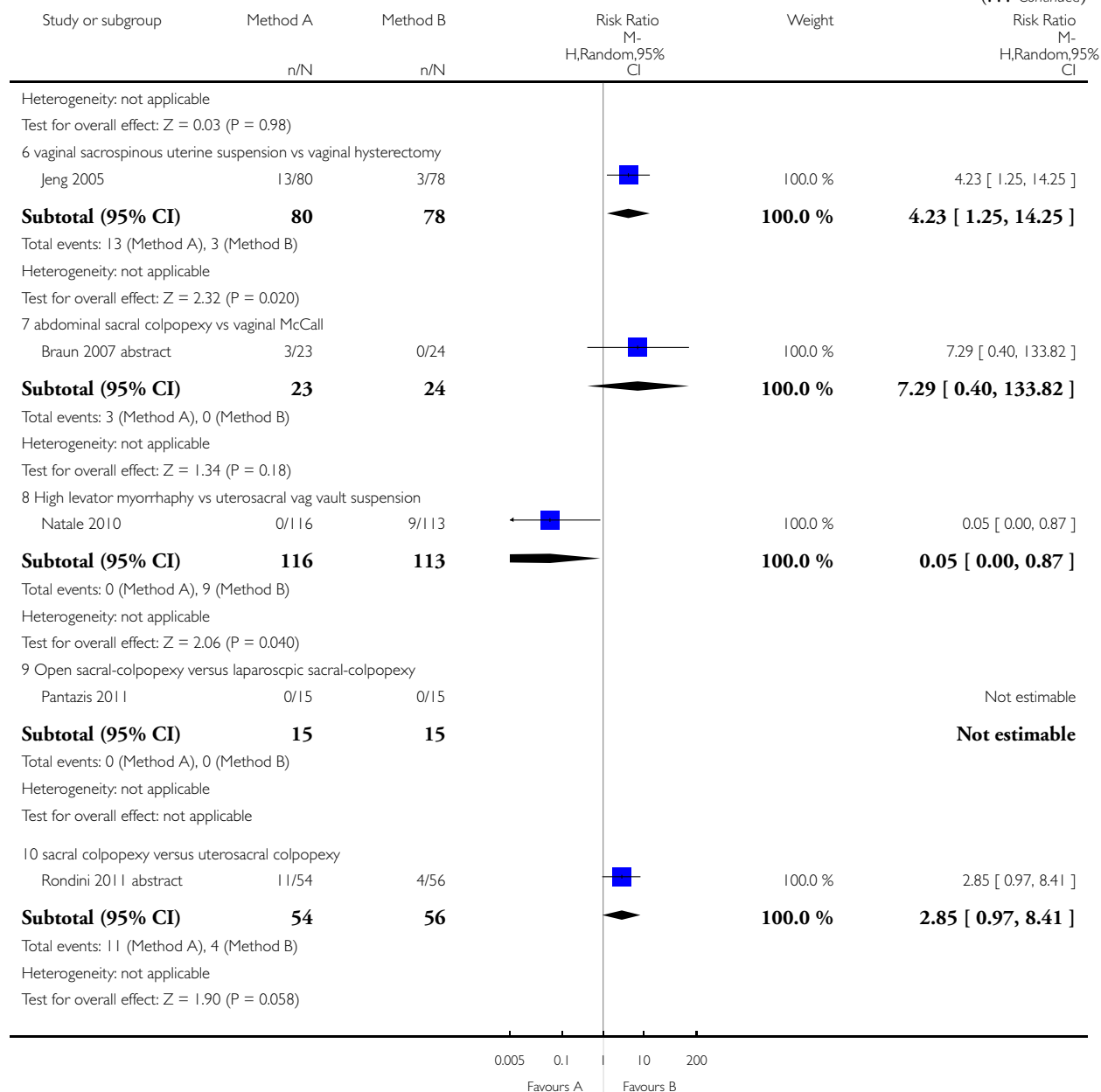
Comparison: 1 Surgery for upper vaginal (vault or uterine) prolapse

Outcome: 32 Adverse effects



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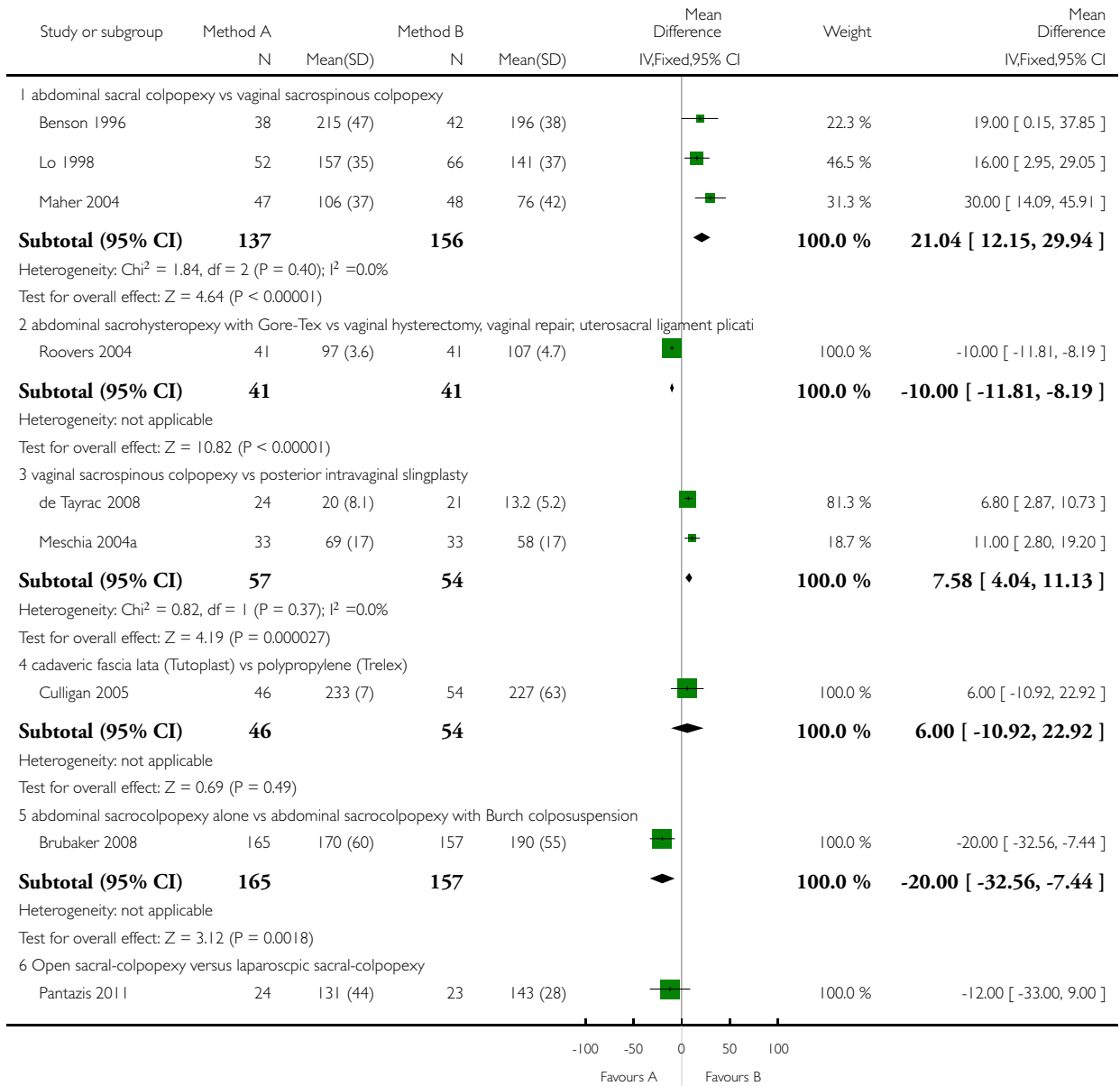


Analysis 1.33. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 33 Operating time (minutes).

Review: Surgical management of pelvic organ prolapse in women

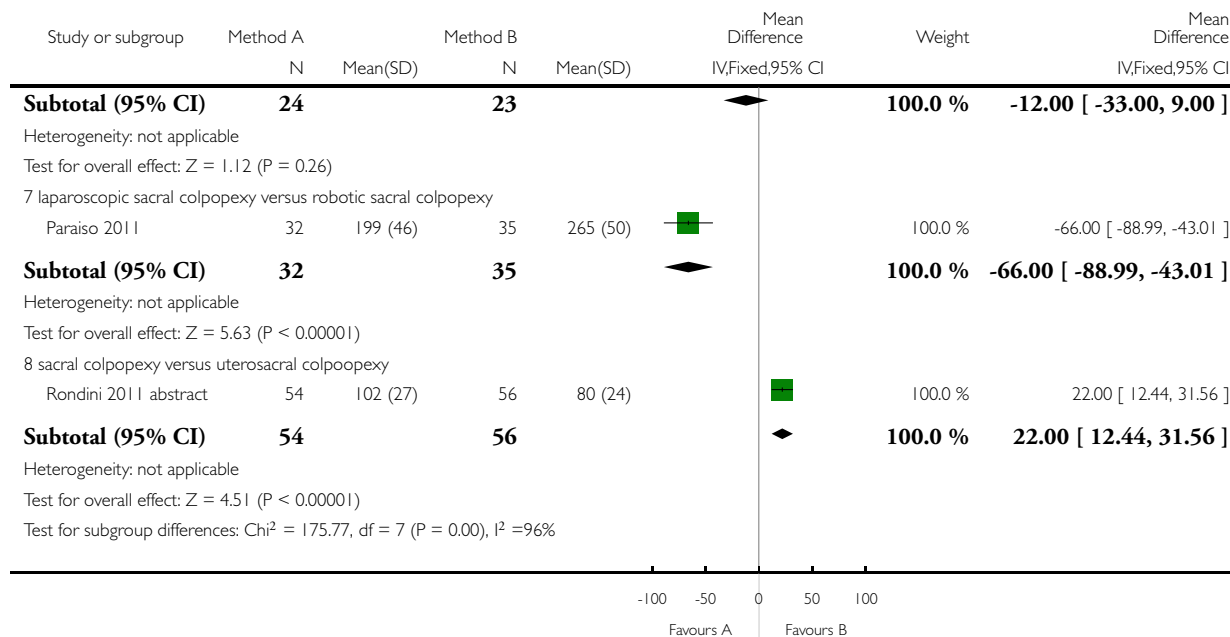
Comparison: 1 Surgery for upper vaginal (vault or uterine) prolapse

Outcome: 33 Operating time (minutes)



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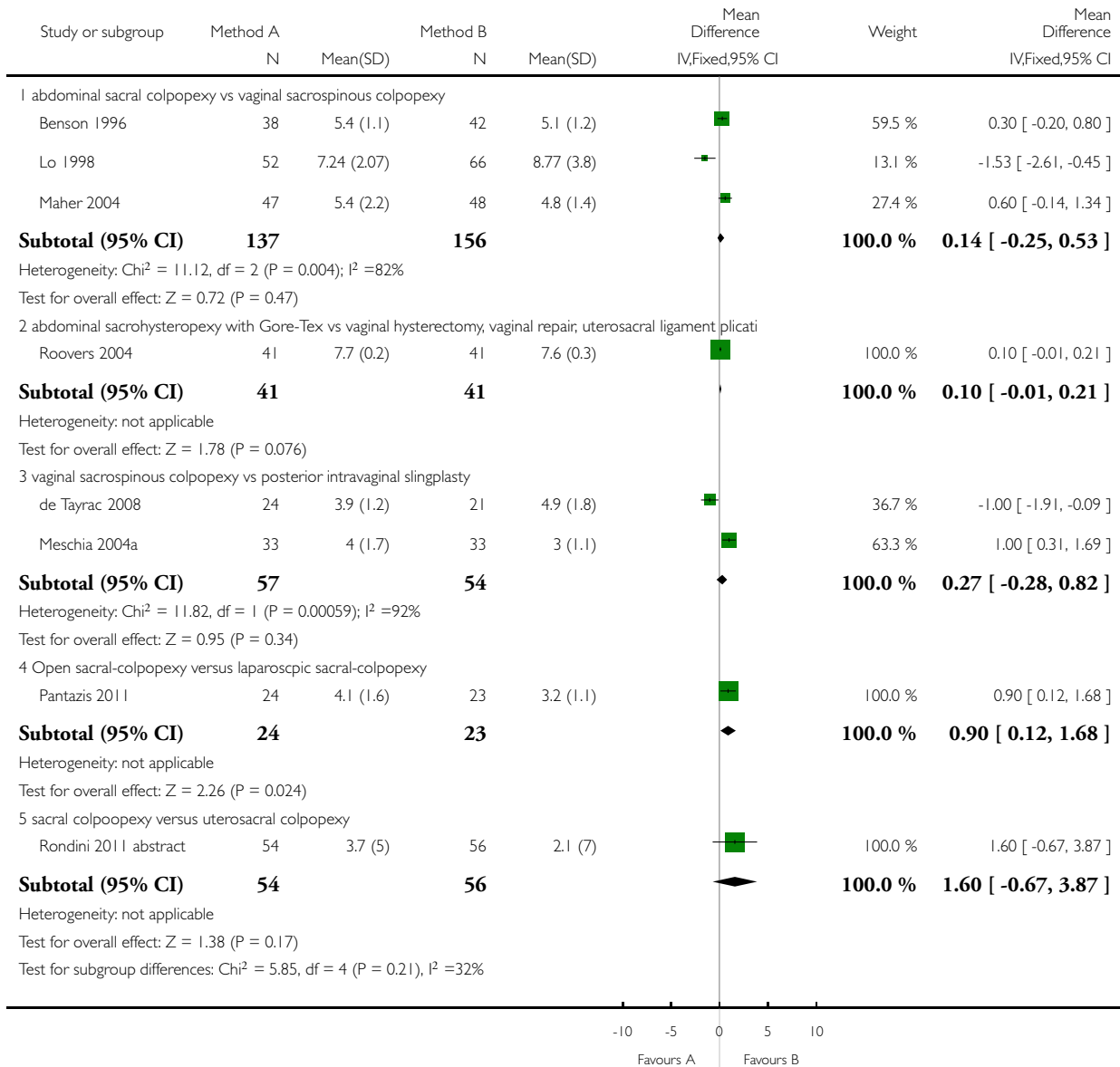


Analysis I.34. Comparison I Surgery for upper vaginal (vault or uterine) prolapse, Outcome 34 Length of stay in hospital (days).

Review: Surgical management of pelvic organ prolapse in women

Comparison: I Surgery for upper vaginal (vault or uterine) prolapse

Outcome: 34 Length of stay in hospital (days)

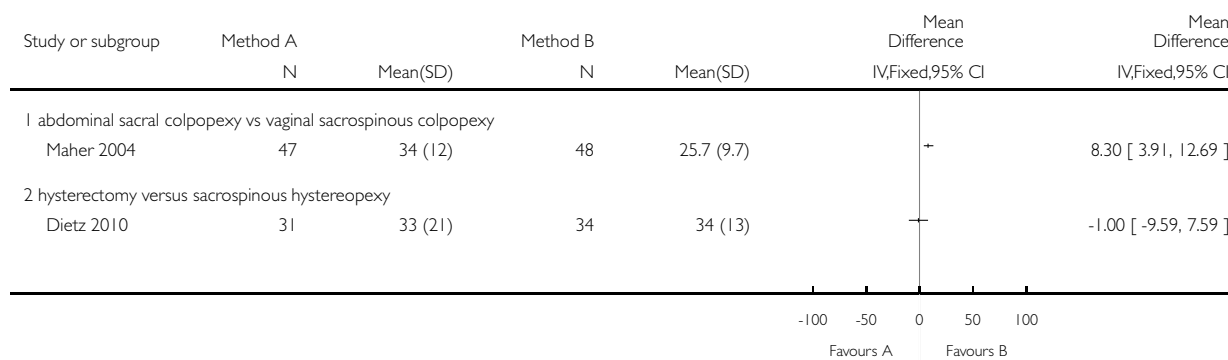


Analysis 1.35. Comparison I Surgery for upper vaginal (vault or uterine) prolapse, Outcome 35 Time to return to normal activity ADL (days).

Review: Surgical management of pelvic organ prolapse in women

Comparison: I Surgery for upper vaginal (vault or uterine) prolapse

Outcome: 35 Time to return to normal activity ADL (days)

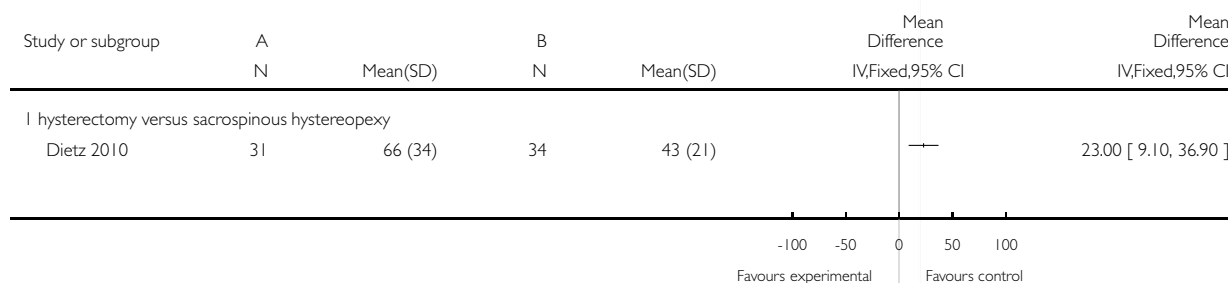


Analysis 1.36. Comparison I Surgery for upper vaginal (vault or uterine) prolapse, Outcome 36 Days to return to work.

Review: Surgical management of pelvic organ prolapse in women

Comparison: I Surgery for upper vaginal (vault or uterine) prolapse

Outcome: 36 Days to return to work

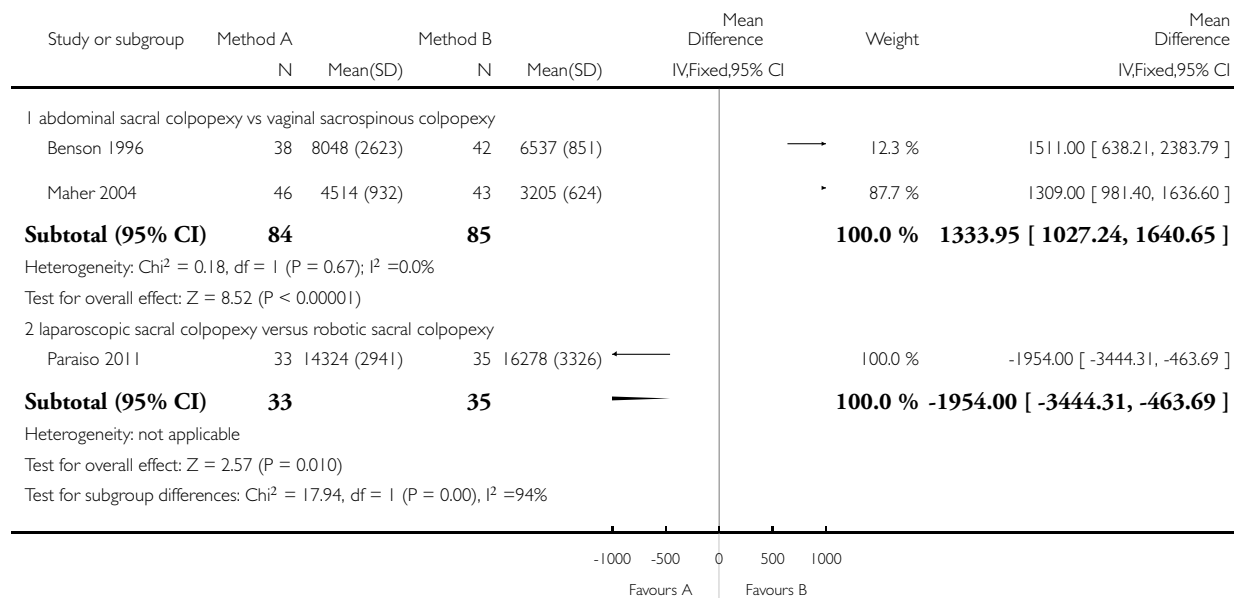


Analysis 1.37. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 37 Cost (US dollars).

Review: Surgical management of pelvic organ prolapse in women

Comparison: 1 Surgery for upper vaginal (vault or uterine) prolapse

Outcome: 37 Cost (US dollars)



Analysis 1.38. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 38 Time to recurrence of prolapse (months).

Review: Surgical management of pelvic organ prolapse in women

Comparison: 1 Surgery for upper vaginal (vault or uterine) prolapse

Outcome: 38 Time to recurrence of prolapse (months)

Study or subgroup	Method A		Method B		Mean Difference IV,Fixed,95% CI	Mean Difference IV,Fixed,95% CI
	N	Mean(SD)	N	Mean(SD)		
1 abdominal sacral colpopexy vs vaginal sacrospinous colpopexy						
Benson 1996	38	-22.1 (16.2)	42	-11.2 (11.5)	—	-10.90 [-17.12, -4.68]

Analysis 1.39. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 39 Women having further prolapse surgery.

Review: Surgical management of pelvic organ prolapse in women

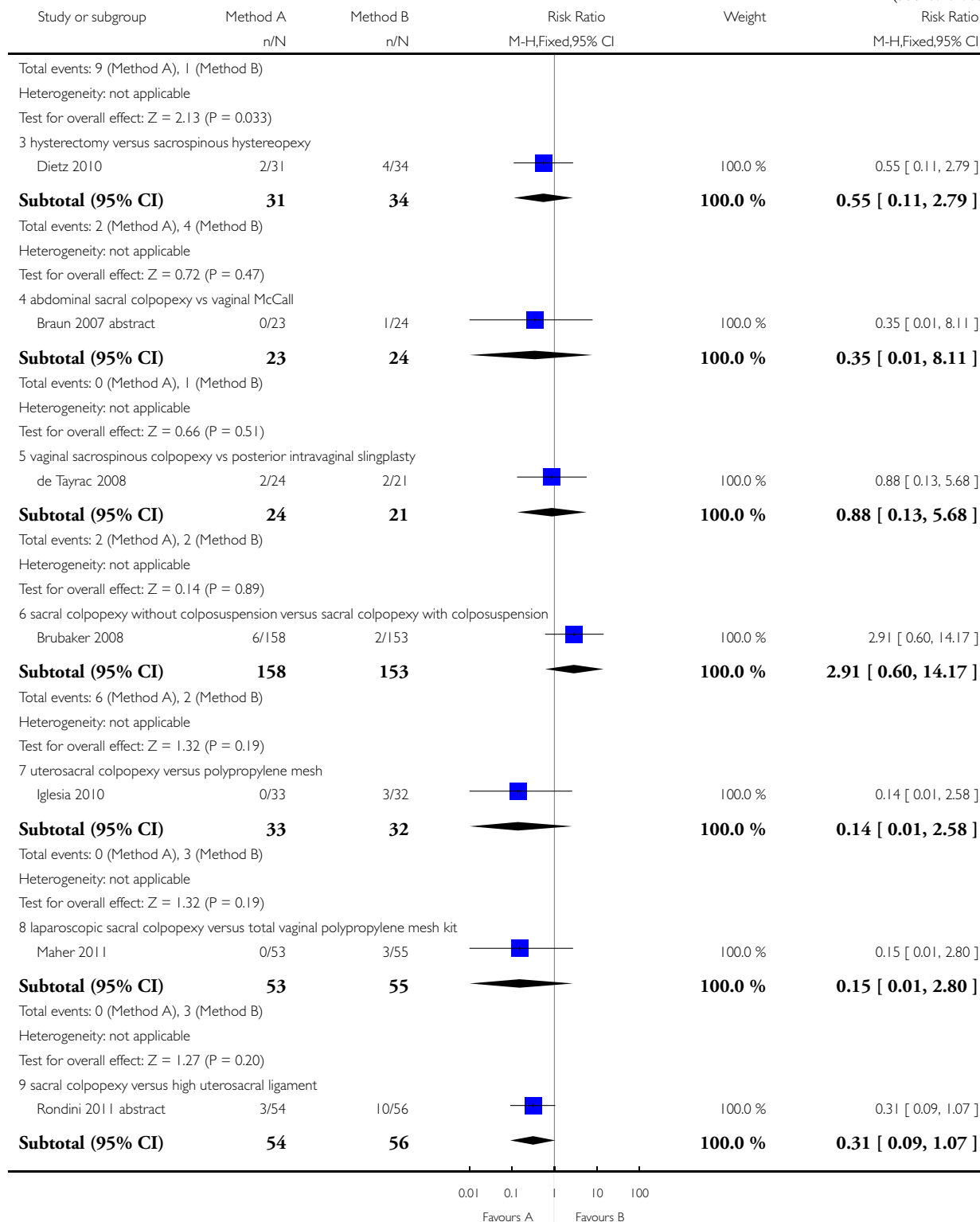
Comparison: 1 Surgery for upper vaginal (vault or uterine) prolapse

Outcome: 39 Women having further prolapse surgery

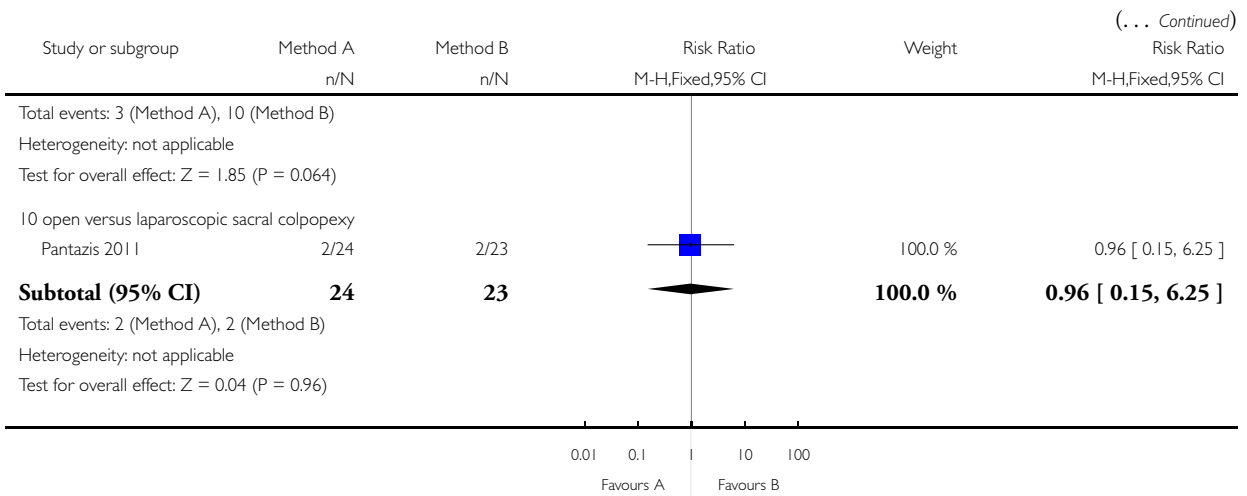
Study or subgroup	Method A	Method B	Risk Ratio M-H,Fixed,95% CI	Weight	Risk Ratio M-H,Fixed,95% CI
	n/N	n/N			
1 abdominal sacral colpopexy vs vaginal sacrospinous colpopexy					
Benson 1996	5/38	11/42		77.1 %	0.50 [0.19, 1.31]
Maher 2004	1/46	3/43		22.9 %	0.31 [0.03, 2.88]
Subtotal (95% CI)	84	85		100.0 %	0.46 [0.19, 1.11]
Total events: 6 (Method A), 14 (Method B)					
Heterogeneity: Chi ² = 0.15, df = 1 (P = 0.70); I ² = 0.0%					
Test for overall effect: Z = 1.73 (P = 0.083)					
2 abdominal sacrohysteropexy with Gore-Tex vs vaginal hysterectomy, vaginal repair; uterosacral ligament plicati					
Roovers 2004	9/41	1/41		100.0 %	9.00 [1.19, 67.85]
Subtotal (95% CI)	41	41		100.0 %	9.00 [1.19, 67.85]

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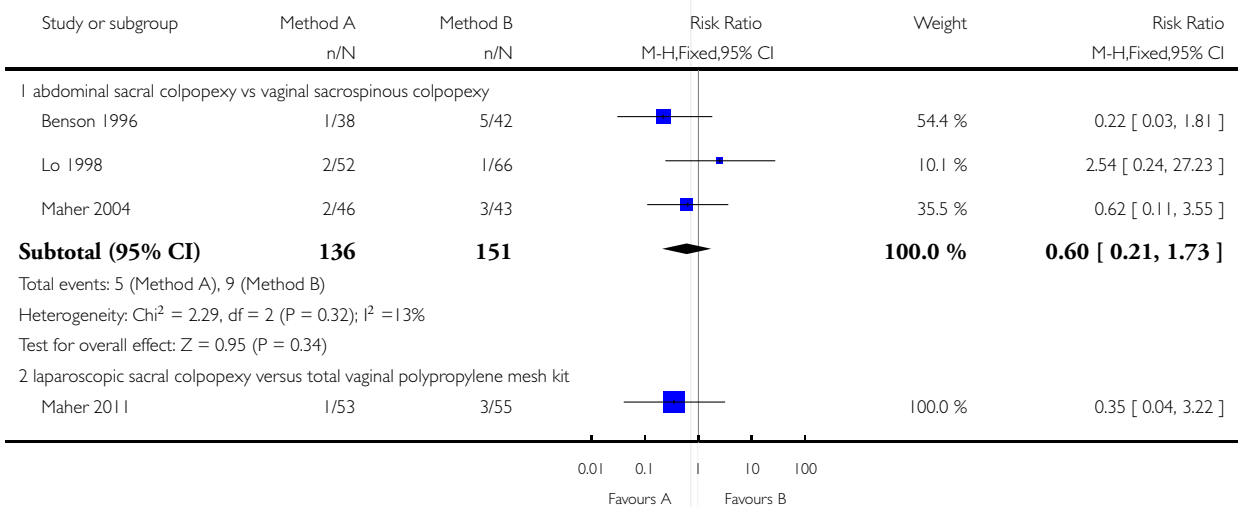


Analysis 1.40. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 40 Women having further continence surgery.

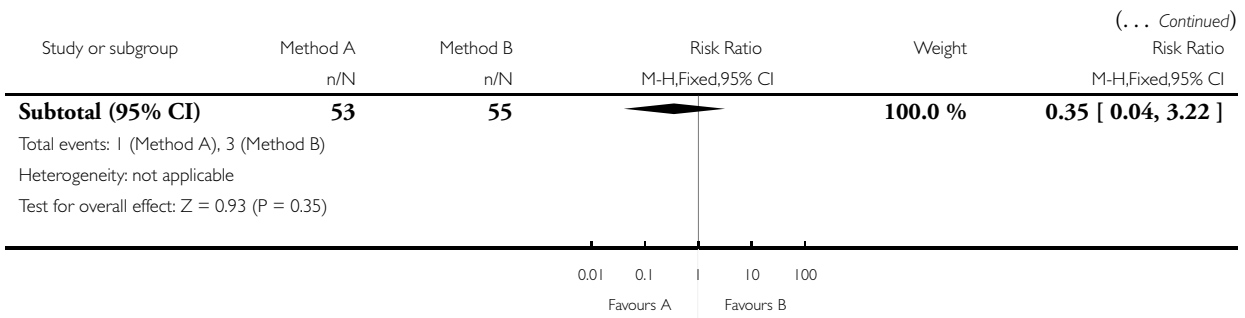
Review: Surgical management of pelvic organ prolapse in women

Comparison: 1 Surgery for upper vaginal (vault or uterine) prolapse

Outcome: 40 Women having further continence surgery



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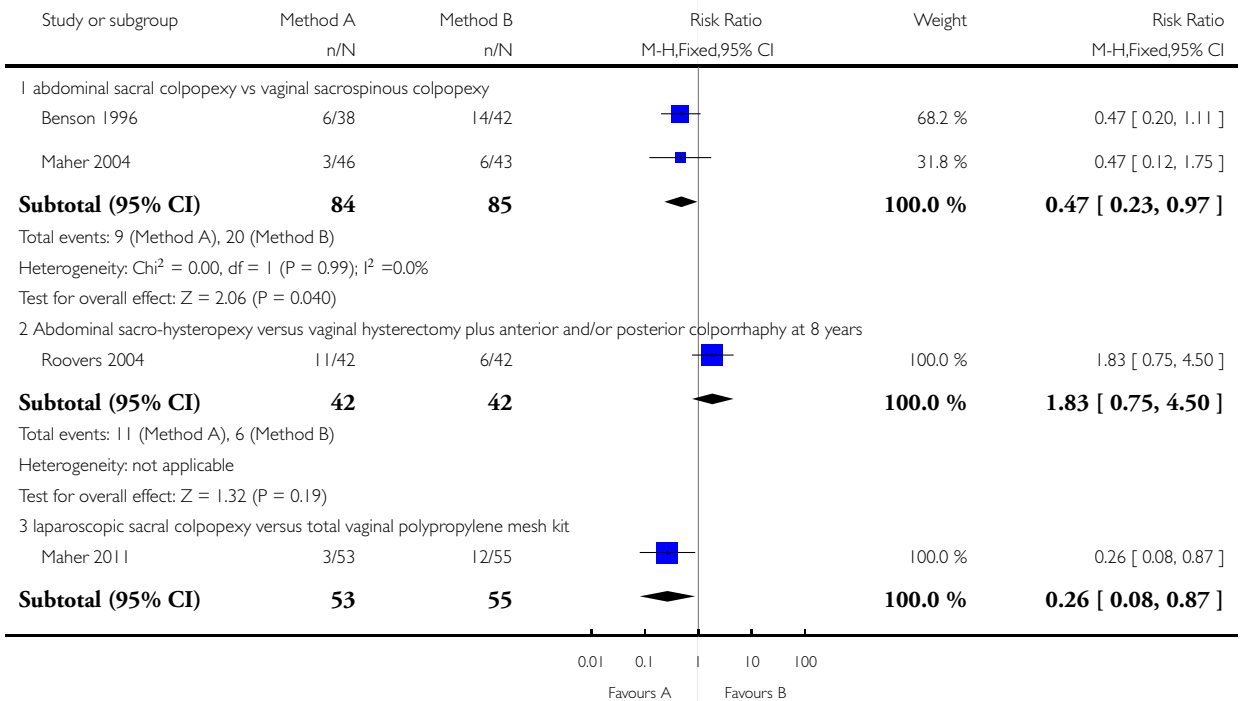


Analysis 1.41. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 41 Women having further related to primary surgery (prolapse, continence or mesh complications).

Review: Surgical management of pelvic organ prolapse in women

Comparison: 1 Surgery for upper vaginal (vault or uterine) prolapse

Outcome: 41 Women having further related to primary surgery (prolapse, continence or mesh complications)



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Study or subgroup	Method A n/N	Method B n/N	Risk Ratio M-H,Fixed,95% CI	Weight	Risk Ratio M-H,Fixed,95% CI
Total events: 3 (Method A), 12 (Method B)					
Heterogeneity: not applicable					
Test for overall effect: Z = 2.19 (P = 0.029)					
			0.01 0.1 10 100		
			Favours A	Favours B	

Analysis 1.42. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 42 mesh exposure.

Review: Surgical management of pelvic organ prolapse in women
 Comparison: 1 Surgery for upper vaginal (vault or uterine) prolapse
 Outcome: 42 mesh exposure

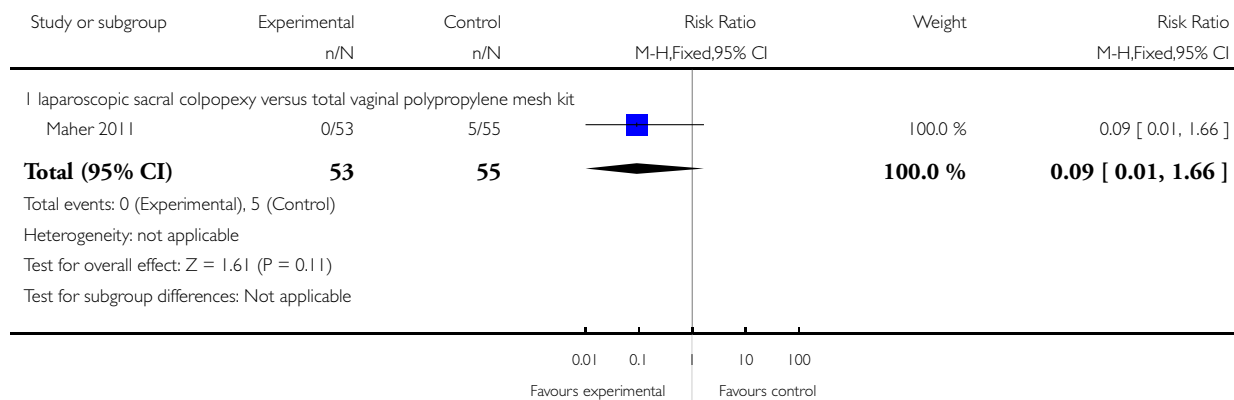
Study or subgroup	Experimental n/N	Control n/N	Risk Ratio M-H,Fixed,95% CI	Weight	Risk Ratio M-H,Fixed,95% CI
1 laparoscopic sacral colpopexy versus total vaginal polypropylene mesh kit					
Maher 2011	1/53	7/55		100.0 %	0.15 [0.02, 1.16]
Subtotal (95% CI)	53	55		100.0 %	0.15 [0.02, 1.16]
Total events: 1 (Experimental), 7 (Control)					
Heterogeneity: not applicable					
Test for overall effect: Z = 1.82 (P = 0.069)					
2 open versus laproscopic sacral colpopexy					
Pantazis 2011	0/24	0/23			Not estimable
Subtotal (95% CI)	24	23			Not estimable
Total events: 0 (Experimental), 0 (Control)					
Heterogeneity: not applicable					
Test for overall effect: not applicable					
Total (95% CI)	77	78		100.0 %	0.15 [0.02, 1.16]
Total events: 1 (Experimental), 7 (Control)					
Heterogeneity: not applicable					
Test for overall effect: Z = 1.82 (P = 0.069)					
Test for subgroup differences: Not applicable					
			0.01 0.1 10 100		
			Favours experimental	Favours control	

Analysis 1.43. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 43 surgery for mesh exposure.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 1 Surgery for upper vaginal (vault or uterine) prolapse

Outcome: 43 surgery for mesh exposure

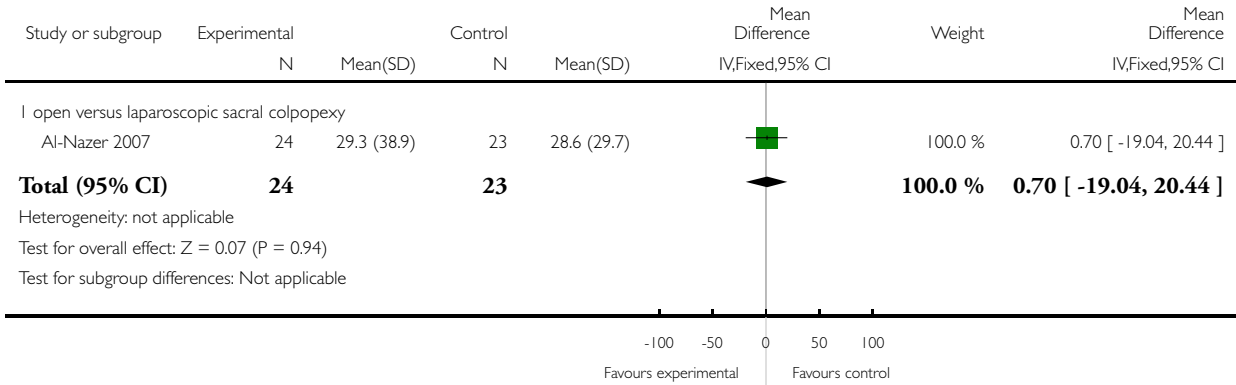


Analysis 1.44. Comparison 1 Surgery for upper vaginal (vault or uterine) prolapse, Outcome 44 Prolapse Quality of Life questionnaire (P-QOL).

Review: Surgical management of pelvic organ prolapse in women

Comparison: 1 Surgery for upper vaginal (vault or uterine) prolapse

Outcome: 44 Prolapse Quality of Life questionnaire (P-QOL)

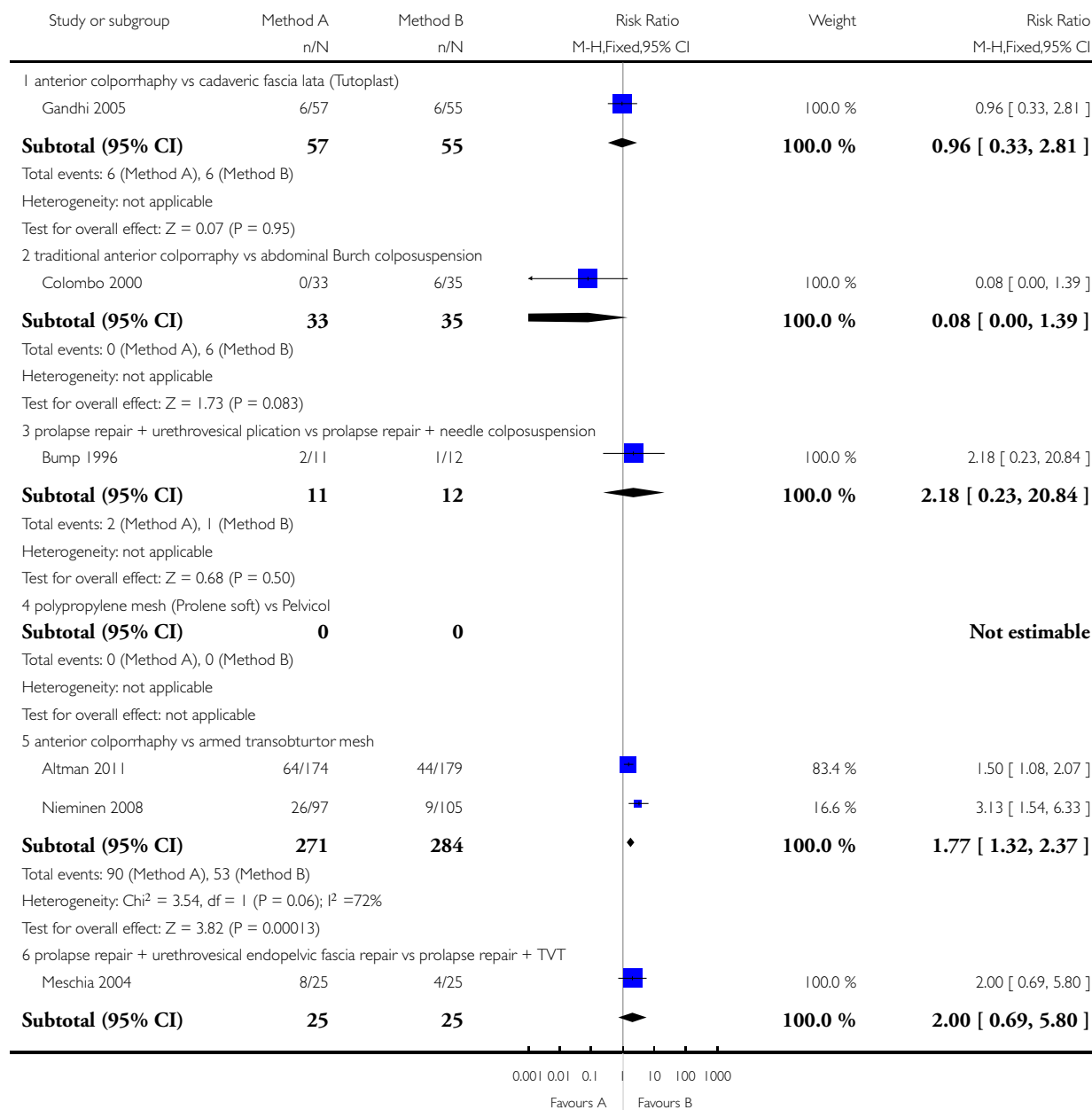


Analysis 2.1. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 1 Number of women with prolapse symptoms (subjective failure).

Review: Surgical management of pelvic organ prolapse in women

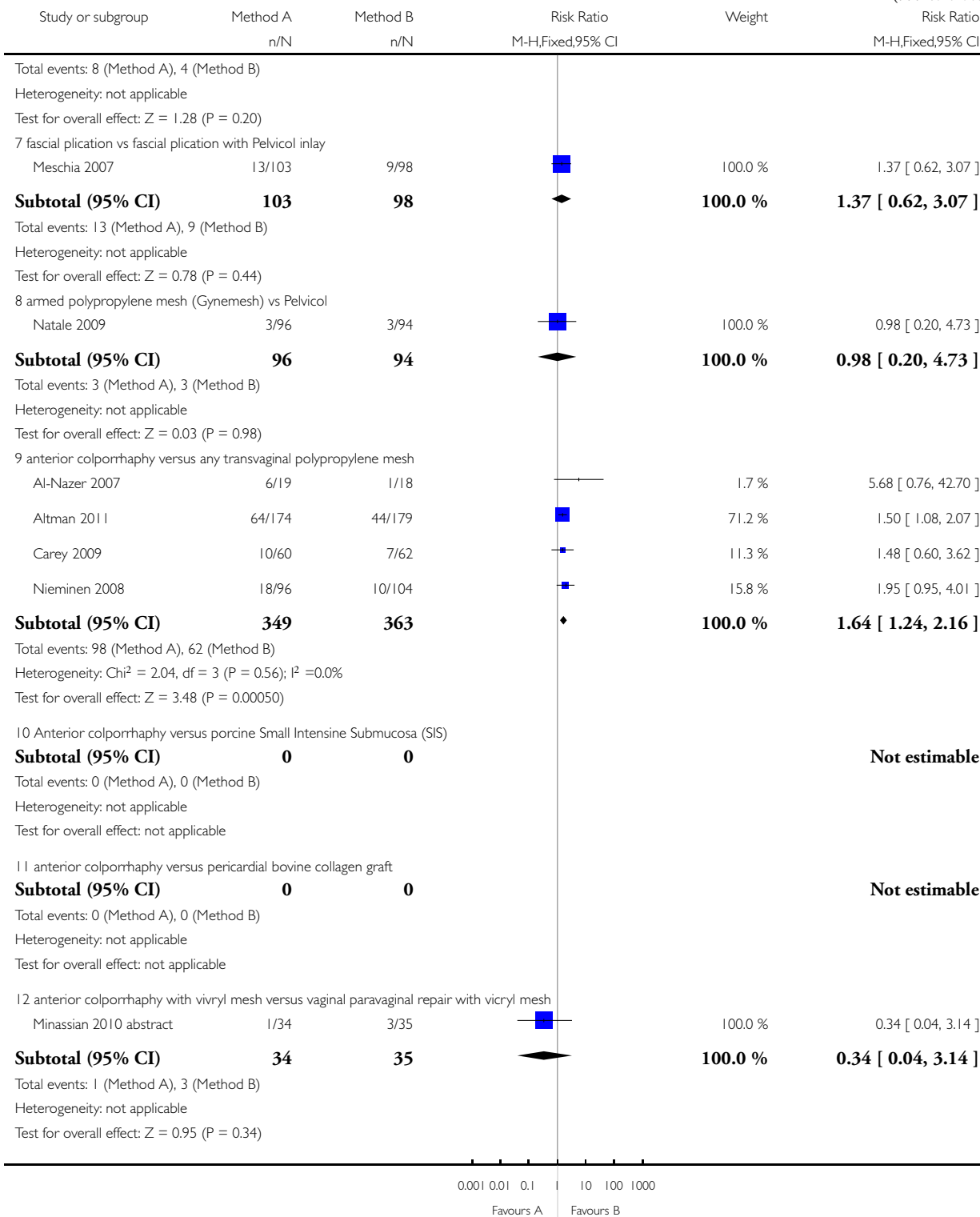
Comparison: 2 One method of anterior prolapse repair versus another surgical method

Outcome: 1 Number of women with prolapse symptoms (subjective failure)



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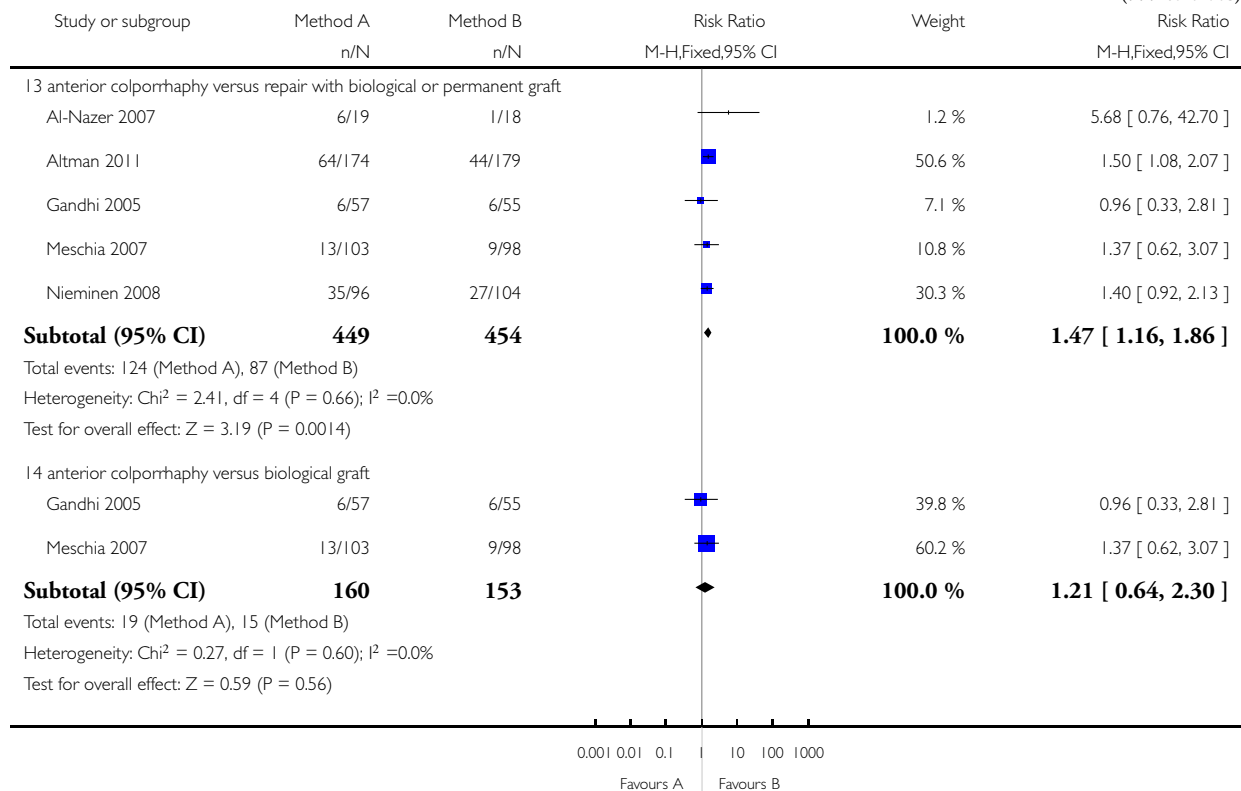
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0.001 0.01 0.1 1 10 100 1000
Favours A Favours B

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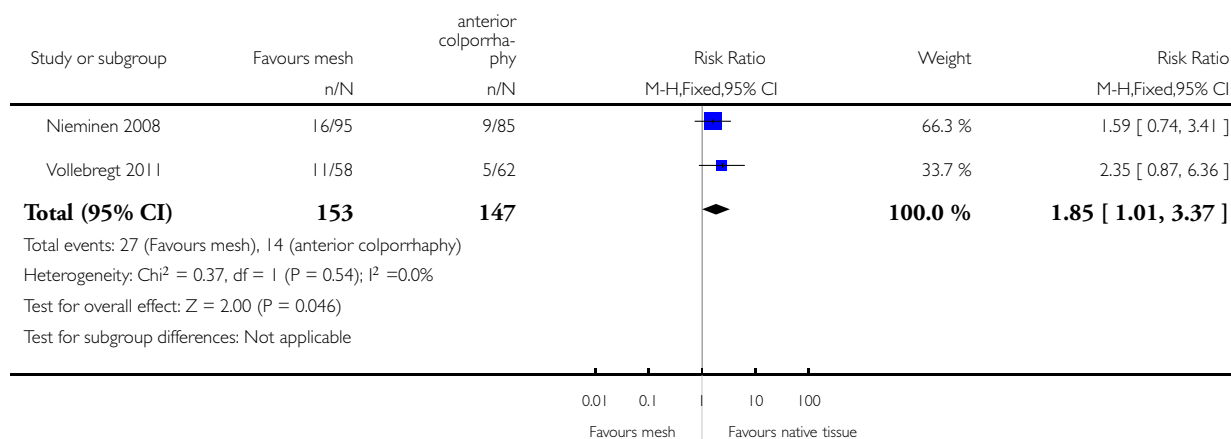


Analysis 2.2. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 2 number of women with posterior or apical prolapse.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 2 One method of anterior prolapse repair versus another surgical method

Outcome: 2 number of women with posterior or apical prolapse

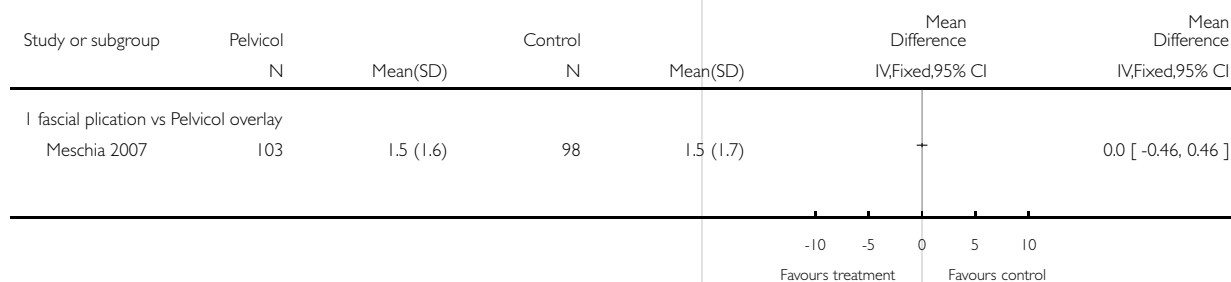


Analysis 2.3. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 3 Severity of prolapse symptoms (measured using visual analogue scale).

Review: Surgical management of pelvic organ prolapse in women

Comparison: 2 One method of anterior prolapse repair versus another surgical method

Outcome: 3 Severity of prolapse symptoms (measured using visual analogue scale)

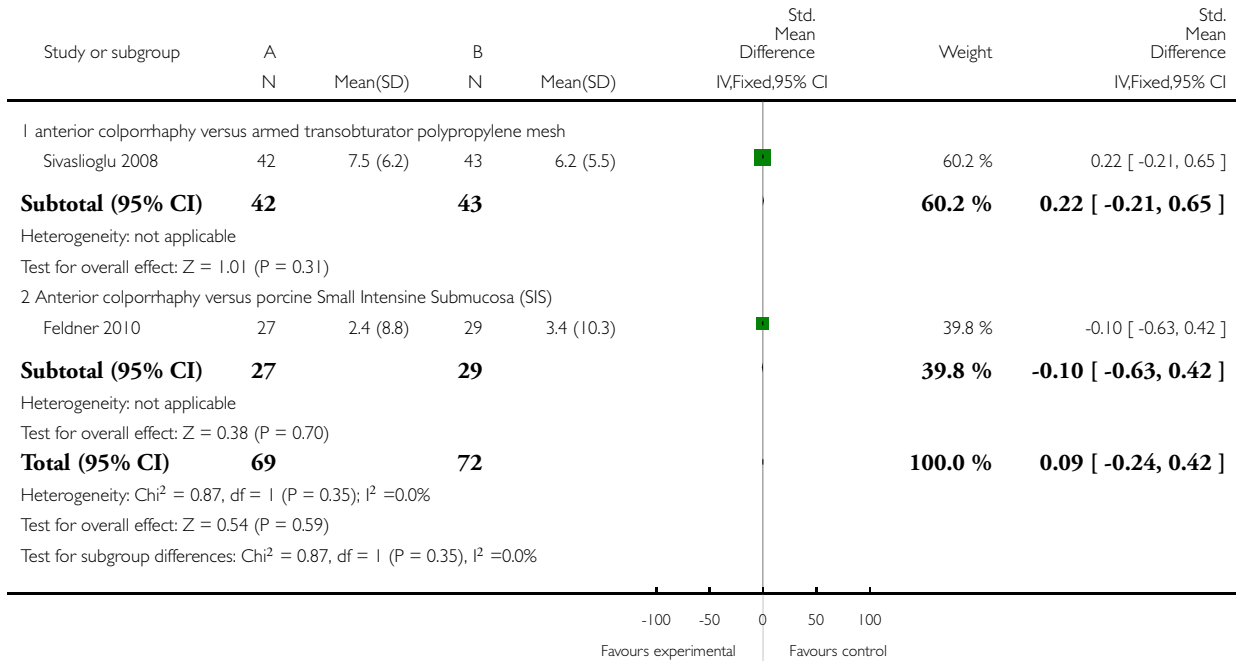


Analysis 2.4. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 4 Prolapse Quality of Life after surgery (P-QOL).

Review: Surgical management of pelvic organ prolapse in women

Comparison: 2 One method of anterior prolapse repair versus another surgical method

Outcome: 4 Prolapse Quality of Life after surgery (P-QOL)

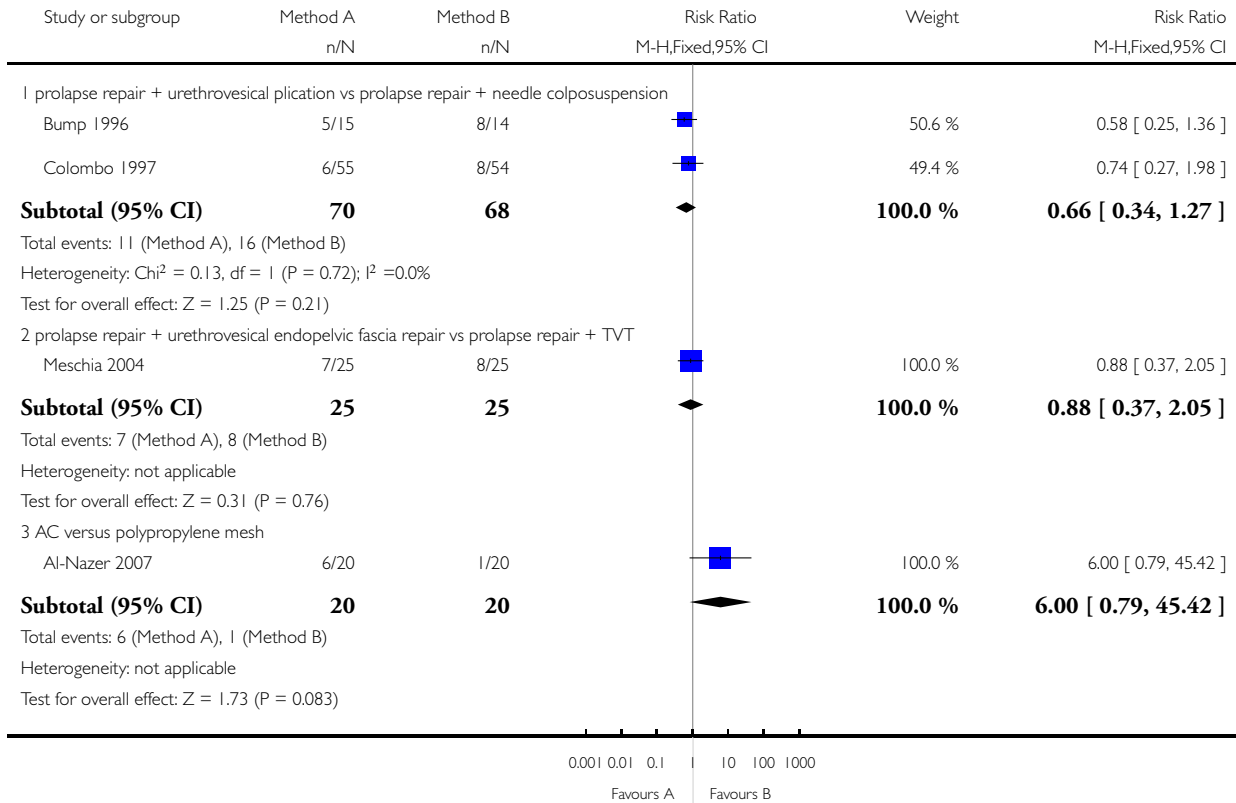


Analysis 2.5. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 5 Number of women with prolapse (objective failure any site).

Review: Surgical management of pelvic organ prolapse in women

Comparison: 2 One method of anterior prolapse repair versus another surgical method

Outcome: 5 Number of women with prolapse (objective failure any site)

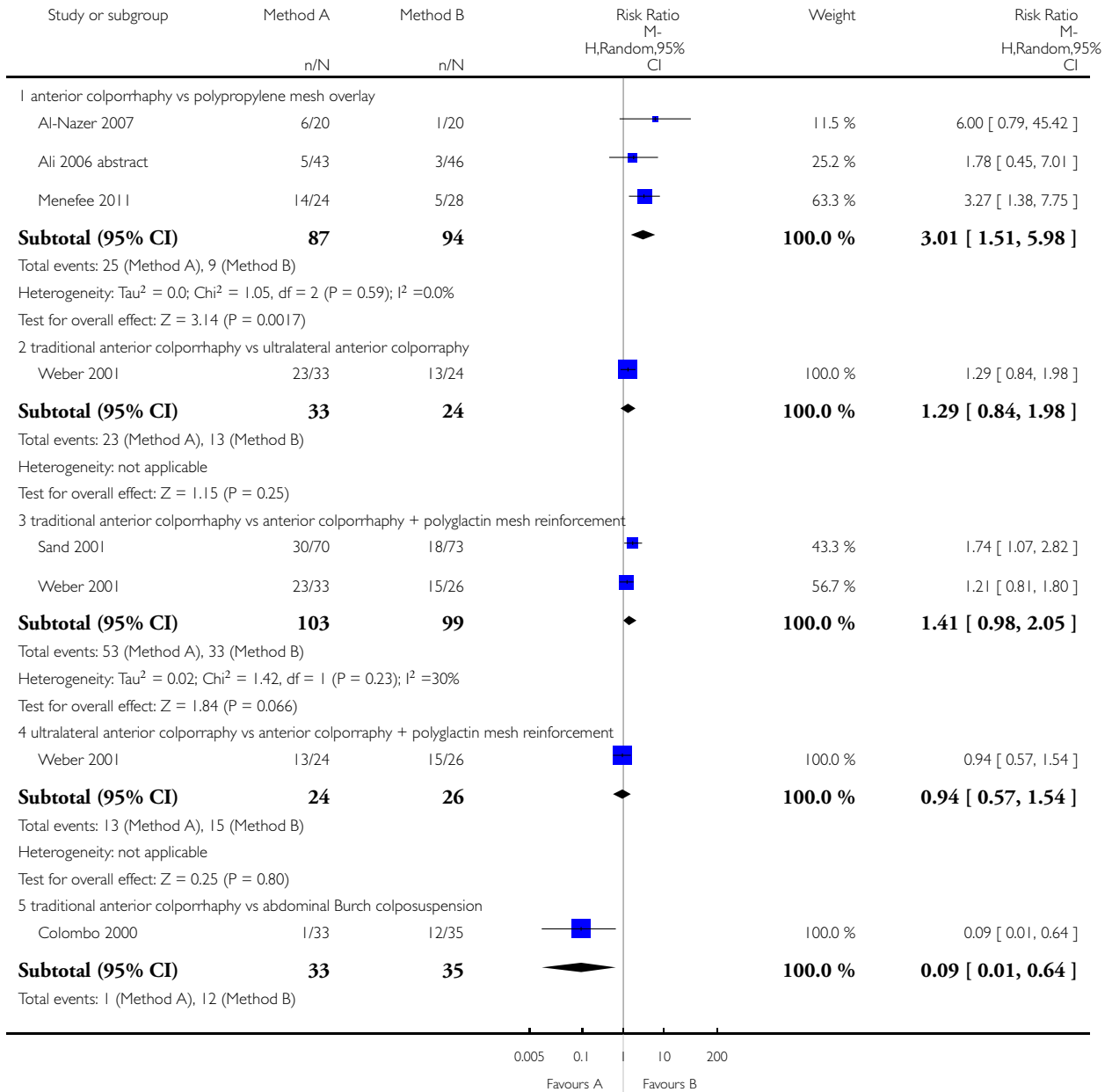


Analysis 2.6. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 6 Number of women with anterior prolapse / cystocele (objective failure).

Review: Surgical management of pelvic organ prolapse in women

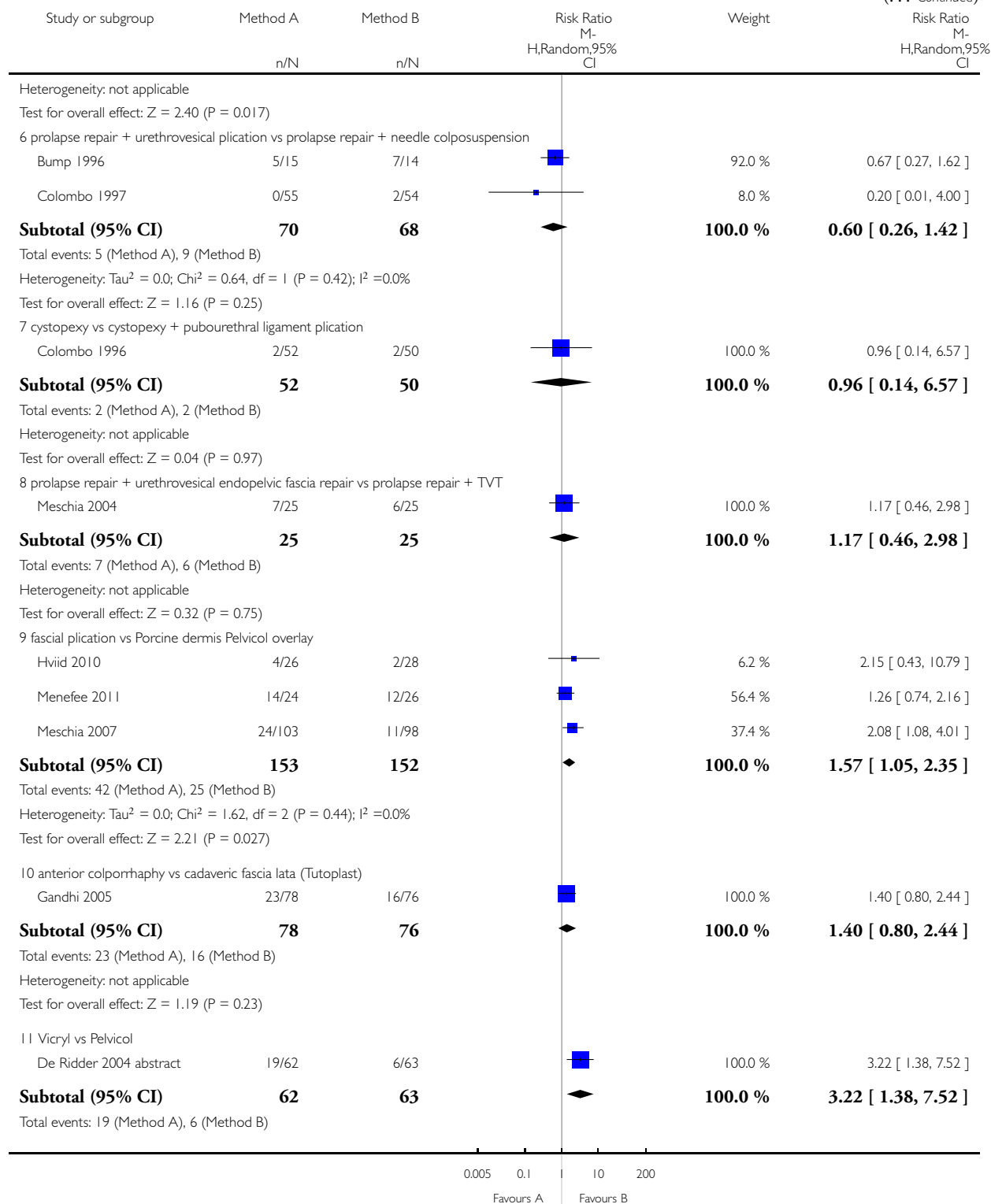
Comparison: 2 One method of anterior prolapse repair versus another surgical method

Outcome: 6 Number of women with anterior prolapse / cystocele (objective failure)



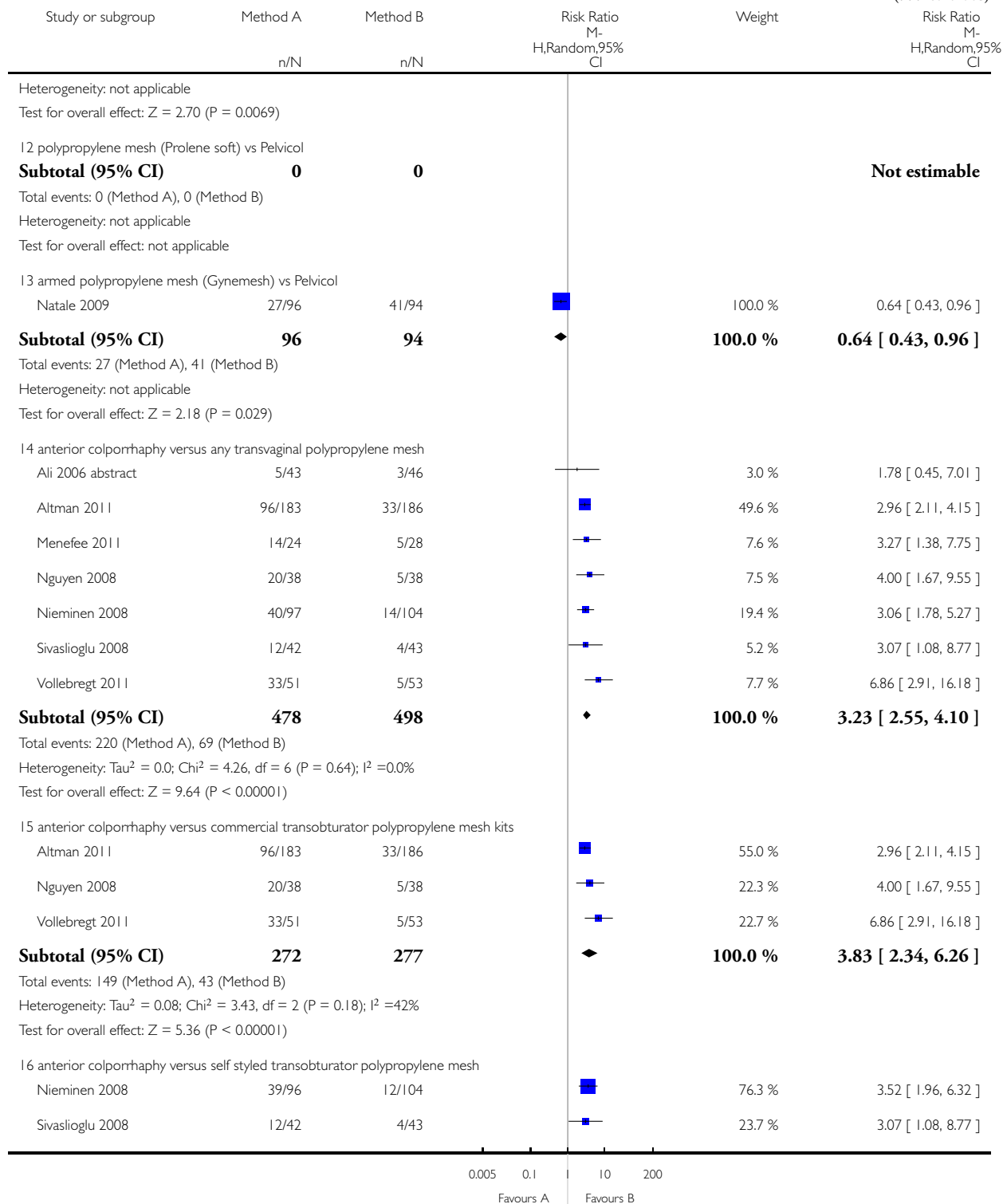
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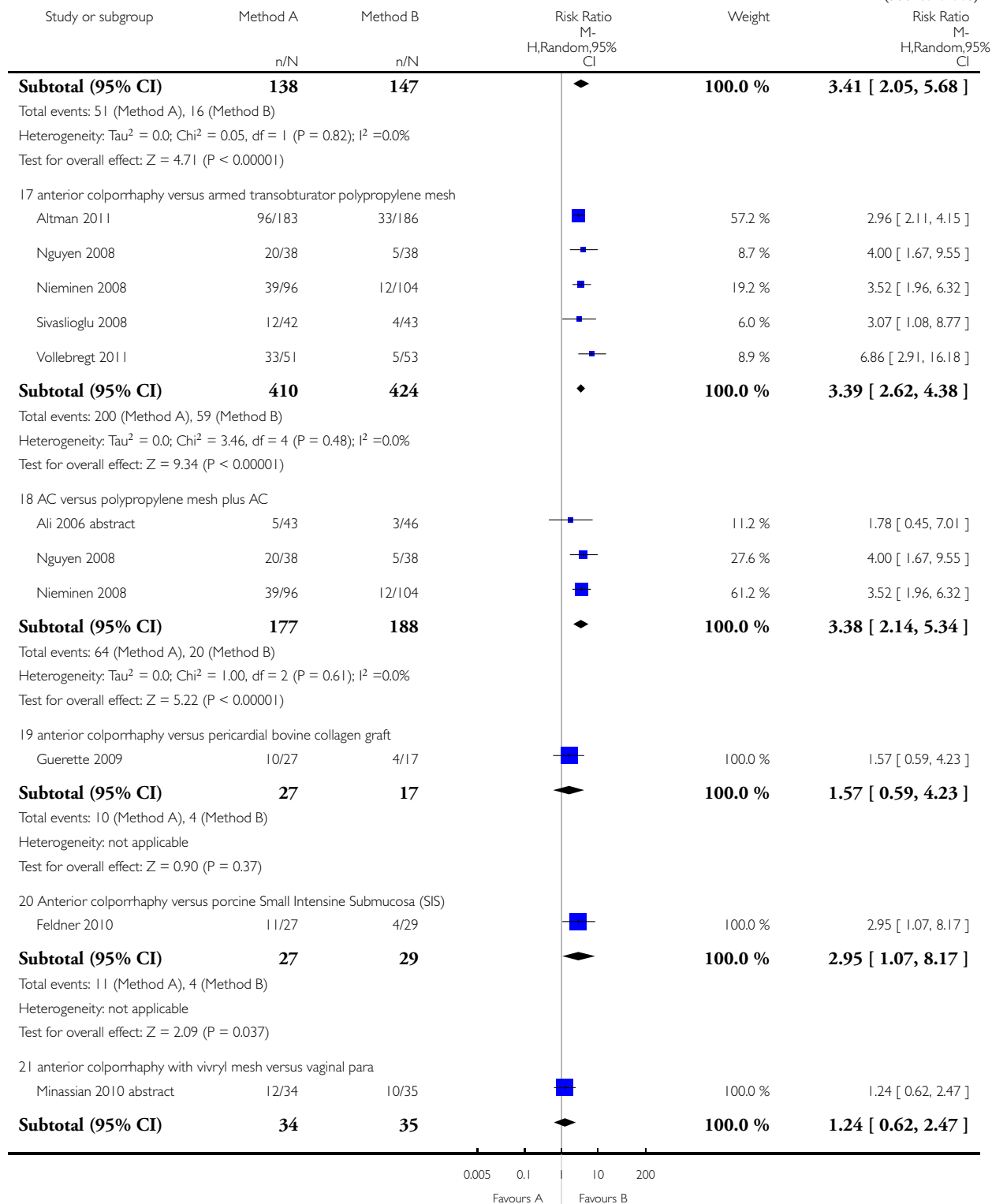
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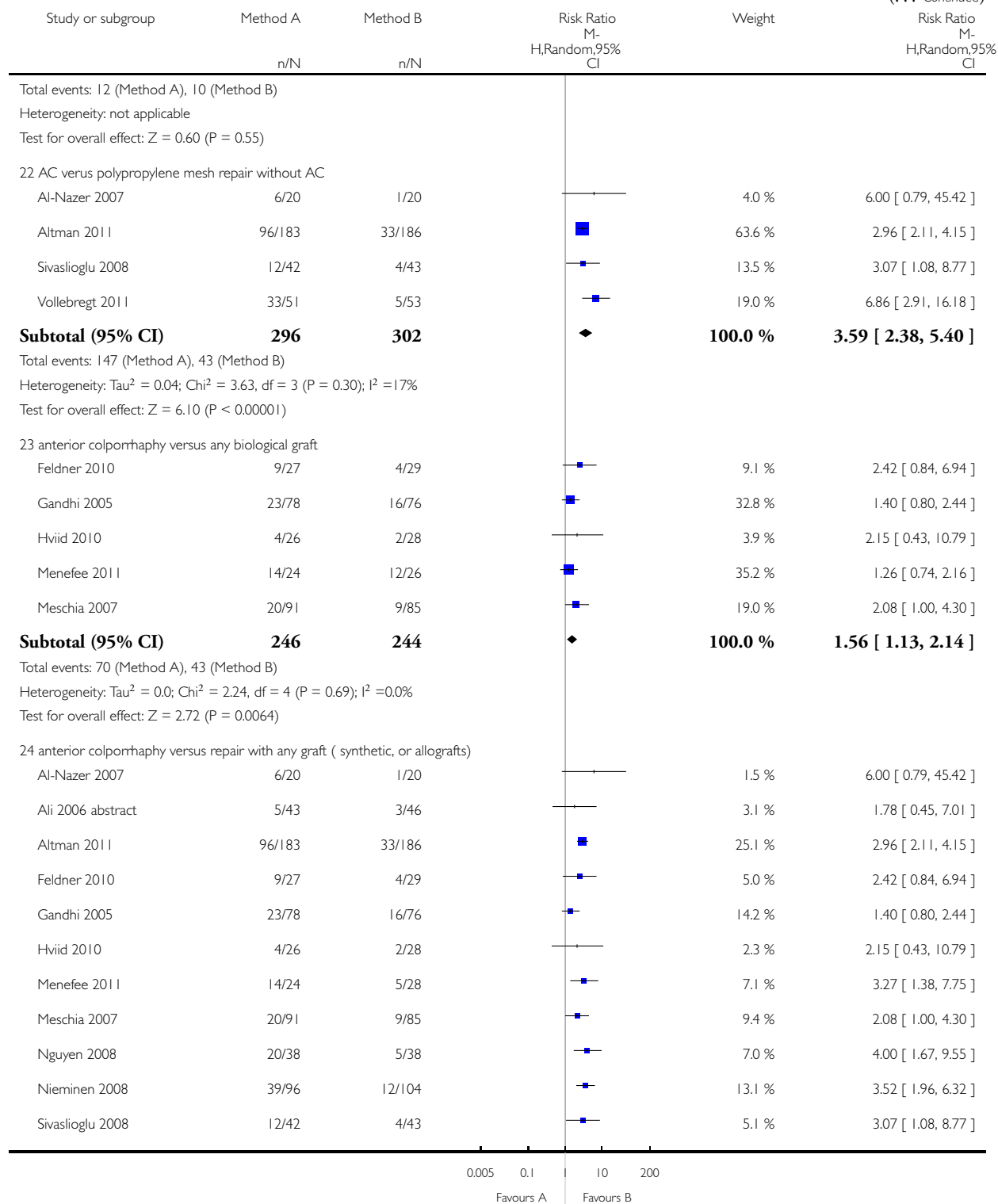
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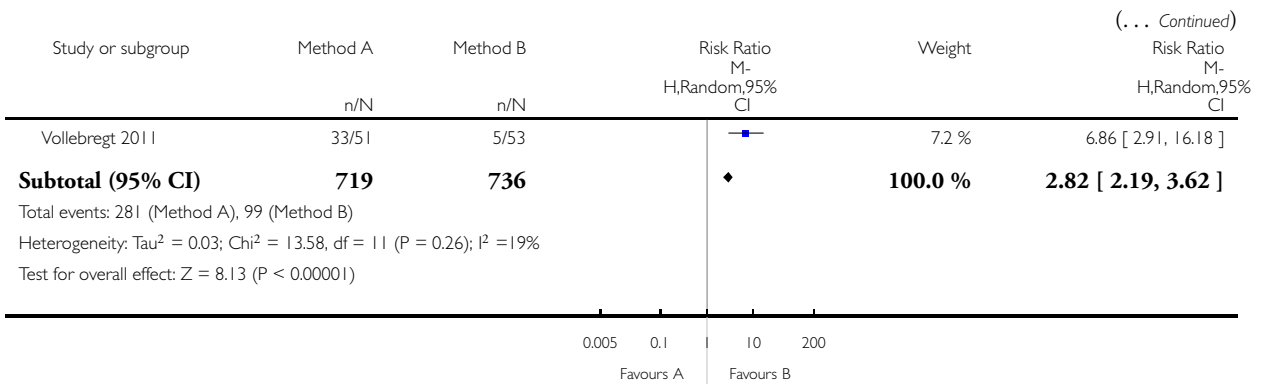


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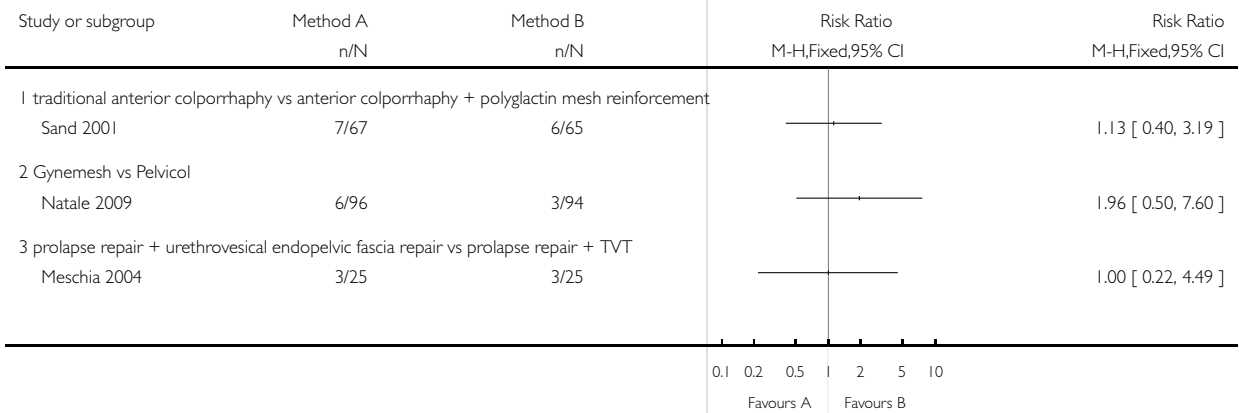


Analysis 2.7. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 7 Number of women with posterior prolapse / rectocele (objective failure).

Review: Surgical management of pelvic organ prolapse in women

Comparison: 2 One method of anterior prolapse repair versus another surgical method

Outcome: 7 Number of women with posterior prolapse / rectocele (objective failure)

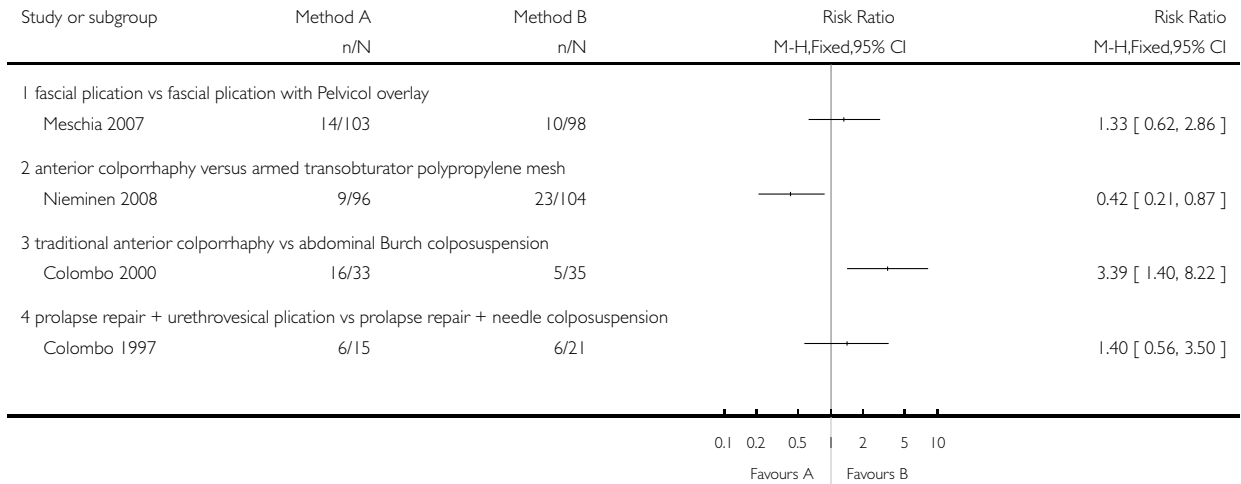


Analysis 2.8. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 8 Number of women with postoperative stress urinary incontinence.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 2 One method of anterior prolapse repair versus another surgical method

Outcome: 8 Number of women with postoperative stress urinary incontinence

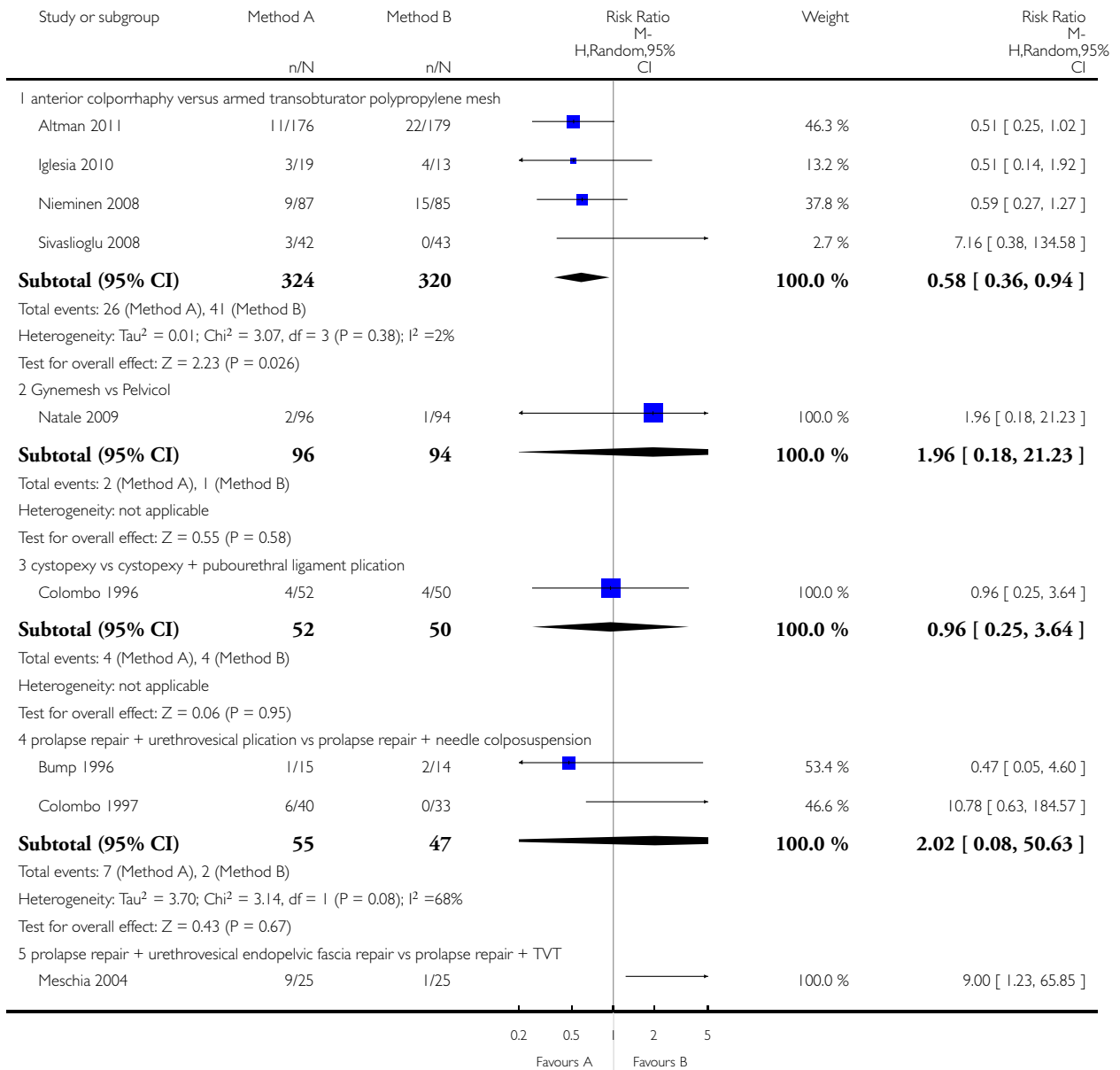


Analysis 2.9. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 9 Number of women with de novo (new) stress urinary incontinence.

Review: Surgical management of pelvic organ prolapse in women

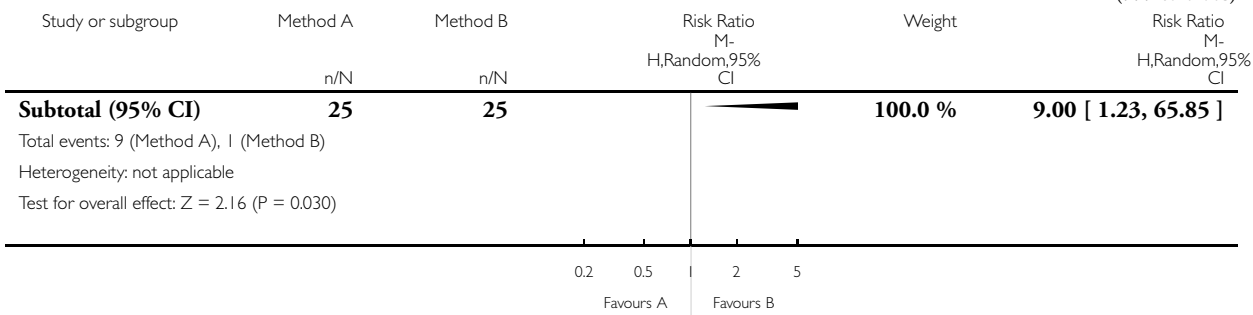
Comparison: 2 One method of anterior prolapse repair versus another surgical method

Outcome: 9 Number of women with de novo (new) stress urinary incontinence



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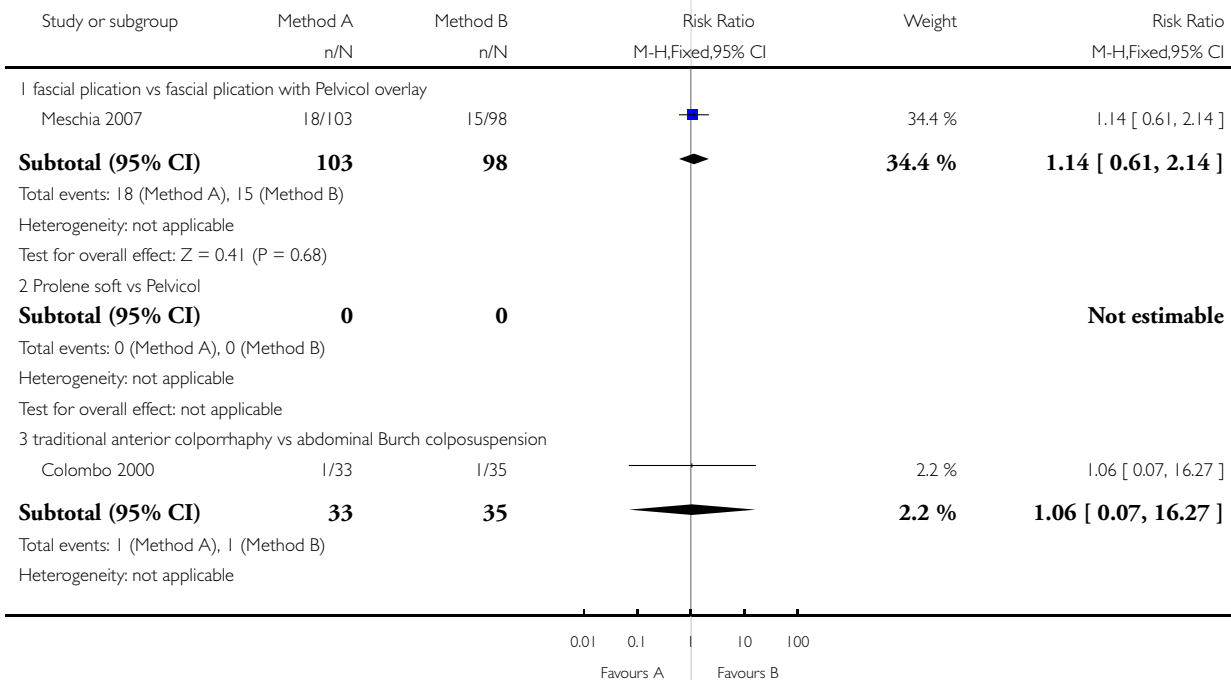


Analysis 2.10. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 10 Number of women with urgency, detrusor overactivity or overactive bladder.

Review: Surgical management of pelvic organ prolapse in women

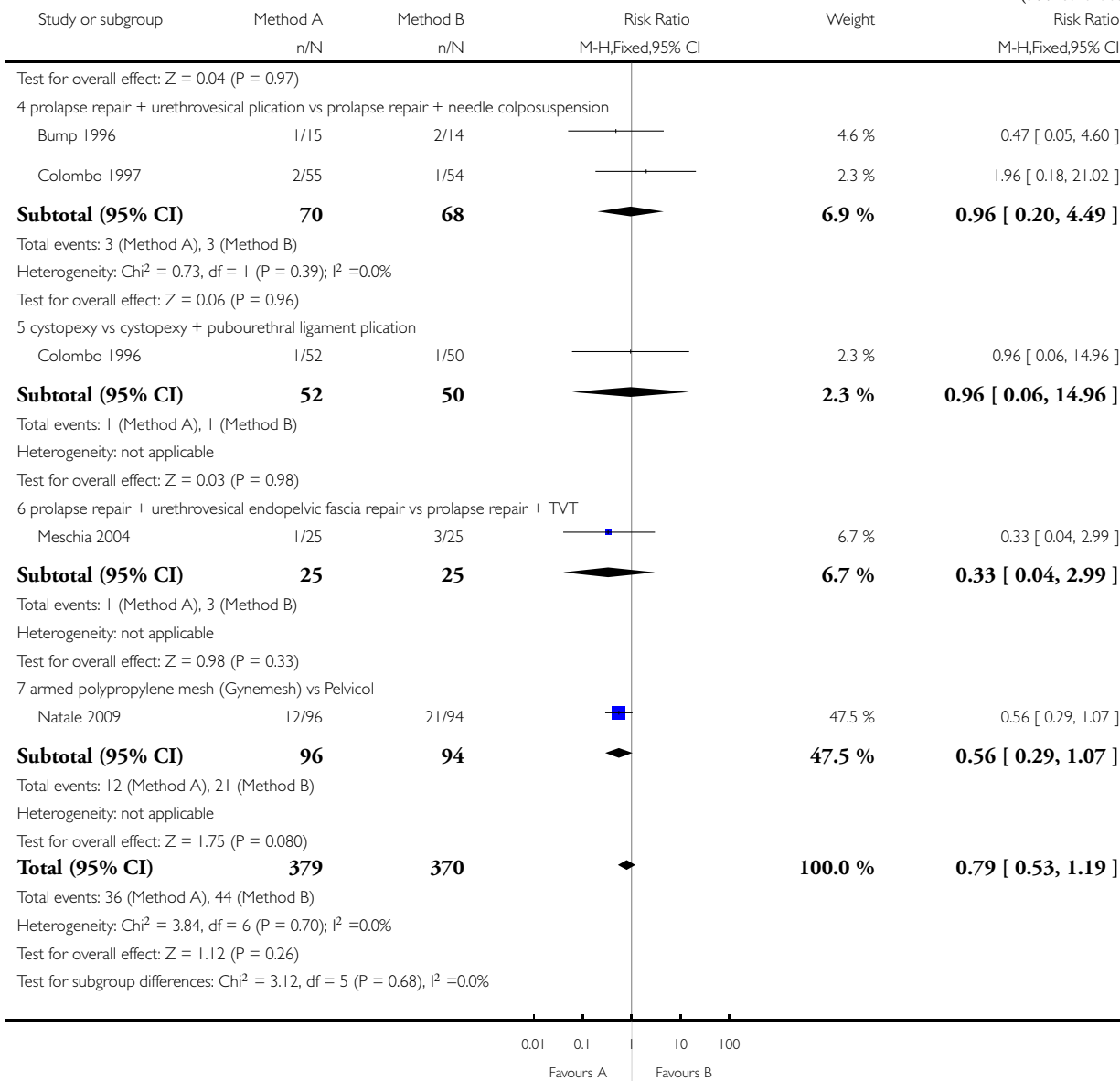
Comparison: 2 One method of anterior prolapse repair versus another surgical method

Outcome: 10 Number of women with urgency, detrusor overactivity or overactive bladder



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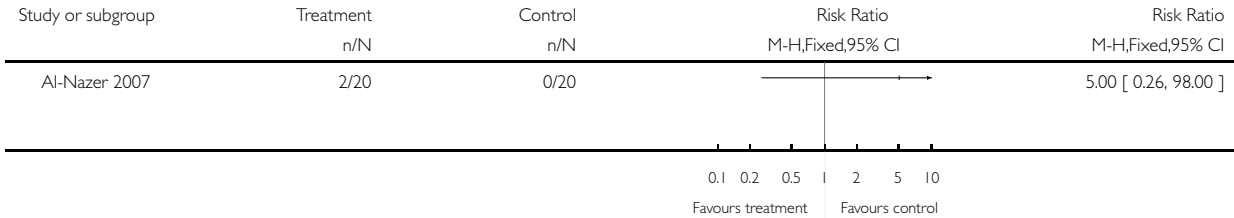


Analysis 2.11. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 11 De novo overactive bladder symptoms.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 2 One method of anterior prolapse repair versus another surgical method

Outcome: 11 De novo overactive bladder symptoms

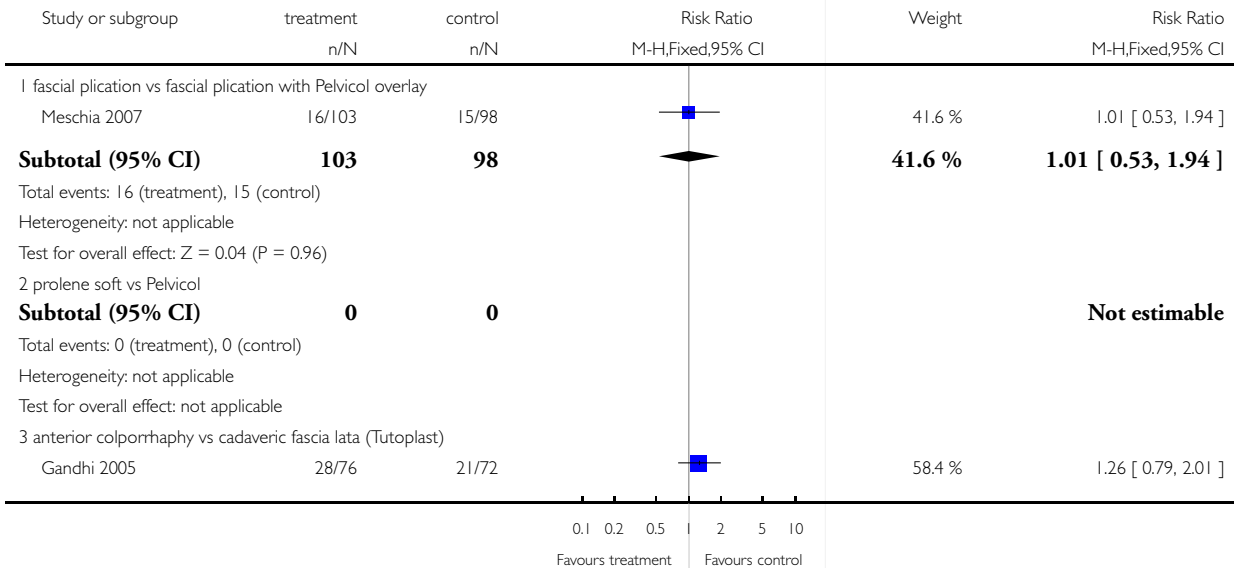


Analysis 2.12. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 12 Postoperative voiding dysfunction symptoms.

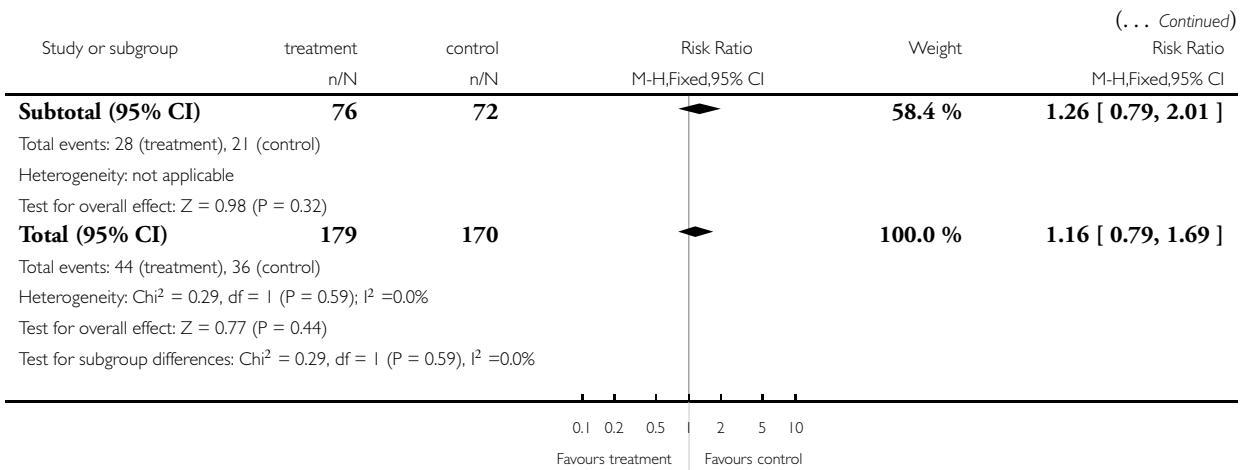
Review: Surgical management of pelvic organ prolapse in women

Comparison: 2 One method of anterior prolapse repair versus another surgical method

Outcome: 12 Postoperative voiding dysfunction symptoms



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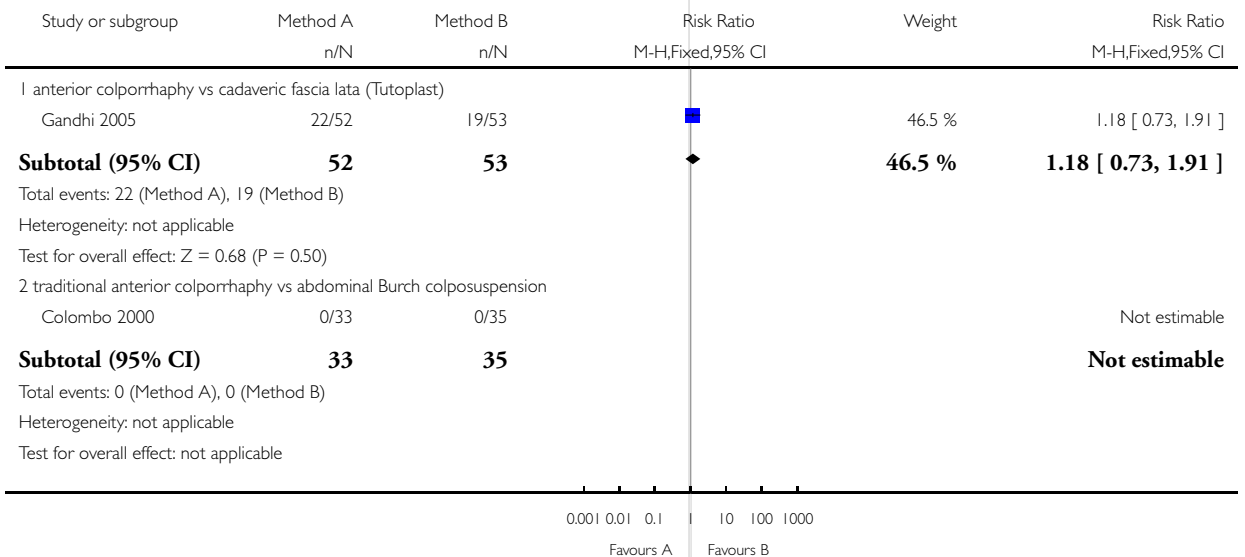


Analysis 2.14. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 14 Persistent voiding dysfunction.

Review: Surgical management of pelvic organ prolapse in women

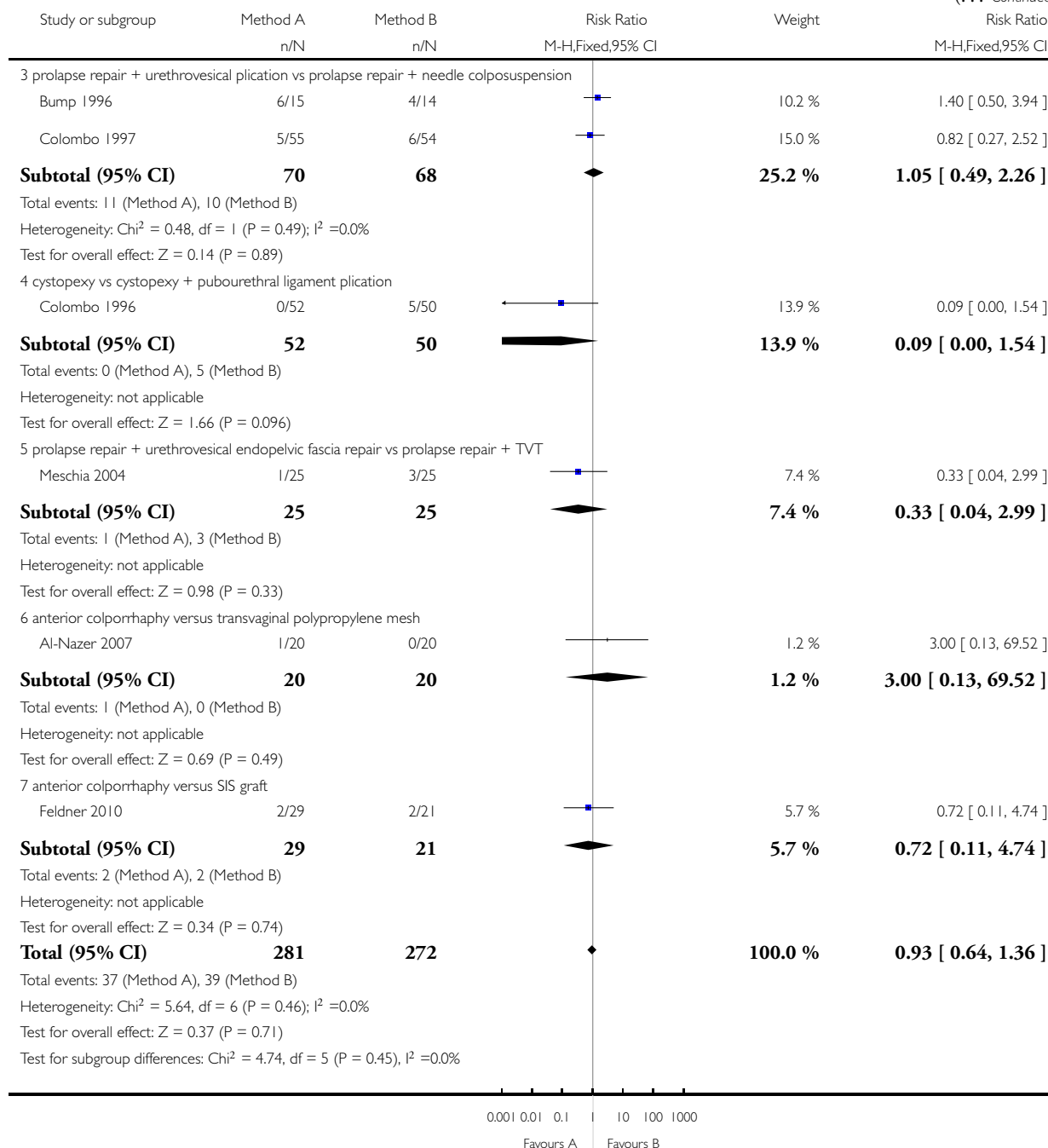
Comparison: 2 One method of anterior prolapse repair versus another surgical method

Outcome: 14 Persistent voiding dysfunction



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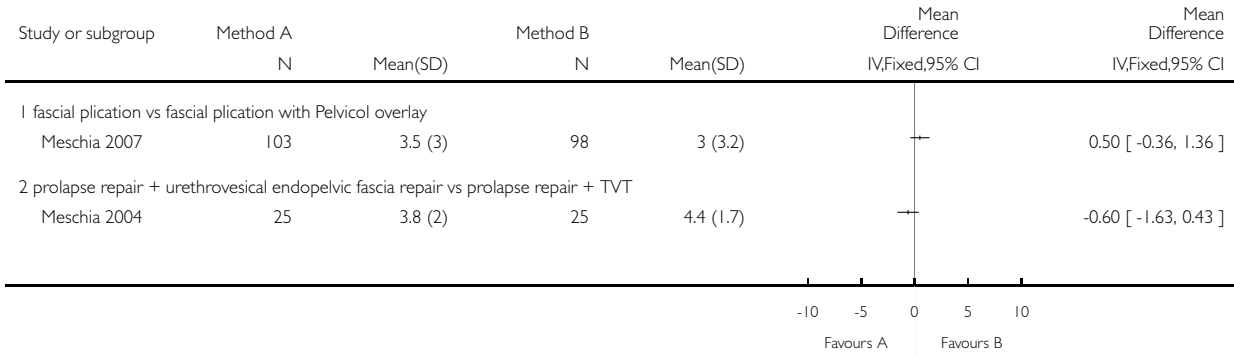


Analysis 2.15. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 15 Time to return to spontaneous voiding (days).

Review: Surgical management of pelvic organ prolapse in women

Comparison: 2 One method of anterior prolapse repair versus another surgical method

Outcome: 15 Time to return to spontaneous voiding (days)

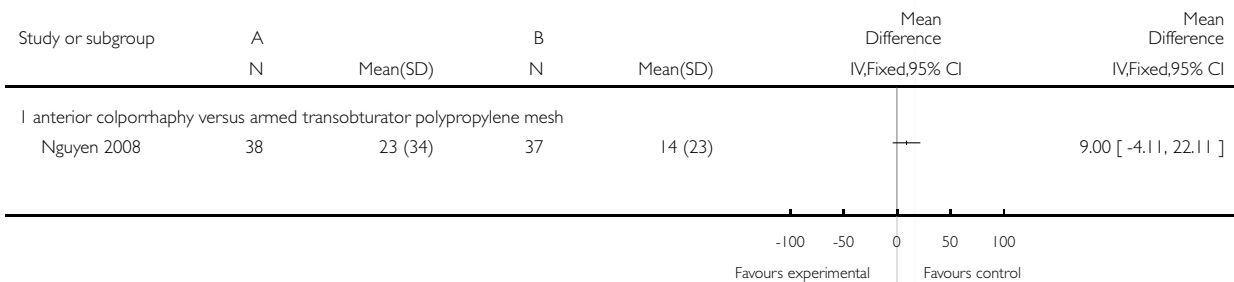


Analysis 2.16. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 16 Pelvic Floor Incontinence Questionnaire-7 after surgery.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 2 One method of anterior prolapse repair versus another surgical method

Outcome: 16 Pelvic Floor Incontinence Questionnaire-7 after surgery



Analysis 2.17. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 17 Number of women with worse bowel function / constipation.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 2 One method of anterior prolapse repair versus another surgical method

Outcome: 17 Number of women with worse bowel function / constipation

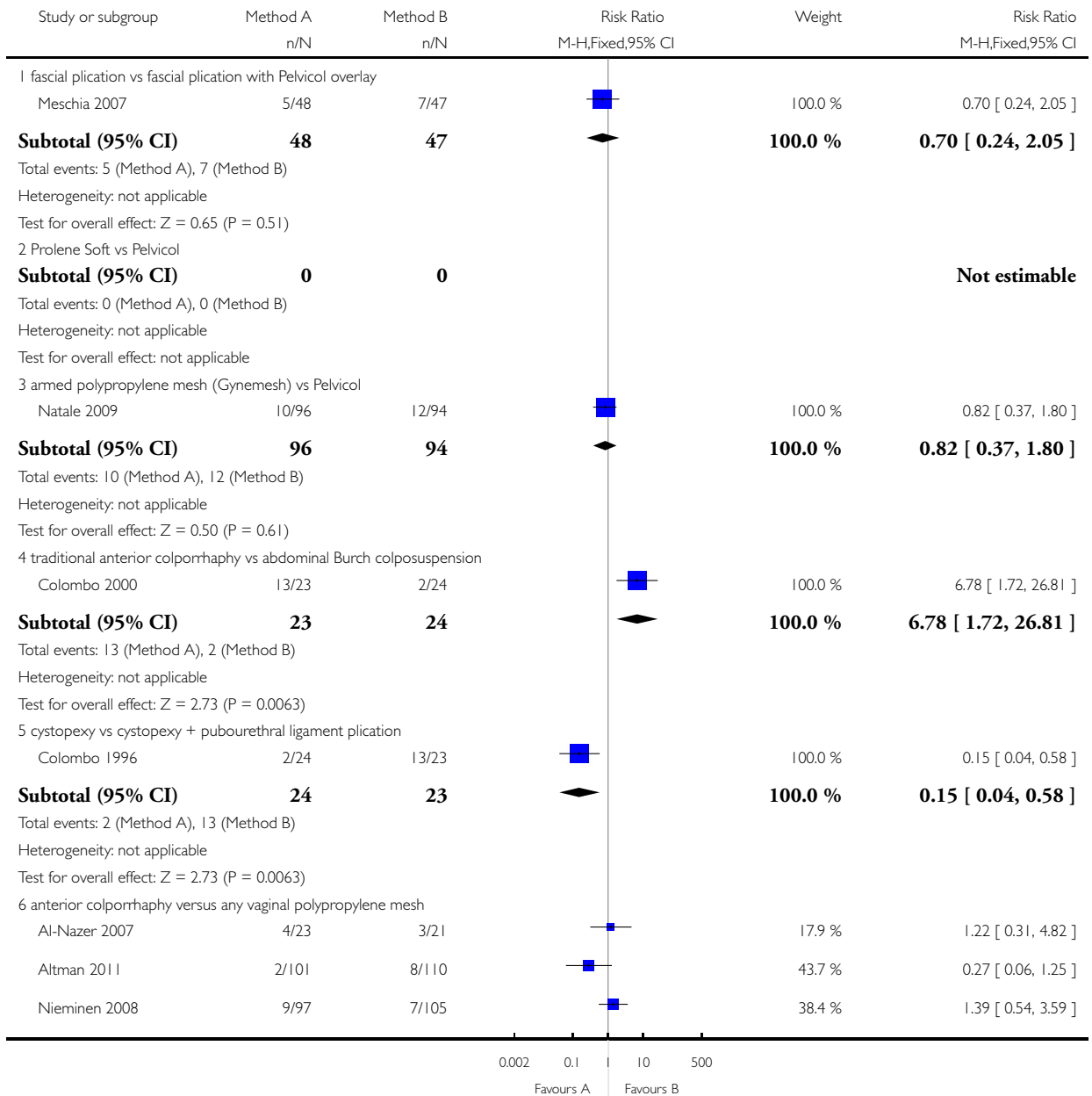
Study or subgroup	Treatment	Control	Risk Ratio	
	n/N	n/N	M-H,Fixed,95% CI	M-H,Fixed,95% CI
1 prolapse repair + urethrovesical plication vs prolapse repair + needle colposuspension Bump 1996	0/11	0/12		Not estimable
2 Prolene soft vs Pelvicol				

Analysis 2.18. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 18 Number of women with dyspareunia.

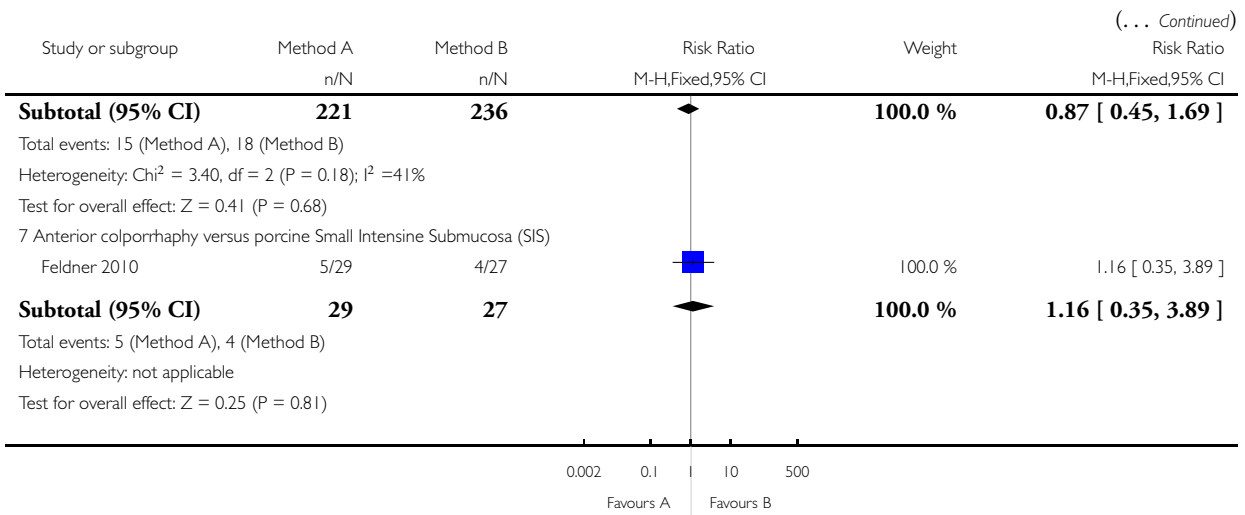
Review: Surgical management of pelvic organ prolapse in women

Comparison: 2 One method of anterior prolapse repair versus another surgical method

Outcome: 18 Number of women with dyspareunia



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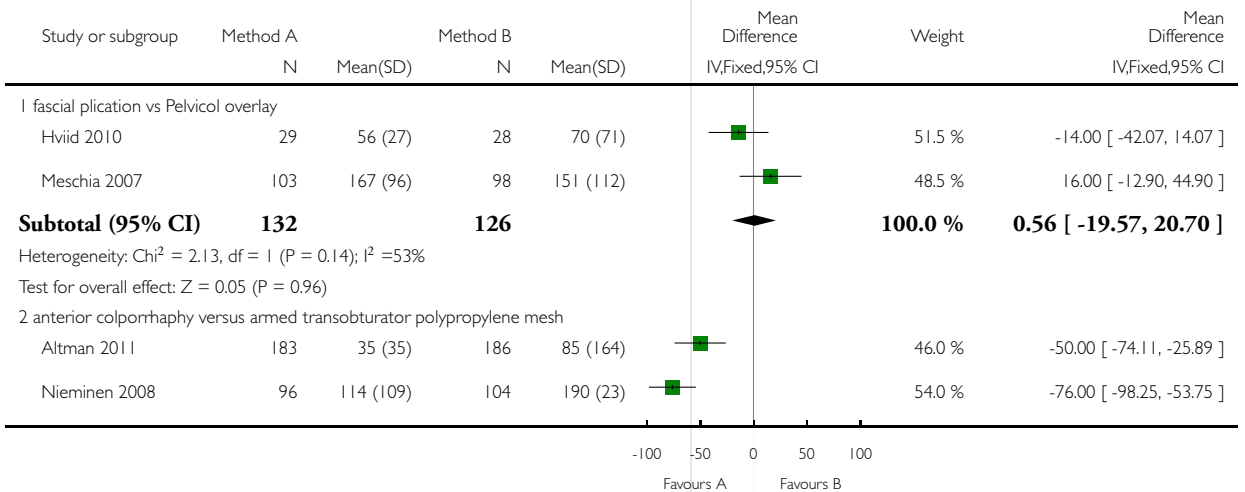


Analysis 2.19. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 19 Blood loss (ml).

Review: Surgical management of pelvic organ prolapse in women

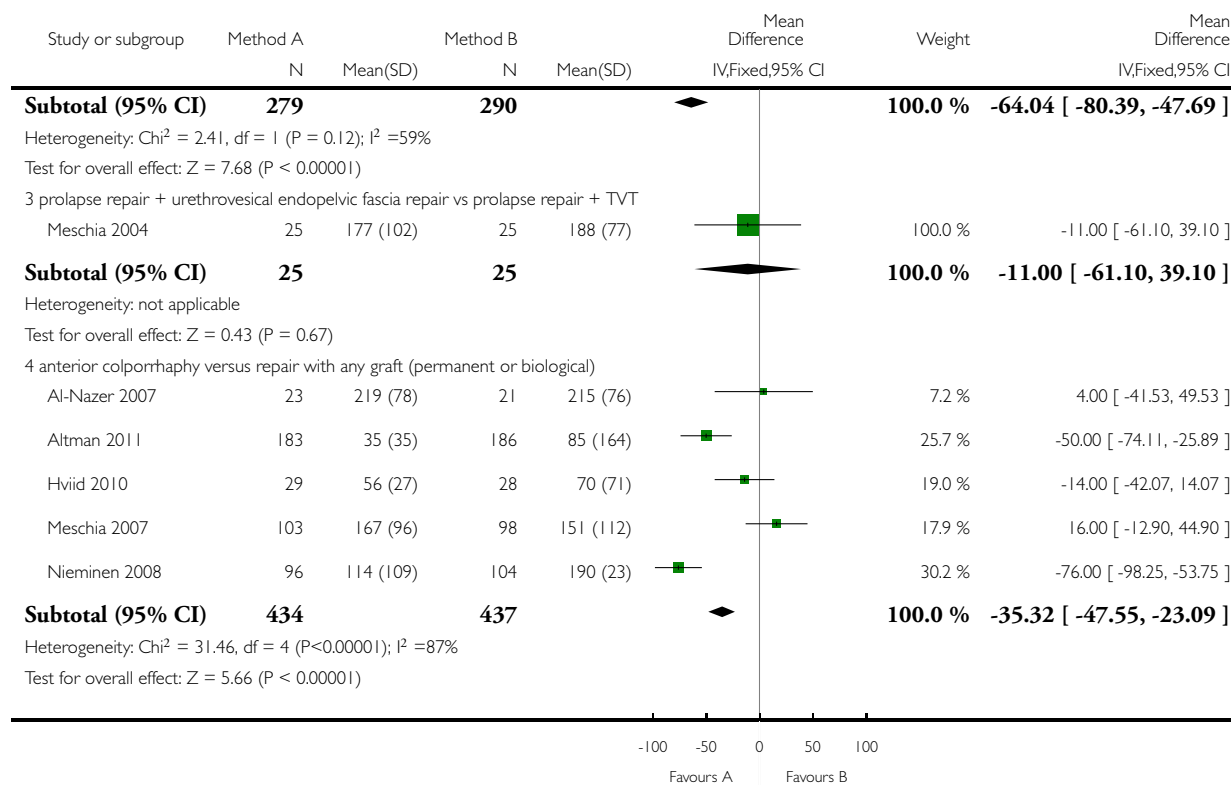
Comparison: 2 One method of anterior prolapse repair versus another surgical method

Outcome: 19 Blood loss (ml)



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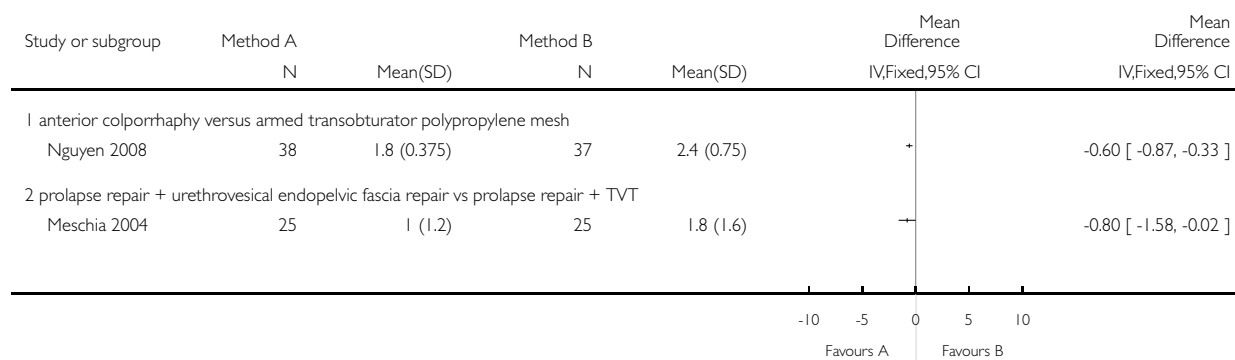


Analysis 2.20. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 20 Haemoglobin change.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 2 One method of anterior prolapse repair versus another surgical method

Outcome: 20 Haemoglobin change

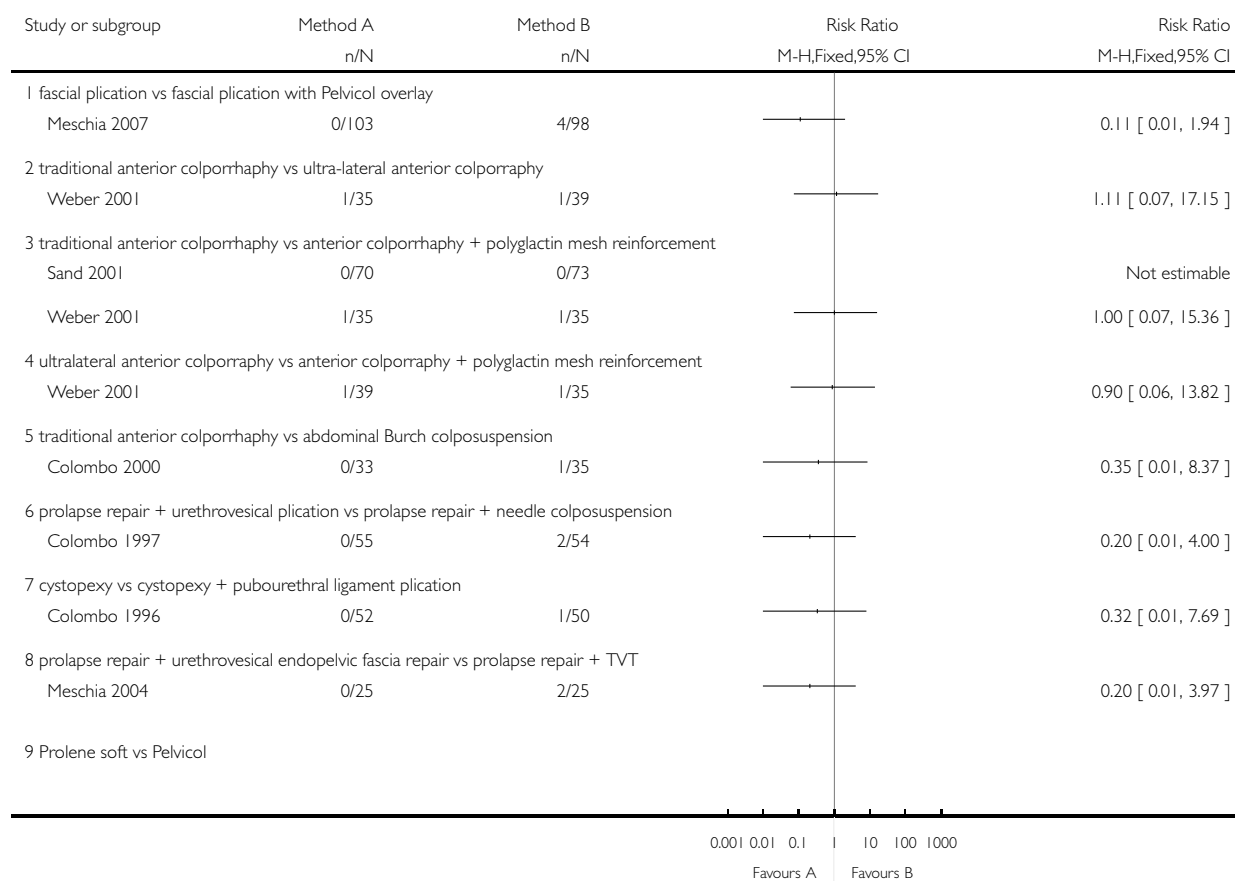


Analysis 2.21. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 21 Number of women with postoperative complications.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 2 One method of anterior prolapse repair versus another surgical method

Outcome: 21 Number of women with postoperative complications

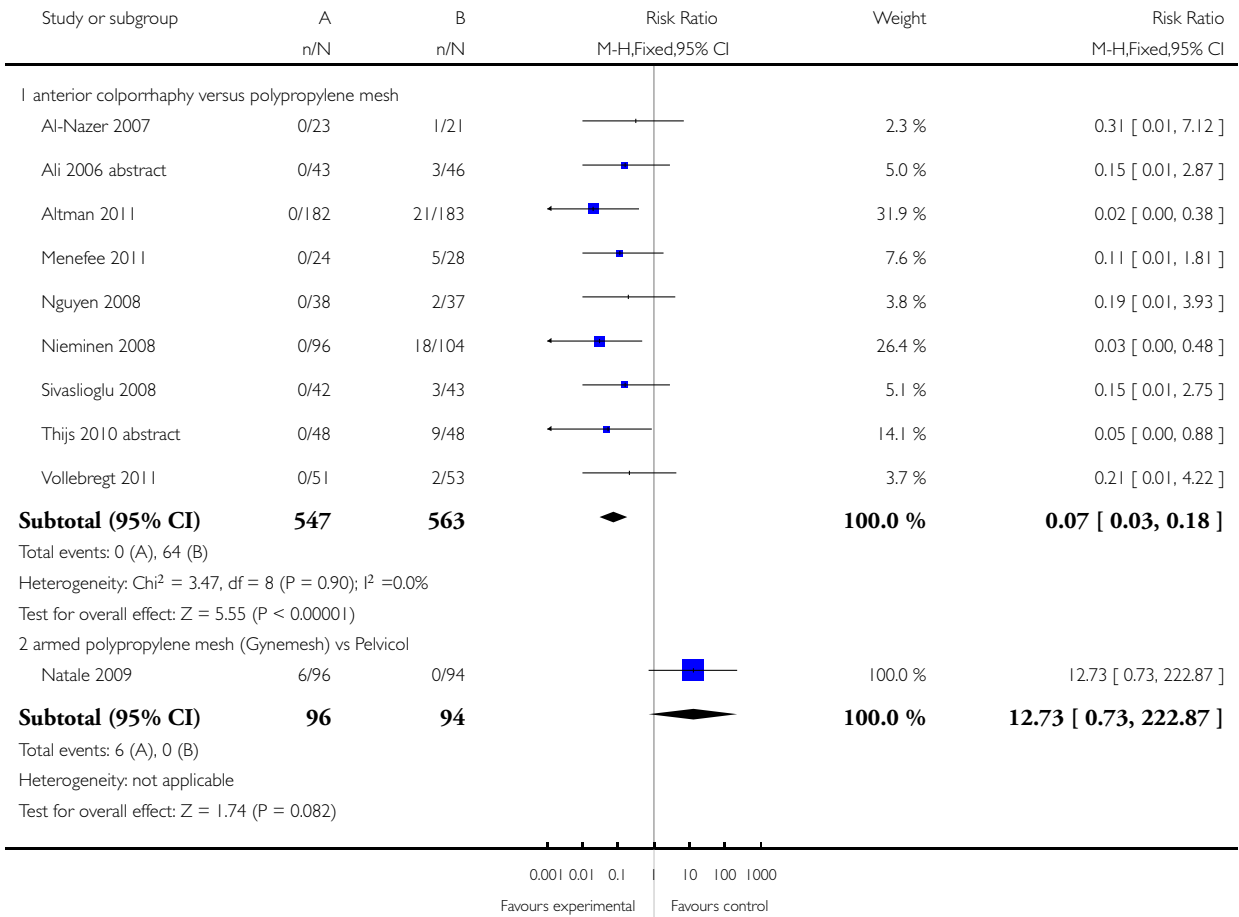


Analysis 2.22. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 22 Mesh erosion.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 2 One method of anterior prolapse repair versus another surgical method

Outcome: 22 Mesh erosion

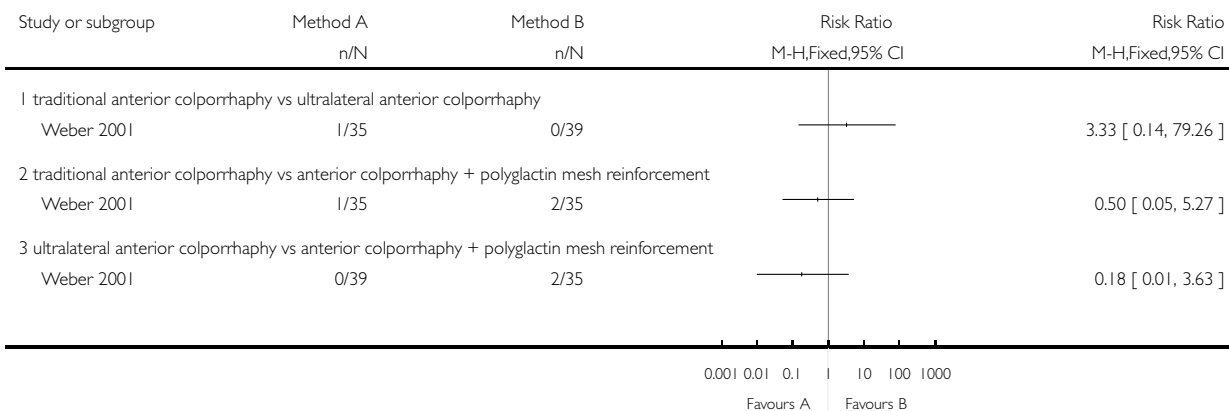


Analysis 2.23. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 23 Death.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 2 One method of anterior prolapse repair versus another surgical method

Outcome: 23 Death

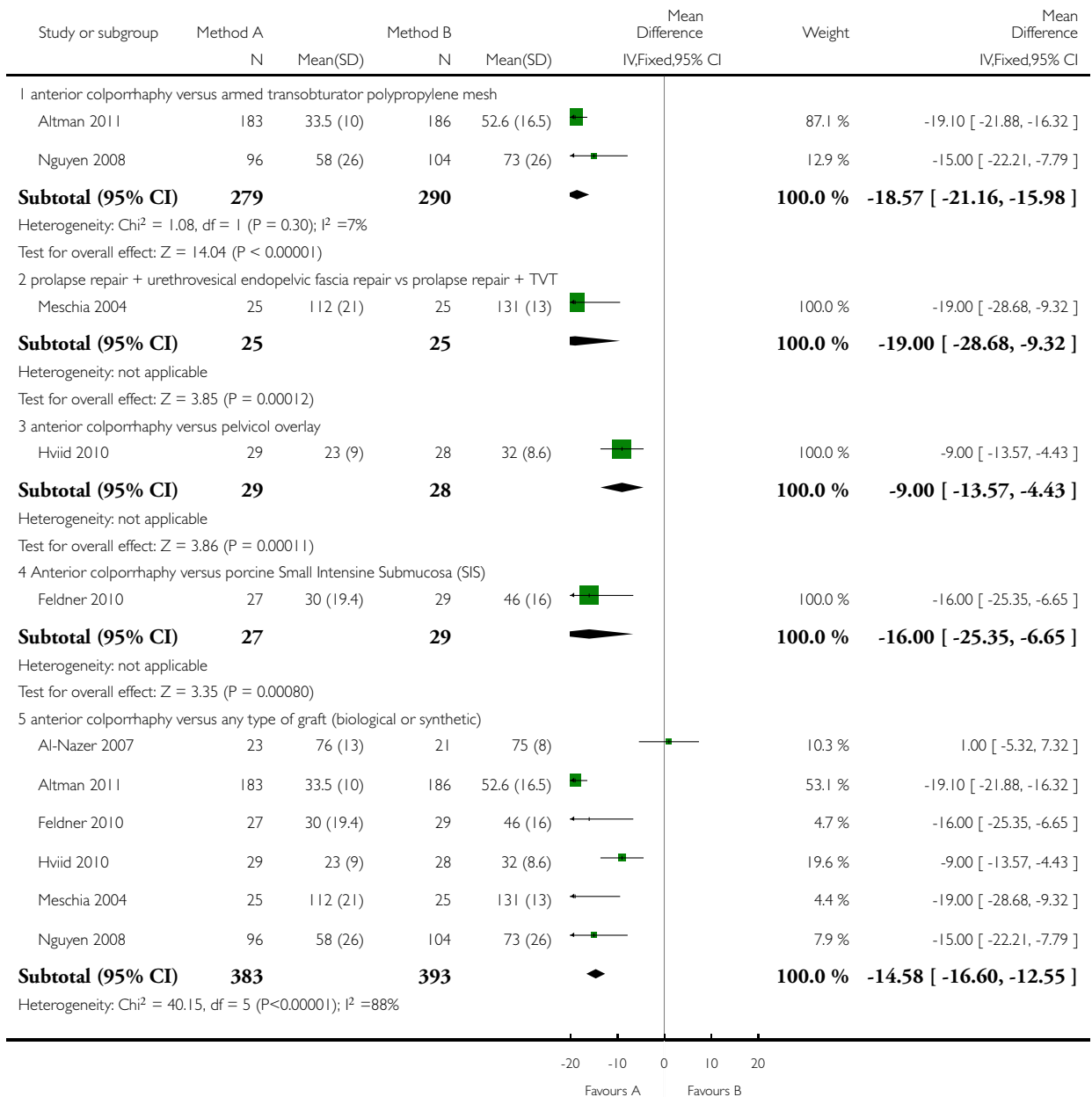


Analysis 2.24. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 24 Operating time (minutes).

Review: Surgical management of pelvic organ prolapse in women

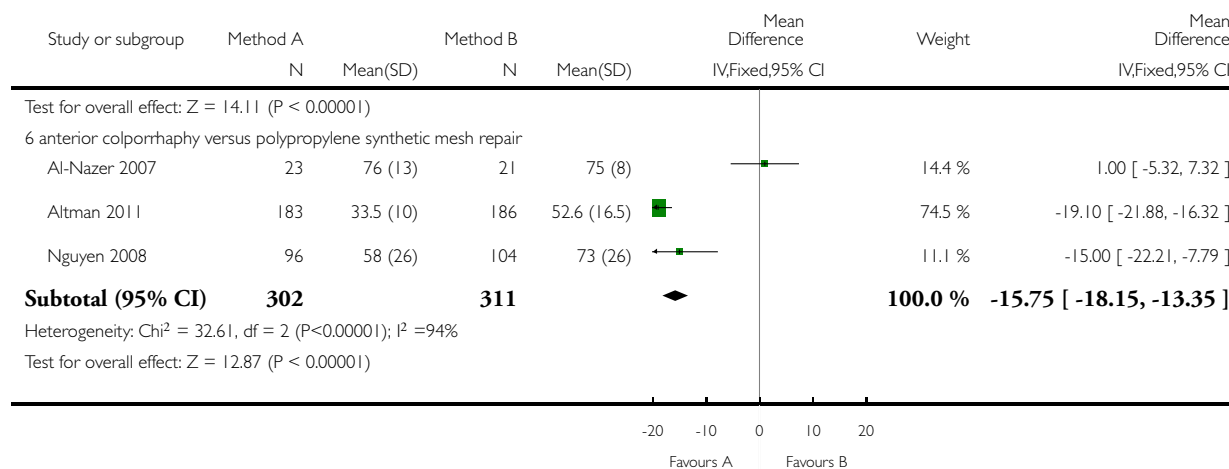
Comparison: 2 One method of anterior prolapse repair versus another surgical method

Outcome: 24 Operating time (minutes)



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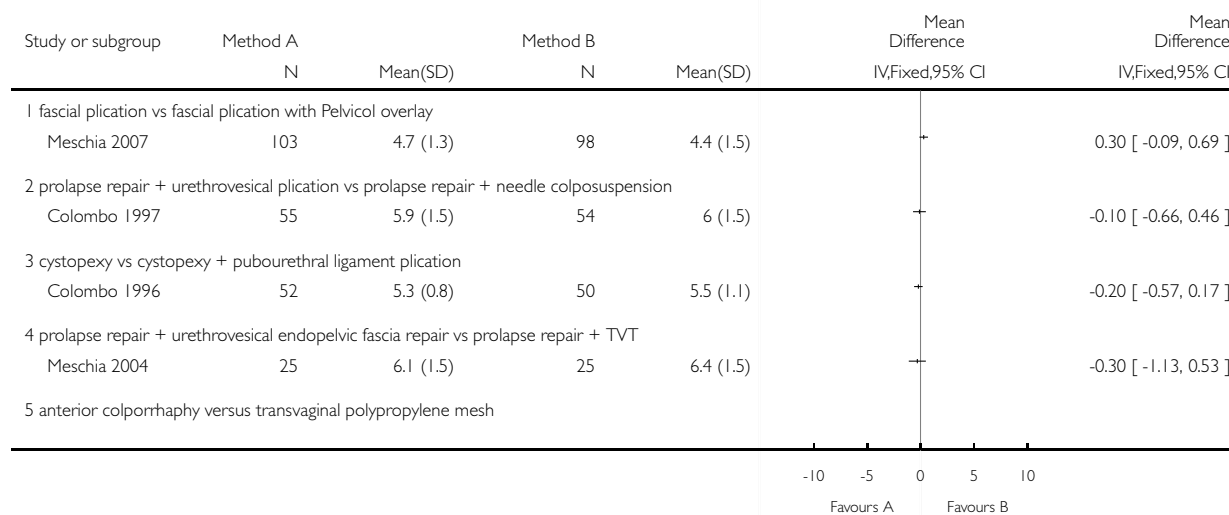


Analysis 2.25. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 25 Length of stay in hospital (days).

Review: Surgical management of pelvic organ prolapse in women

Comparison: 2 One method of anterior prolapse repair versus another surgical method

Outcome: 25 Length of stay in hospital (days)



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Study or subgroup	Method A		Method B		Mean Difference	Mean Difference
	N	Mean(SD)	N	Mean(SD)	IV,Fixed,95% CI	IV,Fixed,95% CI
Al-Nazer 2007	23	2.6 (1.3)	21	2.6 (0.6)		0.0 [-0.59, 0.59]
Altman 2011	183	1.6 (1.1)	186	1.8 (1.2)		-0.20 [-0.43, 0.03]

-10 -5 0 5 10
Favours A Favours B

Analysis 2.26. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 26 Number of women having further prolapse surgery.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 2 One method of anterior prolapse repair versus another surgical method

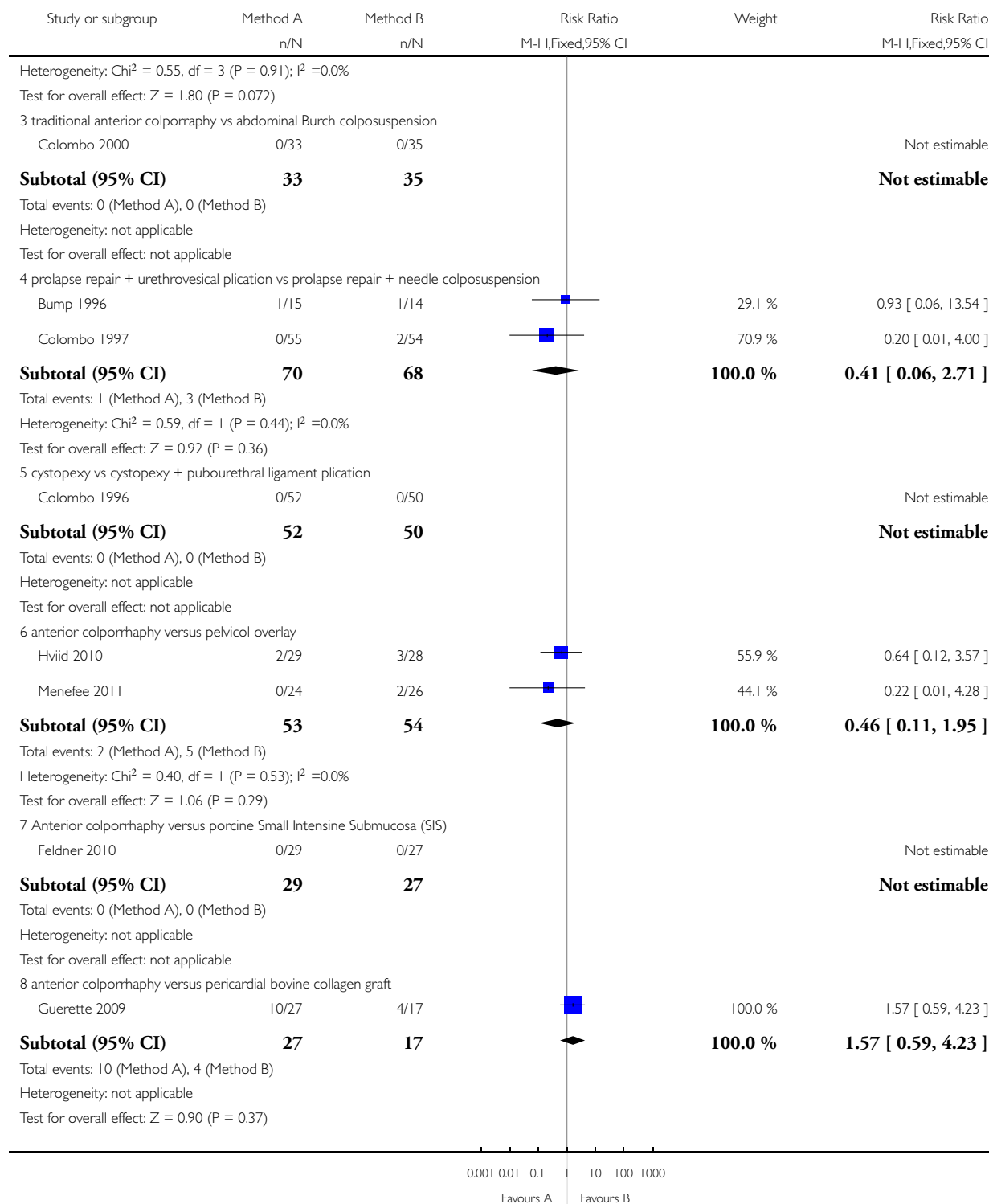
Outcome: 26 Number of women having further prolapse surgery

Study or subgroup	Method A	Method B	Risk Ratio	Weight	Risk Ratio
	n/N	n/N			M-H,Fixed,95% CI
1 Vicryl vs Pelvicol					
De Ridder 2004 abstract	9/62	3/63		100.0 %	3.05 [0.87, 10.73]
Subtotal (95% CI)	62	63		100.0 %	3.05 [0.87, 10.73]
Total events: 9 (Method A), 3 (Method B)					
Heterogeneity: not applicable					
Test for overall effect: Z = 1.74 (P = 0.083)					
2 anterior colporrhaphy versus transobturator mesh					
Altman 2011	1/183	0/186		6.8 %	3.05 [0.13, 74.36]
Nguyen 2008	1/38	0/37		7.0 %	2.92 [0.12, 69.54]
Nieminen 2008	10/97	6/104		79.5 %	1.79 [0.67, 4.73]
Sivaslioglu 2008	0/42	0/43			Not estimable
Thijs 2010 abstract	0/48	0/48			Not estimable
Vollebregt 2011	2/51	0/53		6.7 %	5.19 [0.26, 105.59]
Subtotal (95% CI)	459	471		100.0 %	2.18 [0.93, 5.10]
Total events: 14 (Method A), 6 (Method B)					

0.001 0.01 0.1 1 10 100 1000
Favours A Favours B

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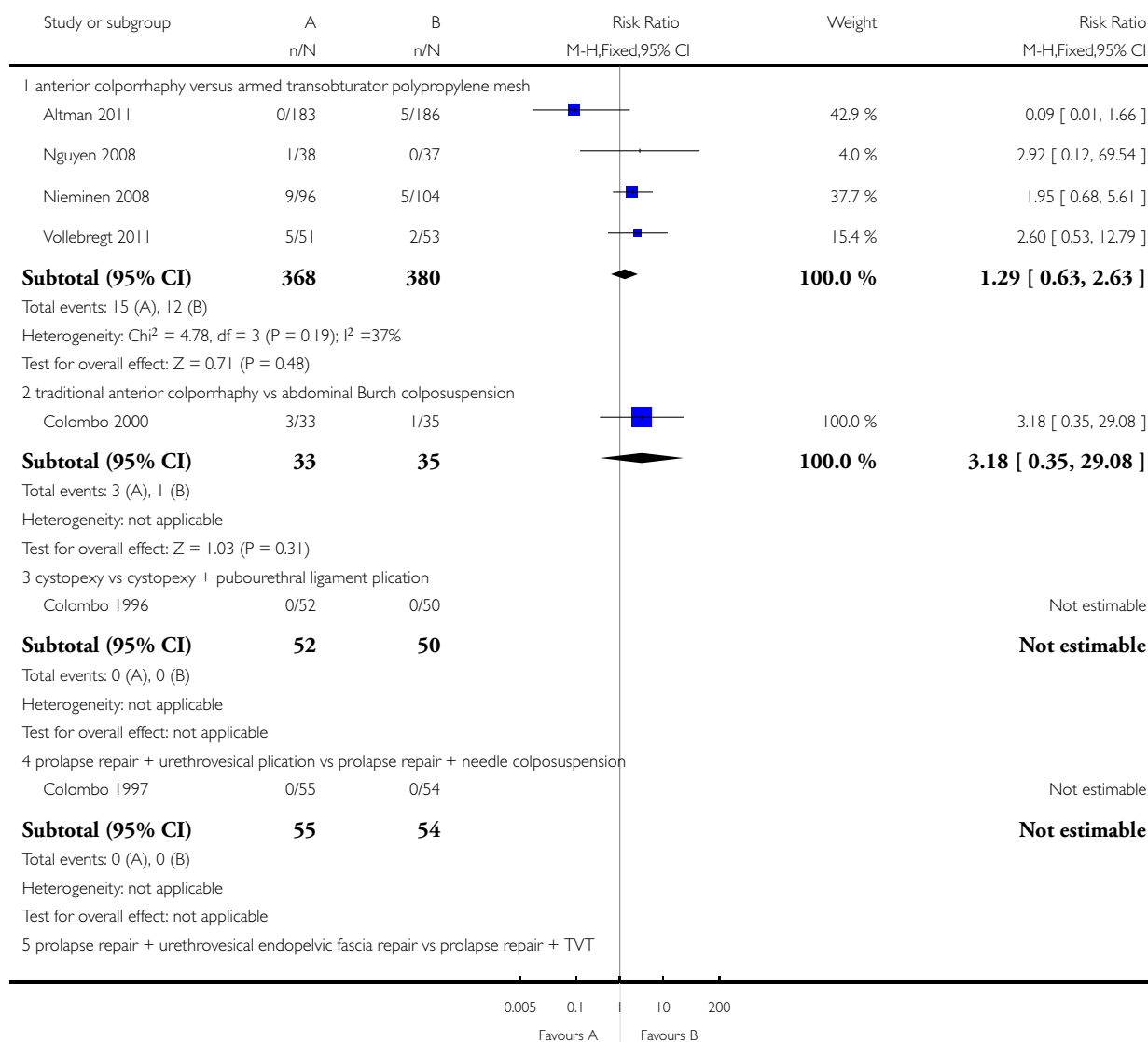


Analysis 2.27. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 27 Number of women having further incontinence surgery.

Review: Surgical management of pelvic organ prolapse in women

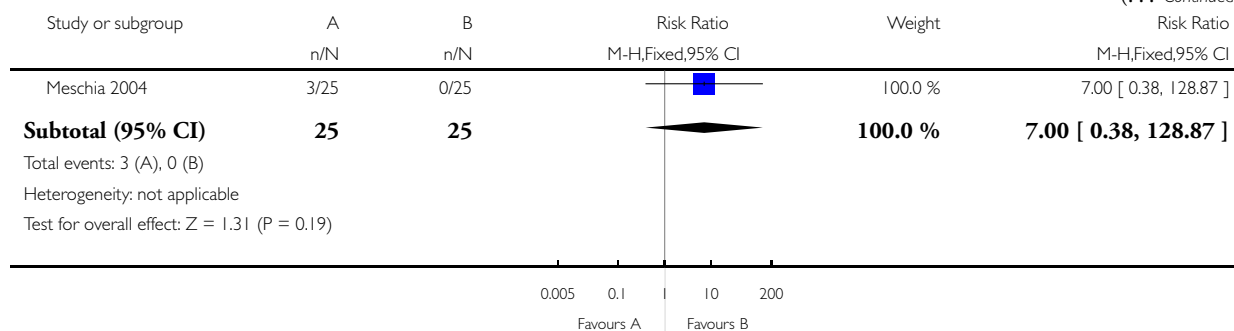
Comparison: 2 One method of anterior prolapse repair versus another surgical method

Outcome: 27 Number of women having further incontinence surgery



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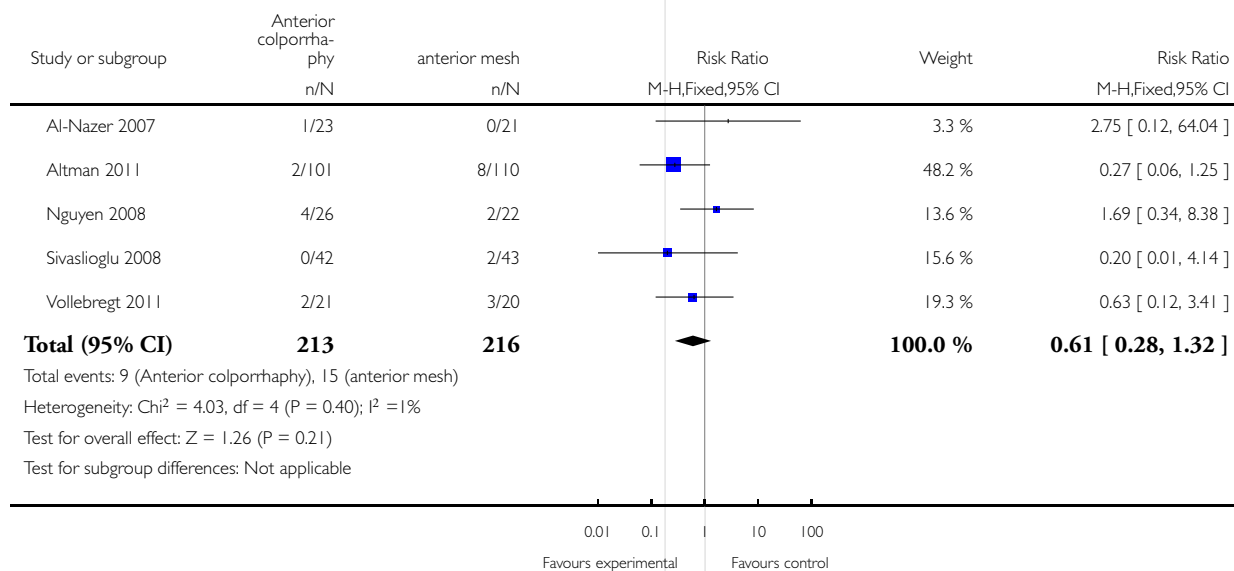


Analysis 2.28. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 28 number of women with denovo dyspareunia.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 2 One method of anterior prolapse repair versus another surgical method

Outcome: 28 number of women with denovo dyspareunia

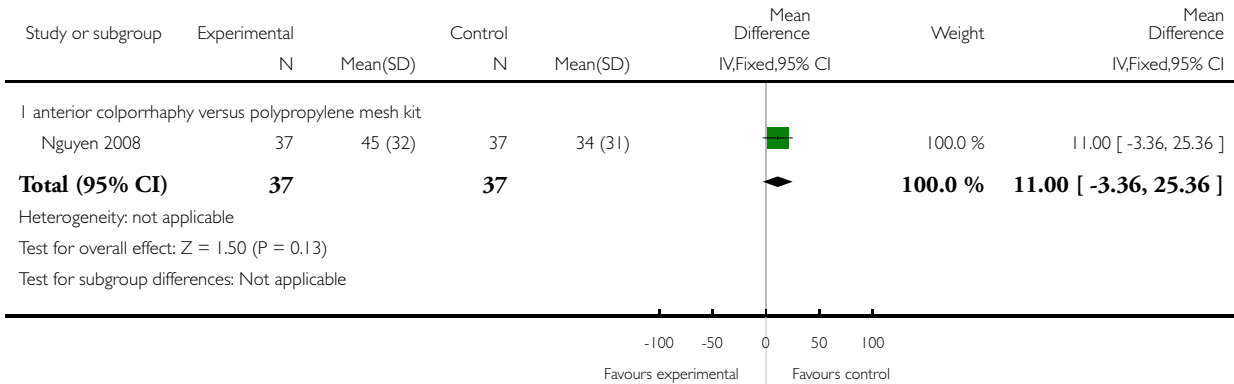


Analysis 2.29. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 29 Prolapse quality of life (PFDI-20).

Review: Surgical management of pelvic organ prolapse in women

Comparison: 2 One method of anterior prolapse repair versus another surgical method

Outcome: 29 Prolapse quality of life (PFDI-20)

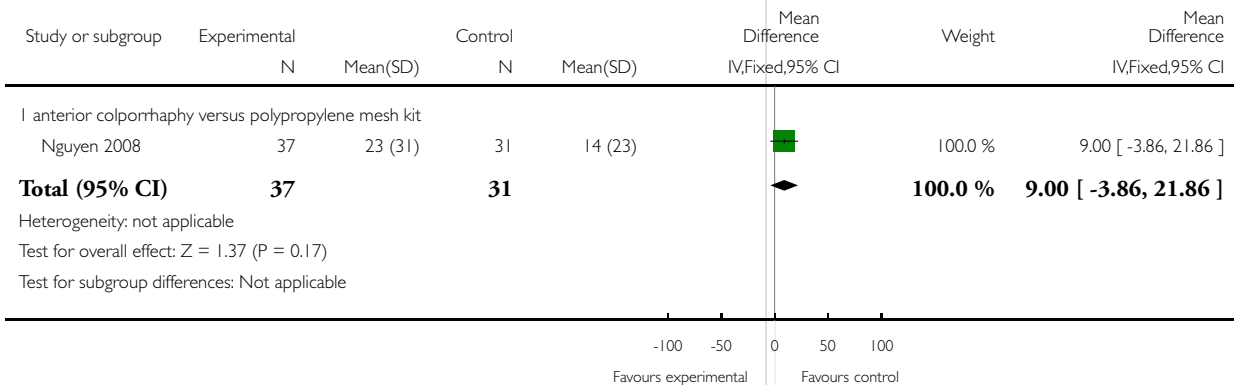


Analysis 2.30. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 30 quality of life (PFDI-7).

Review: Surgical management of pelvic organ prolapse in women

Comparison: 2 One method of anterior prolapse repair versus another surgical method

Outcome: 30 quality of life (PFDI-7)

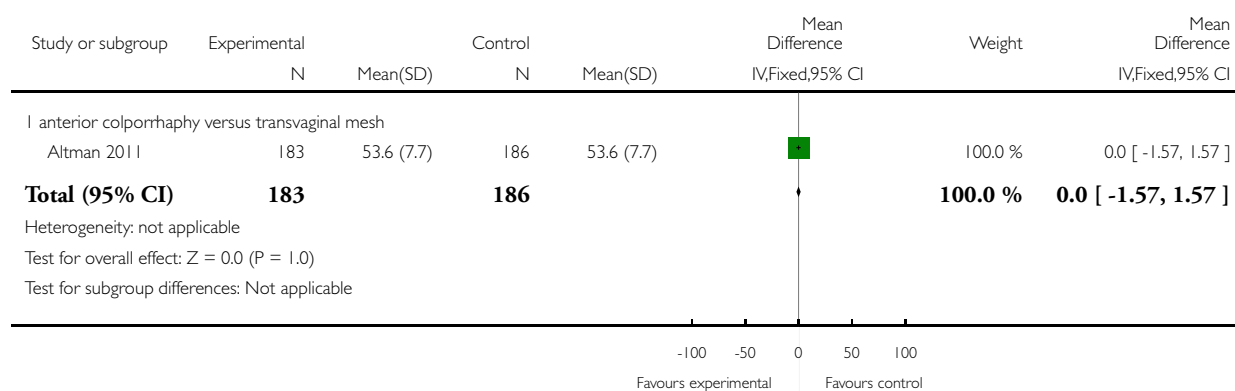


Analysis 2.31. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 31 urinary distress inventory (UDI).

Review: Surgical management of pelvic organ prolapse in women

Comparison: 2 One method of anterior prolapse repair versus another surgical method

Outcome: 31 urinary distress inventory (UDI)

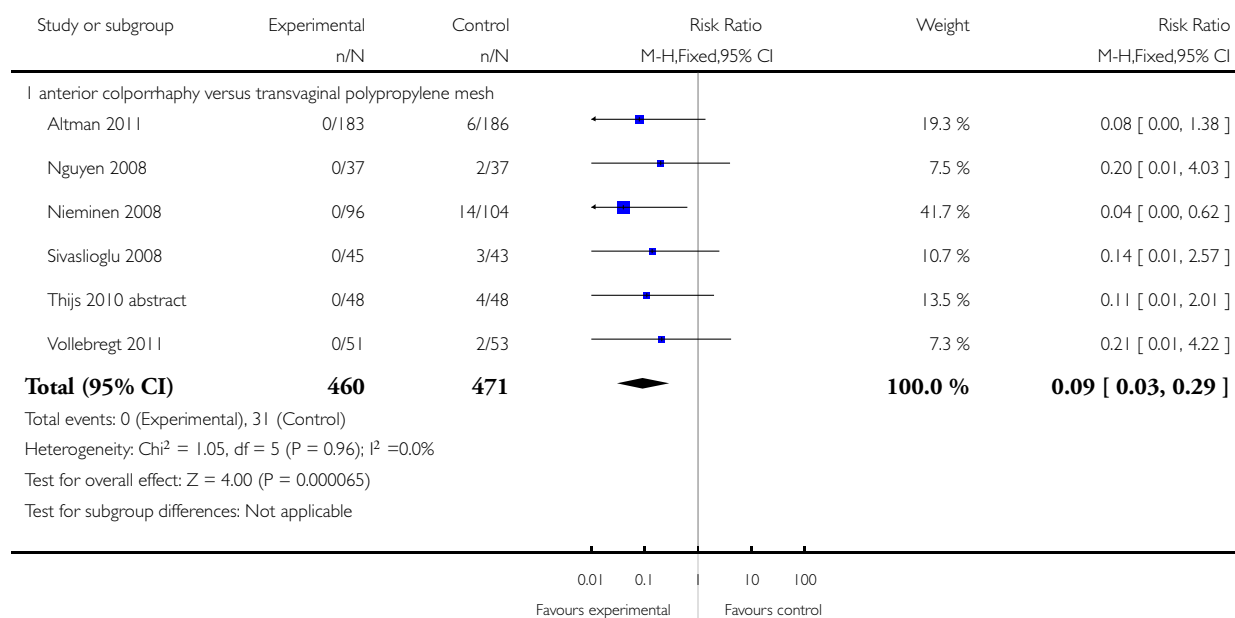


Analysis 2.32. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 32 mesh erosion surgical correction.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 2 One method of anterior prolapse repair versus another surgical method

Outcome: 32 mesh erosion surgical correction

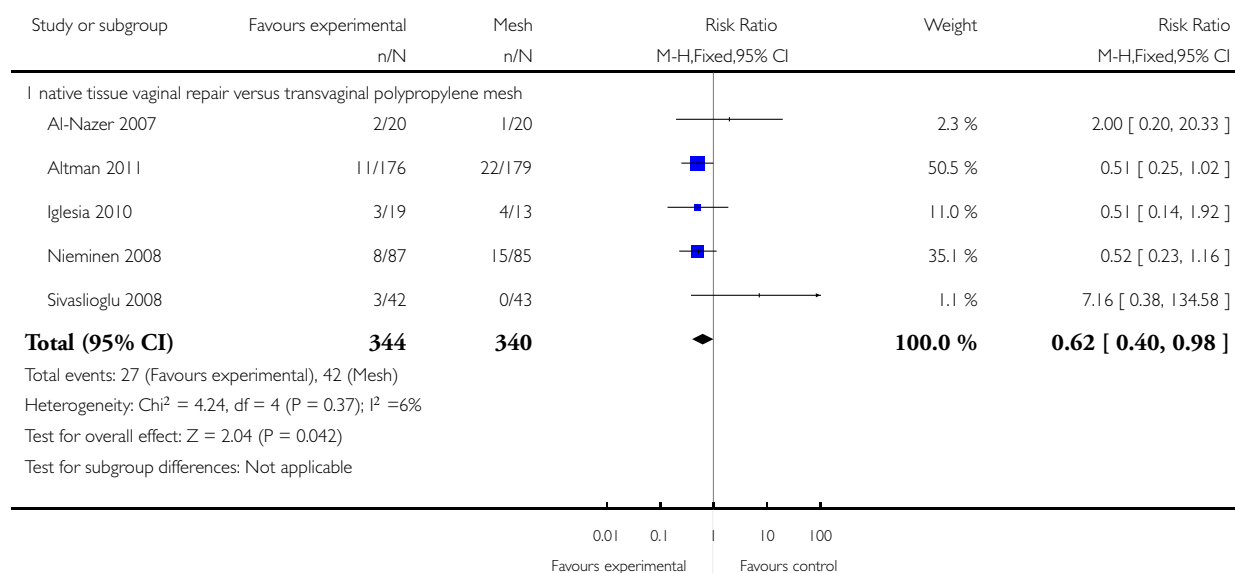


Analysis 2.33. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 33 new urinary stress incontinence postoperative.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 2 One method of anterior prolapse repair versus another surgical method

Outcome: 33 new urinary stress incontinence postoperative

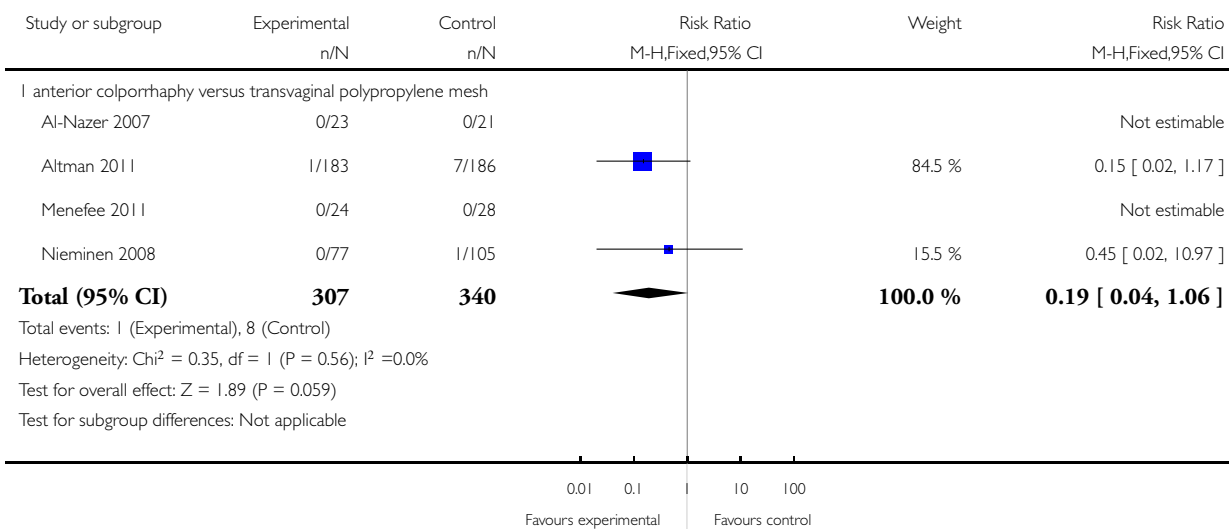


Analysis 2.34. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 34 cystotomy.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 2 One method of anterior prolapse repair versus another surgical method

Outcome: 34 cystotomy

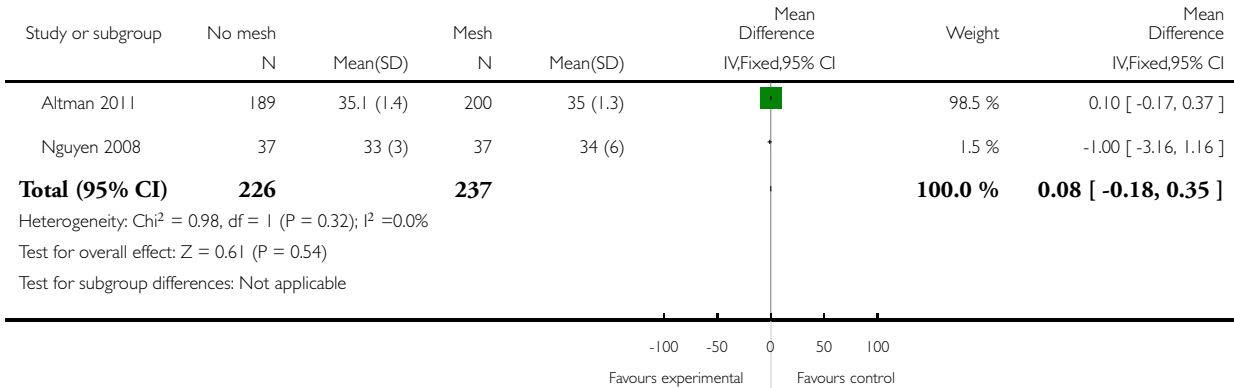


Analysis 2.35. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 35 PISQ-12 Prolapse and Incontinence Sexual Questionnaire.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 2 One method of anterior prolapse repair versus another surgical method

Outcome: 35 PISQ-12 Prolapse and Incontinence Sexual Questionnaire

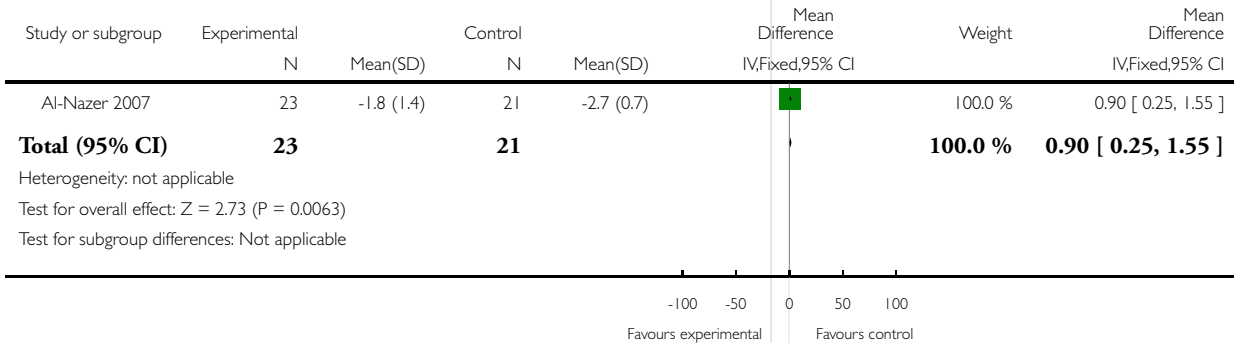


Analysis 2.36. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 36 Point Ba.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 2 One method of anterior prolapse repair versus another surgical method

Outcome: 36 Point Ba

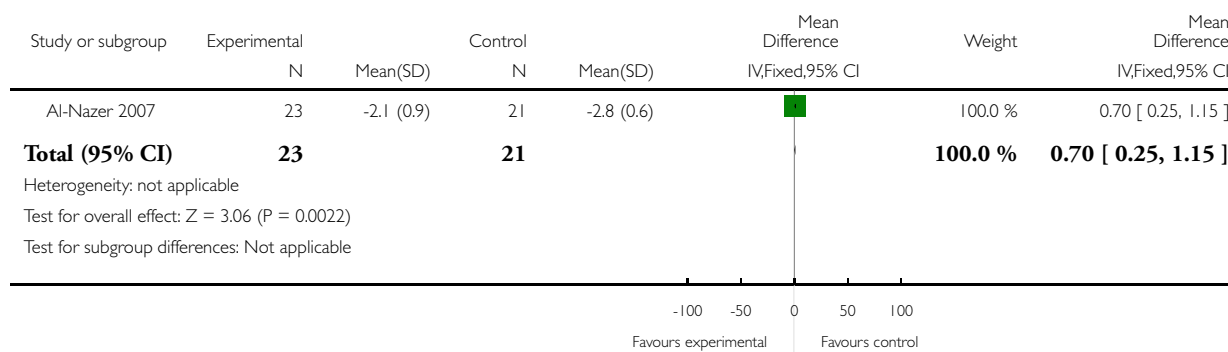


Analysis 2.37. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 37 Point Aa.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 2 One method of anterior prolapse repair versus another surgical method

Outcome: 37 Point Aa

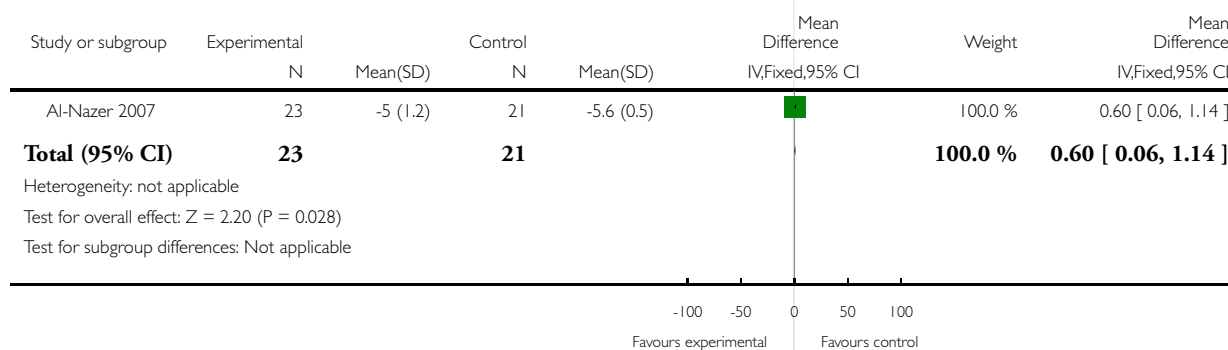


Analysis 2.38. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 38 Point C.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 2 One method of anterior prolapse repair versus another surgical method

Outcome: 38 Point C

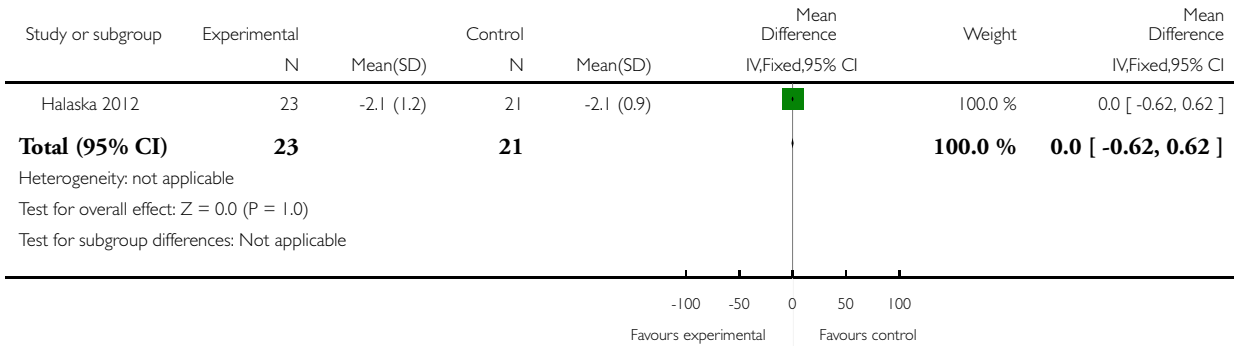


Analysis 2.39. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 39 Point Bp.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 2 One method of anterior prolapse repair versus another surgical method

Outcome: 39 Point Bp

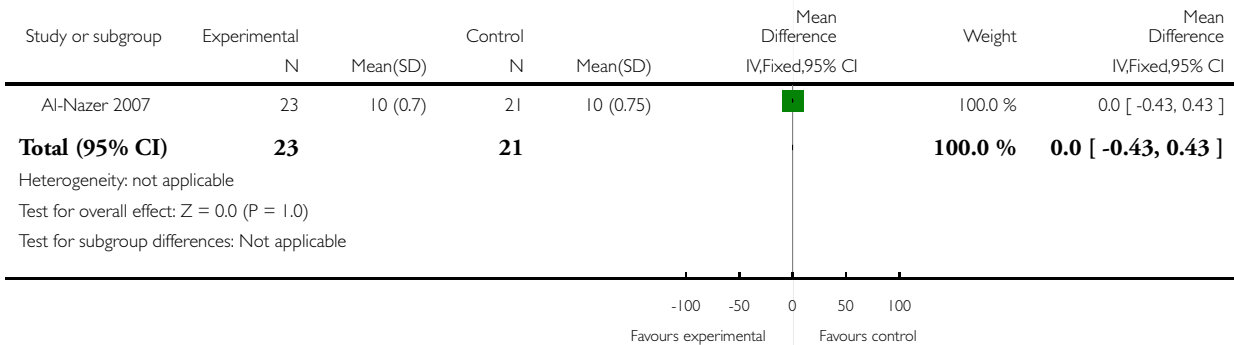


Analysis 2.40. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 40 POPQ Total vaginal length in cm.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 2 One method of anterior prolapse repair versus another surgical method

Outcome: 40 POPQ Total vaginal length in cm

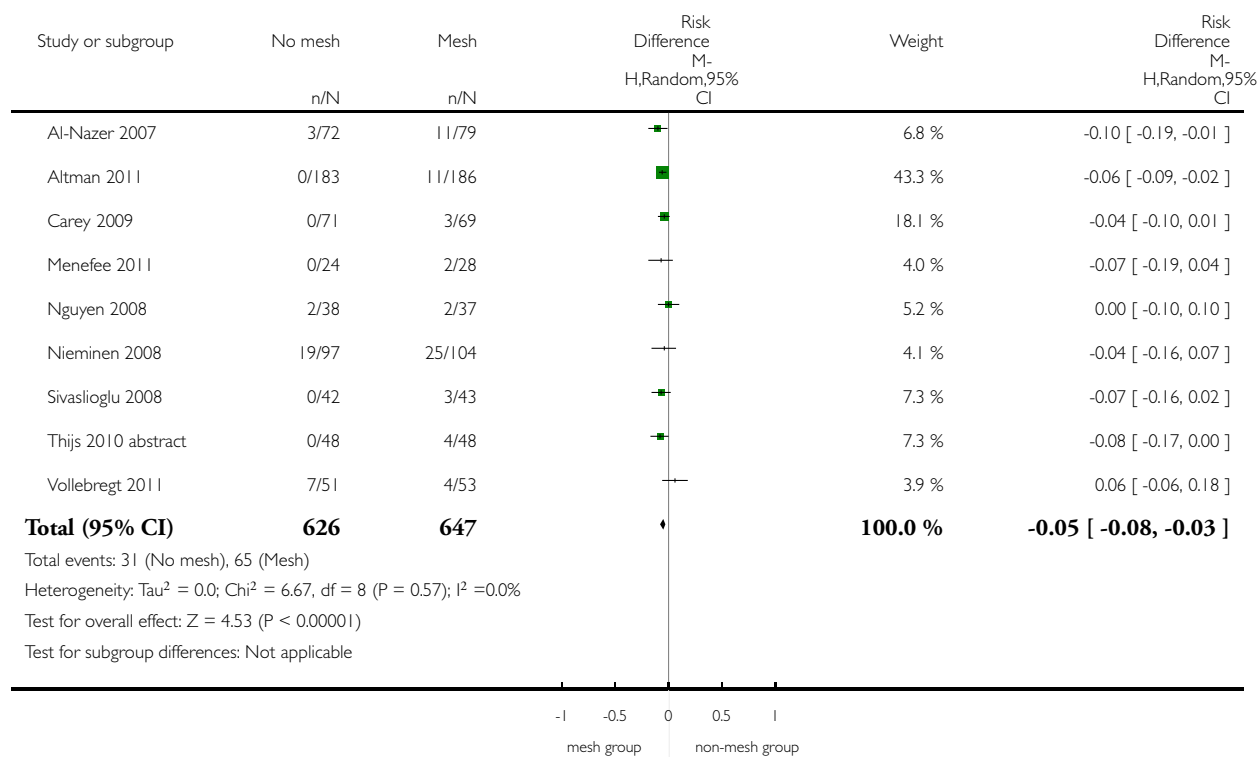


Analysis 2.41. Comparison 2 One method of anterior prolapse repair versus another surgical method, Outcome 41 Subsequent surgery (prolapse, incontinence, mesh exposure, pain).

Review: Surgical management of pelvic organ prolapse in women

Comparison: 2 One method of anterior prolapse repair versus another surgical method

Outcome: 41 Subsequent surgery (prolapse, incontinence, mesh exposure, pain)

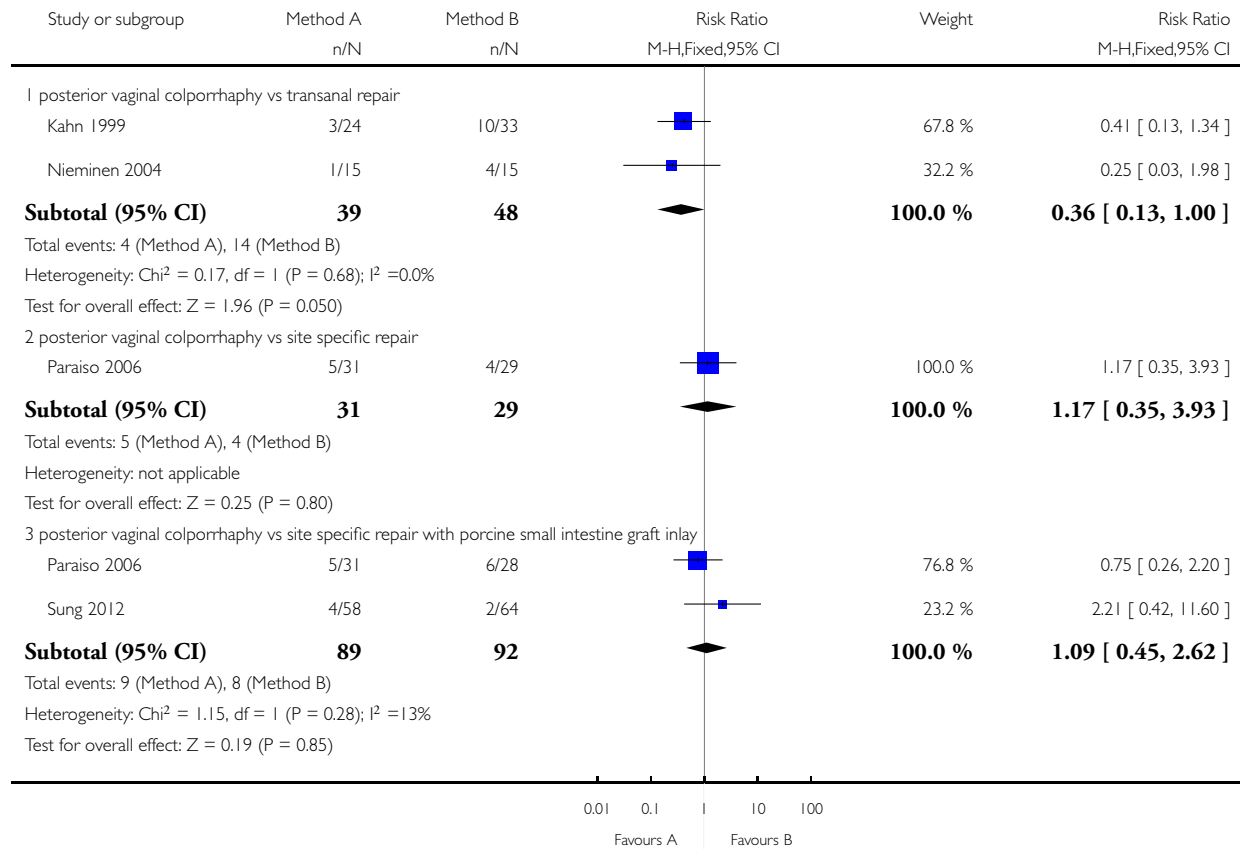


Analysis 3.1. Comparison 3 One method of posterior prolapse repair versus another surgical method, Outcome 1 Number of women with prolapse symptoms (subjective failure).

Review: Surgical management of pelvic organ prolapse in women

Comparison: 3 One method of posterior prolapse repair versus another surgical method

Outcome: 1 Number of women with prolapse symptoms (subjective failure)

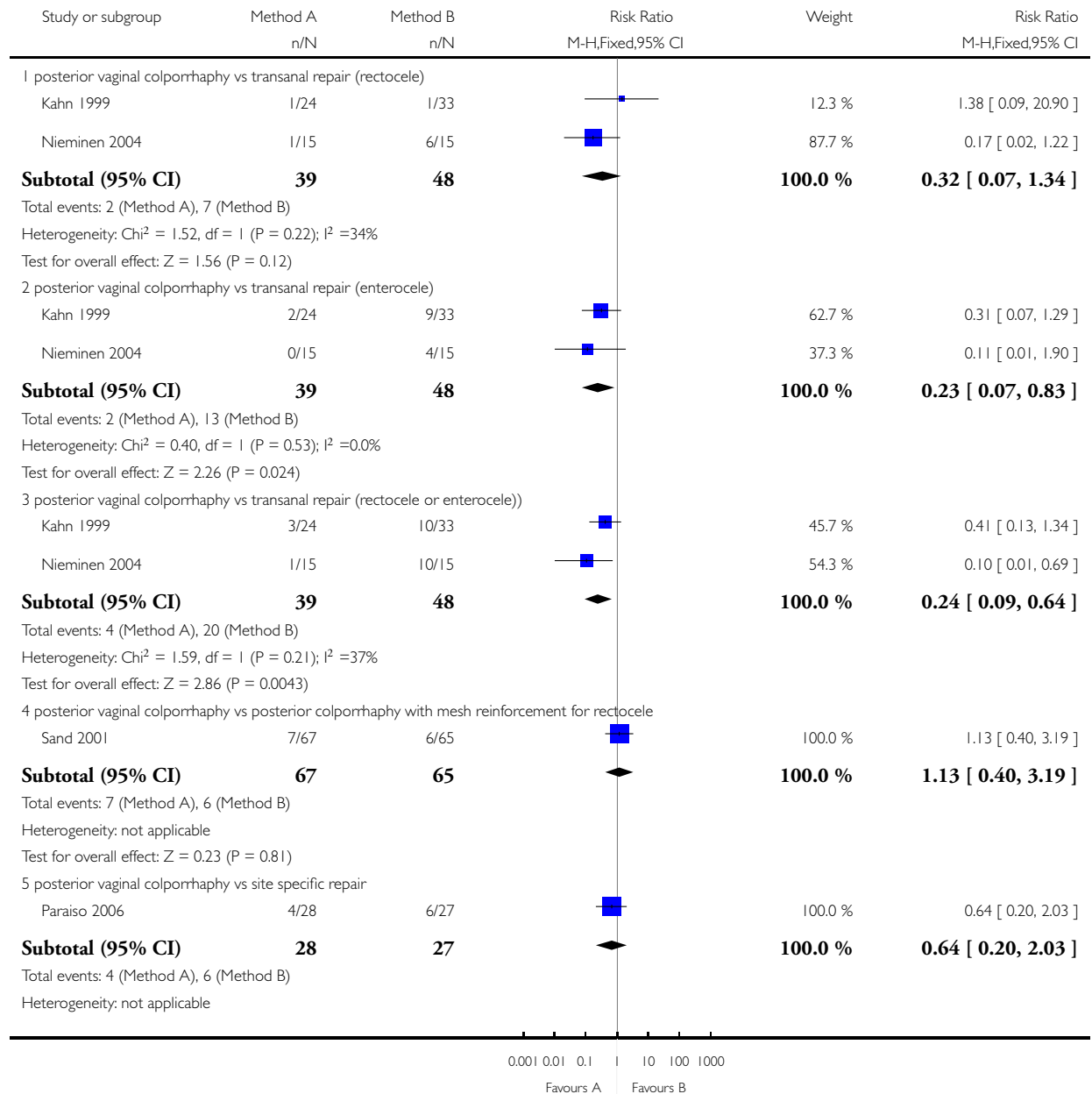


Analysis 3.2. Comparison 3 One method of posterior prolapse repair versus another surgical method, Outcome 2 Number of women with prolapse (objective failure).

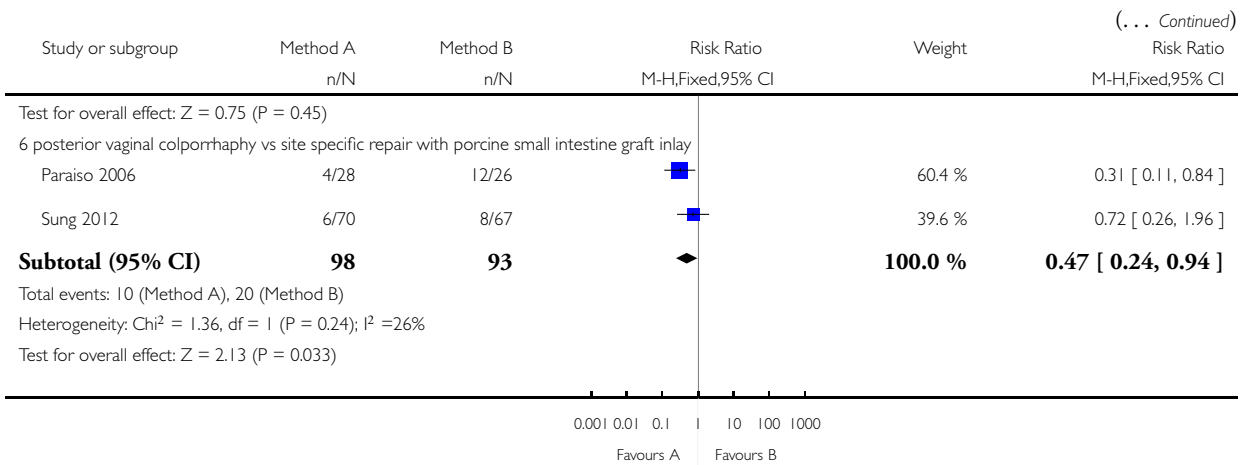
Review: Surgical management of pelvic organ prolapse in women

Comparison: 3 One method of posterior prolapse repair versus another surgical method

Outcome: 2 Number of women with prolapse (objective failure)



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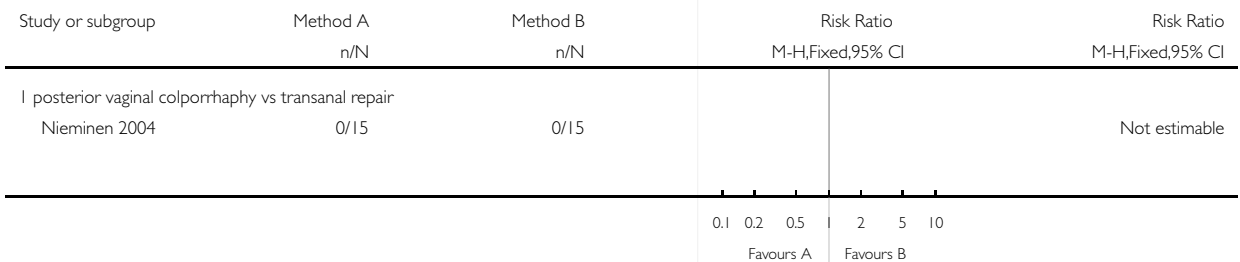


Analysis 3.3. Comparison 3 One method of posterior prolapse repair versus another surgical method, Outcome 3 Number of women with faecal incontinence after operation.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 3 One method of posterior prolapse repair versus another surgical method

Outcome: 3 Number of women with faecal incontinence after operation

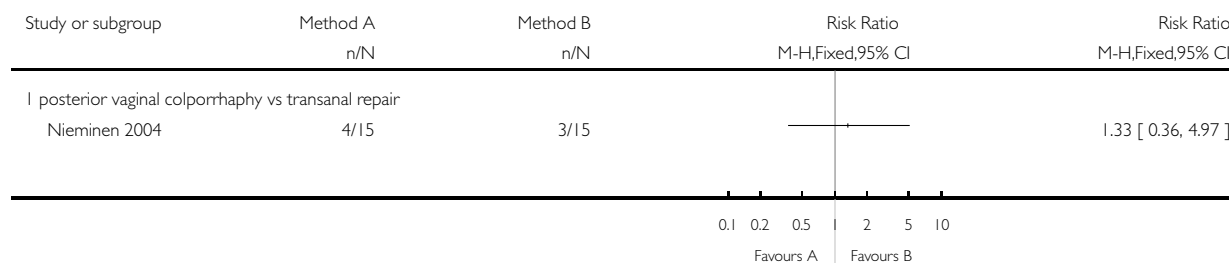


Analysis 3.4. Comparison 3 One method of posterior prolapse repair versus another surgical method, Outcome 4 Number of women with anal incontinence to flatus after operation.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 3 One method of posterior prolapse repair versus another surgical method

Outcome: 4 Number of women with anal incontinence to flatus after operation

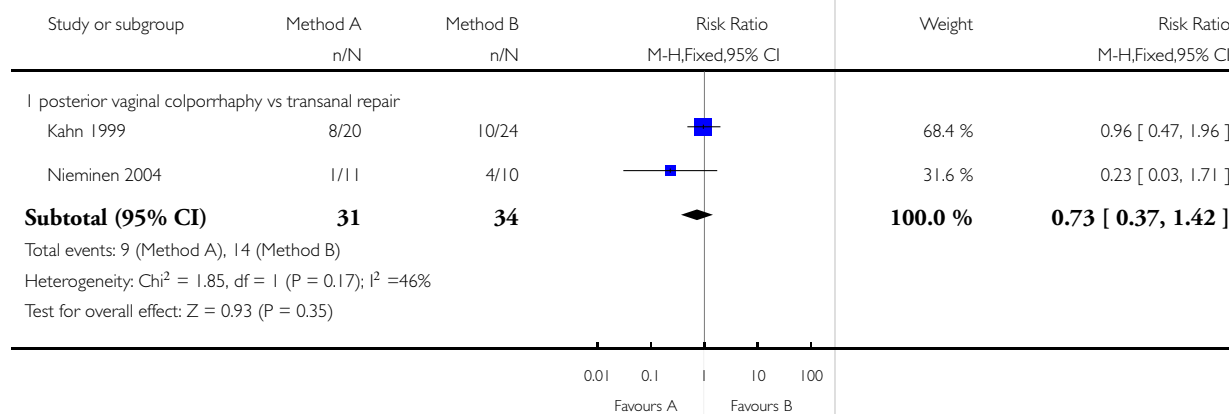


Analysis 3.5. Comparison 3 One method of posterior prolapse repair versus another surgical method, Outcome 5 Number of women with obstructed defecation / constipation after surgery.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 3 One method of posterior prolapse repair versus another surgical method

Outcome: 5 Number of women with obstructed defecation / constipation after surgery

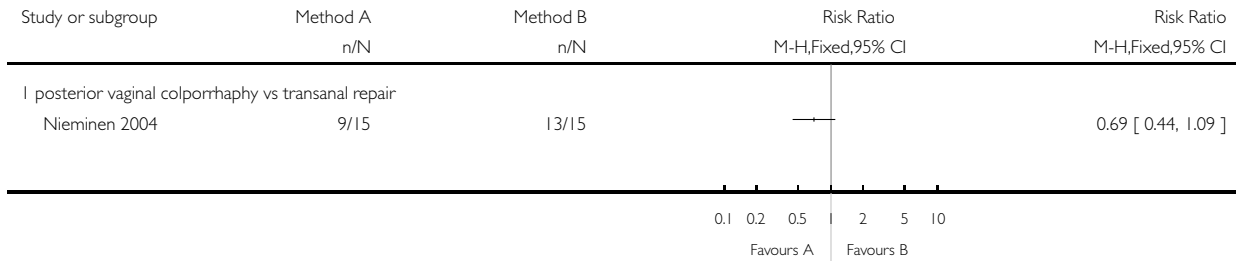


Analysis 3.6. Comparison 3 One method of posterior prolapse repair versus another surgical method, Outcome 6 Number of women with sexual function not improved after operation.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 3 One method of posterior prolapse repair versus another surgical method

Outcome: 6 Number of women with sexual function not improved after operation

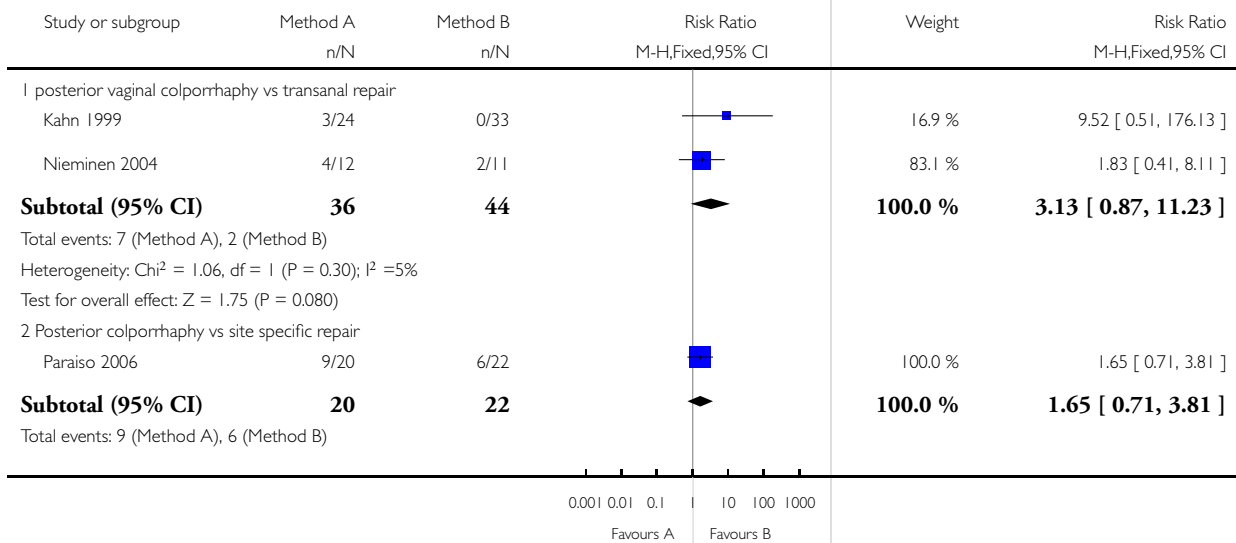


Analysis 3.7. Comparison 3 One method of posterior prolapse repair versus another surgical method, Outcome 7 Number of women with dyspareunia.

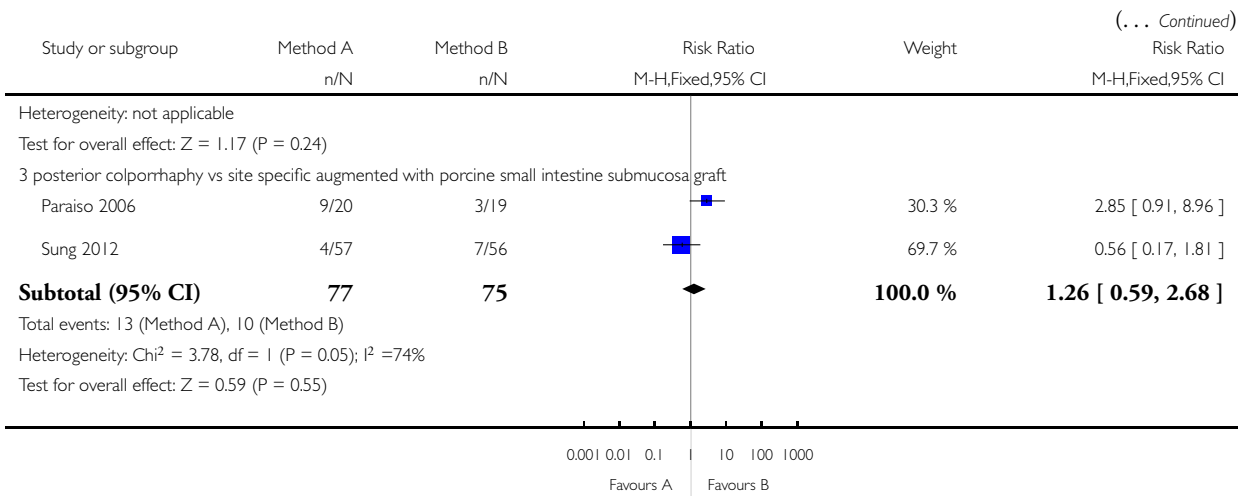
Review: Surgical management of pelvic organ prolapse in women

Comparison: 3 One method of posterior prolapse repair versus another surgical method

Outcome: 7 Number of women with dyspareunia



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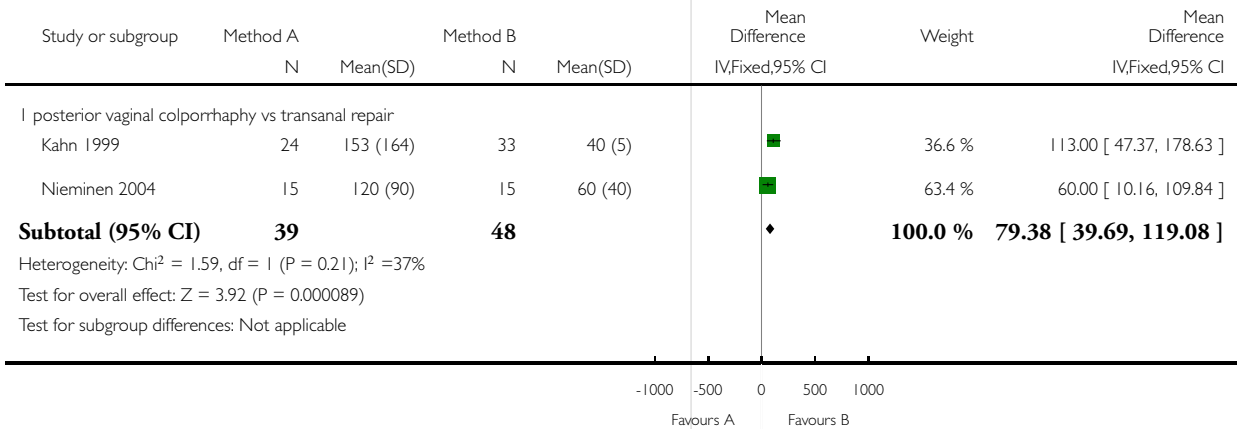


Analysis 3.8. Comparison 3 One method of posterior prolapse repair versus another surgical method, Outcome 8 Blood loss (ml).

Review: Surgical management of pelvic organ prolapse in women

Comparison: 3 One method of posterior prolapse repair versus another surgical method

Outcome: 8 Blood loss (ml)

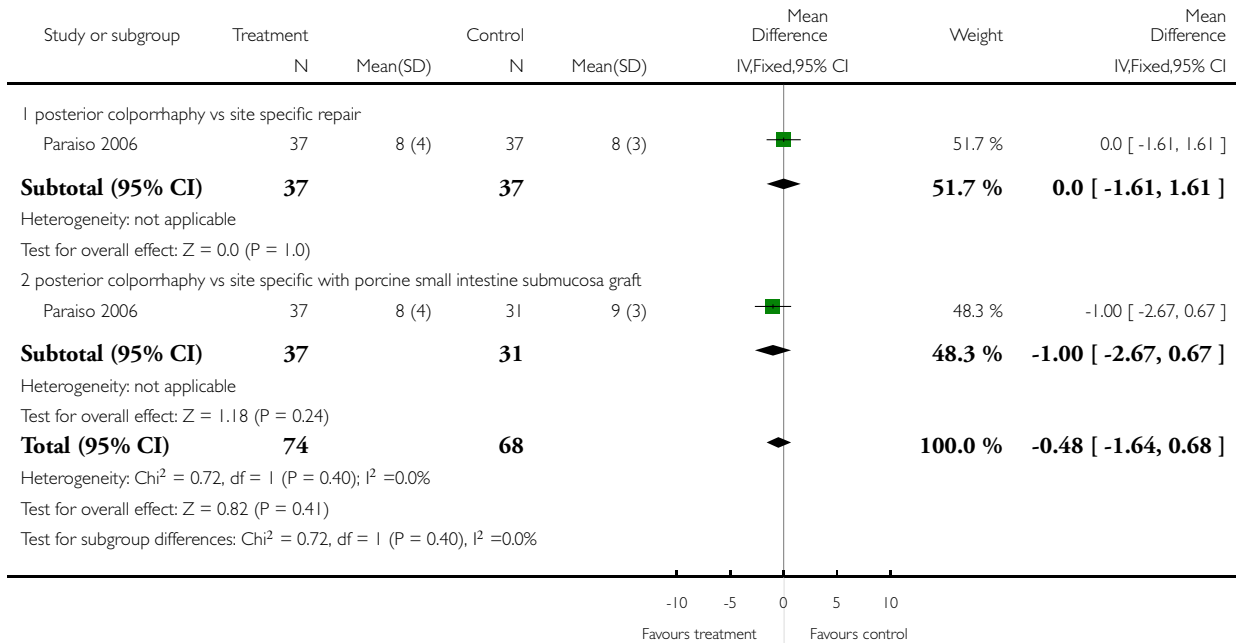


Analysis 3.9. Comparison 3 One method of posterior prolapse repair versus another surgical method, Outcome 9 Change in hematocrit.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 3 One method of posterior prolapse repair versus another surgical method

Outcome: 9 Change in hematocrit

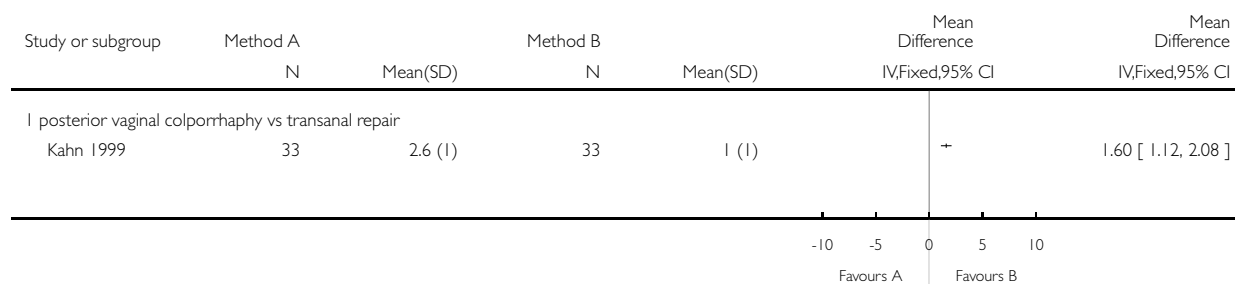


Analysis 3.10. Comparison 3 One method of posterior prolapse repair versus another surgical method, Outcome 10 Difference in haemoglobin.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 3 One method of posterior prolapse repair versus another surgical method

Outcome: 10 Difference in haemoglobin

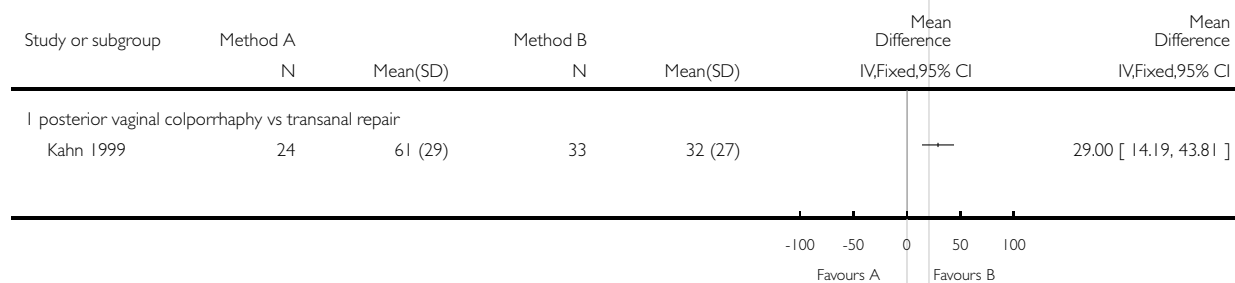


Analysis 3.11. Comparison 3 One method of posterior prolapse repair versus another surgical method, Outcome 11 Postoperative narcotic (morphine) use.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 3 One method of posterior prolapse repair versus another surgical method

Outcome: 11 Postoperative narcotic (morphine) use

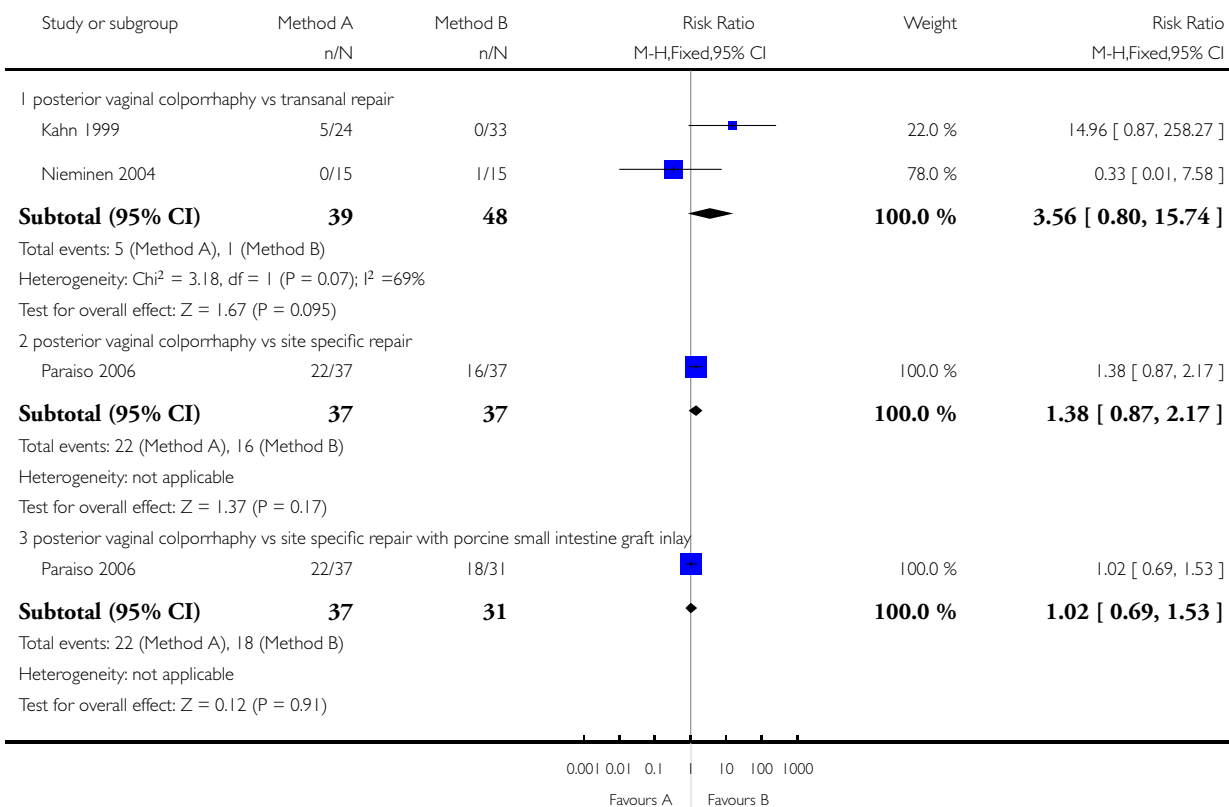


Analysis 3.12. Comparison 3 One method of posterior prolapse repair versus another surgical method, Outcome 12 Number of women with postoperative complications.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 3 One method of posterior prolapse repair versus another surgical method

Outcome: 12 Number of women with postoperative complications

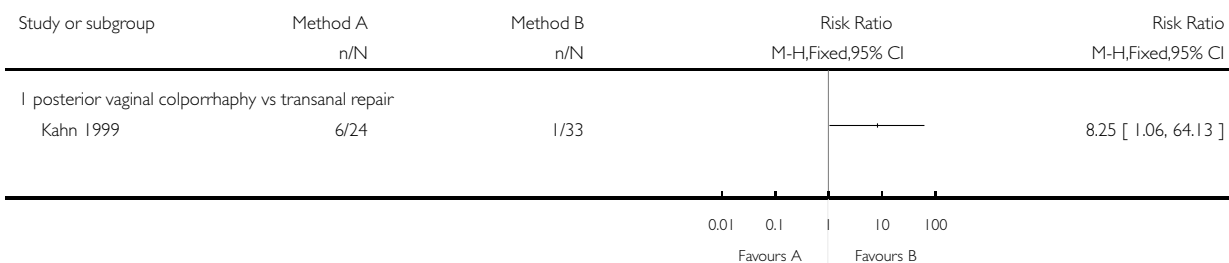


Analysis 3.13. Comparison 3 One method of posterior prolapse repair versus another surgical method, Outcome 13 Persistent postoperative pain.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 3 One method of posterior prolapse repair versus another surgical method

Outcome: 13 Persistent postoperative pain

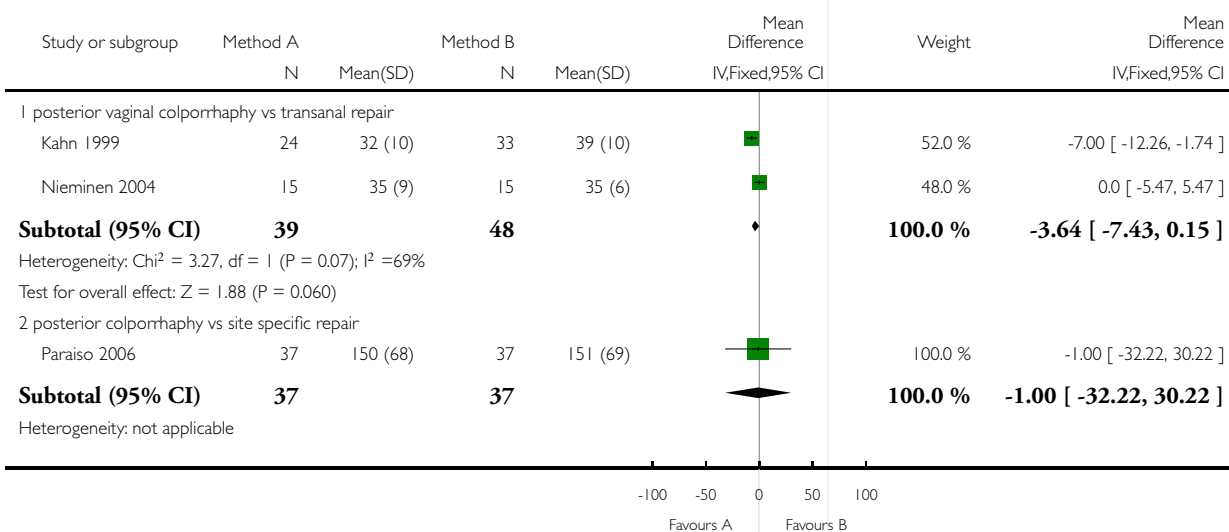


Analysis 3.14. Comparison 3 One method of posterior prolapse repair versus another surgical method, Outcome 14 Operating time (minutes).

Review: Surgical management of pelvic organ prolapse in women

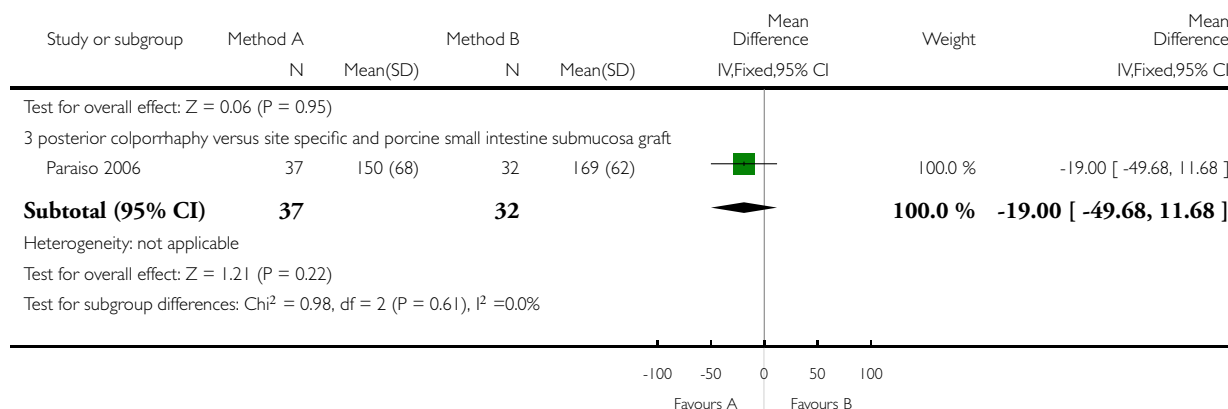
Comparison: 3 One method of posterior prolapse repair versus another surgical method

Outcome: 14 Operating time (minutes)



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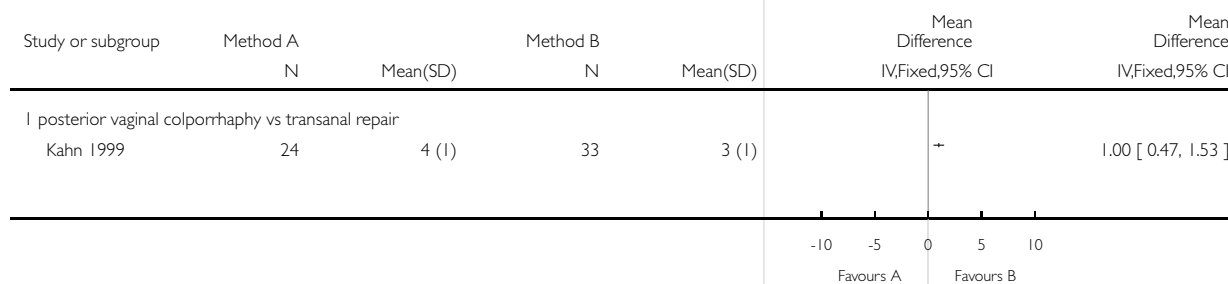


Analysis 3.15. Comparison 3 One method of posterior prolapse repair versus another surgical method, Outcome 15 Length of stay in hospital (days).

Review: Surgical management of pelvic organ prolapse in women

Comparison: 3 One method of posterior prolapse repair versus another surgical method

Outcome: 15 Length of stay in hospital (days)

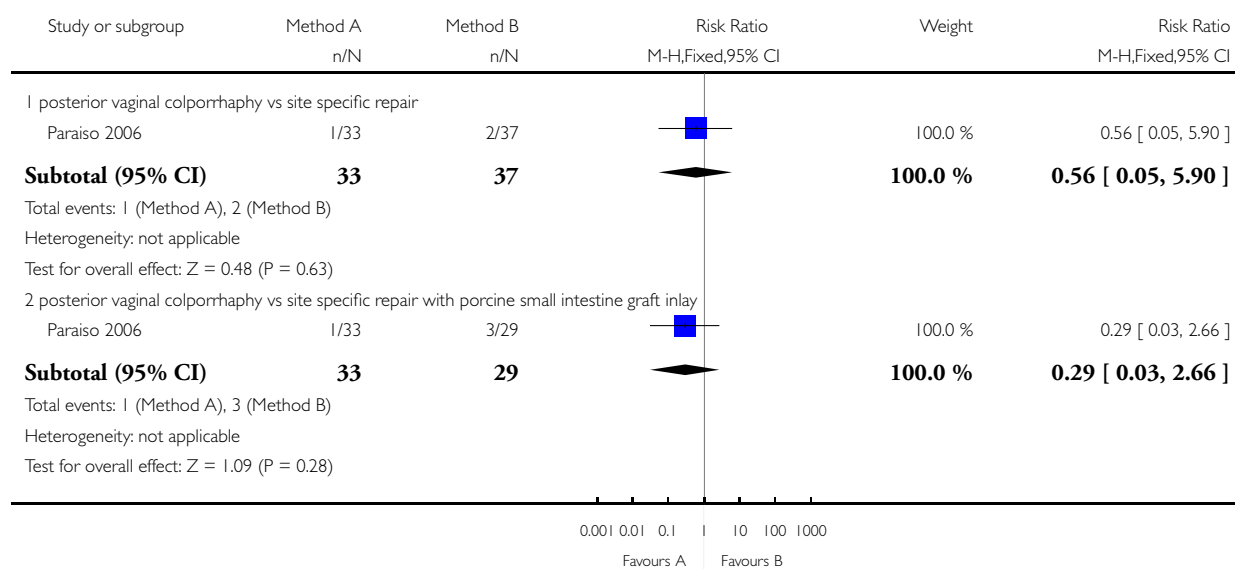


Analysis 3.16. Comparison 3 One method of posterior prolapse repair versus another surgical method, Outcome 16 Number of women having further prolapse surgery.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 3 One method of posterior prolapse repair versus another surgical method

Outcome: 16 Number of women having further prolapse surgery

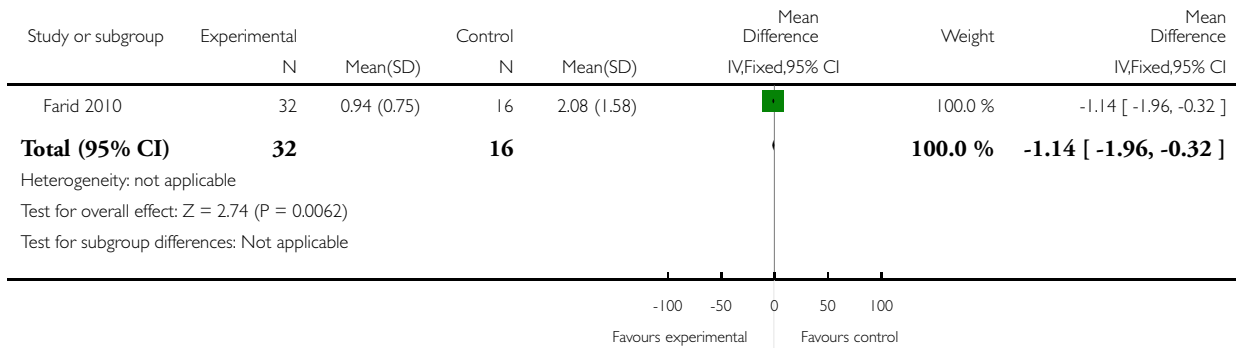


Analysis 3.17. Comparison 3 One method of posterior prolapse repair versus another surgical method, Outcome 17 rectocele size (centimetres) on defecography.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 3 One method of posterior prolapse repair versus another surgical method

Outcome: 17 rectocele size (centimetres) on defecography

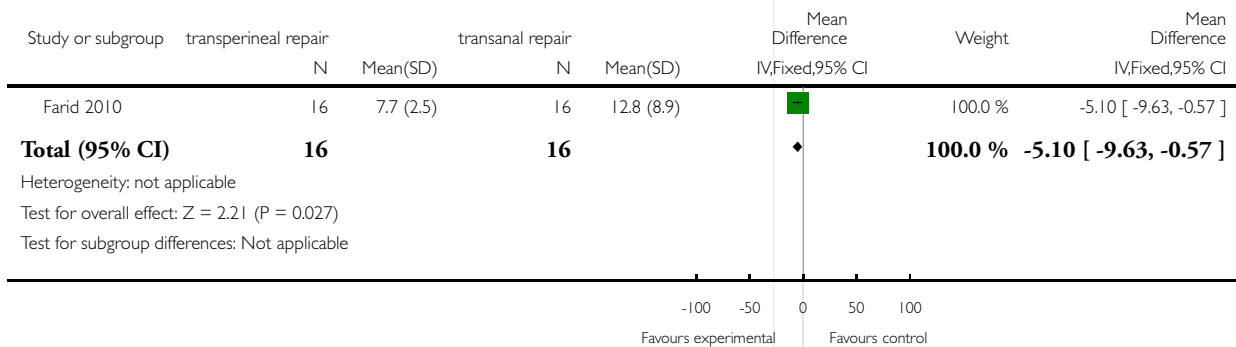


Analysis 3.18. Comparison 3 One method of posterior prolapse repair versus another surgical method, Outcome 18 modified obstructed defecation syndrome patient questionnaire.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 3 One method of posterior prolapse repair versus another surgical method

Outcome: 18 modified obstructed defecation syndrome patient questionnaire

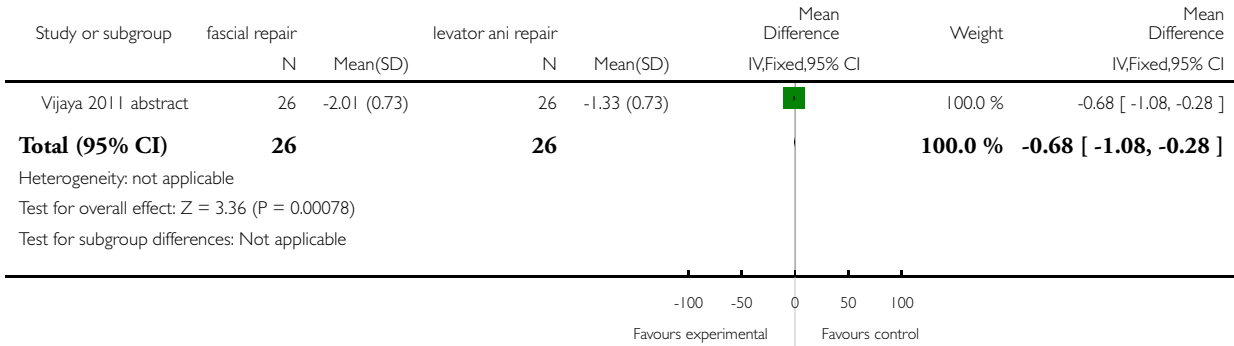


Analysis 3.19. Comparison 3 One method of posterior prolapse repair versus another surgical method, Outcome 19 rectocele on examination (point Ap).

Review: Surgical management of pelvic organ prolapse in women

Comparison: 3 One method of posterior prolapse repair versus another surgical method

Outcome: 19 rectocele on examination (point Ap)

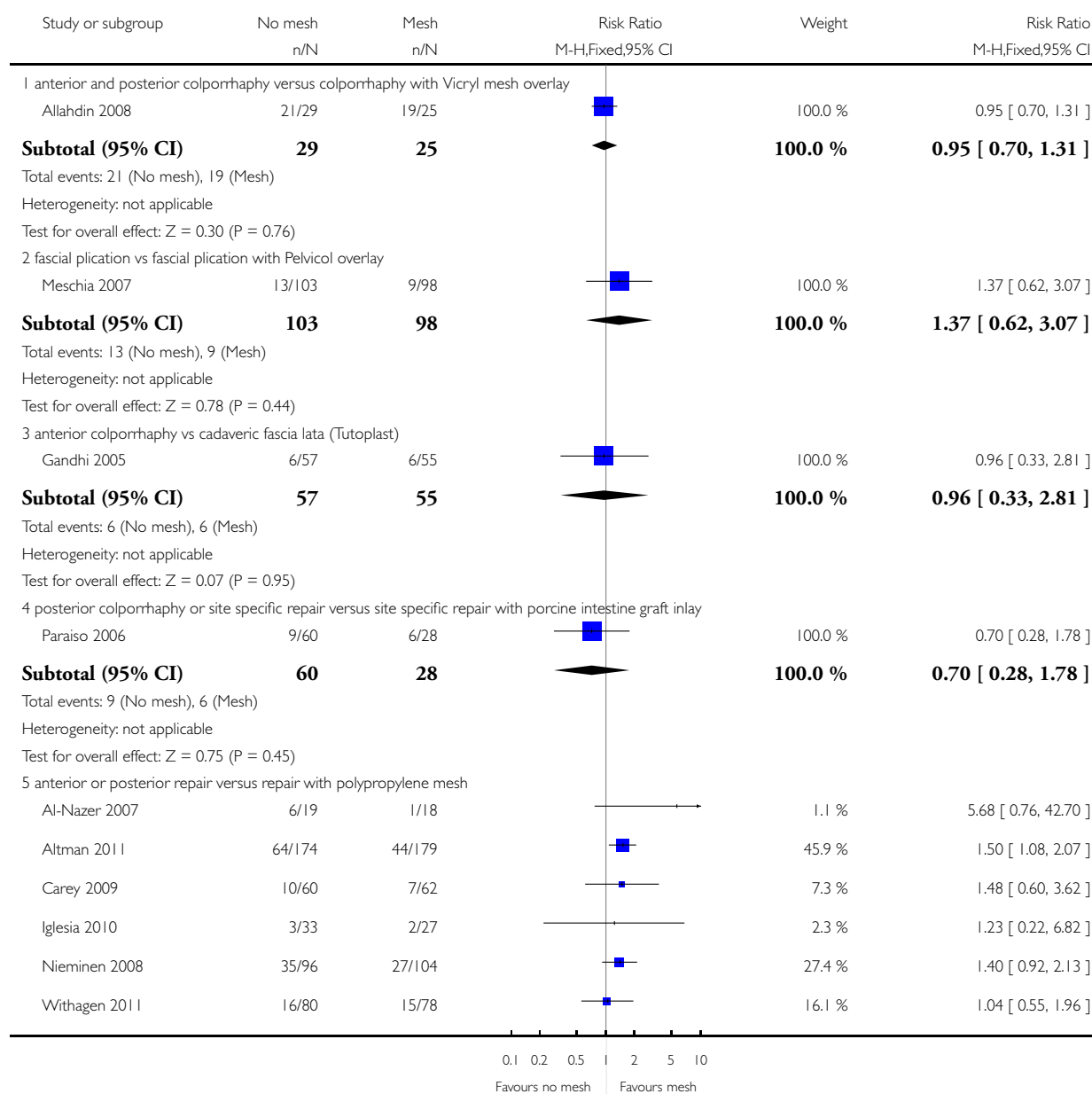


Analysis 6.1. Comparison 6 No graft versus use of graft (synthetic mesh or biological graft), Outcome 1 Number of women with prolapse symptoms (subjective failure).

Review: Surgical management of pelvic organ prolapse in women

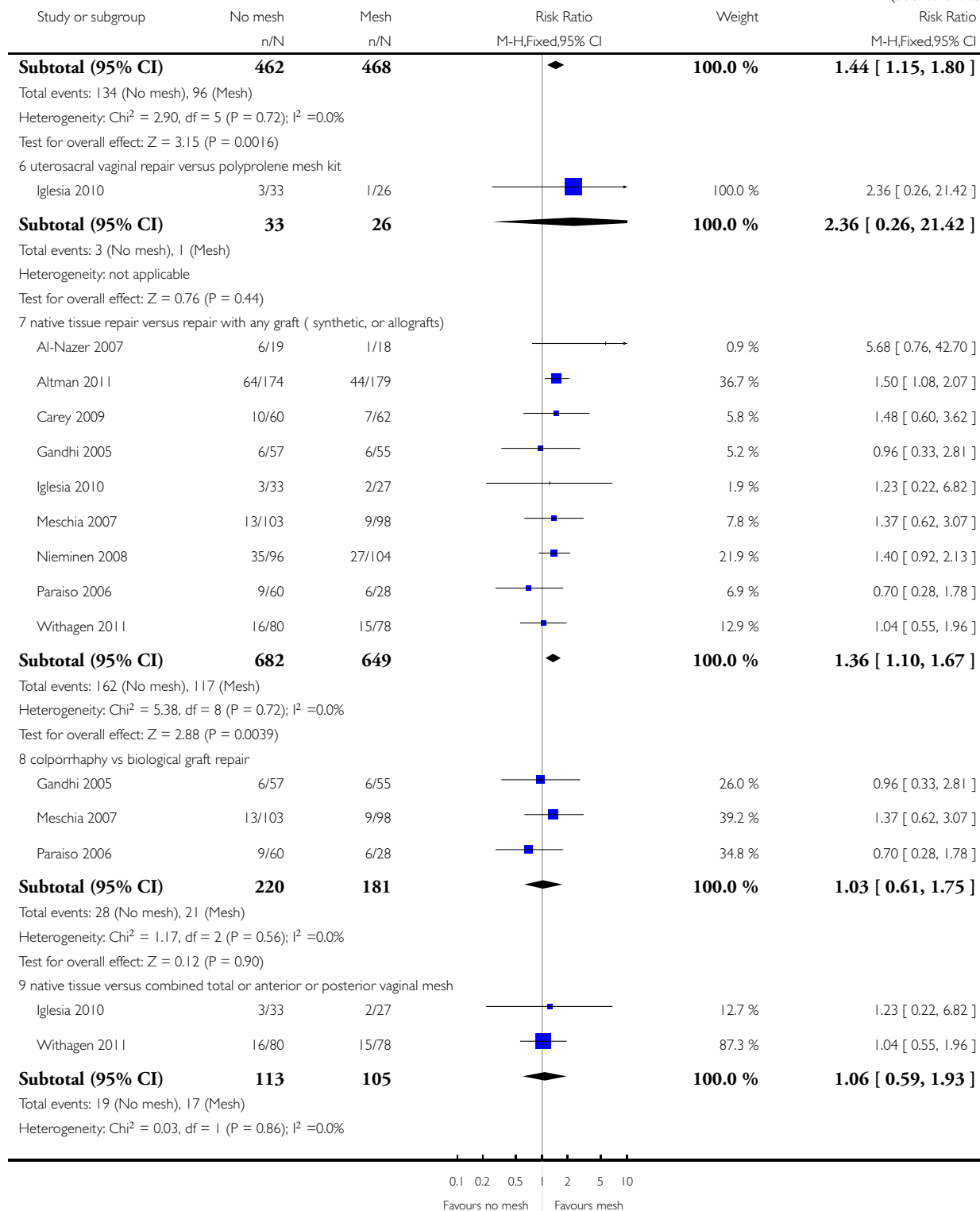
Comparison: 6 No graft versus use of graft (synthetic mesh or biological graft)

Outcome: 1 Number of women with prolapse symptoms (subjective failure)



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Study or subgroup	No mesh n/N	Mesh n/N	Risk Ratio		Weight	Risk Ratio
			M-H,Fixed,95% CI			M-H,Fixed,95% CI

Test for overall effect: $Z = 0.20$ ($P = 0.84$)
 Test for subgroup differences: $\text{Chi}^2 = 7.78$, $\text{df} = 8$ ($P = 0.46$), $I^2 = 0.0\%$

0.1 0.2 0.5 | 2 5 10
 Favours no mesh Favours mesh

Analysis 6.2. Comparison 6 No graft versus use of graft (synthetic mesh or biological graft), Outcome 2 Prolapse symptom score at 1 to 5 years.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 6 No graft versus use of graft (synthetic mesh or biological graft)

Outcome: 2 Prolapse symptom score at 1 to 5 years

Study or subgroup	No mesh		Mesh		Mean Difference	Mean Difference
	N	Mean(SD)	N	Mean(SD)	IV,Fixed,95% CI	IV,Fixed,95% CI

I anterior and posterior colporrhaphy versus colporrhaphy with Vicryl mesh overlay						
Allahdin 2008	29	4.3 (6.3)	25	4.3 (4.2)		0.0 [-2.82, 2.82]

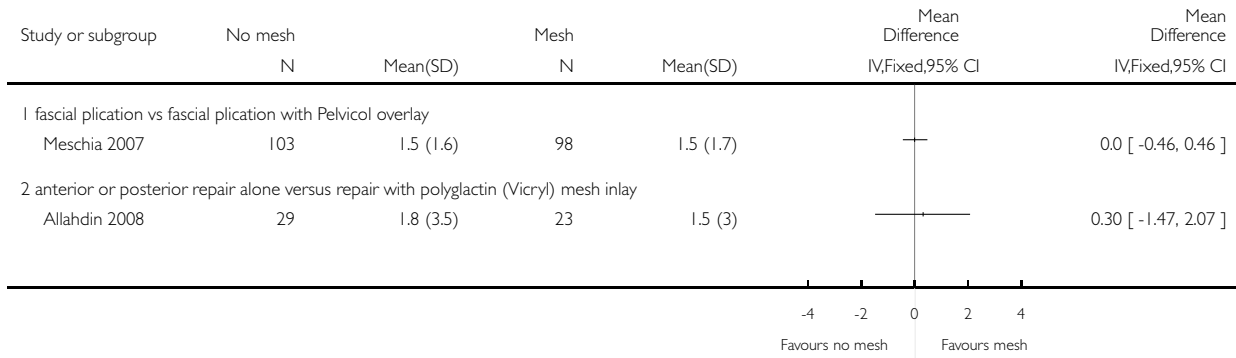
-4 -2 0 2 4
 Favours no mesh Favours mesh

Analysis 6.3. Comparison 6 No graft versus use of graft (synthetic mesh or biological graft), Outcome 3 Quality of life (VAS) for severity of prolapse symptoms.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 6 No graft versus use of graft (synthetic mesh or biological graft)

Outcome: 3 Quality of life (VAS) for severity of prolapse symptoms

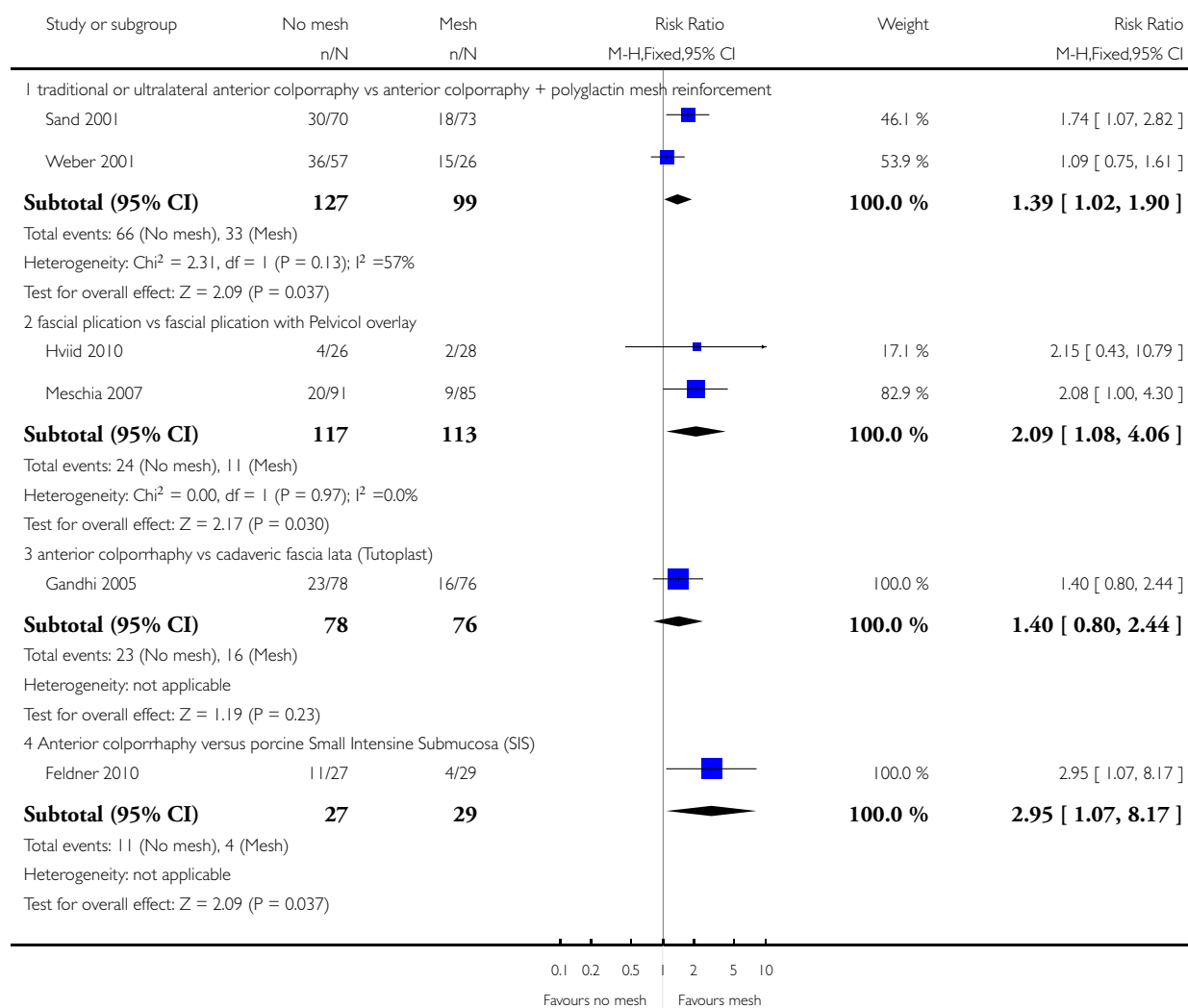


Analysis 6.4. Comparison 6 No graft versus use of graft (synthetic mesh or biological graft), Outcome 4 Number of women with anterior prolapse / cystocele (objective failure).

Review: Surgical management of pelvic organ prolapse in women

Comparison: 6 No graft versus use of graft (synthetic mesh or biological graft)

Outcome: 4 Number of women with anterior prolapse / cystocele (objective failure)

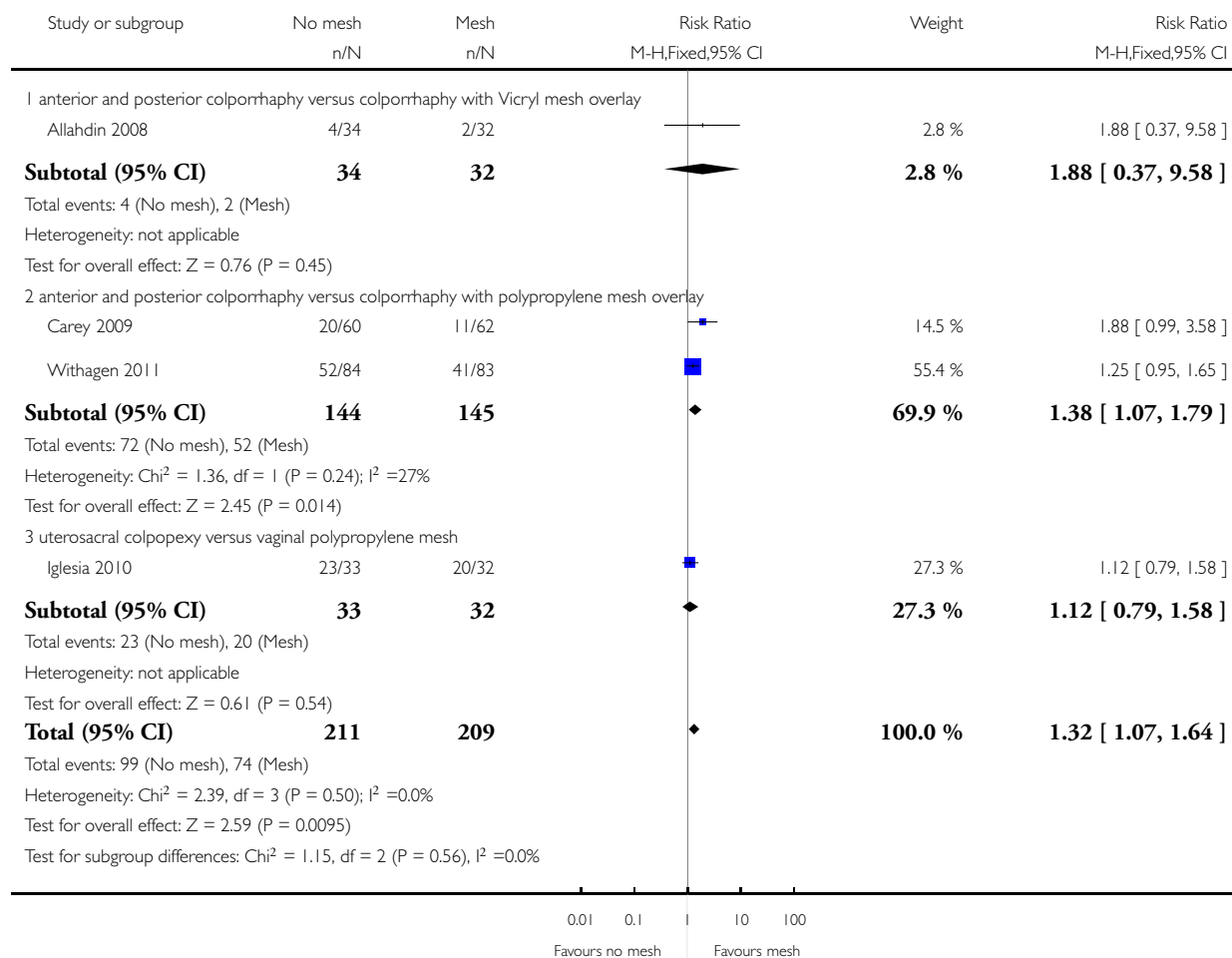


Analysis 6.5. Comparison 6 No graft versus use of graft (synthetic mesh or biological graft), Outcome 5 Objective failure all sites.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 6 No graft versus use of graft (synthetic mesh or biological graft)

Outcome: 5 Objective failure all sites

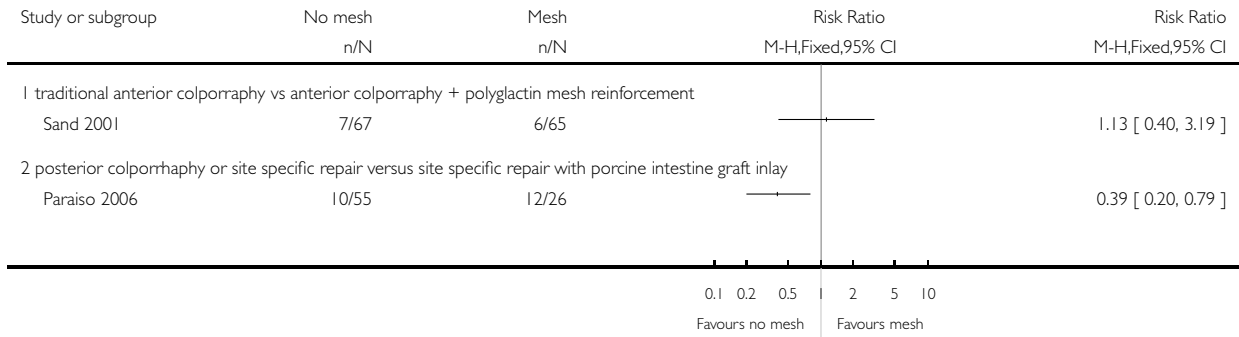


Analysis 6.6. Comparison 6 No graft versus use of graft (synthetic mesh or biological graft), Outcome 6 Number of women with posterior prolapse / rectocele (objective failure).

Review: Surgical management of pelvic organ prolapse in women

Comparison: 6 No graft versus use of graft (synthetic mesh or biological graft)

Outcome: 6 Number of women with posterior prolapse / rectocele (objective failure)

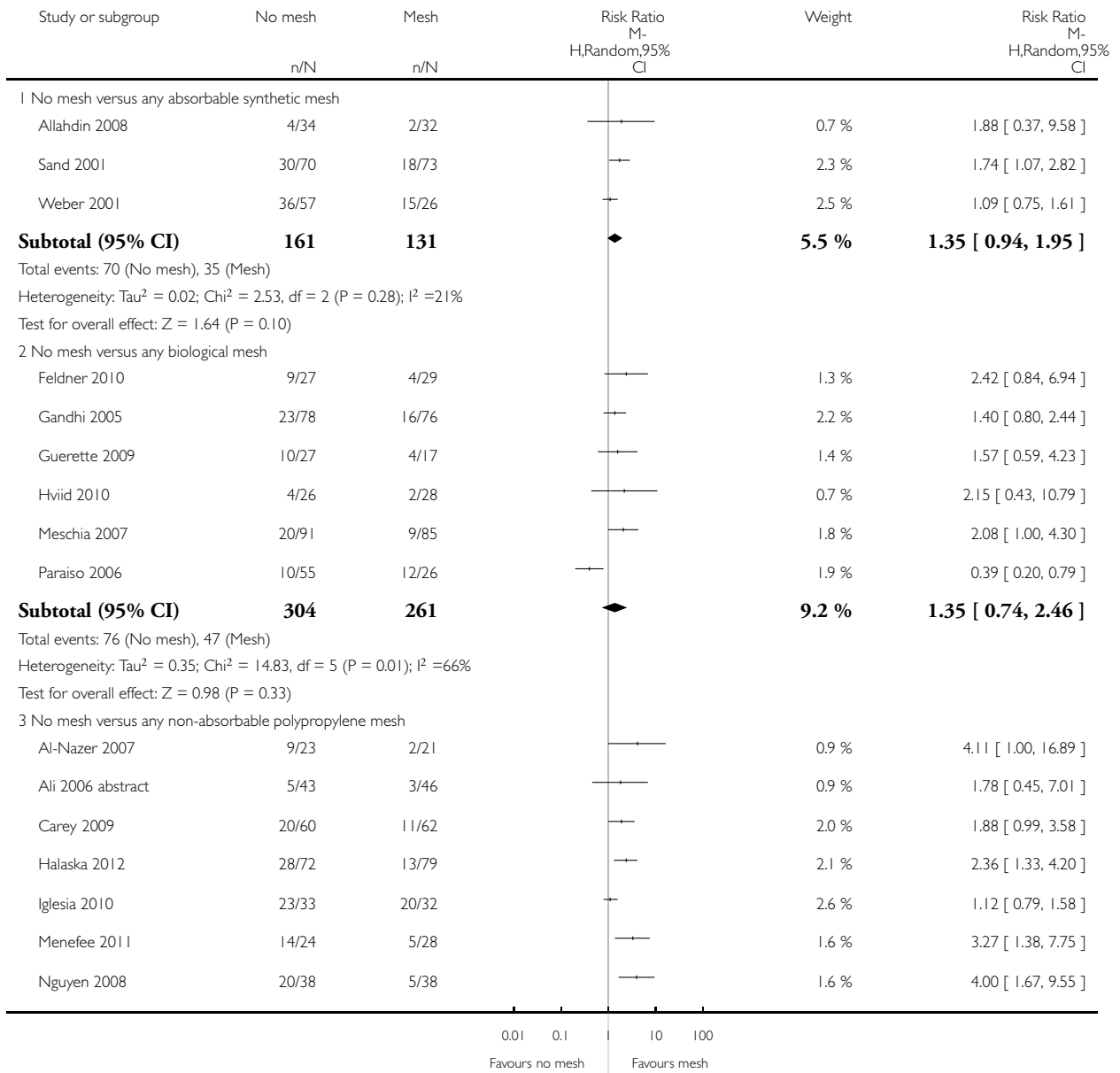


Analysis 6.7. Comparison 6 No graft versus use of graft (synthetic mesh or biological graft), Outcome 7 Objective failure, any site, no mesh versus any mesh.

Review: Surgical management of pelvic organ prolapse in women

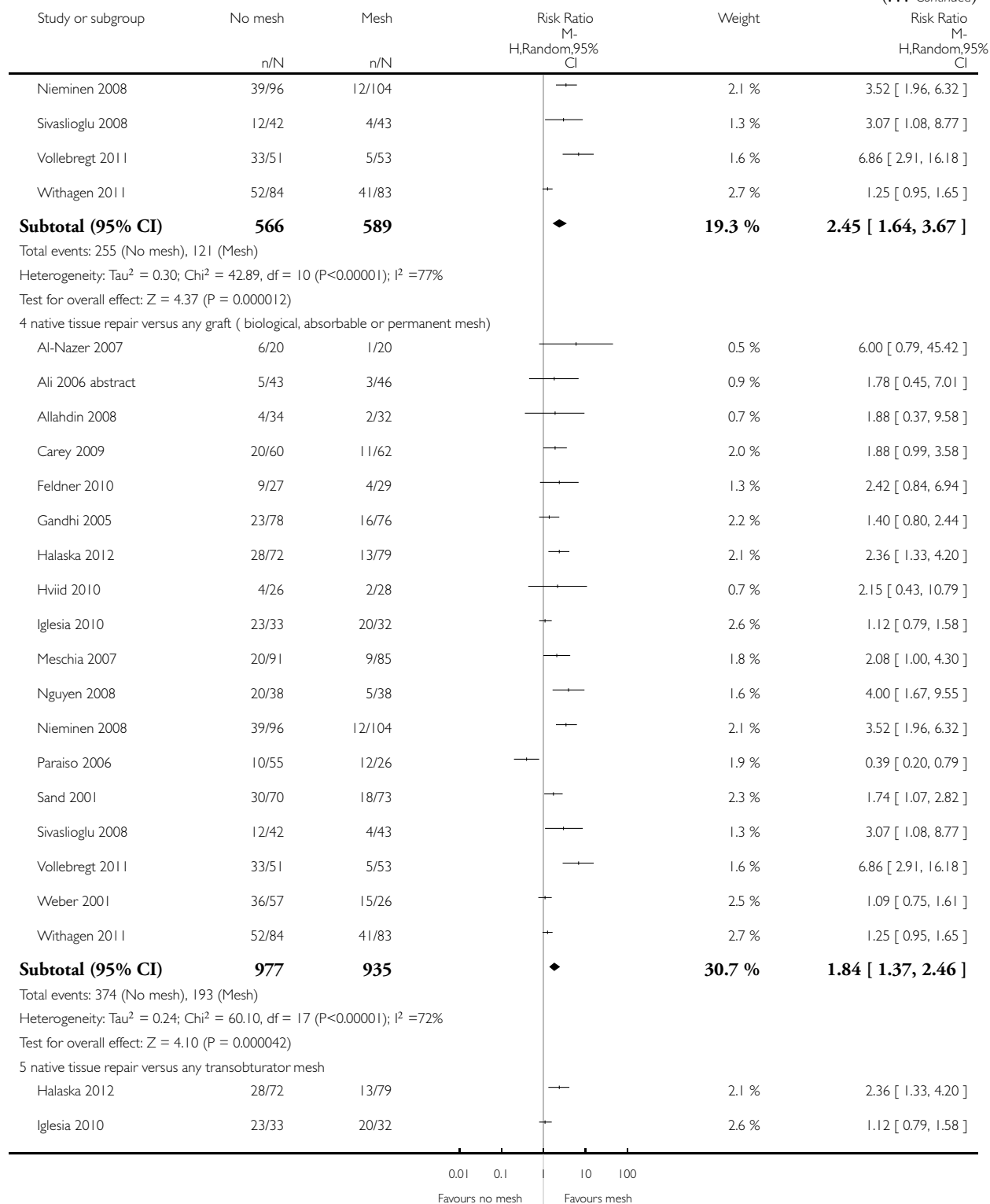
Comparison: 6 No graft versus use of graft (synthetic mesh or biological graft)

Outcome: 7 Objective failure, any site, no mesh versus any mesh



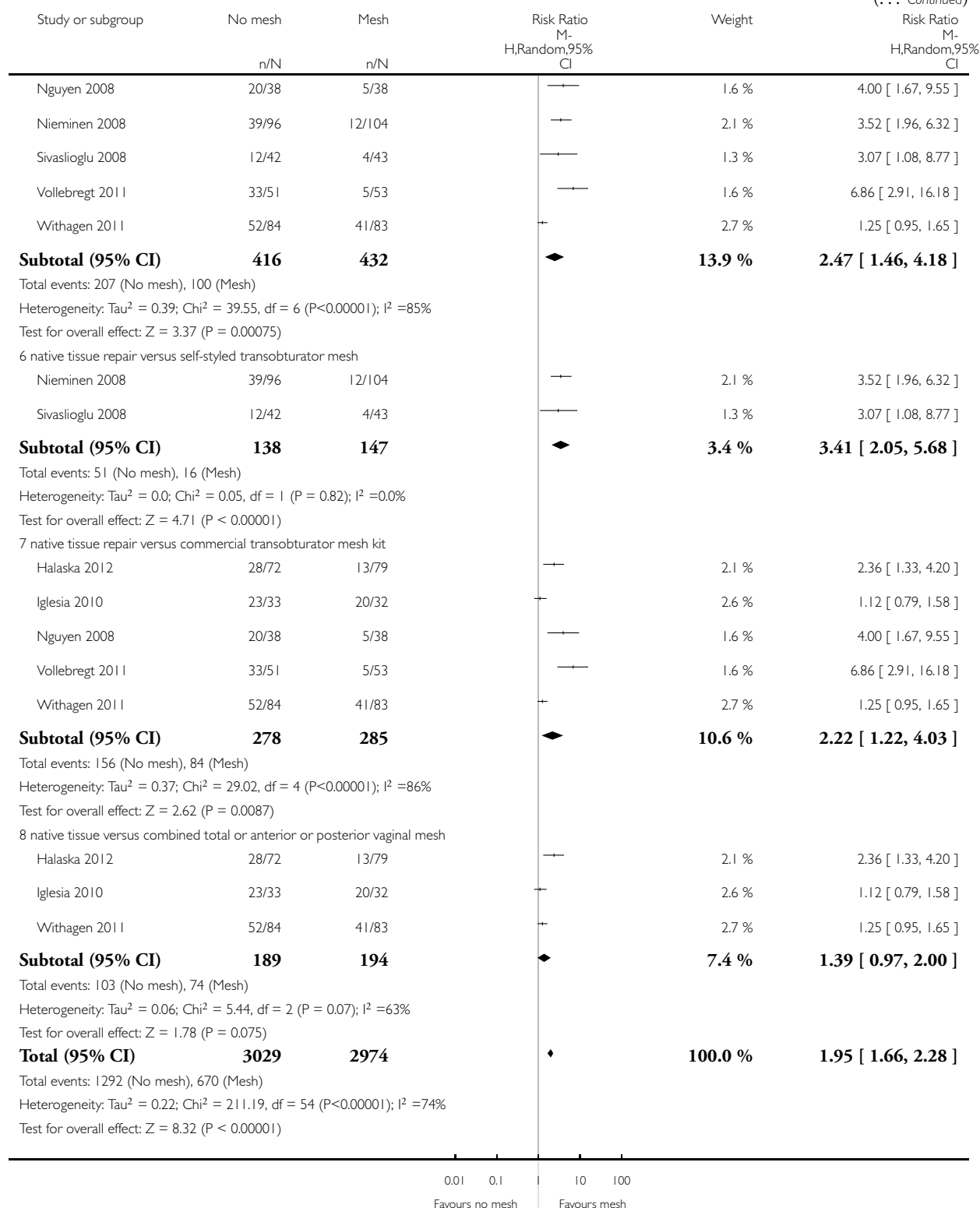
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Study or subgroup	No mesh n/N	Mesh n/N	Risk Ratio M- H,Random,95% CI	Weight	Risk Ratio M- H,Random,95% CI
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Test for subgroup differences: $\text{Chi}^2 = 15.22$, $\text{df} = 7$ ($P = 0.03$), $I^2 = 54\%$

0.01 0.1 10 100
Favours no mesh Favours mesh

Analysis 6.8. Comparison 6 No graft versus use of graft (synthetic mesh or biological graft), Outcome 8 Number of women having repeat prolapse surgery.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 6 No graft versus use of graft (synthetic mesh or biological graft)

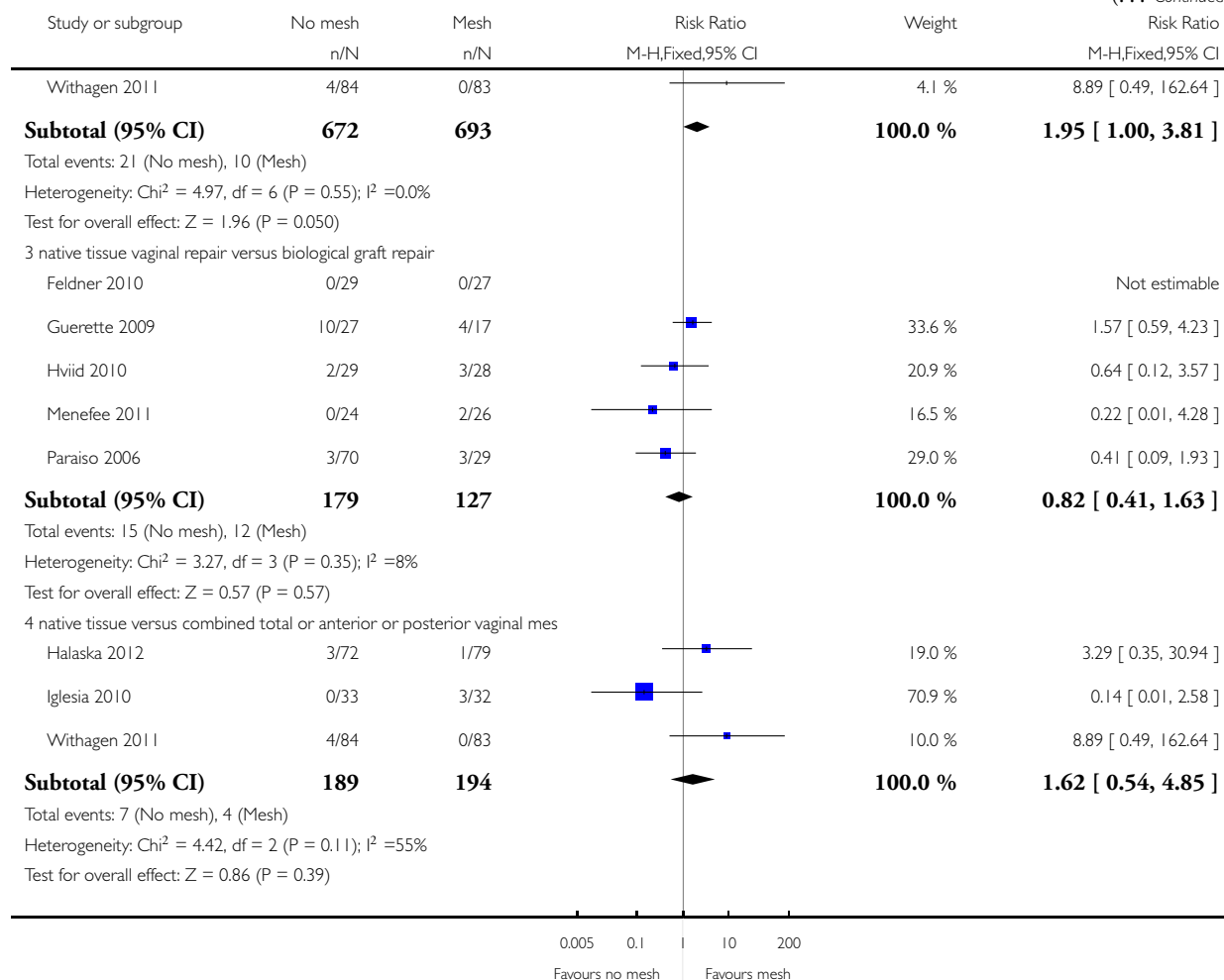
Outcome: 8 Number of women having repeat prolapse surgery

Study or subgroup	No mesh n/N	Mesh n/N	Risk Ratio M-H,Fixed,95% CI	Weight	Risk Ratio M-H,Fixed,95% CI
1 anterior or posterior repair alone versus repair with polyglactin (Vicryl) mesh inlay					
Allahdin 2008	4/34	2/32		100.0 %	1.88 [0.37, 9.58]
Subtotal (95% CI)	34	32		100.0 %	1.88 [0.37, 9.58]
Total events: 4 (No mesh), 2 (Mesh)					
Heterogeneity: not applicable					
Test for overall effect: $Z = 0.76$ ($P = 0.45$)					
2 native tissue vaginal repair versus transvaginal polpropylene mesh kit					
Altman 2011	1/183	0/186		4.0 %	3.05 [0.13, 74.36]
Halaska 2012	3/72	1/79		7.8 %	3.29 [0.35, 30.94]
Iglesia 2010	0/33	3/32		28.9 %	0.14 [0.01, 2.58]
Menefee 2011	0/24	0/28			Not estimable
Nguyen 2008	1/38	0/37		4.1 %	2.92 [0.12, 69.54]
Nieminen 2008	10/97	6/104		47.1 %	1.79 [0.67, 4.73]
Sivaslioglu 2008	0/42	0/43			Not estimable
Thijs 2010 abstract	0/48	0/48			Not estimable
Vollebregt 2011	2/51	0/53		4.0 %	5.19 [0.26, 105.59]

0.005 0.1 10 200
Favours no mesh Favours mesh

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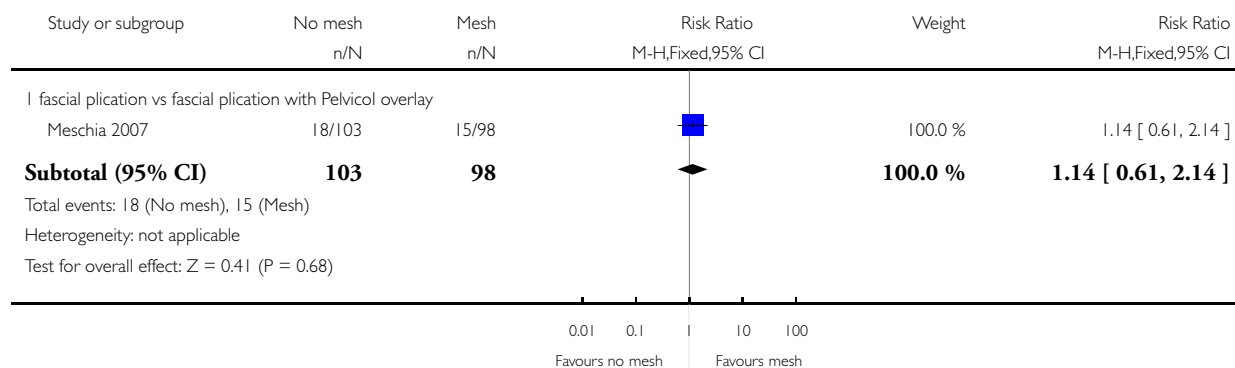


**Analysis 6.9. Comparison 6 No graft versus use of graft (synthetic mesh or biological graft), Outcome 9
Number of women with urgency, detrusor overactivity or overactive bladder.**

Review: Surgical management of pelvic organ prolapse in women

Comparison: 6 No graft versus use of graft (synthetic mesh or biological graft)

Outcome: 9 Number of women with urgency, detrusor overactivity or overactive bladder

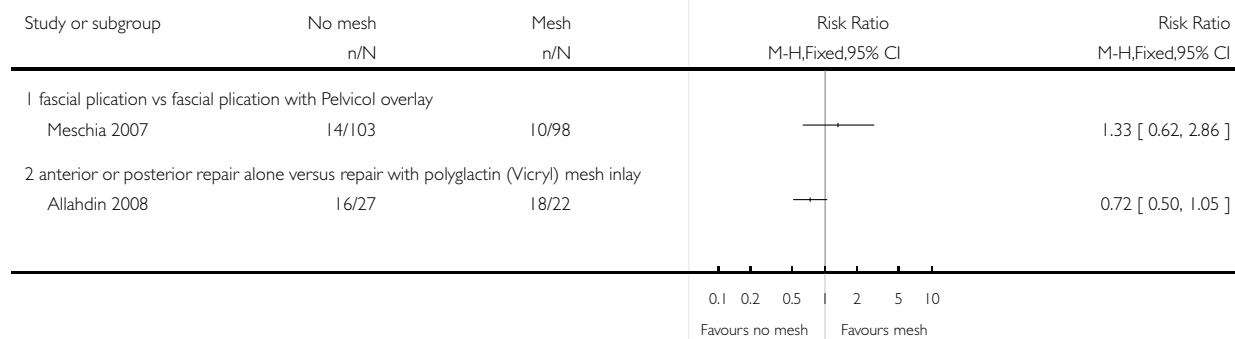


**Analysis 6.10. Comparison 6 No graft versus use of graft (synthetic mesh or biological graft), Outcome 10
Number of women with postoperative urinary incontinence.**

Review: Surgical management of pelvic organ prolapse in women

Comparison: 6 No graft versus use of graft (synthetic mesh or biological graft)

Outcome: 10 Number of women with postoperative urinary incontinence

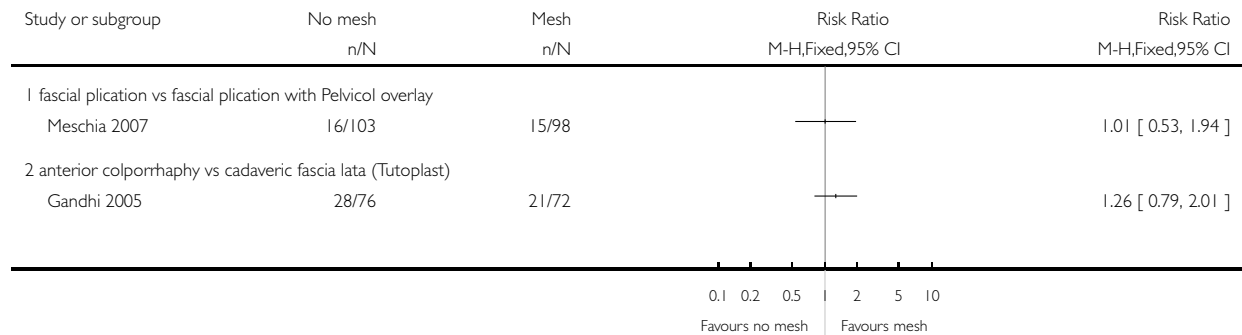


Analysis 6.11. Comparison 6 No graft versus use of graft (synthetic mesh or biological graft), Outcome 11 Postoperative voiding dysfunction symptoms.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 6 No graft versus use of graft (synthetic mesh or biological graft)

Outcome: 11 Postoperative voiding dysfunction symptoms

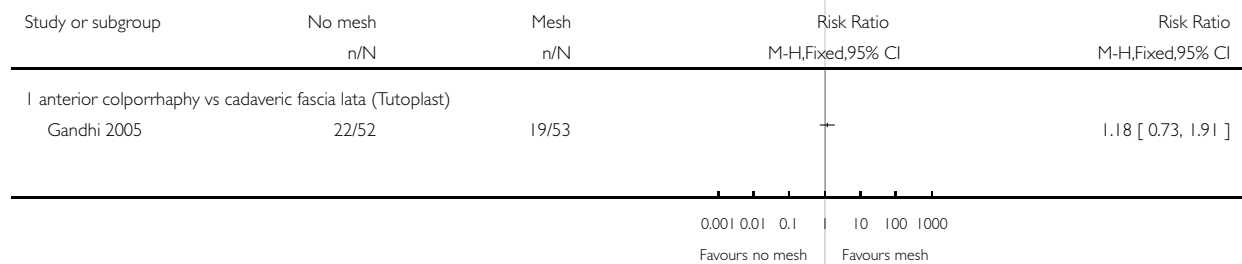


Analysis 6.12. Comparison 6 No graft versus use of graft (synthetic mesh or biological graft), Outcome 12 Persistent voiding dysfunction.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 6 No graft versus use of graft (synthetic mesh or biological graft)

Outcome: 12 Persistent voiding dysfunction

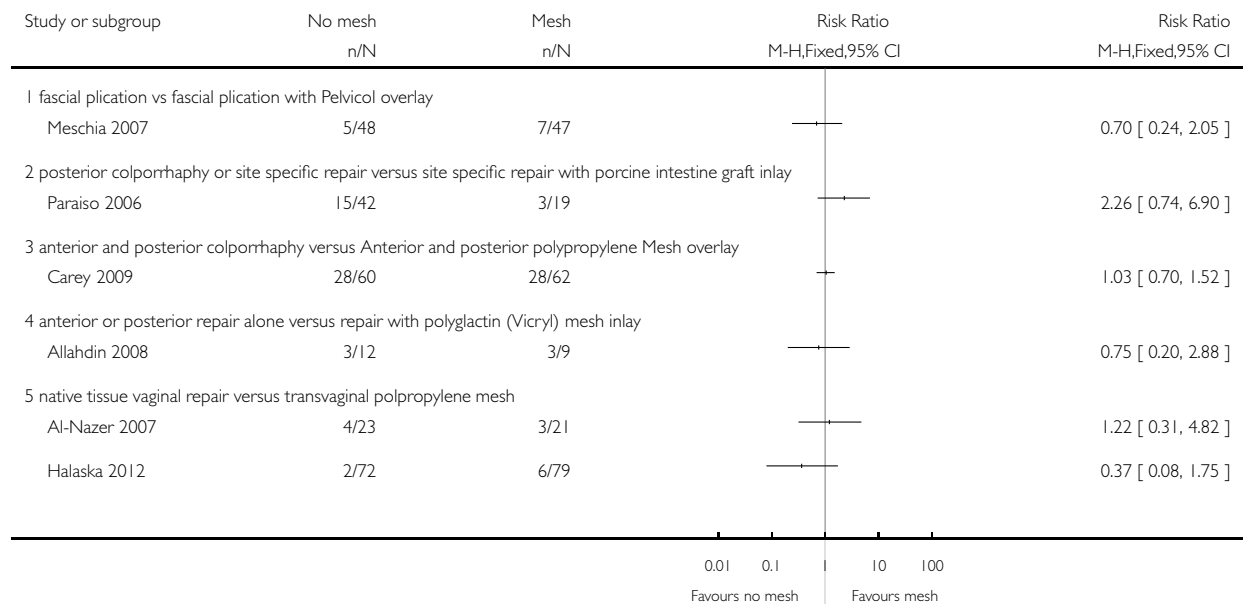


**Analysis 6.13. Comparison 6 No graft versus use of graft (synthetic mesh or biological graft), Outcome 13
Number of women with dyspareunia.**

Review: Surgical management of pelvic organ prolapse in women

Comparison: 6 No graft versus use of graft (synthetic mesh or biological graft)

Outcome: 13 Number of women with dyspareunia

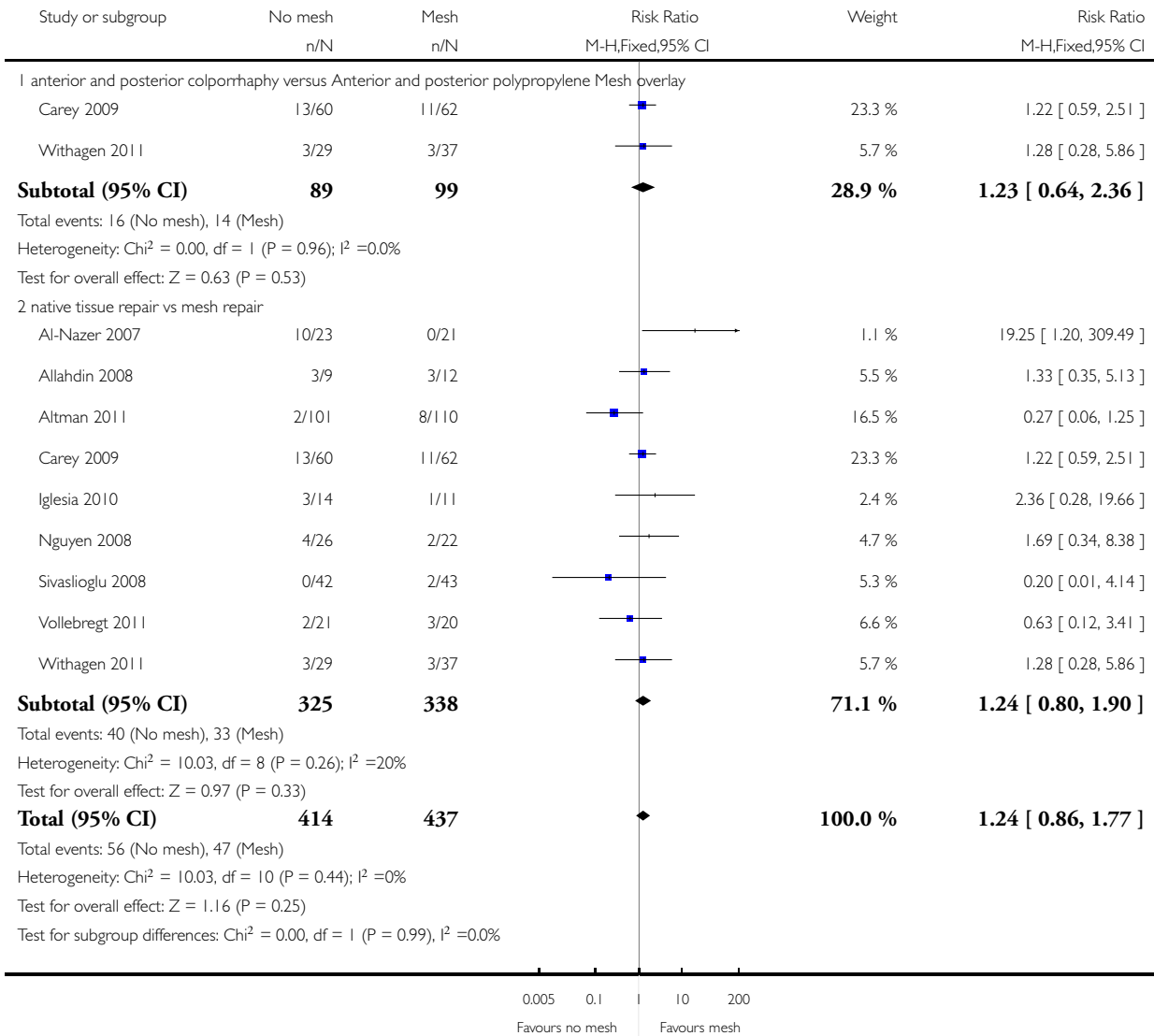


Analysis 6.14. Comparison 6 No graft versus use of graft (synthetic mesh or biological graft), Outcome 14 De novo dyspareunia.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 6 No graft versus use of graft (synthetic mesh or biological graft)

Outcome: 14 De novo dyspareunia

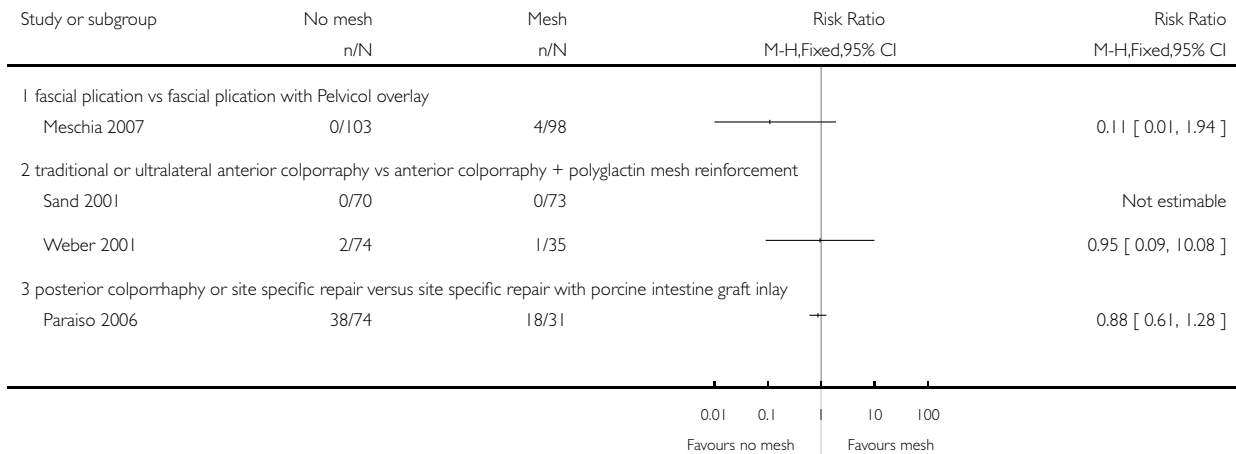


**Analysis 6.15. Comparison 6 No graft versus use of graft (synthetic mesh or biological graft), Outcome 15
Number of women with postoperative complications.**

Review: Surgical management of pelvic organ prolapse in women

Comparison: 6 No graft versus use of graft (synthetic mesh or biological graft)

Outcome: 15 Number of women with postoperative complications

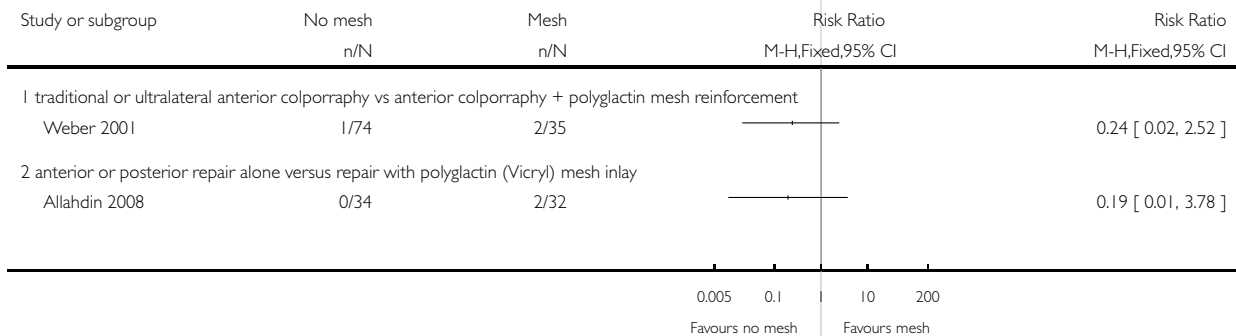


**Analysis 6.16. Comparison 6 No graft versus use of graft (synthetic mesh or biological graft), Outcome 16
Death.**

Review: Surgical management of pelvic organ prolapse in women

Comparison: 6 No graft versus use of graft (synthetic mesh or biological graft)

Outcome: 16 Death



Analysis 6.17. Comparison 6 No graft versus use of graft (synthetic mesh or biological graft), Outcome 17 Length of stay in hospital (days).

Review: Surgical management of pelvic organ prolapse in women

Comparison: 6 No graft versus use of graft (synthetic mesh or biological graft)

Outcome: 17 Length of stay in hospital (days)

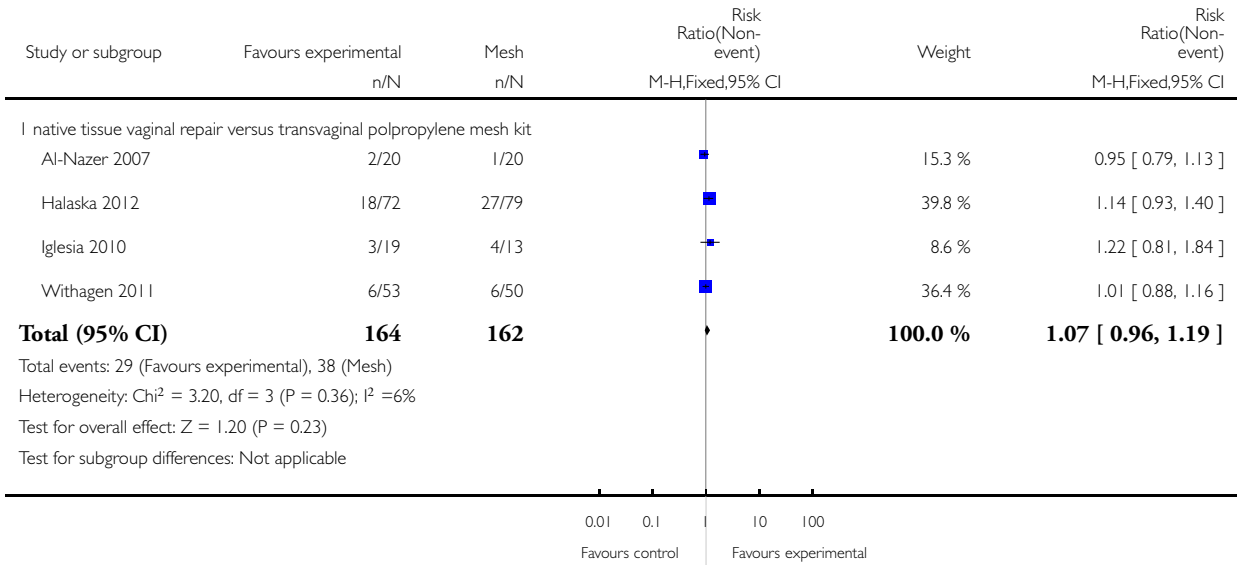
Study or subgroup	No mesh		Mesh		Mean Difference IV,Fixed,95% CI	Mean Difference IV,Fixed,95% CI
	N	Mean(SD)	N	Mean(SD)		
1 fascial plication vs fascial plication with Pelvicol overlay						
Meschia 2007	103	4.7 (1.3)	98	4.4 (1.5)		0.30 [-0.09, 0.69]
2 native tissue versus transvaginal polypropylene mesh						
Al-Nazer 2007	23	2.6 (1.3)	21	2.6 (0.6)		0.0 [-0.59, 0.59]
Altman 2011	183	1.6 (1.1)	186	1.8 (1.2)		-0.20 [-0.43, 0.03]

Analysis 6.18. Comparison 6 No graft versus use of graft (synthetic mesh or biological graft), Outcome 18 new urinary stress incontinence postoperative.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 6 No graft versus use of graft (synthetic mesh or biological graft)

Outcome: 18 new urinary stress incontinence postoperative

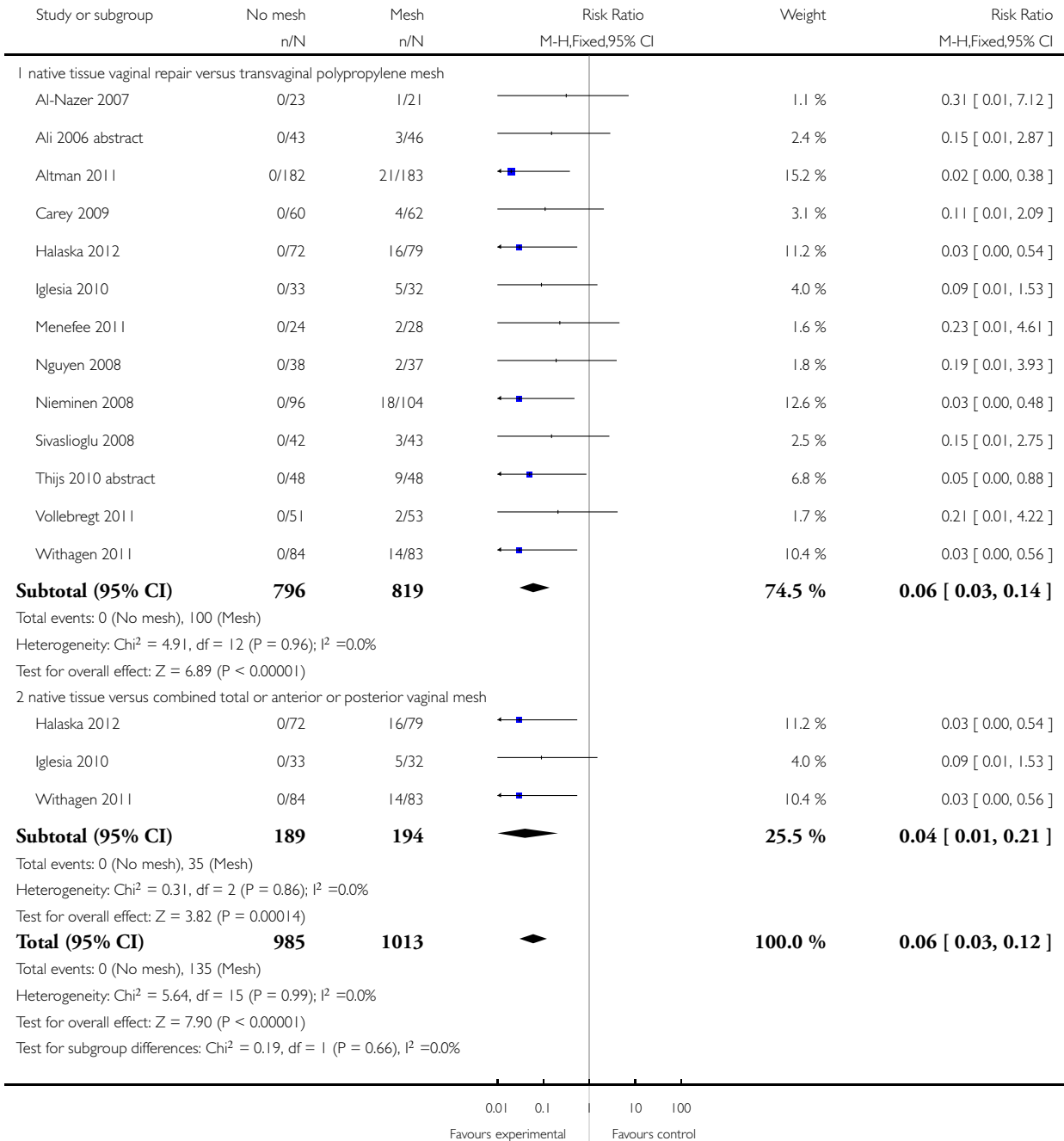


Analysis 6.19. Comparison 6 No graft versus use of graft (synthetic mesh or biological graft), Outcome 19 mesh erosion.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 6 No graft versus use of graft (synthetic mesh or biological graft)

Outcome: 19 mesh erosion

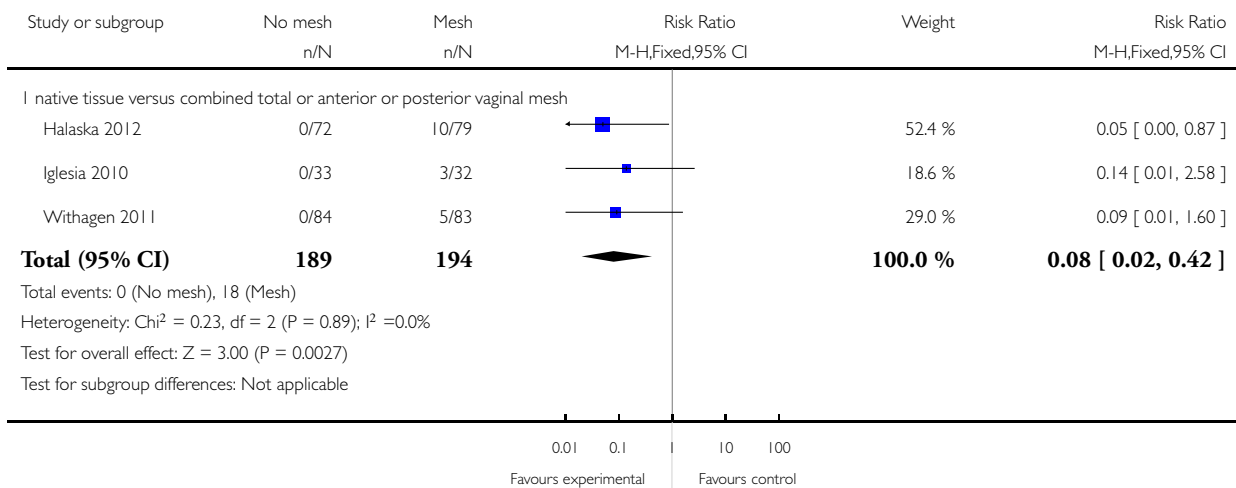


Analysis 6.20. Comparison 6 No graft versus use of graft (synthetic mesh or biological graft), Outcome 20 surgery for mesh erosion.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 6 No graft versus use of graft (synthetic mesh or biological graft)

Outcome: 20 surgery for mesh erosion

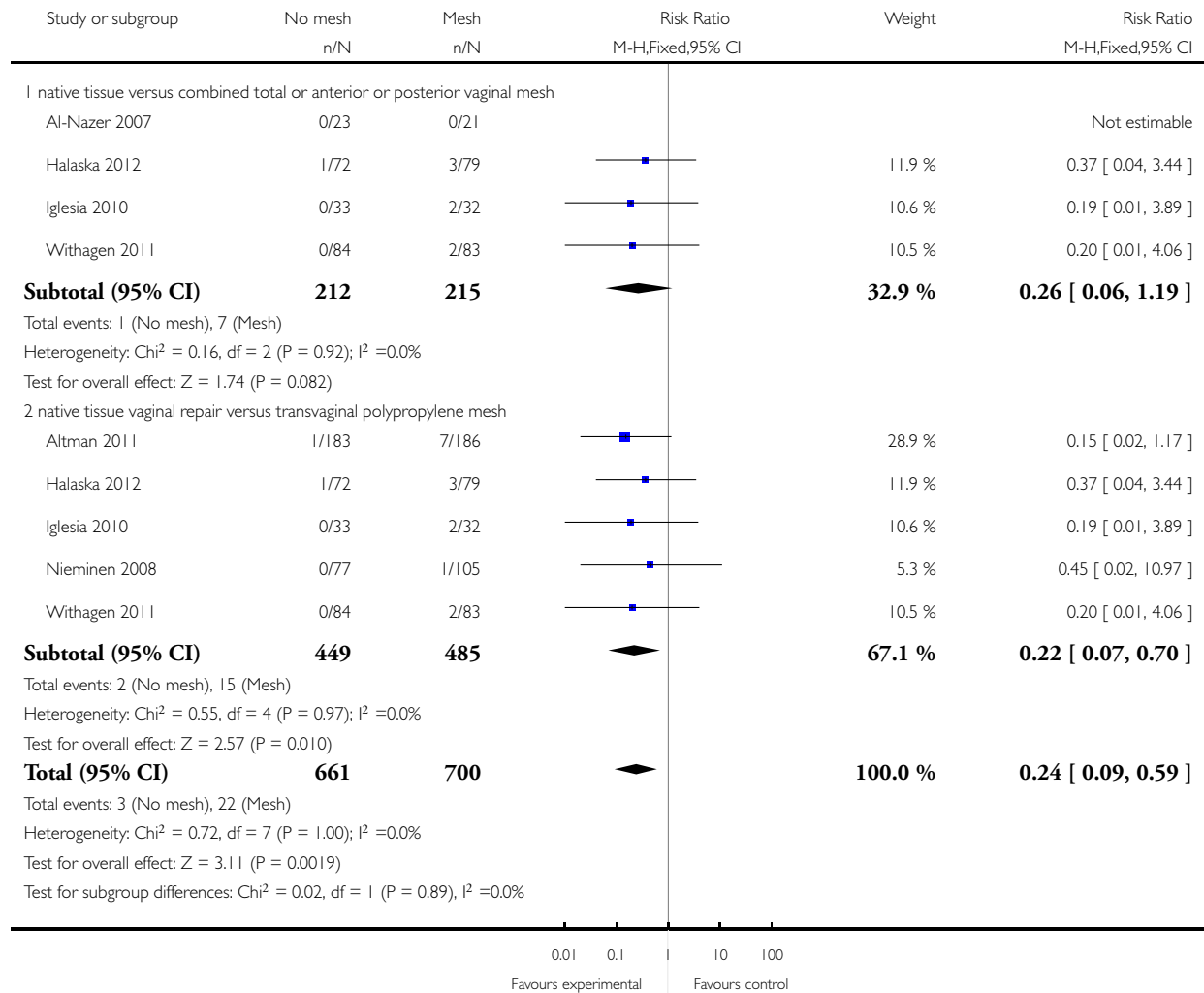


Analysis 6.21. Comparison 6 No graft versus use of graft (synthetic mesh or biological graft), Outcome 21 cystotomy.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 6 No graft versus use of graft (synthetic mesh or biological graft)

Outcome: 21 cystotomy

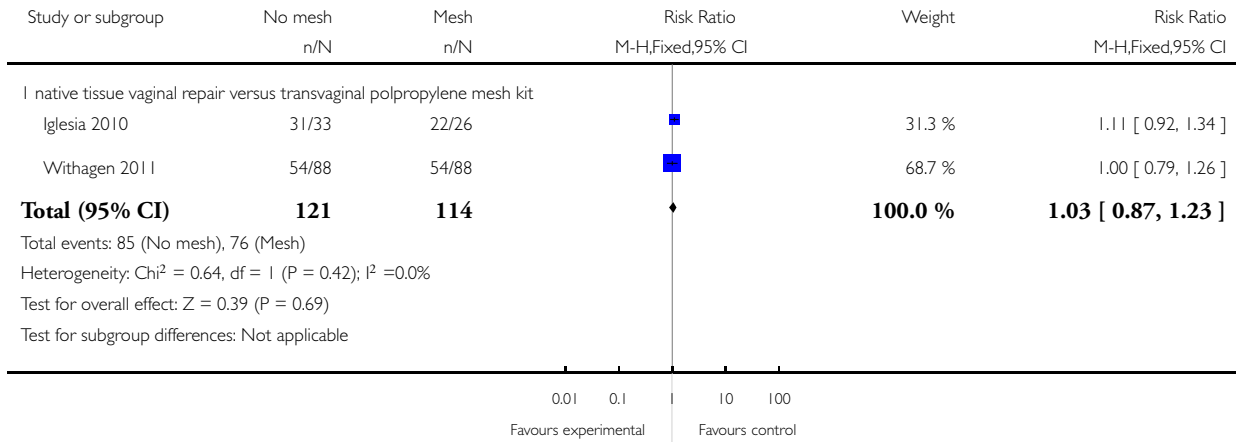


Analysis 6.22. Comparison 6 No graft versus use of graft (synthetic mesh or biological graft), Outcome 22 Patient global impression of improvement (PGI-I) very much or much better.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 6 No graft versus use of graft (synthetic mesh or biological graft)

Outcome: 22 Patient global impression of improvement (PGI-I) very much or much better

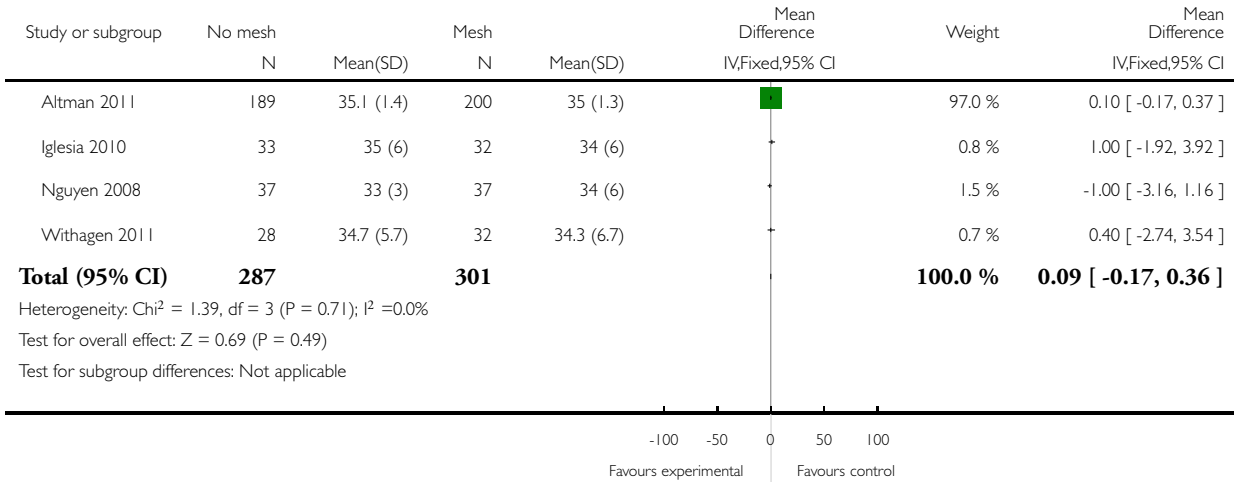


Analysis 6.23. Comparison 6 No graft versus use of graft (synthetic mesh or biological graft), Outcome 23 PISQ-12 Prolapse and Incontinence Sexual Questionnaire.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 6 No graft versus use of graft (synthetic mesh or biological graft)

Outcome: 23 PISQ-12 Prolapse and Incontinence Sexual Questionnaire

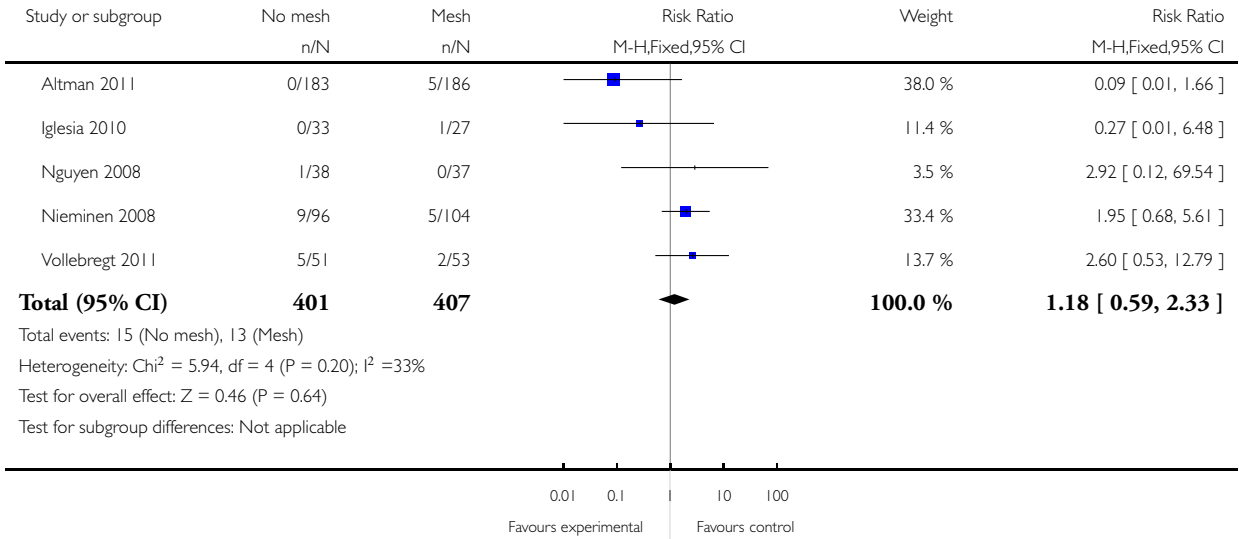


Analysis 6.24. Comparison 6 No graft versus use of graft (synthetic mesh or biological graft), Outcome 24 number undergoing further continence surgery.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 6 No graft versus use of graft (synthetic mesh or biological graft)

Outcome: 24 number undergoing further continence surgery

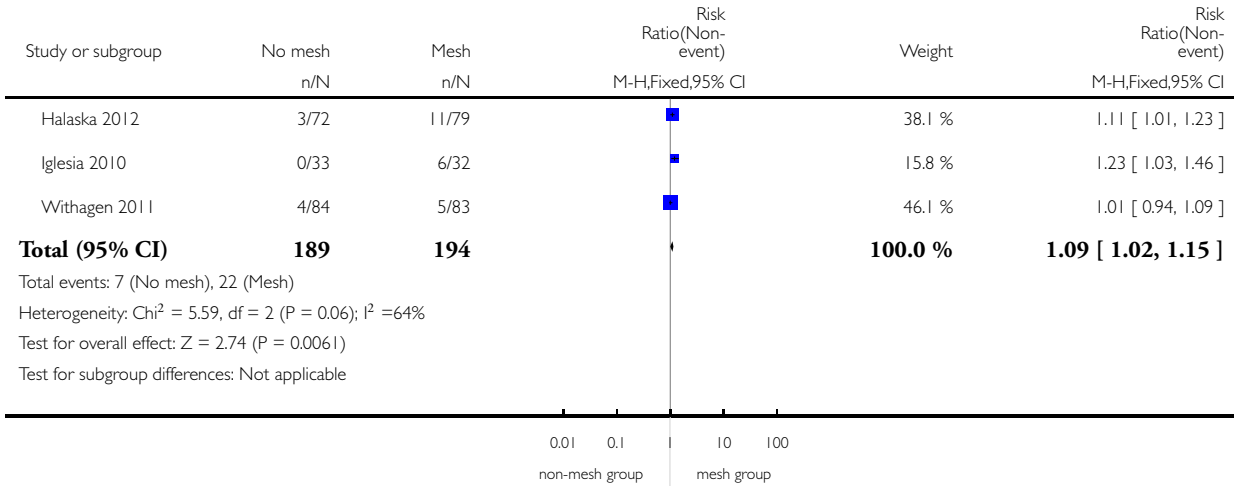


Analysis 6.25. Comparison 6 No graft versus use of graft (synthetic mesh or biological graft), Outcome 25 Subsequent surgery (prolapse, incontinence, mesh exposure, pain).

Review: Surgical management of pelvic organ prolapse in women

Comparison: 6 No graft versus use of graft (synthetic mesh or biological graft)

Outcome: 25 Subsequent surgery (prolapse, incontinence, mesh exposure, pain)

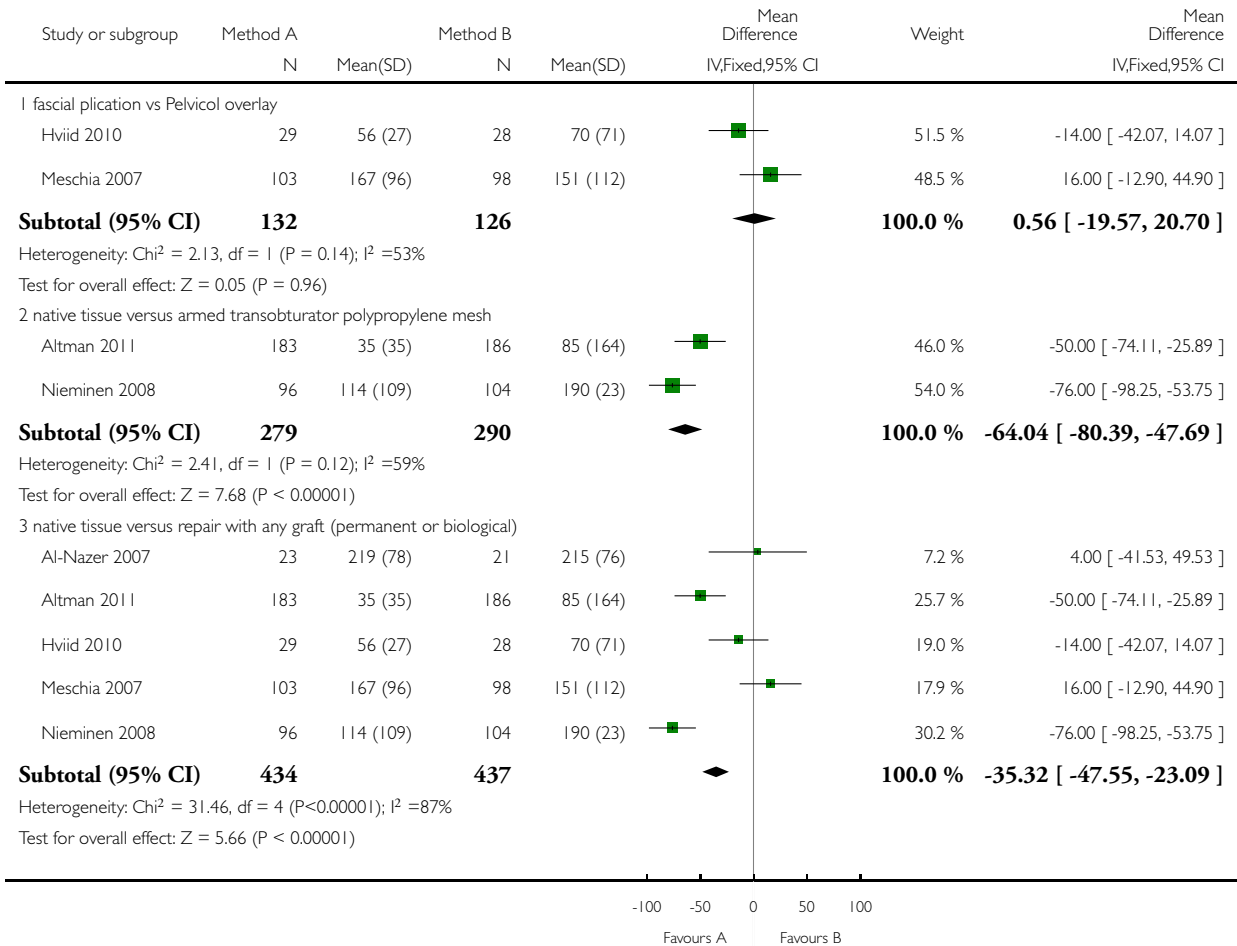


Analysis 6.26. Comparison 6 No graft versus use of graft (synthetic mesh or biological graft), Outcome 26 Blood loss (ml).

Review: Surgical management of pelvic organ prolapse in women

Comparison: 6 No graft versus use of graft (synthetic mesh or biological graft)

Outcome: 26 Blood loss (ml)

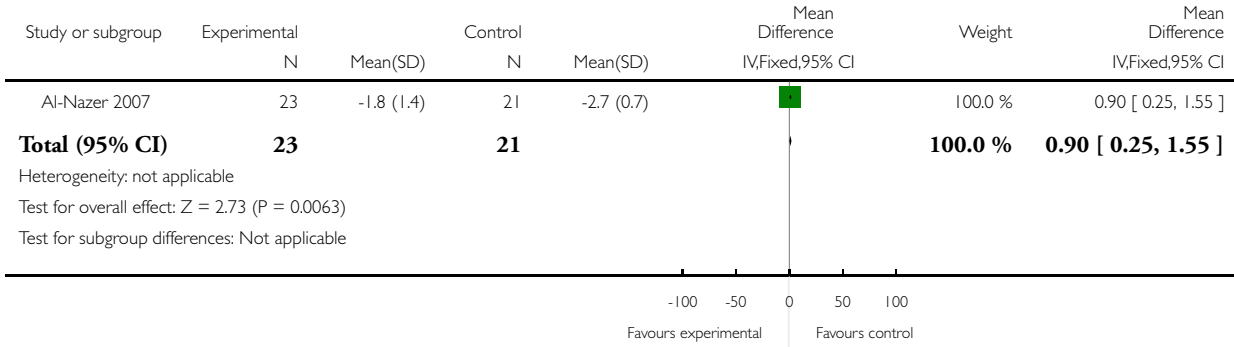


Analysis 6.27. Comparison 6 No graft versus use of graft (synthetic mesh or biological graft), Outcome 27 Point Ba.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 6 No graft versus use of graft (synthetic mesh or biological graft)

Outcome: 27 Point Ba

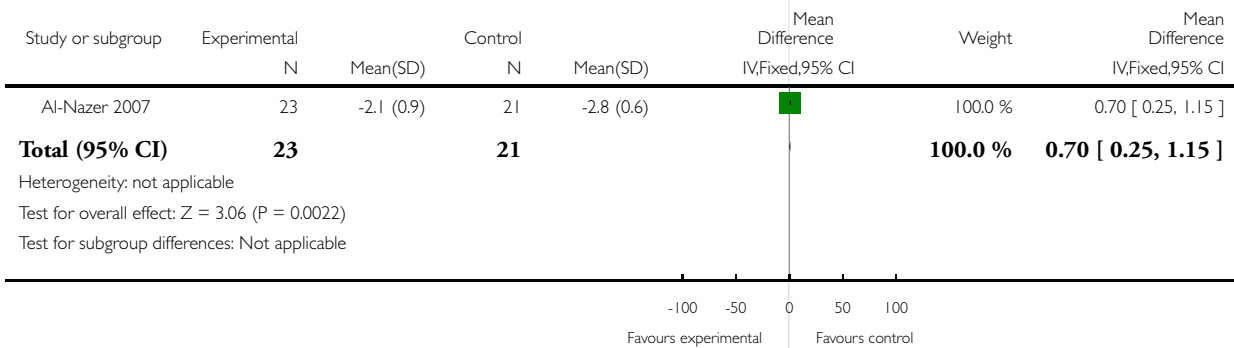


Analysis 6.28. Comparison 6 No graft versus use of graft (synthetic mesh or biological graft), Outcome 28 Point Aa.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 6 No graft versus use of graft (synthetic mesh or biological graft)

Outcome: 28 Point Aa

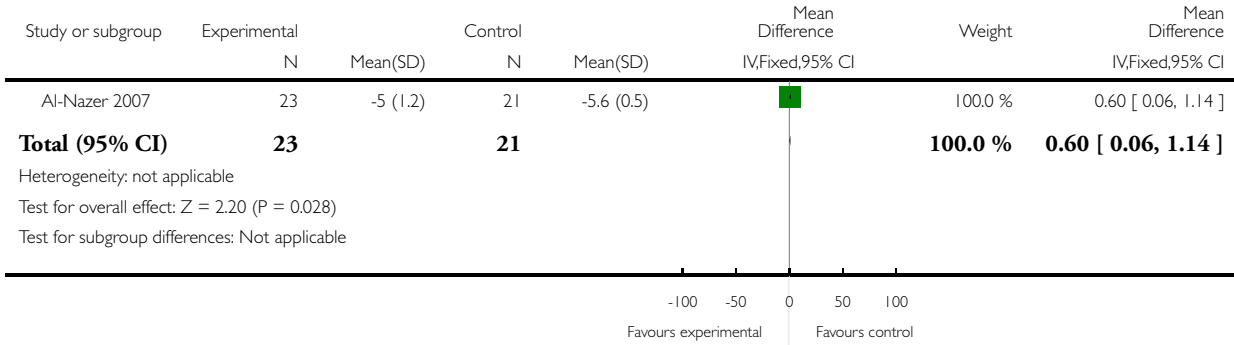


Analysis 6.29. Comparison 6 No graft versus use of graft (synthetic mesh or biological graft), Outcome 29 Point C.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 6 No graft versus use of graft (synthetic mesh or biological graft)

Outcome: 29 Point C

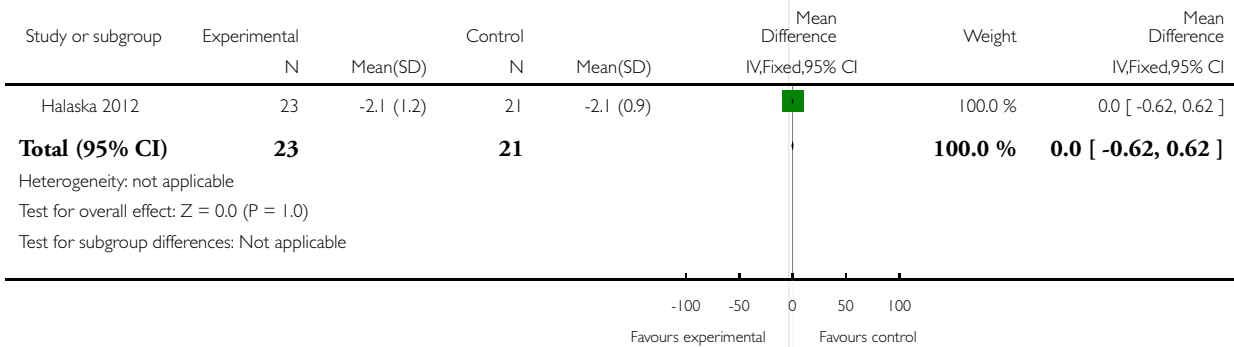


Analysis 6.30. Comparison 6 No graft versus use of graft (synthetic mesh or biological graft), Outcome 30 Point Bp.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 6 No graft versus use of graft (synthetic mesh or biological graft)

Outcome: 30 Point Bp

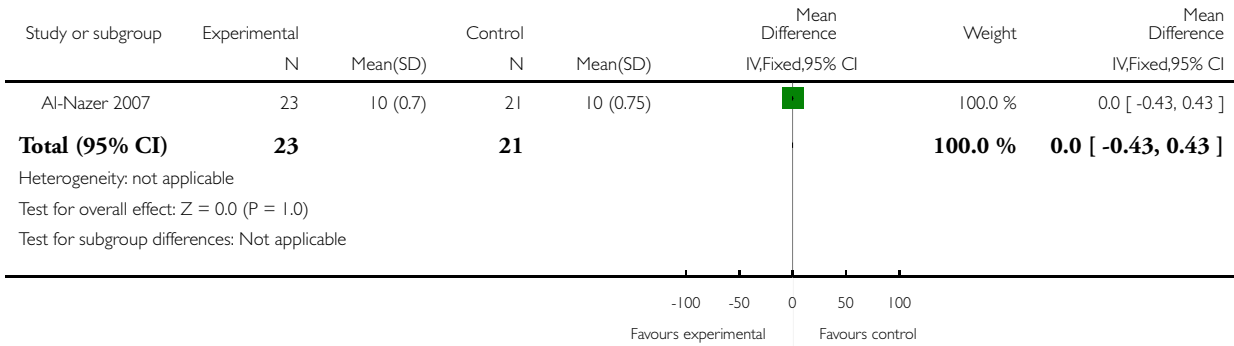


Analysis 6.31. Comparison 6 No graft versus use of graft (synthetic mesh or biological graft), Outcome 31 POPQ Total vaginal length in cm.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 6 No graft versus use of graft (synthetic mesh or biological graft)

Outcome: 31 POPQ Total vaginal length in cm

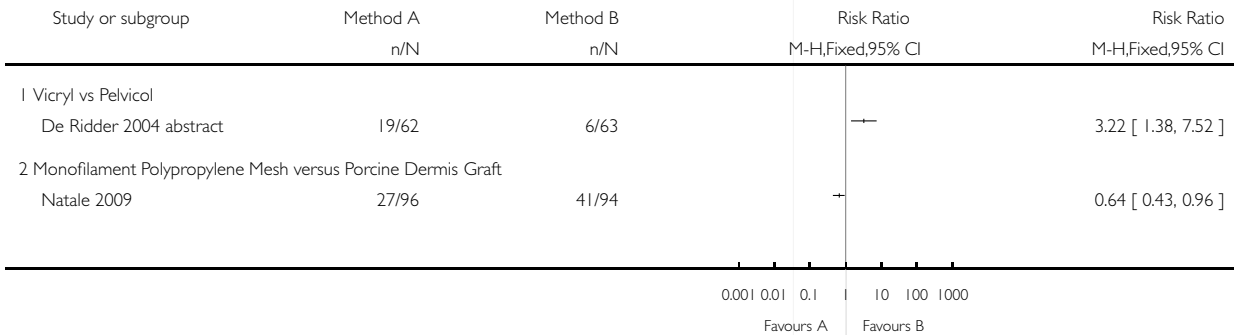


Analysis 7.2. Comparison 7 One type of graft (synthetic mesh or biological graft) versus another type of graft, Outcome 2 Number of women with anterior prolapse / cystocele (objective failure).

Review: Surgical management of pelvic organ prolapse in women

Comparison: 7 One type of graft (synthetic mesh or biological graft) versus another type of graft

Outcome: 2 Number of women with anterior prolapse / cystocele (objective failure)

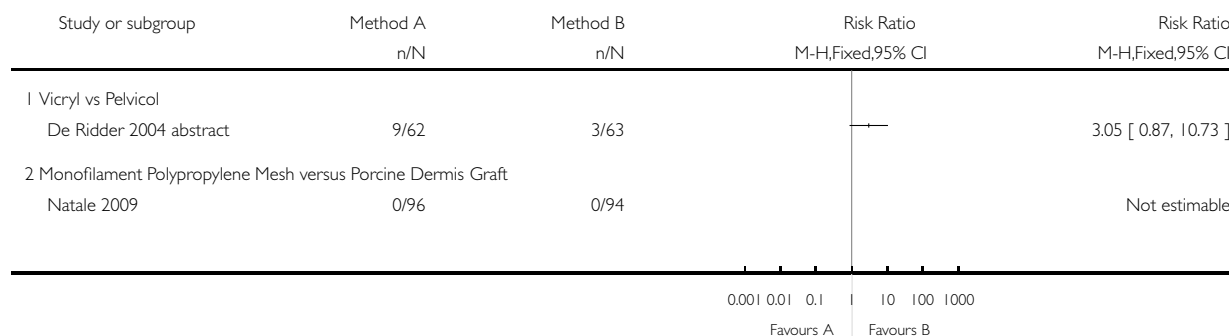


Analysis 7.3. Comparison 7 One type of graft (synthetic mesh or biological graft) versus another type of graft, Outcome 3 Number of women having further prolapse surgery.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 7 One type of graft (synthetic mesh or biological graft) versus another type of graft

Outcome: 3 Number of women having further prolapse surgery

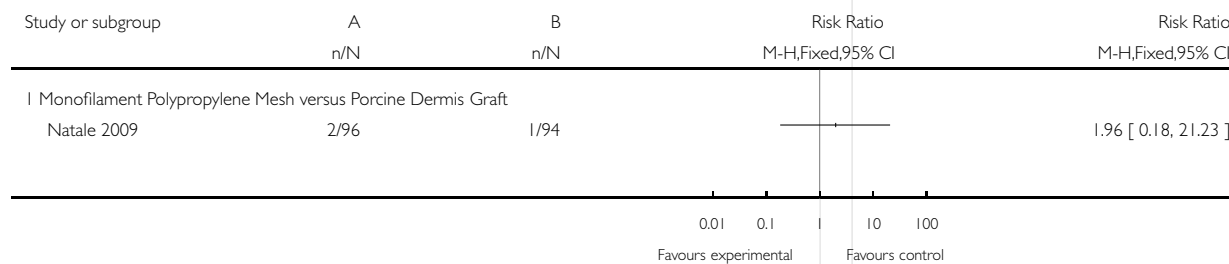


Analysis 7.4. Comparison 7 One type of graft (synthetic mesh or biological graft) versus another type of graft, Outcome 4 Stress urinary incontinence de novo.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 7 One type of graft (synthetic mesh or biological graft) versus another type of graft

Outcome: 4 Stress urinary incontinence de novo



Analysis 7.5. Comparison 7 One type of graft (synthetic mesh or biological graft) versus another type of graft, Outcome 5 Increased daytime urinary frequency post-op.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 7 One type of graft (synthetic mesh or biological graft) versus another type of graft

Outcome: 5 Increased daytime urinary frequency post-op



Analysis 7.6. Comparison 7 One type of graft (synthetic mesh or biological graft) versus another type of graft, Outcome 6 Dyspareunia post-op.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 7 One type of graft (synthetic mesh or biological graft) versus another type of graft

Outcome: 6 Dyspareunia post-op

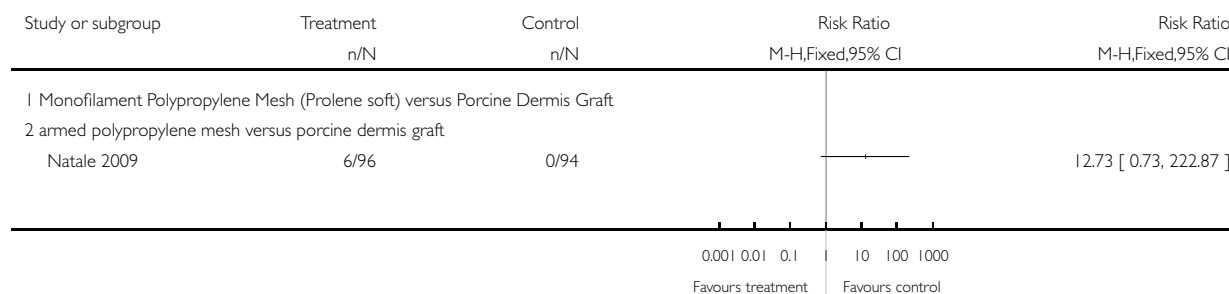


Analysis 7.7. Comparison 7 One type of graft (synthetic mesh or biological graft) versus another type of graft, Outcome 7 Vaginal mesh erosion.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 7 One type of graft (synthetic mesh or biological graft) versus another type of graft

Outcome: 7 Vaginal mesh erosion

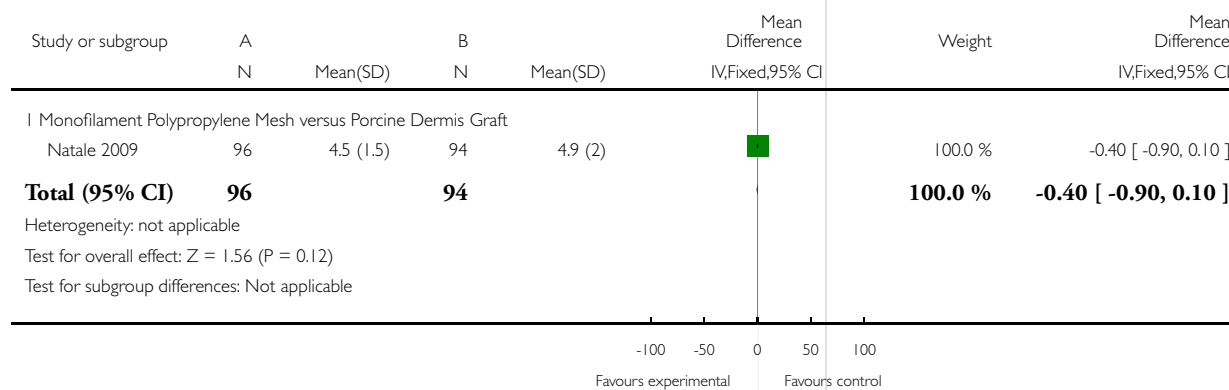


Analysis 7.8. Comparison 7 One type of graft (synthetic mesh or biological graft) versus another type of graft, Outcome 8 Hospital stay (days).

Review: Surgical management of pelvic organ prolapse in women

Comparison: 7 One type of graft (synthetic mesh or biological graft) versus another type of graft

Outcome: 8 Hospital stay (days)

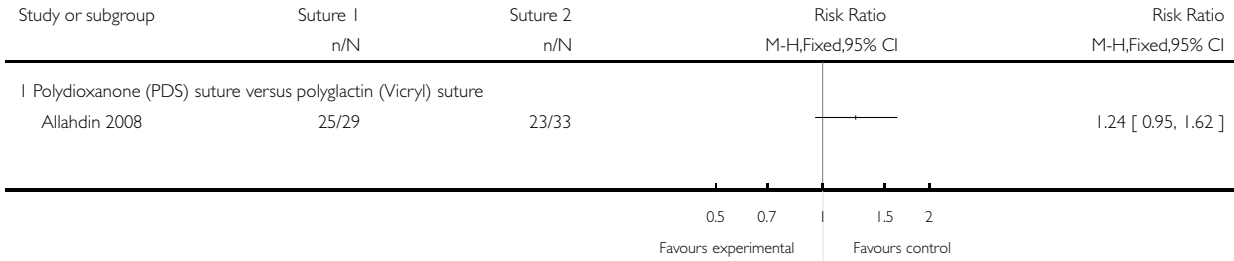


Analysis 8.1. Comparison 8 One suture type versus another type of suture, Outcome 1 Number of women with prolapse symptoms up to 1 year (subjective failure).

Review: Surgical management of pelvic organ prolapse in women

Comparison: 8 One suture type versus another type of suture

Outcome: 1 Number of women with prolapse symptoms up to 1 year (subjective failure)

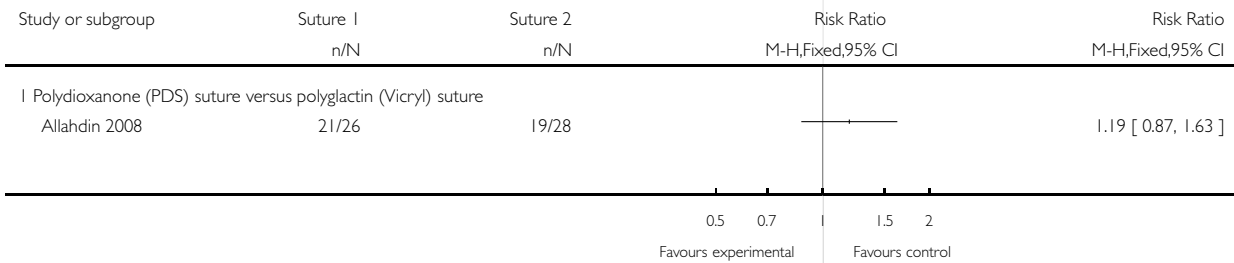


Analysis 8.2. Comparison 8 One suture type versus another type of suture, Outcome 2 Number of women with prolapse symptoms at 1 to 5 years (subjective failure).

Review: Surgical management of pelvic organ prolapse in women

Comparison: 8 One suture type versus another type of suture

Outcome: 2 Number of women with prolapse symptoms at 1 to 5 years (subjective failure)



Analysis 8.3. Comparison 8 One suture type versus another type of suture, Outcome 3 Prolapse symptom score up to 1 year.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 8 One suture type versus another type of suture

Outcome: 3 Prolapse symptom score up to 1 year

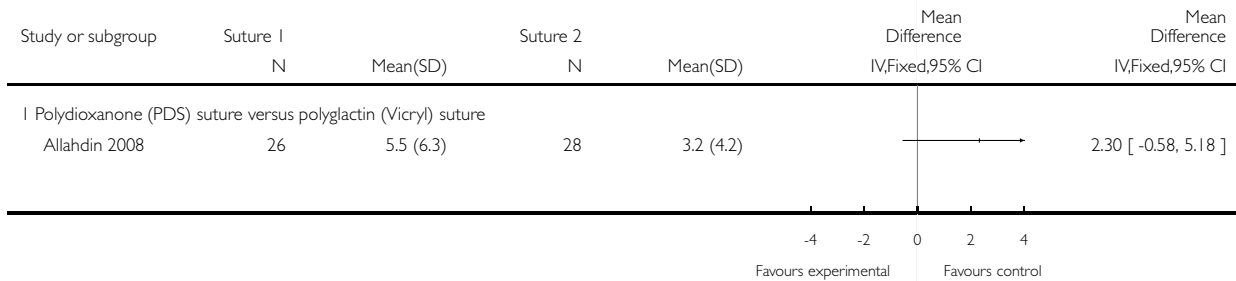


Analysis 8.4. Comparison 8 One suture type versus another type of suture, Outcome 4 Prolapse symptom score at 1 to 5 years.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 8 One suture type versus another type of suture

Outcome: 4 Prolapse symptom score at 1 to 5 years

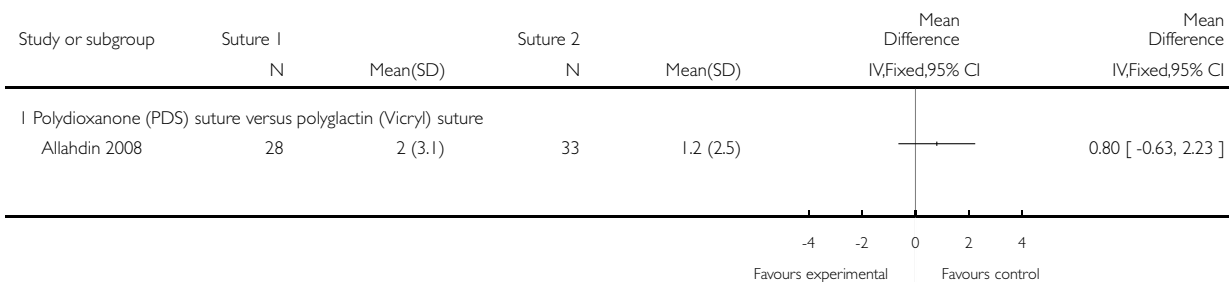


Analysis 8.5. Comparison 8 One suture type versus another type of suture, Outcome 5 Quality of life score due to prolapse (VAS) up to 1 year.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 8 One suture type versus another type of suture

Outcome: 5 Quality of life score due to prolapse (VAS) up to 1 year

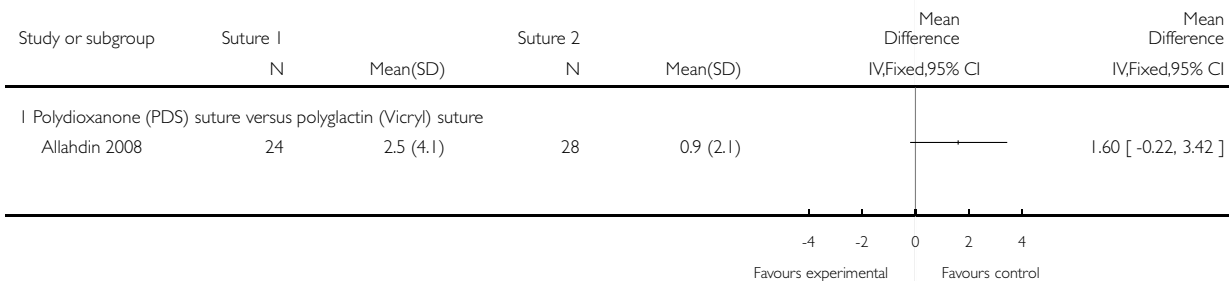


Analysis 8.6. Comparison 8 One suture type versus another type of suture, Outcome 6 Quality of life score due to prolapse (VAS) at 1 to 5 years.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 8 One suture type versus another type of suture

Outcome: 6 Quality of life score due to prolapse (VAS) at 1 to 5 years

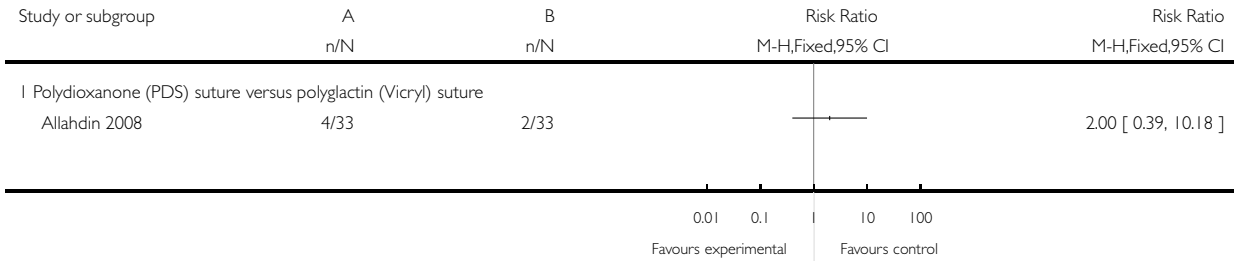


Analysis 8.7. Comparison 8 One suture type versus another type of suture, Outcome 7 Objective failure all sites.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 8 One suture type versus another type of suture

Outcome: 7 Objective failure all sites

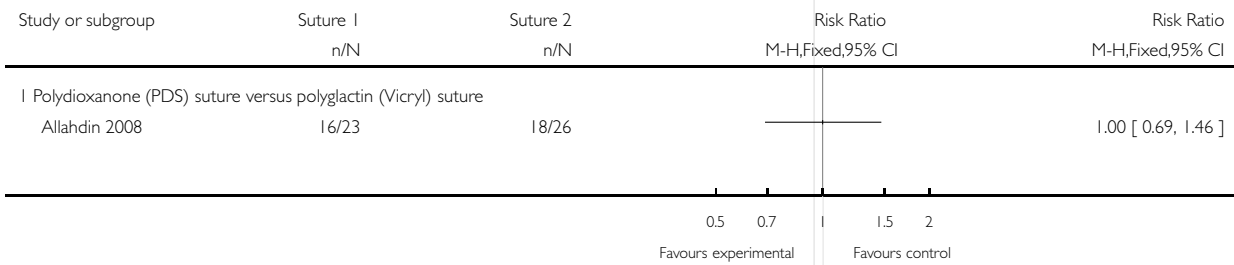


Analysis 8.8. Comparison 8 One suture type versus another type of suture, Outcome 8 Number of women with urinary incontinence at 1 to 5 years.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 8 One suture type versus another type of suture

Outcome: 8 Number of women with urinary incontinence at 1 to 5 years

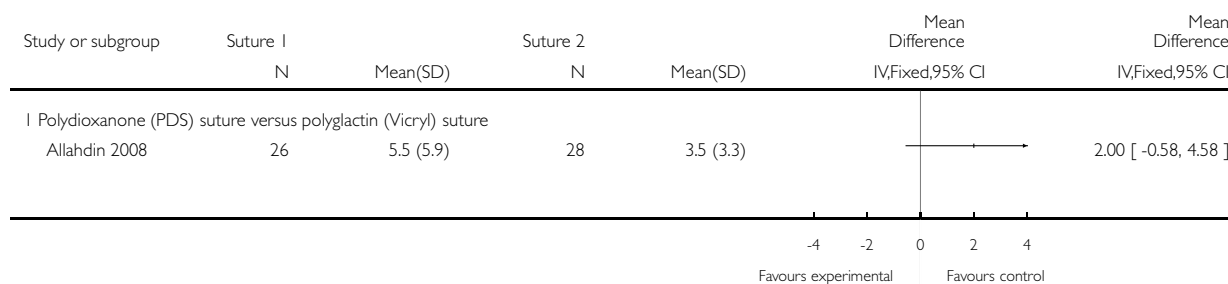


Analysis 8.9. Comparison 8 One suture type versus another type of suture, Outcome 9 ICI Urinary symptom score at 1 to 5 years.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 8 One suture type versus another type of suture

Outcome: 9 ICI Urinary symptom score at 1 to 5 years

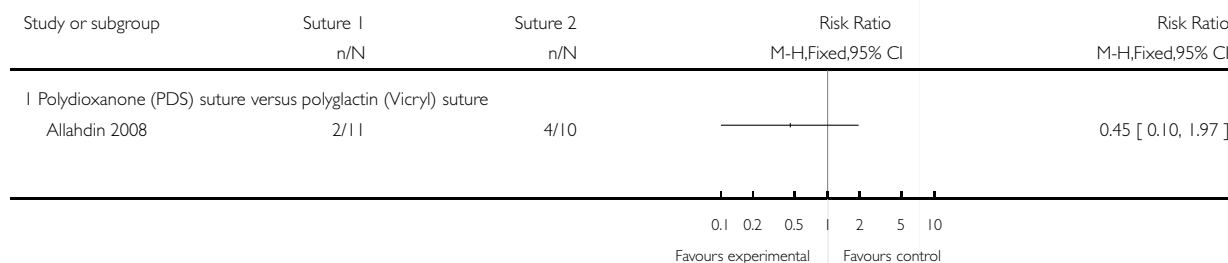


Analysis 8.10. Comparison 8 One suture type versus another type of suture, Outcome 10 Number of women with dyspareunia at 1 to 5 years.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 8 One suture type versus another type of suture

Outcome: 10 Number of women with dyspareunia at 1 to 5 years

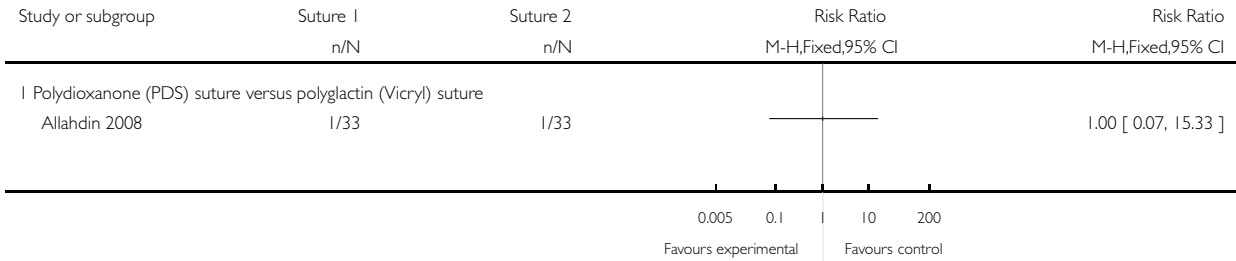


Analysis 8.11. Comparison 8 One suture type versus another type of suture, Outcome 11 Death.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 8 One suture type versus another type of suture

Outcome: 11 Death

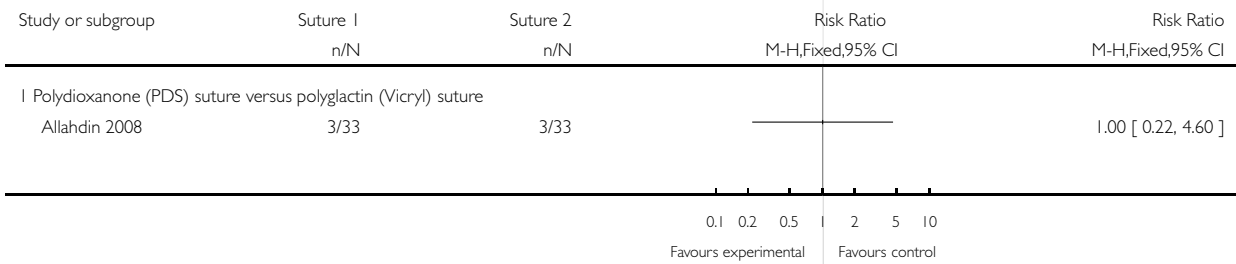


Analysis 8.12. Comparison 8 One suture type versus another type of suture, Outcome 12 Number of women having repeat prolapse surgery.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 8 One suture type versus another type of suture

Outcome: 12 Number of women having repeat prolapse surgery

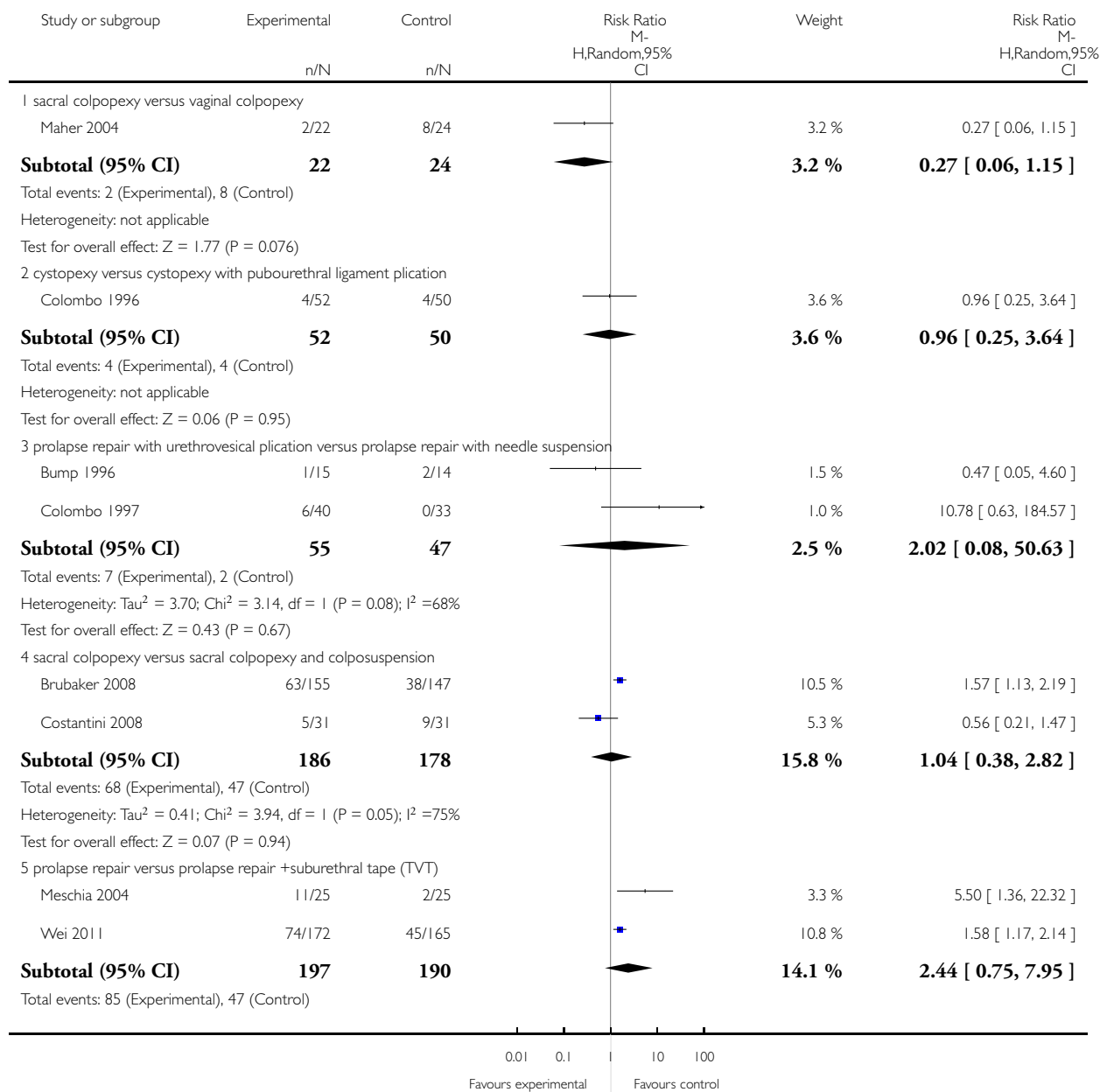


Analysis 9.1. Comparison 9 Prolapse surgery and bladder function, Outcome 1 number with de novo (new) stress urinary incontinence.

Review: Surgical management of pelvic organ prolapse in women

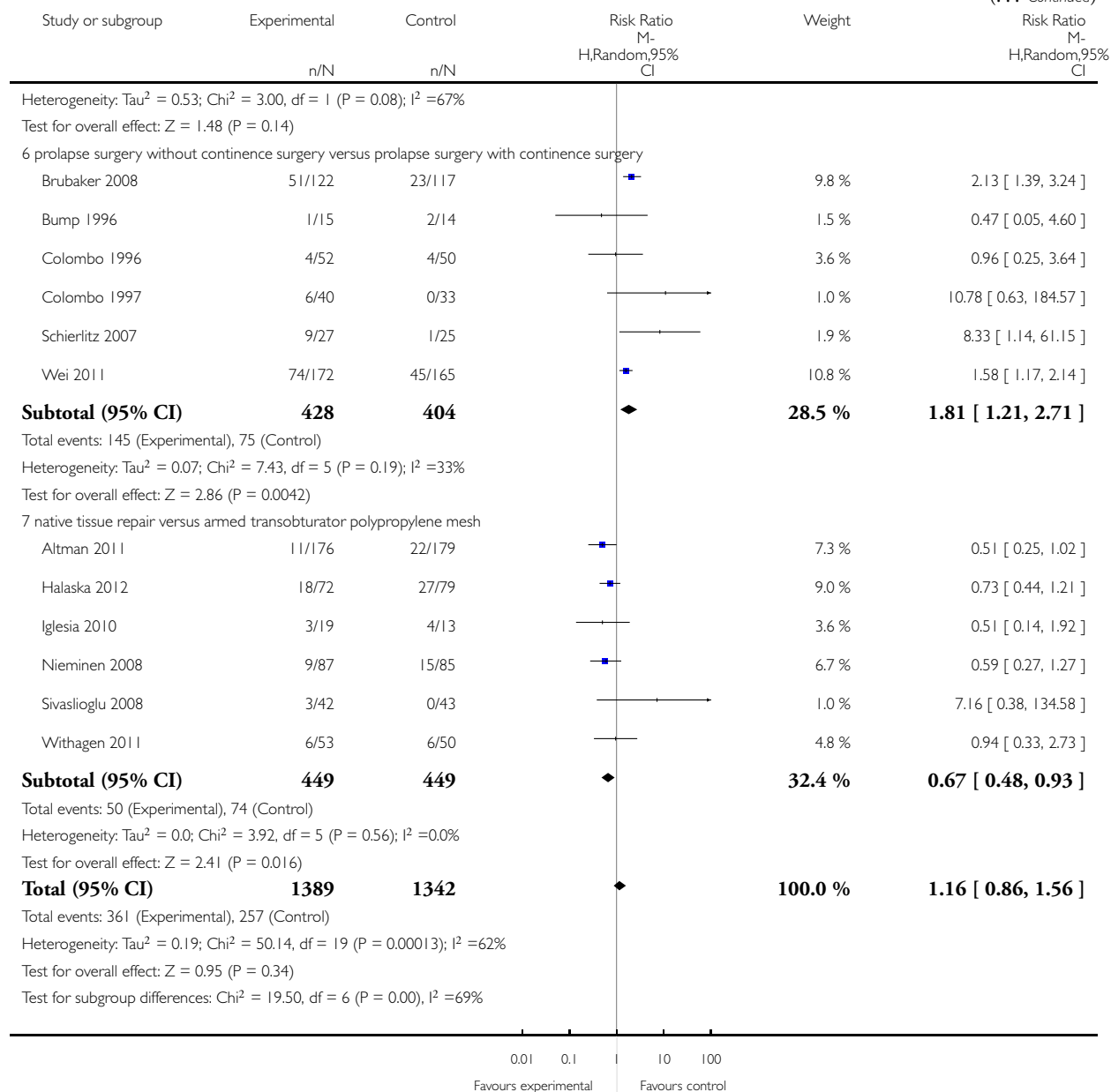
Comparison: 9 Prolapse surgery and bladder function

Outcome: 1 number with de novo (new) stress urinary incontinence



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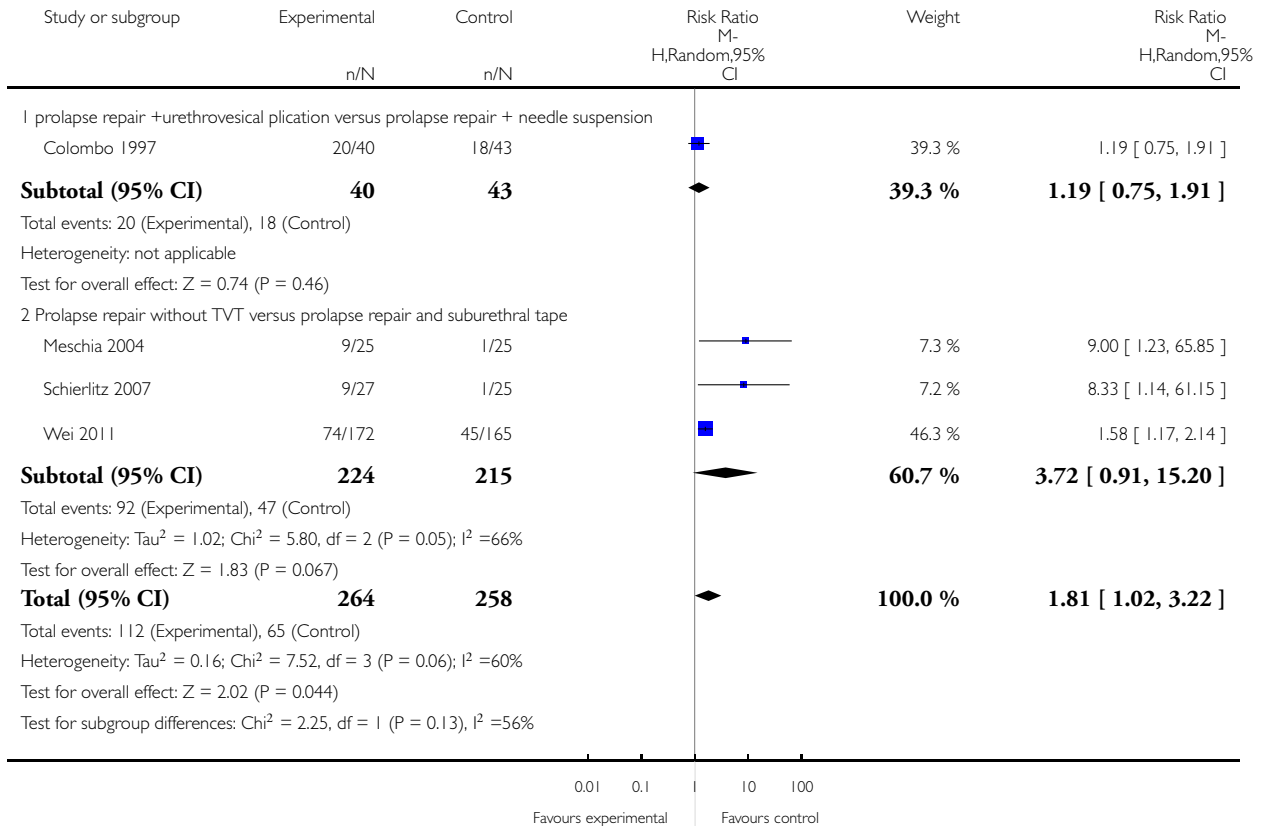


Analysis 9.2. Comparison 9 Prolapse surgery and bladder function, Outcome 2 Number with de novo (new) stress urinary incontinence (objective).

Review: Surgical management of pelvic organ prolapse in women

Comparison: 9 Prolapse surgery and bladder function

Outcome: 2 Number with de novo (new) stress urinary incontinence (objective)

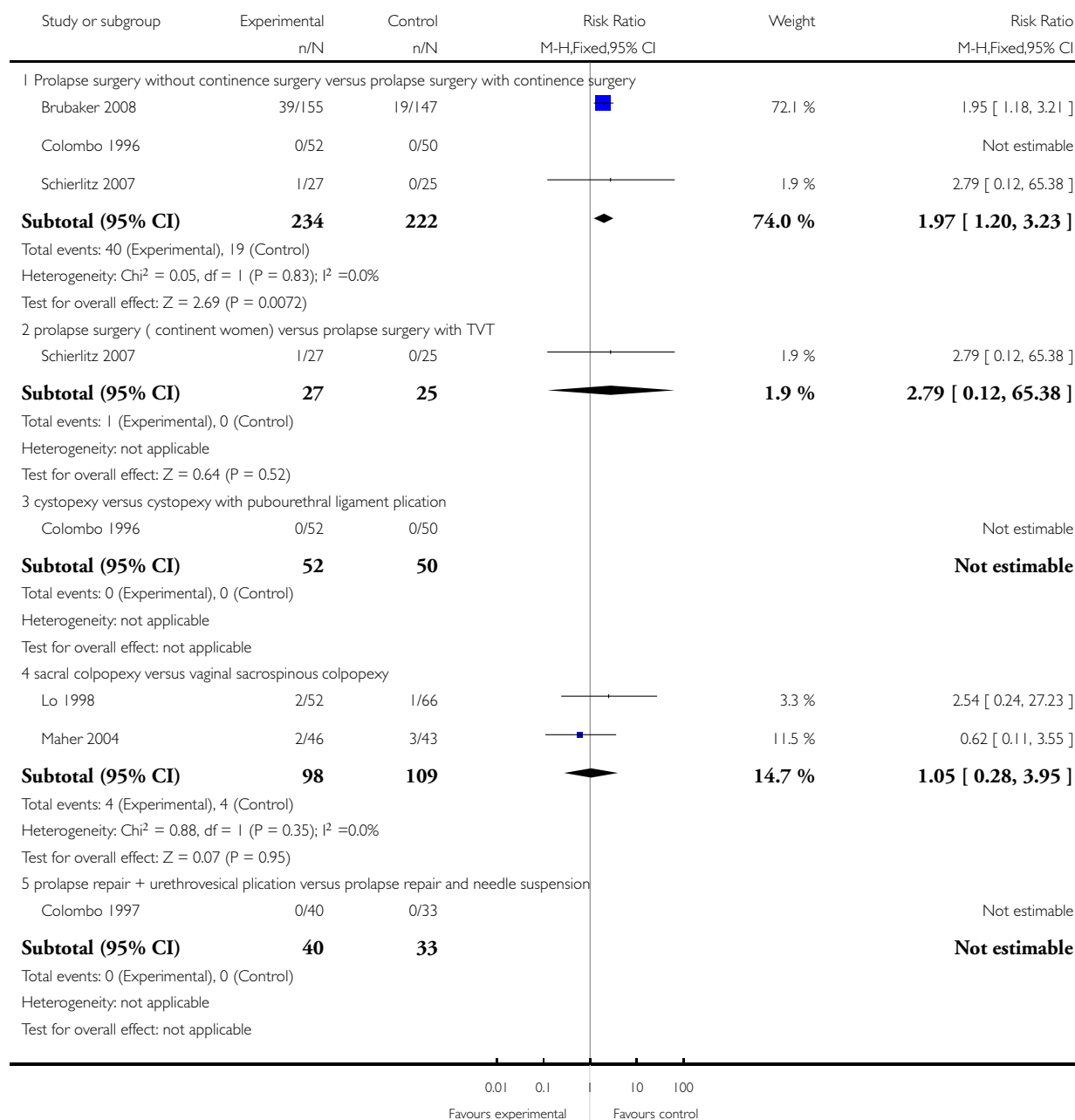


Analysis 9.3. Comparison 9 Prolapse surgery and bladder function, Outcome 3 Further continence surgery.

Review: Surgical management of pelvic organ prolapse in women

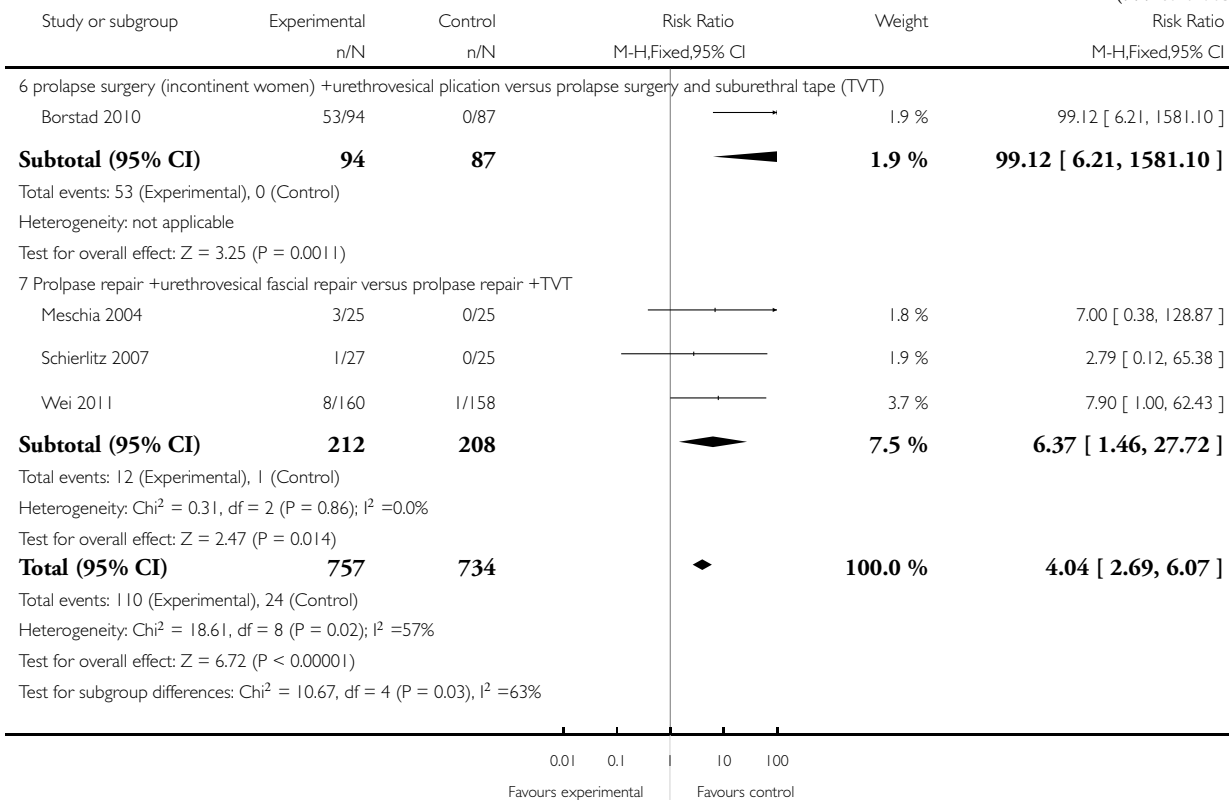
Comparison: 9 Prolapse surgery and bladder function

Outcome: 3 Further continence surgery



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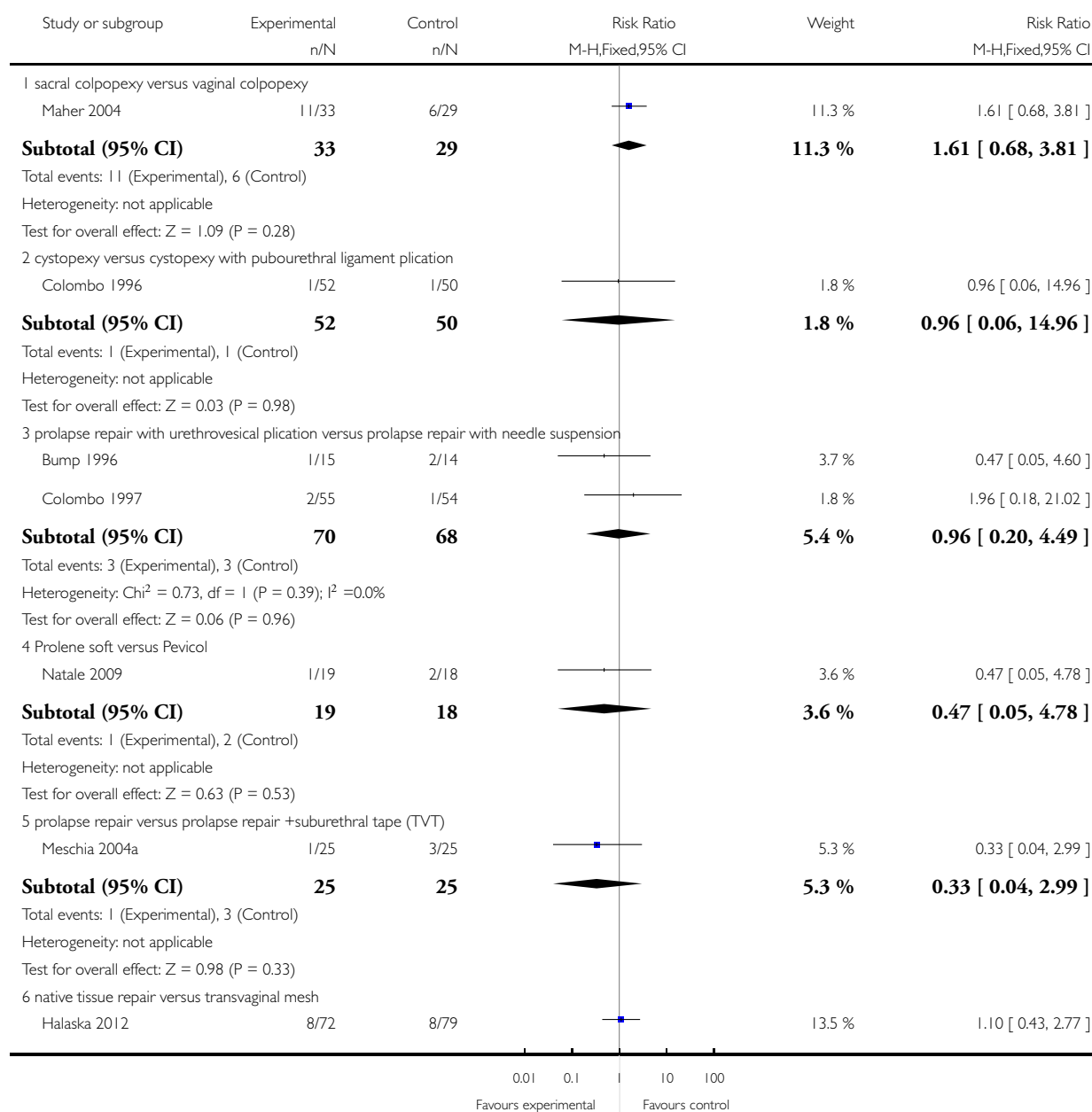


Analysis 9.4. Comparison 9 Prolapse surgery and bladder function, Outcome 4 Number with denovo (new) urgency, detrusor overactivity or overactive bladder.

Review: Surgical management of pelvic organ prolapse in women

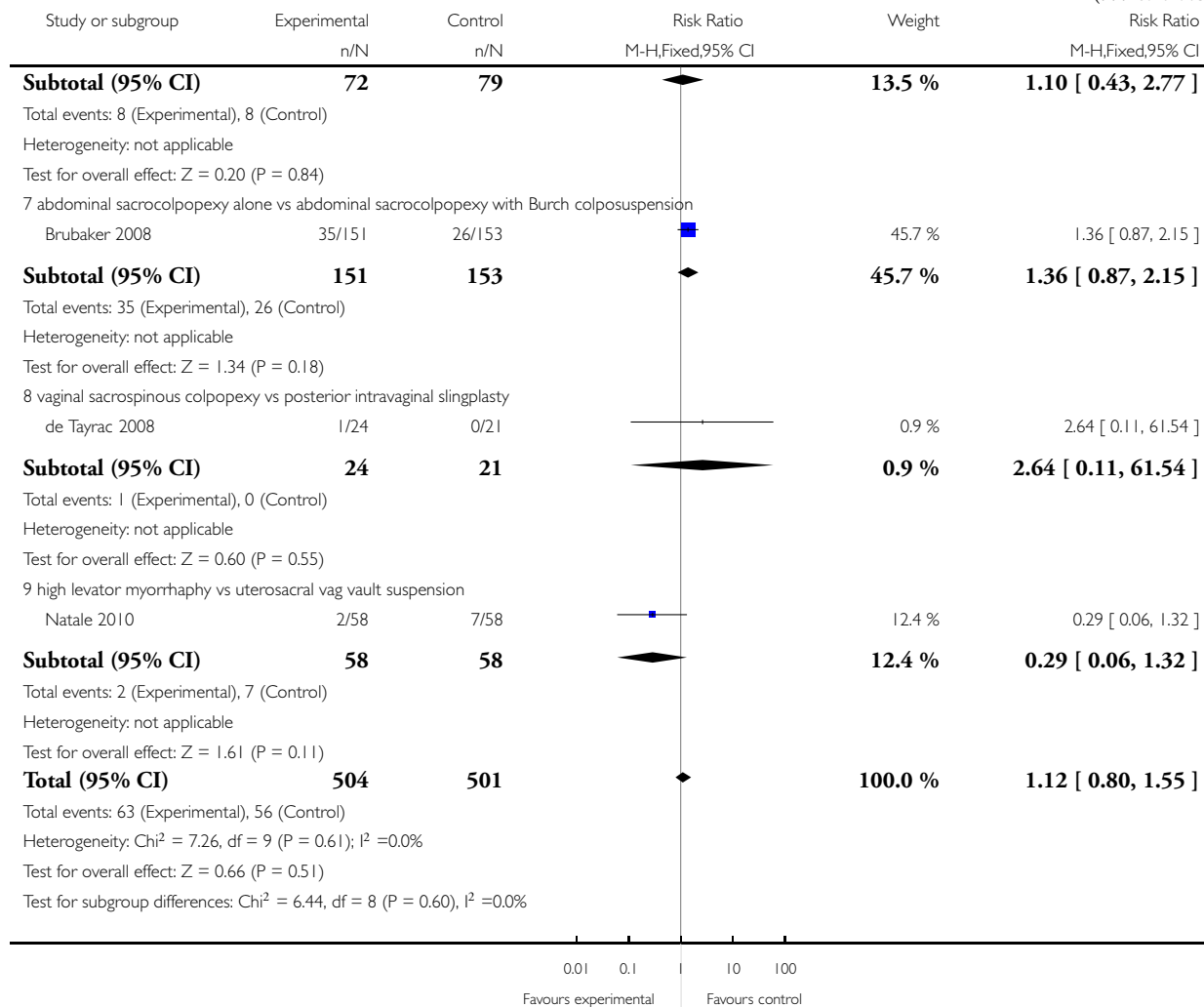
Comparison: 9 Prolapse surgery and bladder function

Outcome: 4 Number with denovo (new) urgency, detrusor overactivity or overactive bladder



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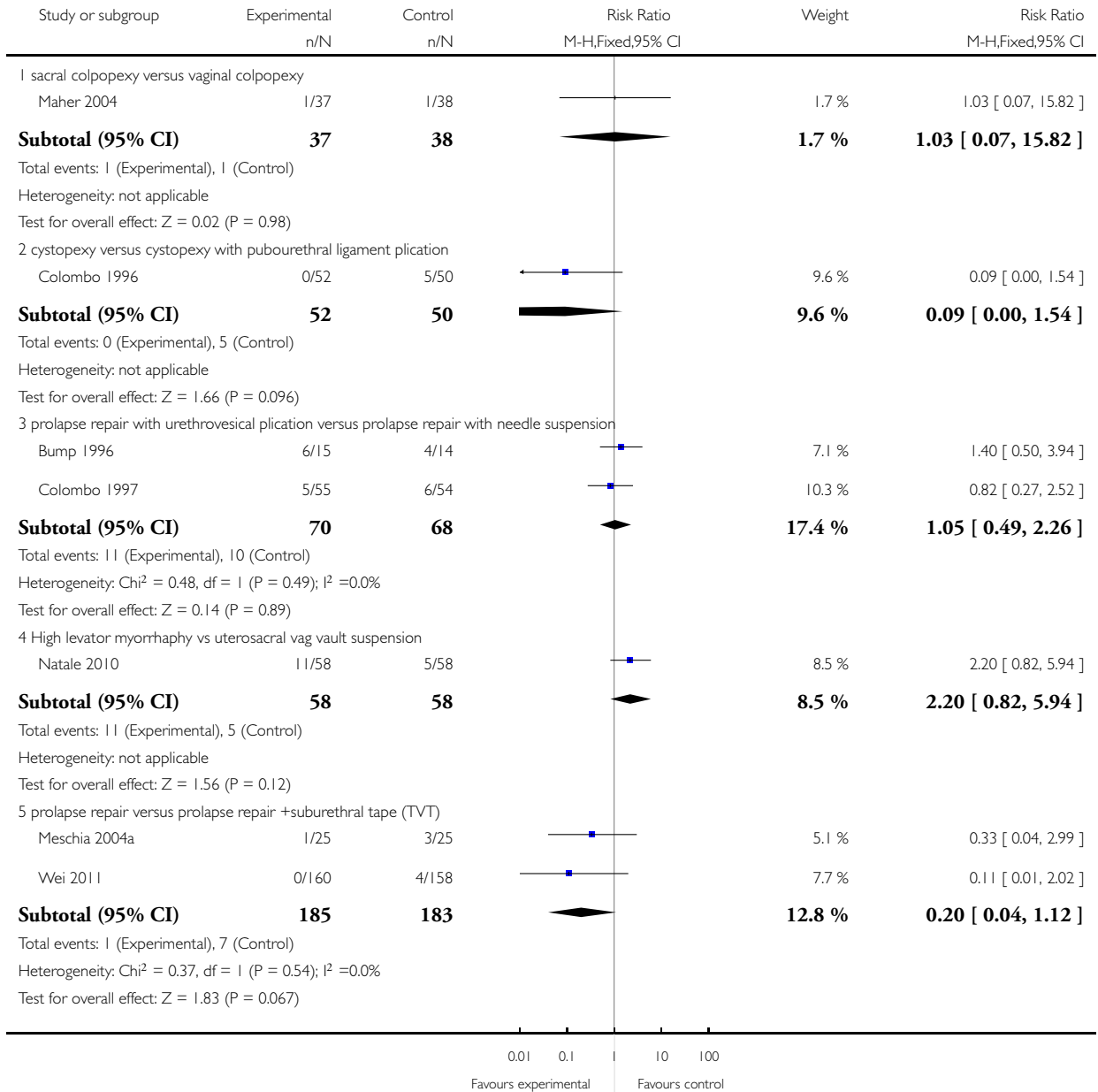


Analysis 9.5. Comparison 9 Prolapse surgery and bladder function, Outcome 5 Longterm voiding dysfunction.

Review: Surgical management of pelvic organ prolapse in women

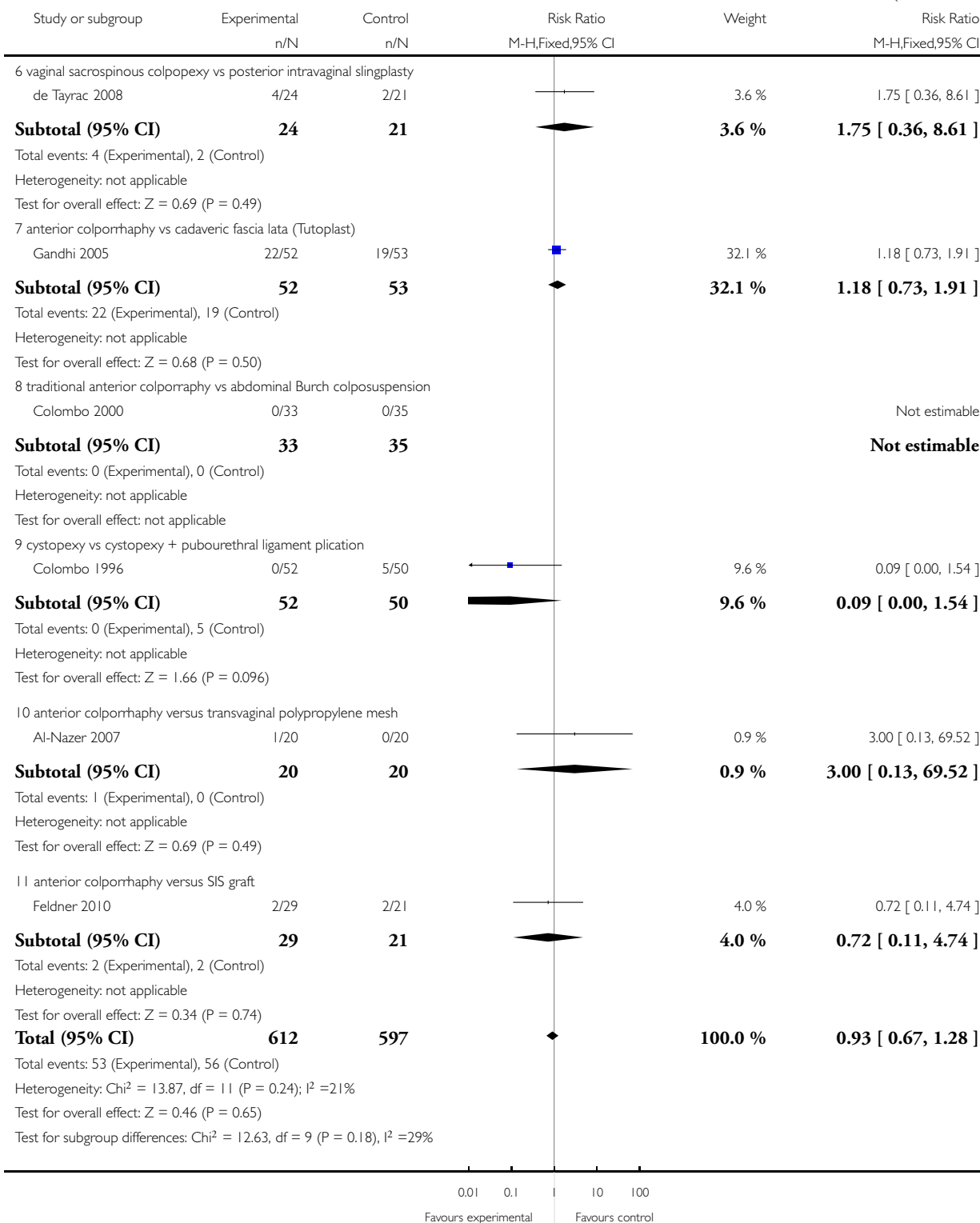
Comparison: 9 Prolapse surgery and bladder function

Outcome: 5 Longterm voiding dysfunction



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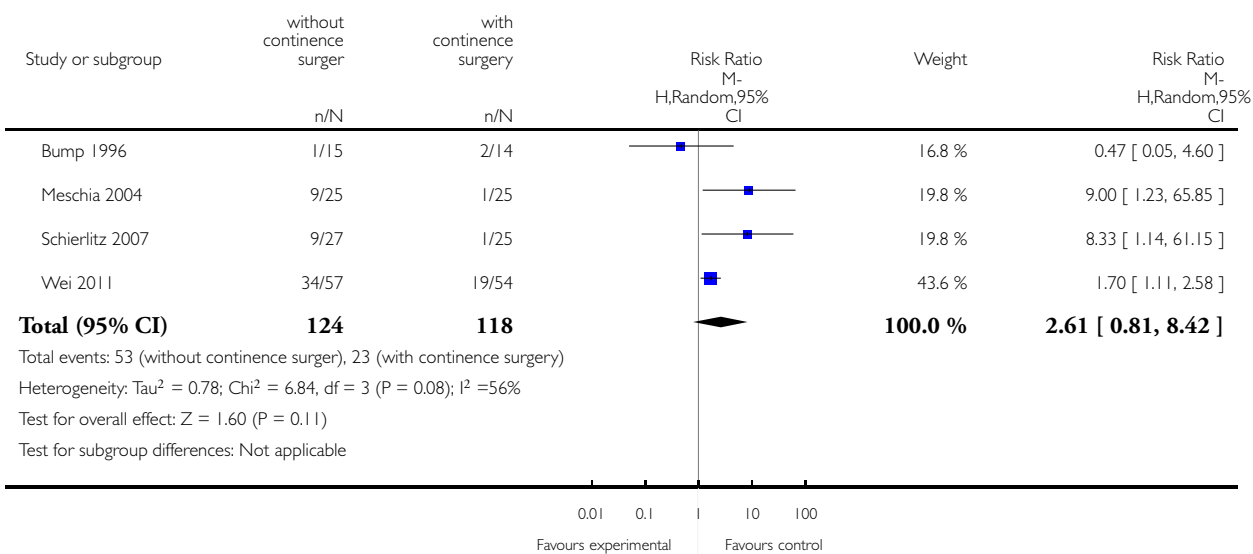


Analysis 9.6. Comparison 9 Prolapse surgery and bladder function, Outcome 6 Number with new or denovo SUI who had occult SUI pre-operatively.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 9 Prolapse surgery and bladder function

Outcome: 6 Number with new or denovo SUI who had occult SUI pre-operatively

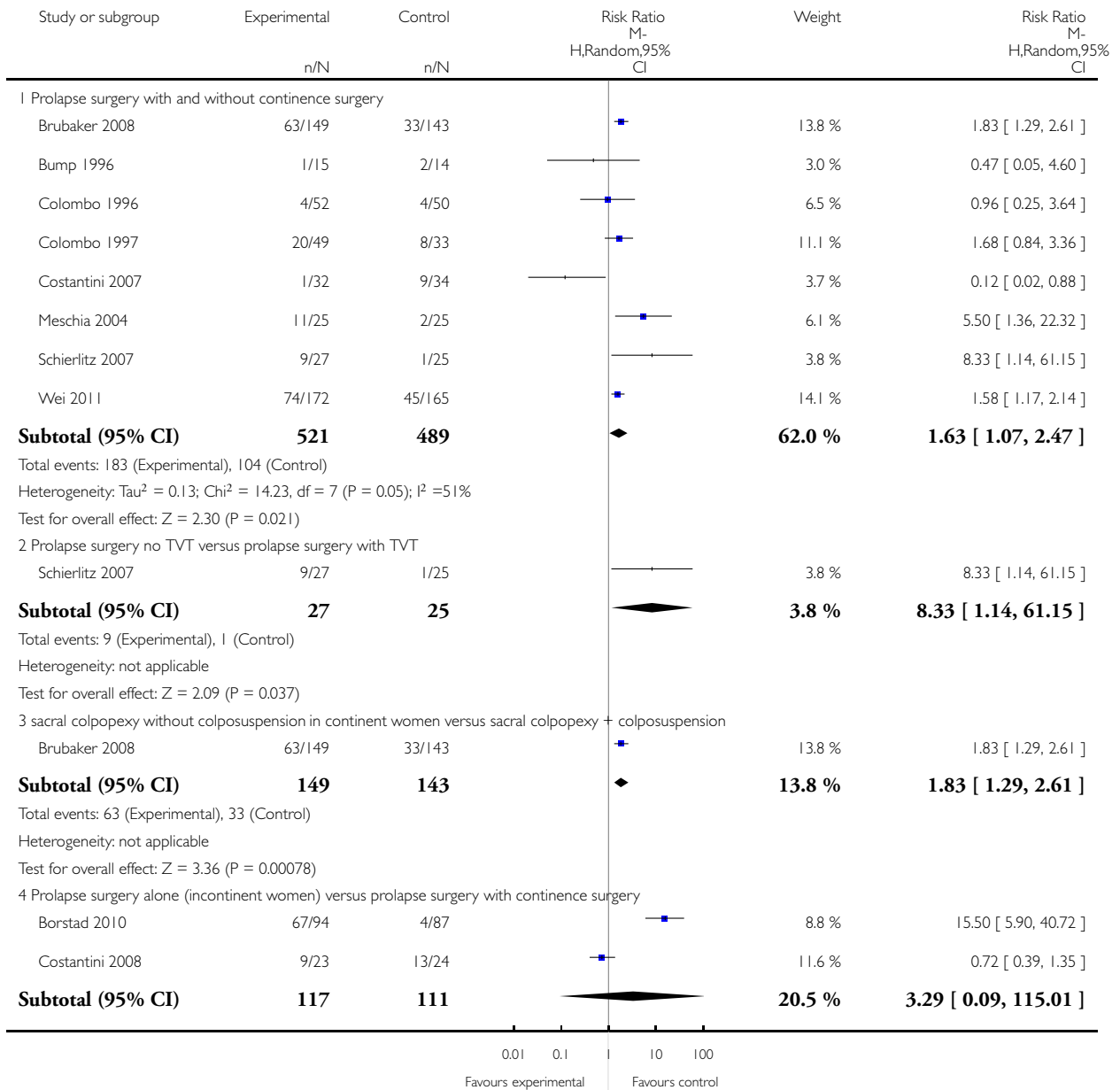


Analysis 9.7. Comparison 9 Prolapse surgery and bladder function, Outcome 7 post prolapse surgery SUI objective.

Review: Surgical management of pelvic organ prolapse in women

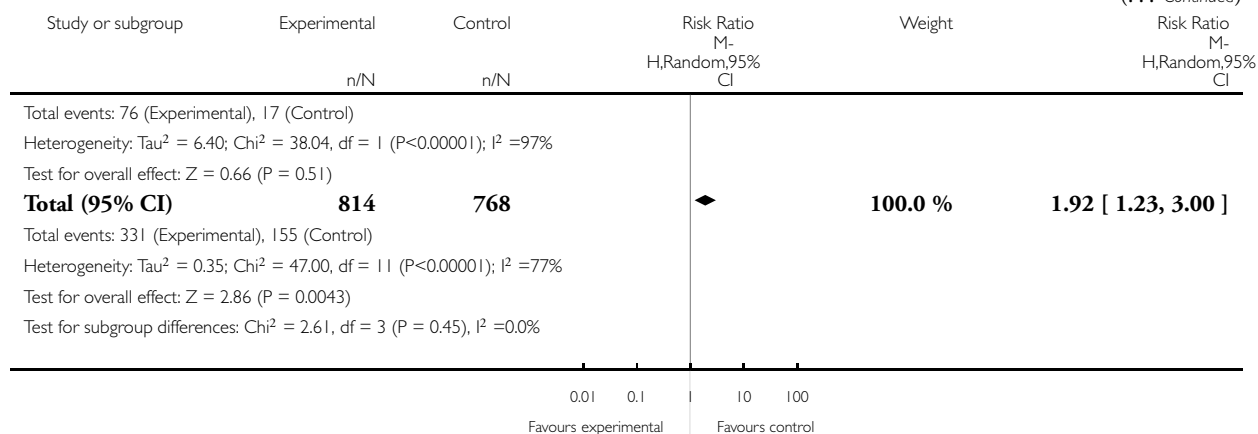
Comparison: 9 Prolapse surgery and bladder function

Outcome: 7 post prolapse surgery SUI objective



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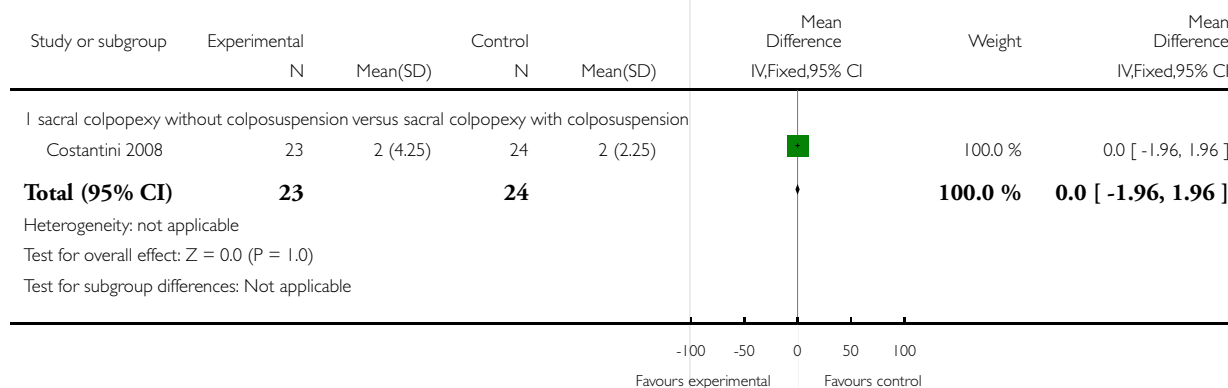


Analysis 9.8. Comparison 9 Prolapse surgery and bladder function, Outcome 8 Incontinence Impact Questionnaire IIQ post.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 9 Prolapse surgery and bladder function

Outcome: 8 Incontinence Impact Questionnaire IIQ post

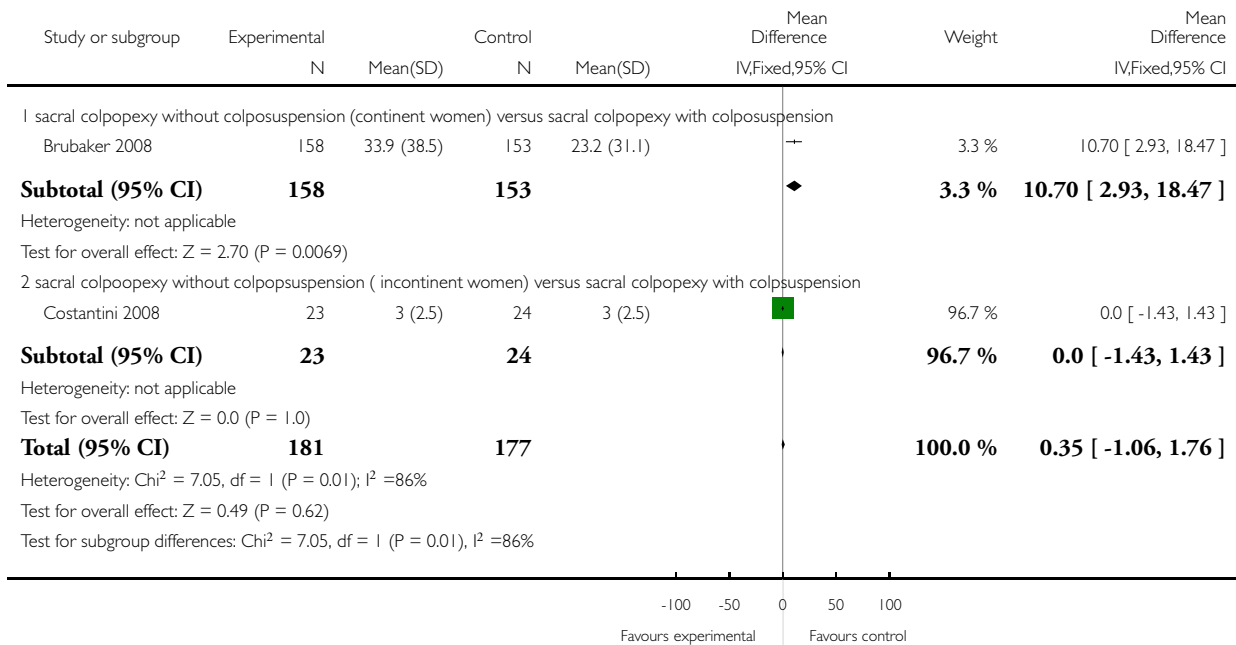


Analysis 9.9. Comparison 9 Prolapse surgery and bladder function, Outcome 9 Urinary Distress Inventory (UDI-6).

Review: Surgical management of pelvic organ prolapse in women

Comparison: 9 Prolapse surgery and bladder function

Outcome: 9 Urinary Distress Inventory (UDI-6)

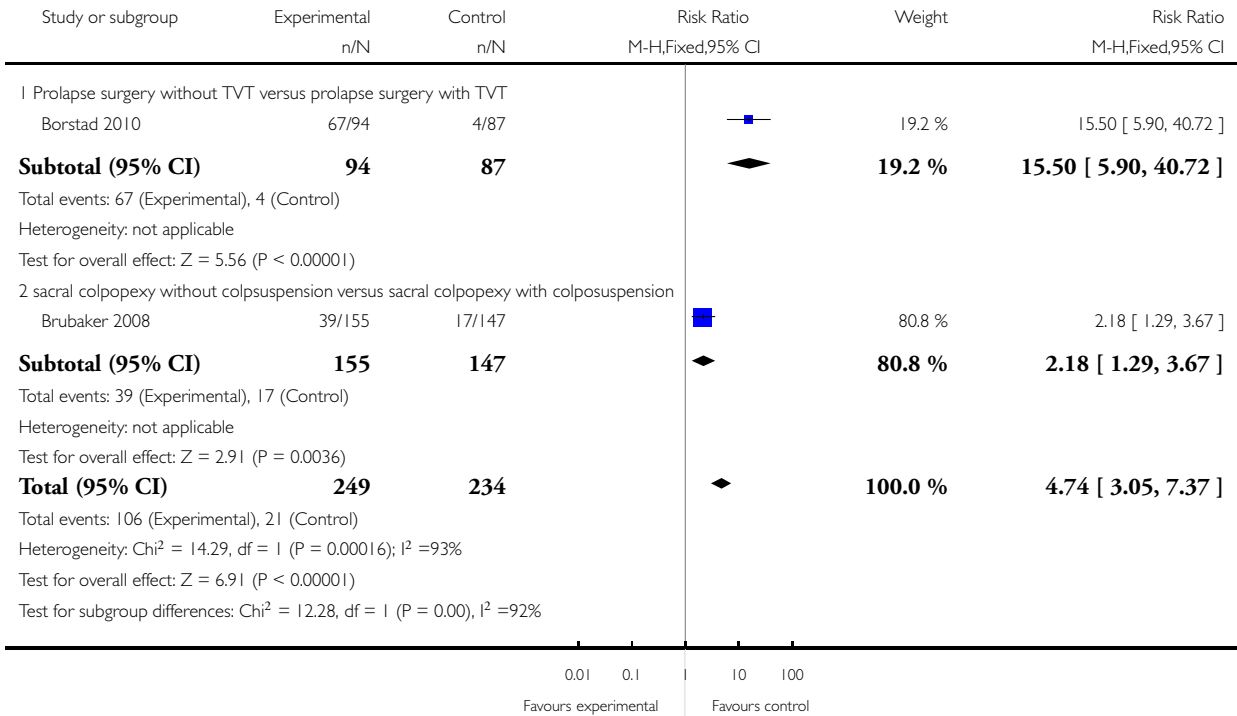


Analysis 9.10. Comparison 9 Prolapse surgery and bladder function, Outcome 10 Bothersome SUI (PFDI) post-operative.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 9 Prolapse surgery and bladder function

Outcome: 10 Bothersome SUI (PFDI) post-operative

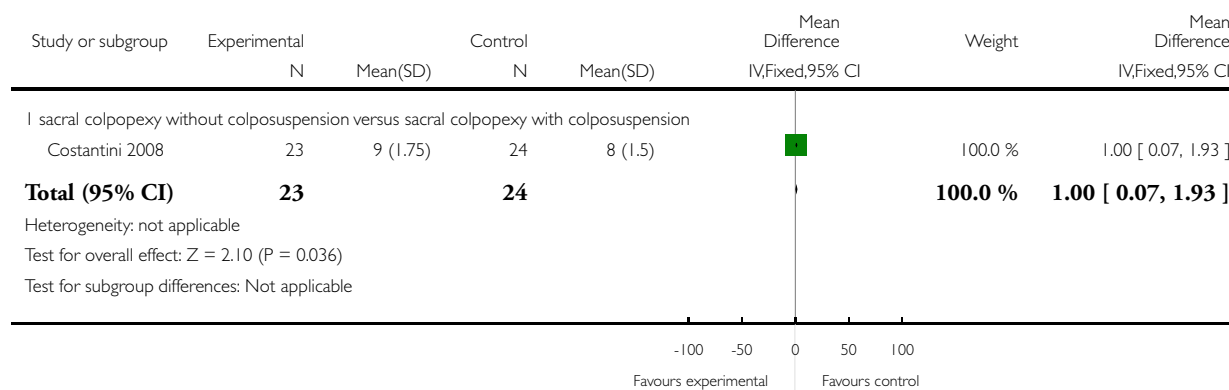


Analysis 9.11. Comparison 9 Prolapse surgery and bladder function, Outcome 11 satisfaction (VAS 0-10).

Review: Surgical management of pelvic organ prolapse in women

Comparison: 9 Prolapse surgery and bladder function

Outcome: 11 satisfaction (VAS 0-10)

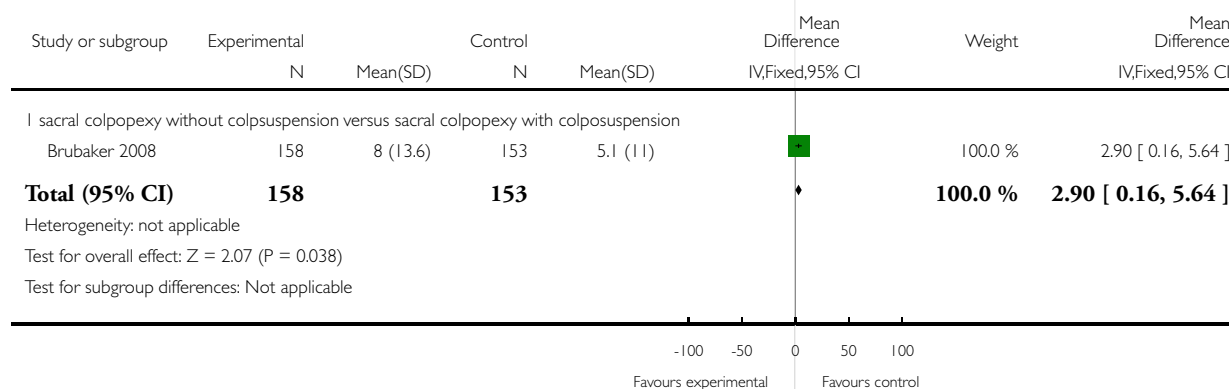


Analysis 9.12. Comparison 9 Prolapse surgery and bladder function, Outcome 12 Pelvic Floor Incontinence questionnaire (PFIQ) bladder domain.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 9 Prolapse surgery and bladder function

Outcome: 12 Pelvic Floor Incontinence questionnaire (PFIQ) bladder domain

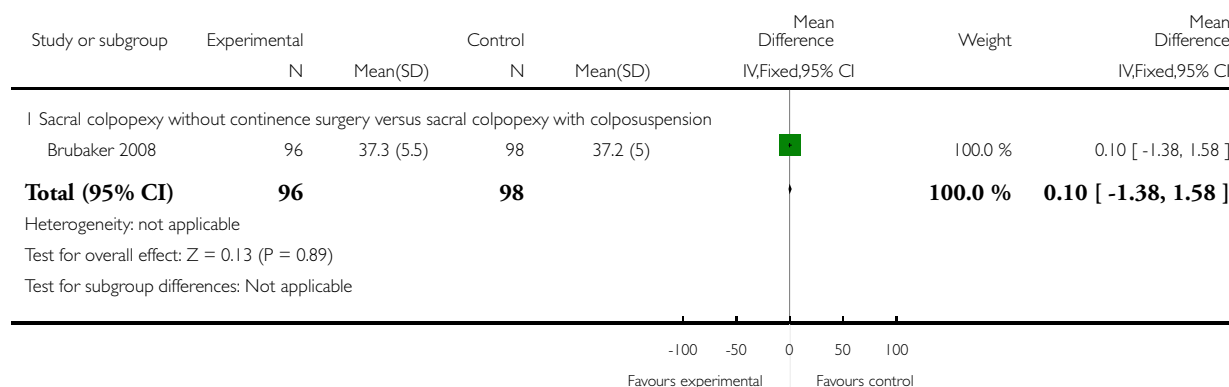


Analysis 9.13. Comparison 9 Prolapse surgery and bladder function, Outcome 13 Pelvic organ Prolapse/Urinary incontinence Sexual Function Questionnaire (PISQ).

Review: Surgical management of pelvic organ prolapse in women

Comparison: 9 Prolapse surgery and bladder function

Outcome: 13 Pelvic organ Prolapse/Urinary incontinence Sexual Function Questionnaire (PISQ)

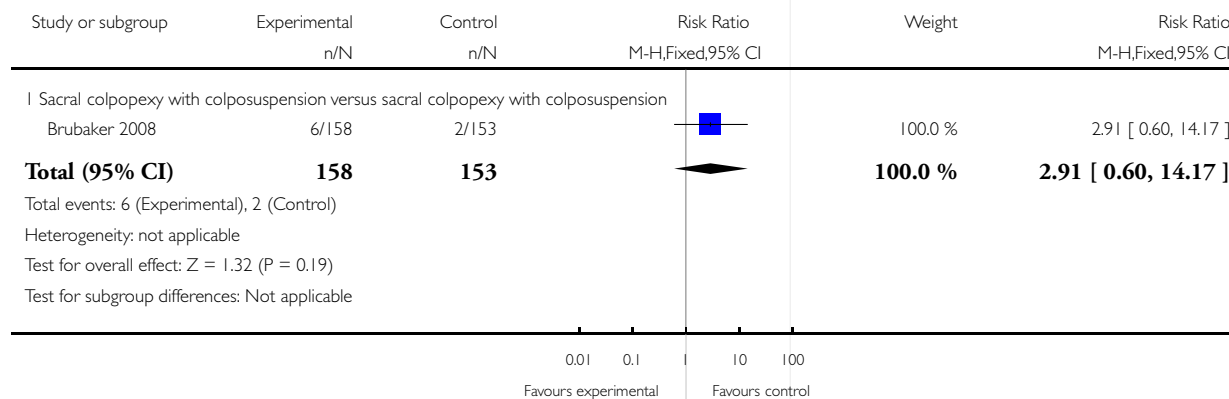


Analysis 9.14. Comparison 9 Prolapse surgery and bladder function, Outcome 14 further Prolapse surgery.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 9 Prolapse surgery and bladder function

Outcome: 14 further Prolapse surgery

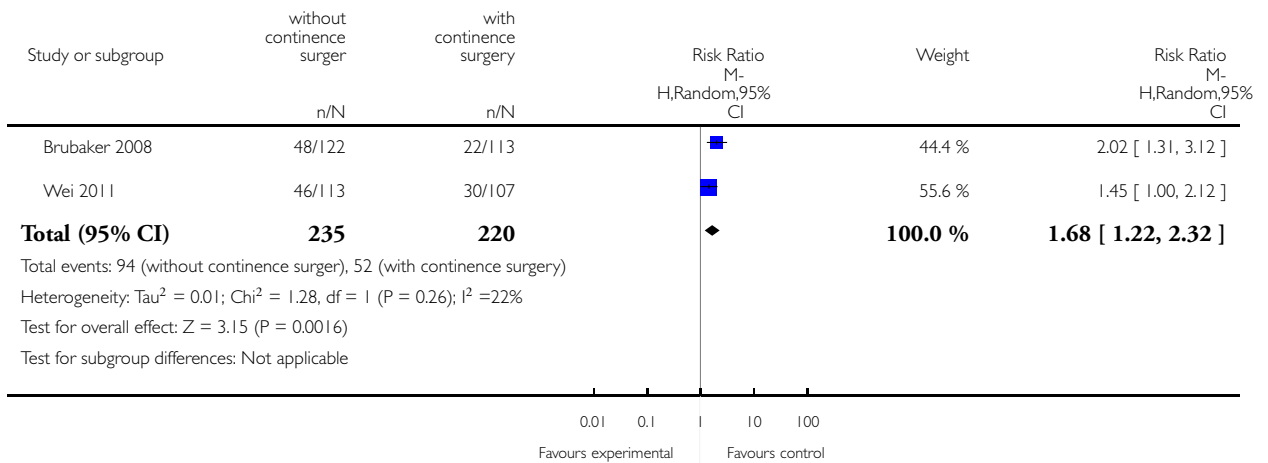


Analysis 9.15. Comparison 9 Prolapse surgery and bladder function, Outcome 15 De novo Stress urinary incontinence women with negative preoperative stress test.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 9 Prolapse surgery and bladder function

Outcome: 15 De novo Stress urinary incontinence women with negative preoperative stress test

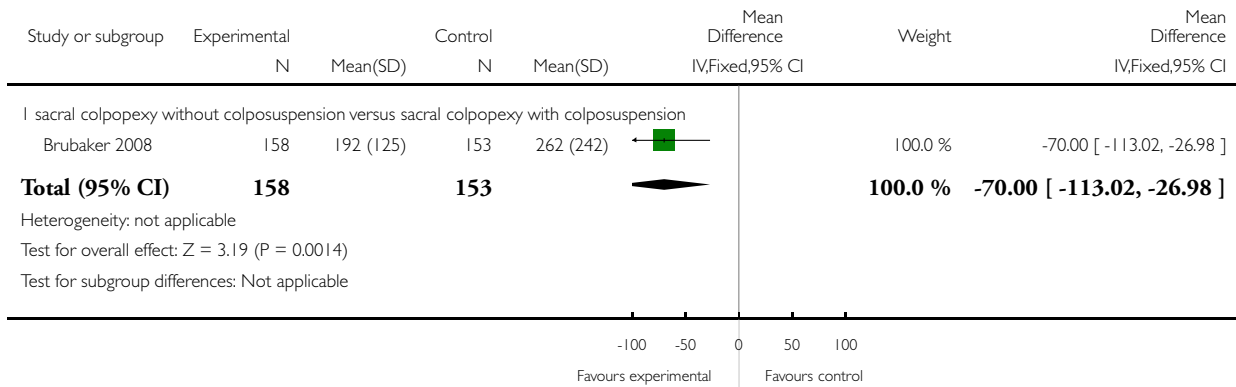


Analysis 9.16. Comparison 9 Prolapse surgery and bladder function, Outcome 16 blood loss (mls).

Review: Surgical management of pelvic organ prolapse in women

Comparison: 9 Prolapse surgery and bladder function

Outcome: 16 blood loss (mls)

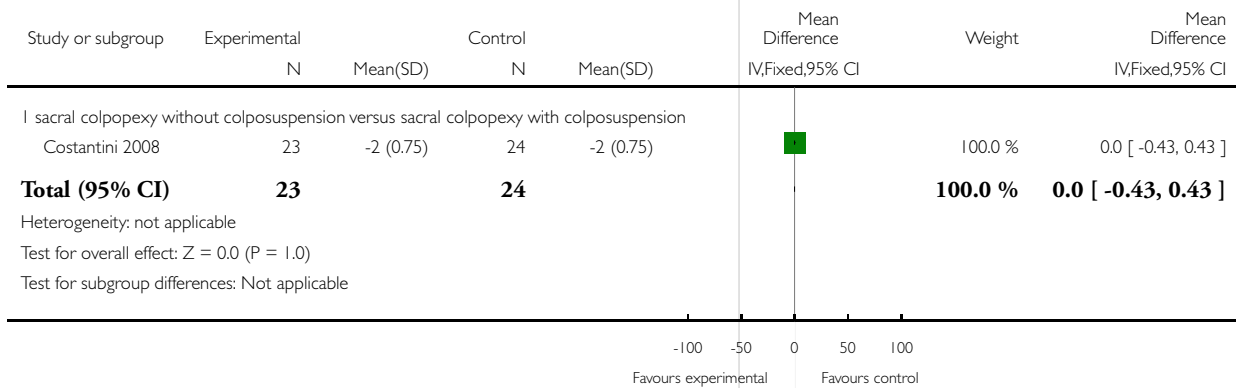


Analysis 9.17. Comparison 9 Prolapse surgery and bladder function, Outcome 17 POPQ point Aa.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 9 Prolapse surgery and bladder function

Outcome: 17 POPQ point Aa

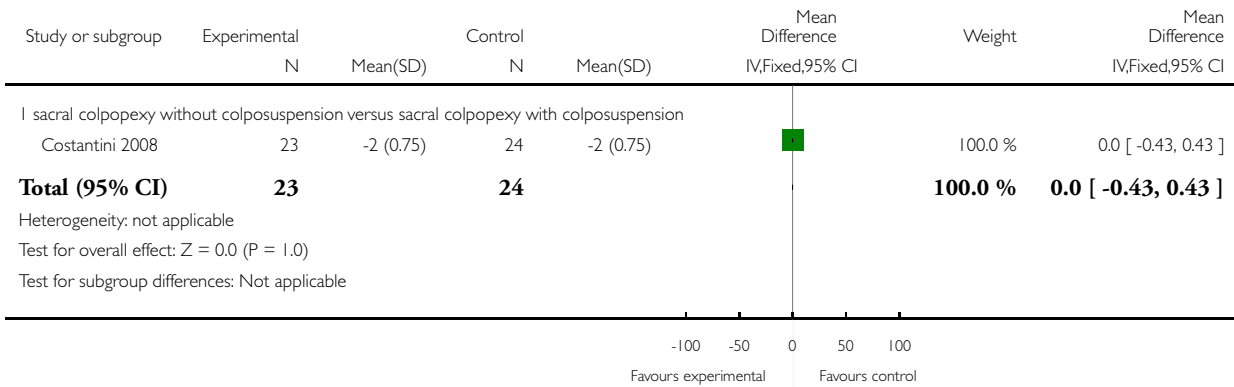


Analysis 9.18. Comparison 9 Prolapse surgery and bladder function, Outcome 18 Point Ap.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 9 Prolapse surgery and bladder function

Outcome: 18 Point Ap

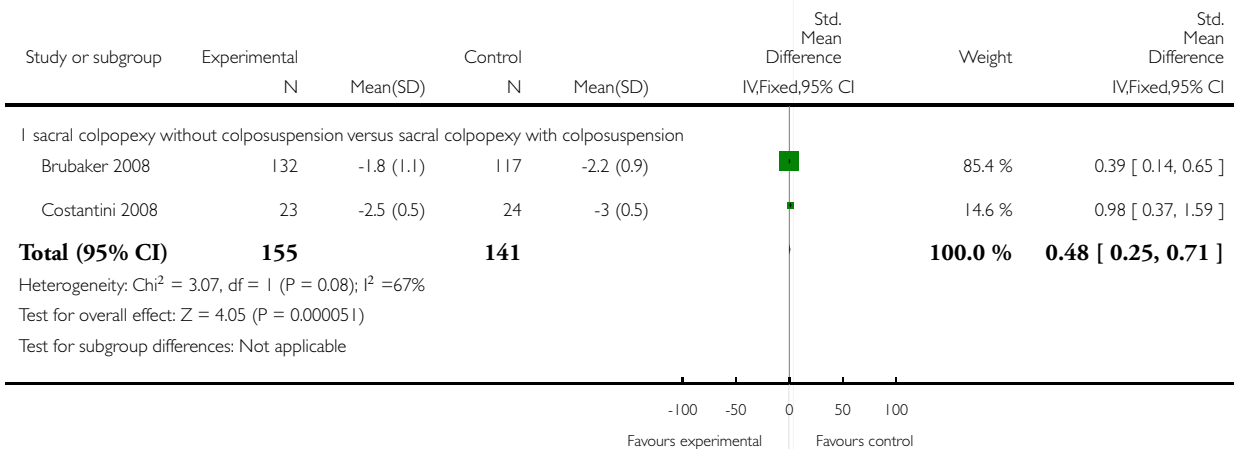


Analysis 9.19. Comparison 9 Prolapse surgery and bladder function, Outcome 19 POP-Q Point Ba.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 9 Prolapse surgery and bladder function

Outcome: 19 POP-Q Point Ba

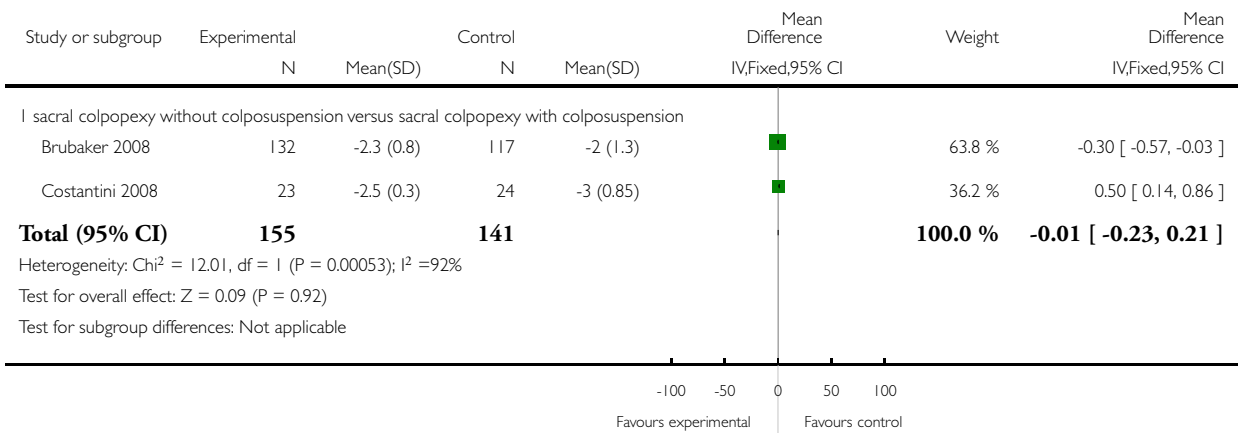


Analysis 9.20. Comparison 9 Prolapse surgery and bladder function, Outcome 20 POPQ point Bp.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 9 Prolapse surgery and bladder function

Outcome: 20 POPQ point Bp

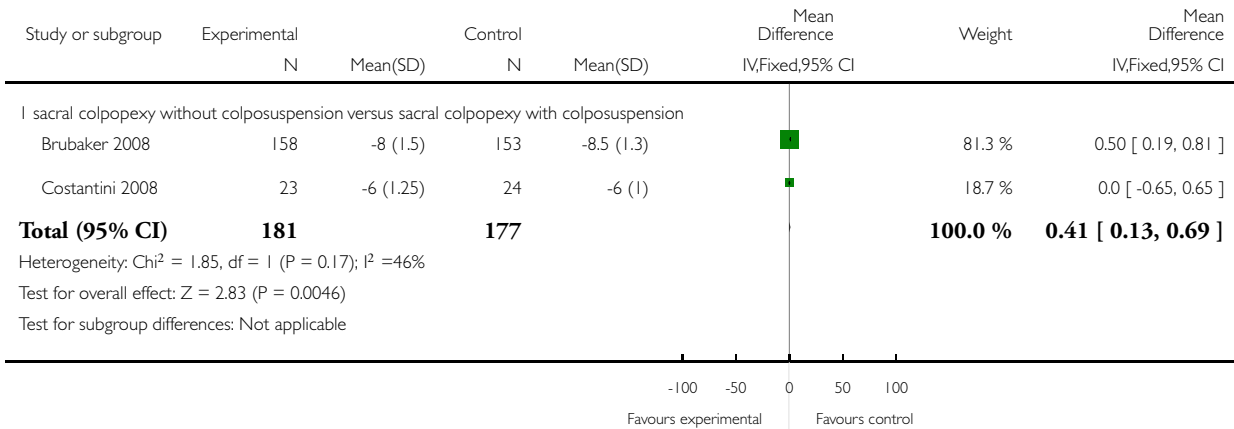


Analysis 9.21. Comparison 9 Prolapse surgery and bladder function, Outcome 21 POPQ point C.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 9 Prolapse surgery and bladder function

Outcome: 21 POPQ point C

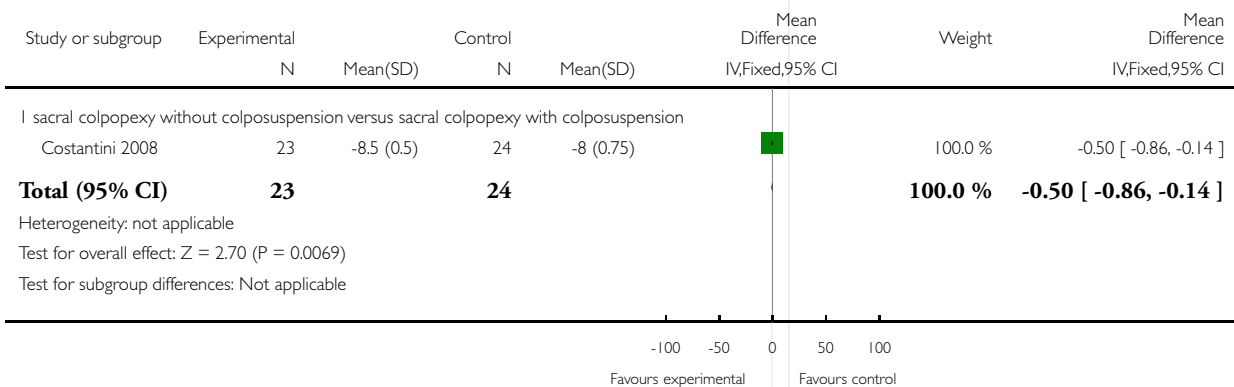


Analysis 9.22. Comparison 9 Prolapse surgery and bladder function, Outcome 22 POPQ point D.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 9 Prolapse surgery and bladder function

Outcome: 22 POPQ point D

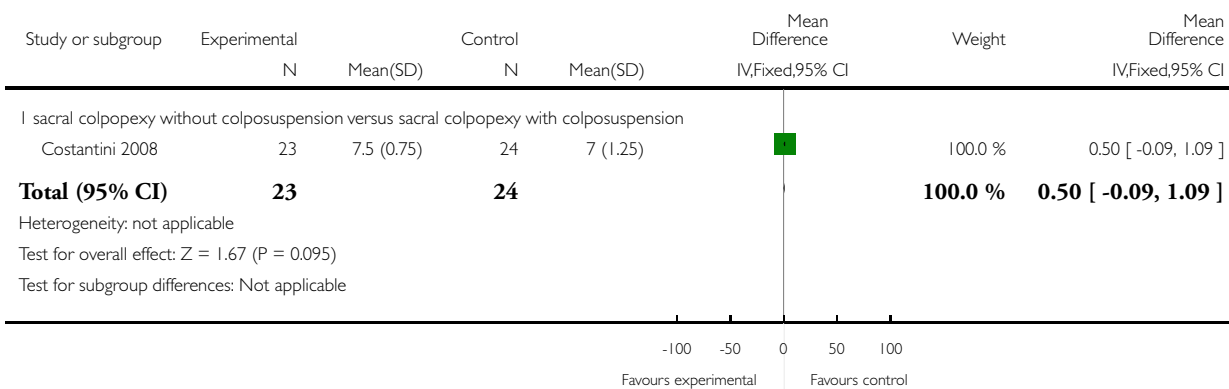


Analysis 9.23. Comparison 9 Prolapse surgery and bladder function, Outcome 23 Total vaginal length (TVL cm).

Review: Surgical management of pelvic organ prolapse in women

Comparison: 9 Prolapse surgery and bladder function

Outcome: 23 Total vaginal length (TVL cm)

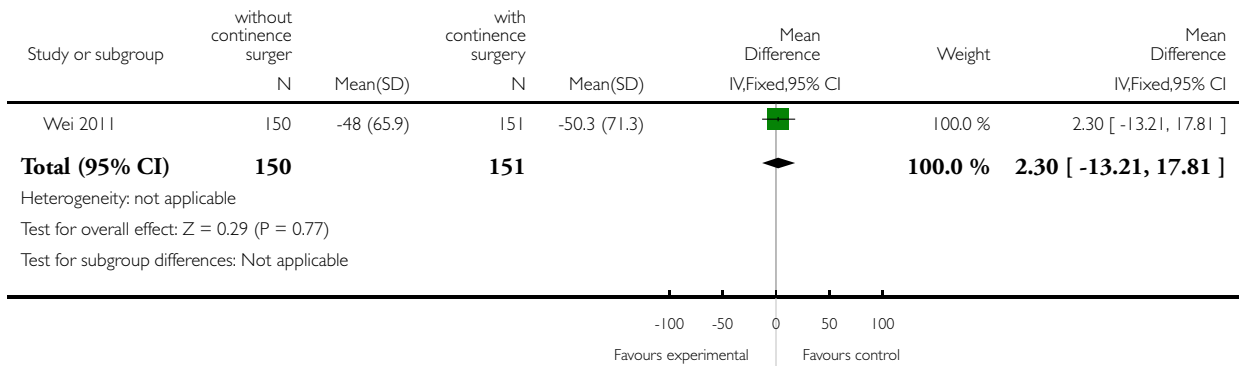


Analysis 9.24. Comparison 9 Prolapse surgery and bladder function, Outcome 24 Pelvic Floor Urinary Impact Questionnaire (PFUIQ).

Review: Surgical management of pelvic organ prolapse in women

Comparison: 9 Prolapse surgery and bladder function

Outcome: 24 Pelvic Floor Urinary Impact Questionnaire (PFUIQ)

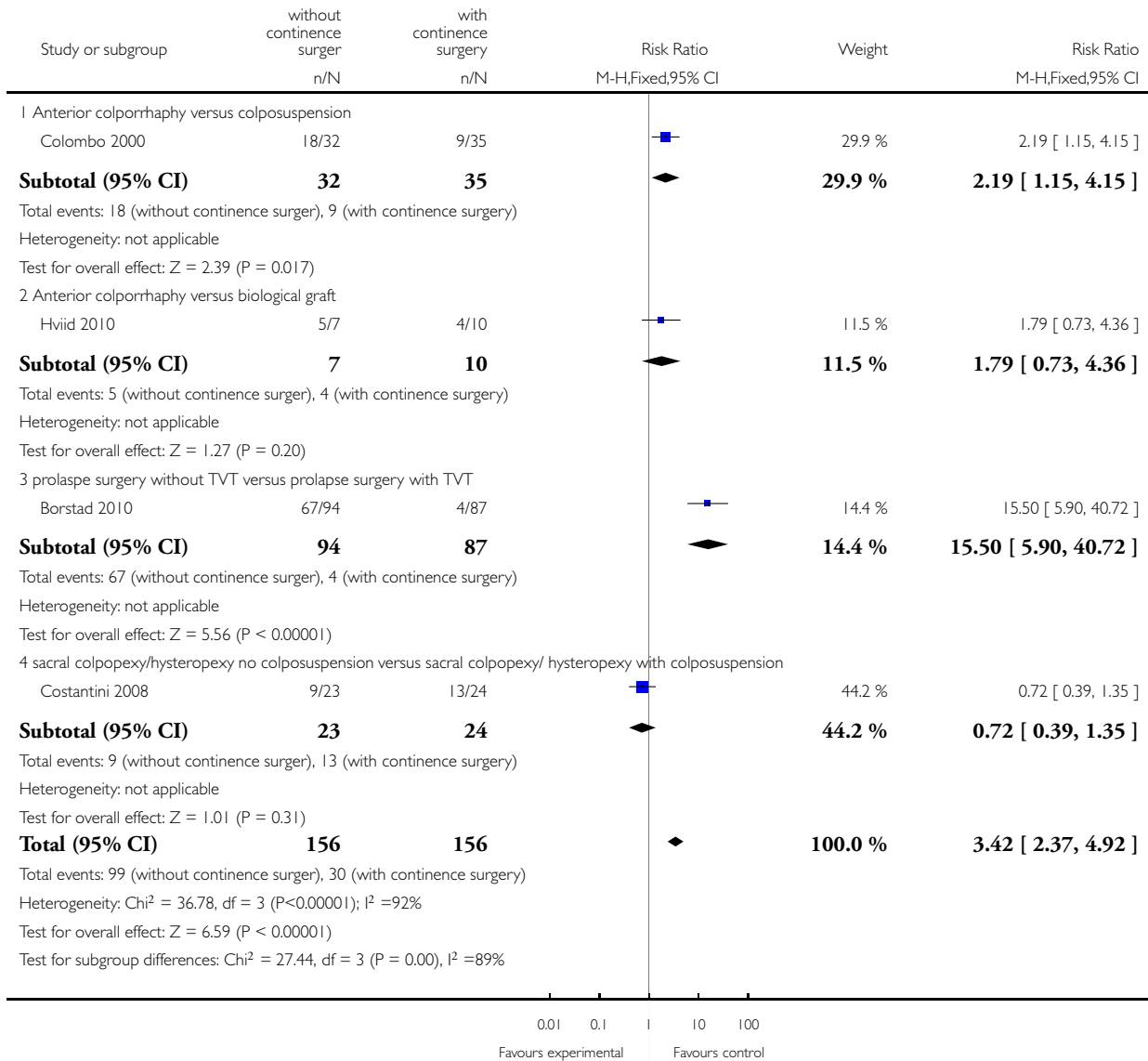


Analysis 9.25. Comparison 9 Prolapse surgery and bladder function, Outcome 25 Number with persisting stress urinary incontinence after prolapse and continence surgery.

Review: Surgical management of pelvic organ prolapse in women

Comparison: 9 Prolapse surgery and bladder function

Outcome: 25 Number with persisting stress urinary incontinence after prolapse and continence surgery



ADDITIONAL TABLES

Table 1. Graft erosion

	Number with erosion	Total number of women
Polyglactin (Vicryl, absorbable synthetic)		
Allahdin 2008	2	32
Sand 2001	0	73
Biological (porcine, Pelvicol)		
Meschia 2007	1	98
Non-absorbable synthetic polypropylene		
Ali 2006 abstract	3	46
Carey 2009	4	62
Menefee 2011	5	28
Nguyen 2008	2	37
Nieminen 2008	18	104
Sivaslioglu 2008	3	43

Table 2. Polypropylene mesh erosion

Ali 2006	3	46
Carey 2009 NEW	4	62
Iglesia 2010 NEW	5	32
Menefee 2011	5	28
Nguyen 2008	2	37
Nieminen 2008	18	104
Sivaslioglu 2008	3	43
Thijs 2010 NEW	9	48
Vollebregt 2010 NEW	2	53

Table 2. Polypropylene mesh erosion (Continued)

Withagen 2011 NEW	14	83
Subtotal (95% CI)		536
Total events	65	

APPENDICES

Appendix I. Types of operations

Sacral colpopexy

Aim

to correct upper genital tract prolapse

Indication

Usually reserved for recurrent prolapse of the upper vagina (recurrent cystocele, vault or enterocele) or massive vaginal eversion

Surgical technique

- Usually performed under general anaesthesia
- Performed through an incision on the lower abdomen or keyhole
- The bladder and rectum are freed from the vagina and permanent mesh supports the front and back wall of the vagina
- This mesh is secured to the sacrum (upper tailbone)
- Peritoneum (lining of the abdominal cavity) is closed over the mesh
- Other repairs are performed as required at the same time including paravaginal repair, perineoplasty, colposuspension or rectopexy
- Bowel preparation is required prior to the surgery

McCaul culdoplasty

Indications

- Vault prolapse or an enterocele
- Often performed at the time of vaginal hysterectomy to prevent future prolapse

Surgical technique

- After the uterus is removed at the time of hysterectomy the uterosacral ligaments are identified and incorporated into the closure of the peritoneum and upper vagina using 1 to 2 sutures
- An anterior or posterior vaginal repair is often performed at the same time

Sacrospinous fixation

Aim

This surgery offers support to the upper vagina minimizing risk of recurrent prolapse at this site. The advantage of this surgery is that vaginal length is maintained.

Indication

Upper vaginal prolapse (uterine or vault prolapse, enteroceles)

This procedure can be used in reconstructive vaginal surgery where increased vaginal length is required.

Procedure

- The procedure can be performed under regional or general anaesthesia
- A routine posterior vaginal incision is made and extended to the top of the vagina
- Using sharp dissection the vagina is freed from the underlying rectovaginal fascia and rectum until the pelvic floor (puborectalis) muscle is seen

- Using sharp and blunt dissection the sacrospinous ligament running from the ischial spine to the sacral bone is palpated and identified
- Two sutures are placed through the strong ligament and secured to the top of the vagina. This results in increased support to the upper vagina. There is no shortening of the vagina
- Other fascial defects in the vagina are repaired and the vaginal skin is closed

Anterior vaginal repair (colporrhaphy)

Indication

- Prolapse of the bladder or urethra
- Sometimes used to treat urinary stress incontinence

Surgical technique

- The procedure can be performed under regional or general anaesthesia
- The vagina overlying the bladder and urethra is incised in the midline
- Dissection in a plane directly below the vagina allows the damaged fascia supporting the bladder and urethra to be exposed
- The fascia is plicated in the midline using delayed absorbable or permanent sutures
- Sometimes excessive vaginal skin is removed
- The vaginal skin is then closed
- Other sites of prolapse are then repaired as required

Posterior vaginal repair and perineoplasty

Indications

Treatment of rectocele (rectum bulges or herniates forward into the vagina) and defects of the perinium (area separating entrance of the vagina and anus)

Aim

correct defects in the rectovaginal fascia separating rectum and vagina while allowing bowel function to be maintained or corrected without interfering with sexual function

Surgical technique

- An incision is made on the posterior wall of the vagina starting at the entrance and finishing at the top of the vagina
- Dissecting the vagina and rectovaginal fascia from the vagina until the pelvic floor muscles (puborectalis) are located
- Defects in the fascia are corrected by centrally plicating the fascia using delayed absorption sutures
- The perineal defects are repaired by placing deep sutures into the perineal muscles to build up the perineal body
- The overlying vaginal and vulval skin is then closed
- A pack is usually placed into the vagina and a catheter into the bladder at the end of surgery

Anterior or posterior vaginal repair, or both (colporrhaphy)

Indications:

Anterior repair: treatment for prolapse of bladder (bladder bulges forward into the vagina; cystocele) or urethra.

Posterior repair: correction of bowel prolapse (rectum bulges forward into the vagina; rectocele).

Vault repair: treat prolapse of upper vagina.

Depending on the side of the defect, the repair can either be anterior, posterior, vault or total. The repair is achieved by the placement of permanent mesh that may result in a stronger repair.

Surgical technique

The procedure can be performed under regional or general anaesthesia.

Anterior vaginal repair

- Midline incision to the vagina overlying the bladder and urethra
- Dissection in a plane directly below the vagina and lateral of the bladder allows the damaged fascia supporting the bladder to be exposed
- The fascia is plicated in the midline using sutures
- Mesh can be used to reinforce the repair and can be used as an inlay, or anchored through the obturator foramen and exiting through small incisions at both sides of the upper inner thigh
- The vaginal skin is closed

Posterior and vault repair

- An incision is made to the posterior wall of the vagina
- Dissection below the vagina identifies the rectovaginal fascia and opens the space between the rectum and the pelvic floor muscle to the sacrospinous ligaments
 - Defects in the fascia are corrected by centrally plicating the fascia using sutures
 - Mesh can be used to reinforce the repair and can be used as an inlay or anchored bilaterally to the pelvic side wall and exiting through a small incision approximately 3cm lateral and down from the anus
 - The vaginal skin is then closed

Vaginal paravaginal repair

Aim: the objective of this surgery is to reattach detached lateral vaginal fascia to its normal point of insertion on the lateral side wall. This firm area of attachment is termed the white line or arcus tendineus fascia pelvis.

Indication

The repair of anterior wall prolapse due to defects of the lateral supporting tissues

Procedure

The procedure can be performed under regional or general anaesthesia

Routine anterior repair

The sharp dissection of the vagina from the bladder fascia continues laterally till the pelvic side wall can be identified

Permanent or delayed absorbable sutures are placed from the lateral vagina to the firm pelvic side wall tissue (white line or arcus tendineus fascia pelvis). Three to four sutures are placed on each side.

A routine anterior repair with midline plication of the fascia, trimming of excess vaginal skin as required and closure of the vaginal skin.

Appendix 2. Description of studies

One type of upper vaginal prolapse (uterine and vaginal vault) repair versus another (Comparison 1)

Eighteen trials compared the management of upper vaginal prolapse (Benson 1996; Braun 2007 abstract; Brubaker 2008; Costantini 2007; Costantini 2008; Culligan 2005; de Tayrac 2008; Dietz 2010; Jeng 2005; Lo 1998; Maher 2004; Meschia 2004a; Natale 2010; Pantazis 2011; Roovers 2004; Maher 2011; Paraiso 2011; Rondini 2011 abstract). Four previously included trials (Culligan 2005; Dietz 2010; Natale 2010; Pantazis 2011) have been updated with data from new publications.

Abdominal sacral colpopexy versus vaginal sacrospinous colpopexy

Three trials addressed this comparison (Benson 1996; Lo 1998; Maher 2004). Benson's trial reported data for 80 of 101 randomised women with uterovaginal or vault prolapse; the women with uterovaginal prolapse all underwent hysterectomy (Benson 1996). Lo's trial reported follow up of 118 of 138 continent women who had at least Stage 3 prolapse; some underwent anterior or posterior repairs or abdominal or vaginal hysterectomy in addition to the repair of the prolapse that was actually being compared in the trial (Lo 1998). Maher's trial included 89 women with post-hysterectomy vaginal vault prolapse (Maher 2004). In the Benson and Maher trials, the abdominal group underwent sacral colpopexy with procedures such as colposuspension, paravaginal repair or a vaginally performed posterior vaginal wall repair, as required. In the vaginal arm of Benson's trial, a bilateral vaginal sacrospinous colpopexy was performed, which was in contrast to a unilateral sacrospinous colpopexy in Maher's trial. In Lo's trial this was not specified but Nichols' method was referenced. Thus, clinical heterogeneity was evident as some women in two of the trials (Benson 1996; Lo 1998) underwent hysterectomy in addition to a prolapse procedure.

Women with stress urinary incontinence were treated with a needle suspension in the vaginal arm of Benson's trial (n = 20) and a colposuspension in the abdominal arm (n = 14) (Benson 1996). Women with stress urinary incontinence or occult incontinence (n = 14, n = 15 in the abdominal and vaginal arms, respectively) received an abdominal colposuspension in both arms of Maher's trial (Maher 2004). In that trial, 27 women had symptoms of overactive bladder at baseline (n = 13, n = 14 respectively). Simple costs were calculated by Benson and Maher, incorporating length of stay and operating theatre cost. Formal cost effectiveness was not reported in either study. However, there was significant variation in the outcome measures (Benson and Lo had incomplete site-specific prolapse reporting; Maher and Lo failed to report time to recurrent prolapse; in Lo optimal surgical cure of prolapse was considered to be Stage 2 prolapse or less). These factors contributed to heterogeneity. Despite these caveats, all three trials were considered to be similar enough for certain outcomes to be combined in a meta-analysis.

Abdominal sacral colpopexy versus high uterosacral ligament suspension

One trial compared open sacral colpopexy (n = 54) and high uterosacral colpopexy (n = 56) for apical prolapse (point C > +3cm) and reported as abstract at one year ([Rondini 2011 abstract](#)). No information was available on exclusion criteria, surgical technique and concomitant surgery.

Abdominal sacral colpopexy and abdominal hysterectomy versus Mayo McCall and vaginal hysterectomy

One trial compared abdominal sacral colpopexy to the vaginal Mayo-McCall technique in the correction of severe (POP-Q Stage 3-4) central compartment prolapse ([Braun 2007 abstract](#)). Patients in group A (n = 47) underwent total abdominal hysterectomy (TAH) with or without bilateral salpingo-oophorectomy (BSO) and sacral colpopexy using synthetic combined absorbable and non-absorbable (Vypro) mesh, while patients in group B (n = 47) underwent vaginal hysterectomy (VH) plus anterior and posterior colporrhaphy plus the Mayo McCall procedure using delayed absorbable (PDS) sutures. Mean follow-up time was 33 months (range 20 to 41) for both groups and no concomitant procedures were performed ([Braun 2007 abstract](#)).

Uterine suspension (preservation) versus vaginal hysterectomy

Abdominal uterine preservation versus vaginal hysterectomy and repair

One trial evaluated only women with uterine prolapse who underwent sacrohysteropexy (with uterine preservation) in the abdominal group (n = 41) and vaginal hysterectomy and vaginal repair with the vault being fixed to the uterosacral cardinal ligament complex in the vaginal group (n = 41) ([Roovers 2004](#)). Roovers' trial was analysed as a separate subcategory in the analyses as the vaginal arm did not include a sacrospinous colpopexy and the abdominal group included uterine preservation. In an update, published only as an abstract, the authors presented long-term (eight years) follow up of this prospective randomised trial comparing abdominal sacrohysteropexy and vaginal hysterectomy with anterior or posterior repair, or both, in women with Stage 2 or greater uterine prolapse (POP-Q). Seventy-four of the original 84 patients were alive and able to be contacted for the follow up. Sixty (71%) women completed questionnaires and 31 (37%) were examined ([Roovers 2004](#)).

Vaginal sacrospinous uterine suspension versus vaginal hysterectomy

Two trials addressed this comparison.

One trial updated in this review ([Dietz 2010](#)) compared vaginal sacrospinous uterine suspension (with uterine preservation) (n = 31) compared with vaginal hysterectomy with uterosacral suspension (n = 34) with both patient and clinician-reported prolapse outcomes. Dietz used the POP-Q system to determine failure, as Stage 2 or greater. One other trial examined sexual function outcomes after vaginal sacrospinous uterine suspension (with uterine preservation) compared with vaginal hysterectomy ([Jeng 2005](#)) but no prolapse or incontinence outcomes were reported.

Hysterectomy with high levator myorrhaphy (HLM) versus hysterectomy with uterosacral vaginal vault suspension (UVVS)

One trial ([Natale 2010](#)) compared two procedures for suspension of the vaginal vault: HLM (n = 116) and UVVS (n = 113) in women with Stage 2 vault prolapse in addition to an anterior vaginal wall prolapse. All women underwent a concomitant vaginal hysterectomy and anterior repair with polypropylene mesh. Demographic parameters and previous prolapse surgeries did not differ between the two groups ([Natale 2010](#)). Data were derived from an abstract (ICS 2007) and published article ([Natale 2010](#)).

Open abdominal sacral colpopexy versus laparoscopic sacral colpopexy

One trial reported (in two abstracts) a pilot RCT comparing open (n = 27) and laparoscopic (n = 26) sacral colpopexy in the treatment of POP-Q Stage 2 vault prolapse ([Pantazis 2011](#)). Women who were medically unfit for sacral colpopexy or those requiring concomitant pelvic surgery were excluded. No CONSORT statement, intention-to-treat analysis or blinding status of the assessors was provided and continuous data were reported without standard deviations. Demographic details were similar in both groups ([Pantazis 2011](#)).

Laparoscopic sacral colpopexy versus total vaginal mesh (TVM)

One single centre multi-surgeon study compared laparoscopic sacral colpopexy (n = 53) versus total vaginal mesh (TVM, Total Prolift) (n = 55) for post-hysterectomy prolapse at two years ([Maher 2011](#)).

Concomitant interventions included laparoscopic colposuspension / paravaginal repair and transvaginal posterior fascial plication in the LSC group, and TVT-O in the TVM group according to individual patients' prolapse and continence status. Primary outcome measures were objective success rates at POP-Q sites Aa, Ba, C, Bp, and Ap defined as less than 1 cm individually and as a total. Secondary outcome measures included perioperative outcomes, patient satisfaction, quality of life outcomes, complications, and reoperations. Randomisation was stratified by urinary stress incontinence and the surgeons were experienced in both surgical techniques. Reviewers were blinded non-surgical staff.

Laparoscopic sacral colpopexy versus robotic sacral colpopexy

One trial compared in a prospective single blinded RCT the perioperative, anatomic, functional, and quality of life outcomes of conventional laparoscopic (n = 33) and robotic-assisted laparoscopic sacral colpopexy (n = 35) in patients with Stages 2-4 apical post hysterectomy vaginal prolapse (Paraiso 2011). The primary outcome measure was operative time from incision to closure. Secondary outcomes included postoperative pain and activity, return to normal activities, perioperative complications, and anatomic and functional outcomes were assessed utilising the POP-Q examination and completed the Pelvic Floor Distress Inventory-20 (PFDI-20), Pelvic Floor Impact Questionnaire-7 (PFIQ-7), Prolapse/Incontinence Sexual Questionnaire - 12 (PISQ-12), and the EQ-5D at baseline and 12 months after surgery. Randomisation was stratified by surgeon who had all completed at least 10 robotic sacral colpopexy prior to commencing the study.

Vaginal sacrospinous colpopexy versus posterior intravaginal slingplasty (PIVS) (infracoccygeal sacropexy)

Two trials compared vaginal sacrospinous colpopexy with PIVS using multi-filament polypropylene tape for uterine or vault prolapse (de Tayrac 2008; Meschia 2004a). de Tayrac 2008 and colleagues conducted a multi-centre study comparing multi-filament PIVS (Tyco, France) with sacrospinous suspension for the management of symptomatic Stage 2 or greater uterine or vaginal vault prolapse. Unfortunately, due to withdrawal of the multi-filament polypropylene tape from the market, recruitment stopped prematurely after randomisation of 21 women in the mesh group and 24 in the sacrospinous group. Meschia et al compared 33 women receiving the PIVS and 33 women who underwent the sacrospinous colpopexy for uterine or vault prolapse (Meschia 2004a).

Vaginal sacrospinous colpopexy versus total vaginal mesh (Prolift)

A single multi-centre randomised trial compared sacrospinous colpopexy (n = 83) and native tissue repairs with total vaginal mesh Prolift (n = 85) for grade 2 or greater post-hysterectomy prolapse Halaska 2012. The allocation concealment and blinding status of patients and reviewer were not recorded. No concomitant surgery was performed. All surgeons had completed at least 20 of each procedure prior to commencing study. The primary outcome was any grade 2 or greater prolapse on examination at one year. Peri-operative outcomes, de novo stress urinary incontinence and bladder overactivity, dyspareunia, pelvic pain and functional outcomes were assessed by the Prolapse/Incontinence Sexual Questionnaire - 12 (PISQ-12), the urinary impact questionnaire (UIQ), the ColoRectoAnal Impact Questionnaire (CRAIQ) and Pelvic Organ Prolapse Impact Questionnaire (POPIQ).

Prolapse repair without continence surgery versus prolapse repair with any continence surgery

Two trials (Brubaker 2008; Costantini 2008) evaluated the efficacy of adding continence surgery (Burch colposuspension) to abdominal sacral colpopexy. Two year data were available for the Brubaker trial (Brubaker 2008). As the primary focus of these papers was continence outcomes they will be re-evaluated in a separate review (prolapse surgery and continence issues).

One type of graft versus another type of graft in sacral colpopexy (also Comparison 8)

One double blind RCT compared a cadaveric fascia lata graft (Tutoplast) (n = 46) with polypropylene mesh (Trelax) (n = 54) in abdominal sacral colpopexy for post-hysterectomy vaginal vault prolapse (Culligan 2005). Amongst these groups, 41% and 44% respectively had undergone previous prolapse or incontinence surgery. A tension-free vaginal tape operation was performed for stress urinary incontinence, abdominal paravaginal repair for paravaginal support defects and rectocele repair as required. The methodology stated that bladder, bowel, sexual function and quality of life were assessed by questionnaires but these results have not yet been published. The post-operative evaluation was performed by a nurse specialist who was blinded to treatment allocation. This study was analysed in a separate subcategory as women in both arms received a graft or mesh. This trial has been updated with information from five year follow up, with 29 patients in each group being assessed (Culligan 2005).

2. One type of anterior vaginal wall prolapse repair versus another (Comparison 2)

Twenty-one trials included various surgical procedures for treating anterior vaginal wall prolapse with or without stress urinary incontinence (Al-Nazer 2007; Ali 2006 abstract; Allahdin 2008; Colombo 2000; De Ridder 2004 abstract; Gandhi 2005; Guerette 2009; Carey 2009; Meschia 2007; Natale 2009; Nguyen 2008; Nieminen 2008; Sand 2001; Sivaslioglu 2008; Weber 2001; Altman 2011; Menefee 2011; Feldner 2010; Hviid 2010; Thijs 2010 abstract; Vollebregt 2011).

Due to clinical heterogeneity in stage of prolapse, types of operations, and whether women with previous surgery, urinary incontinence or occult incontinence had been included, only some trials could be combined for meta-analysis:

- Sand 2001 with Weber 2001; and
- Al-Nazer 2007 with Ali 2006 abstract; Carey 2009; Nguyen 2008; Nieminen 2008; Sivaslioglu 2008; Altman 2011; Thijs 2010 abstract; Menefee 2011; Vollebregt 2011.

One type native tissue anterior vaginal wall prolapse repair versus another

Anterior vaginal wall repair versus Burch colposuspension

In this trial from Italy, women were studied who had primary Stage 2 or 3 cystocele and concomitant urodynamic urinary stress incontinence (Colombo 2000). None of the women had pre-operative detrusor overactivity. The 68 women were randomised to receive either Burch colposuspension (n = 35) or anterior vaginal wall repair (n = 33).

Anterior vaginal repair versus vaginal paravaginal repair

A single centre two-surgeon RCT compared midline anterior colporrhaphy with polydioxanone (PDS) sutures over Vicryl mesh (n = 34) compared to vaginal paravaginal defect repair with PDS sutures also over a Vicryl mesh overlay (n = 35) (Minassian 2010 abstract). Concomitant prolapse and continence surgery were allowed, with the majority undergoing sacral colpopexy which is likely to impact on point Ba. Only one-third of the patients were reviewed at two years.

Native tissue repair versus use of graft (biological or synthetic) (also Comparison 6)

Twenty trials incorporated graft in one or both arms of the comparison (Al-Nazer 2007; Ali 2006 abstract; Allahdin 2008; Altman 2011; Carey 2009; De Ridder 2004 abstract; Feldner 2010; Gandhi 2005; Guerette 2009; Hviid 2010; Meschia 2007; Natale 2009; Nguyen 2008; Nieminen 2008; Sand 2001; Sivaslioglu 2008; Weber 2001; Menefee 2011; Thijs 2010 abstract; Vollebregt 2011). Seven of the trials excluded women who were incontinent at baseline or needed a concomitant continence procedure such as suburethral tape, colposuspension, sling or needle suspension (Altman 2011; Hviid 2010; Natale 2009; Nieminen 2008; Sivaslioglu 2008; Vollebregt 2011; Weber 2001). One trial included women with stress urinary incontinence (SUI) undergoing suburethral tapes only (Nguyen 2008).

Two trials compared traditional anterior vaginal wall repair with anterior vaginal wall repair supplemented by the use of absorbable mesh inlay (polyglactin mesh, Vicryl) for cystocele (Sand 2001; Weber 2001). These two trials were considered similar enough to be combined in a meta-analysis. To enable meaningful comparison between these trials, the standard and ultra-lateral anterior vaginal wall repair groups in Weber's trial (Weber 2001) were combined to mimic Sand's groups (Sand 2001) when comparing anterior vaginal wall repair with and without polyglactin mesh inlay. As objective assessment at three months Allahdin 2008 was not considered suitable to combine in a meta-analysis.

Ten trials compared anterior colporrhaphy to a variety of non-absorbable synthetic mesh repair techniques (Al-Nazer 2007; Ali 2006 abstract; Altman 2011; Carey 2009; Menefee 2011; Nguyen 2008; Nieminen 2008; Sivaslioglu 2008; Thijs 2010 abstract; Vollebregt 2011), three to biological grafts (Feldner 2010; Hviid 2010; Menefee 2011). Menefee was a three-armed study comparing anterior colporrhaphy and paravaginal repair with porcine dermis or self-styled polypropylene mesh.

Anterior vaginal wall repair versus anterior vaginal wall repair with synthetic absorbable mesh

- Anterior vaginal wall repair versus anterior vaginal wall repair with polyglactin mesh (Vicryl) inlay

Sand randomly allocated women with cystocele, to or beyond the introitus, to anterior vaginal wall repair alone (n = 70) or anterior vaginal wall repair and polyglactin mesh inlay (n = 73) (Sand 2001). The surgery was for primary cystocele in 85% of cases. Concomitant surgery was performed as required and included vaginal hysterectomy, vaginal sacrospinous colpopexy, posterior vaginal wall repair

(n = 67/70 and 65/73) and continence surgery. The women who underwent posterior vaginal wall repair and were assigned to the polyglactin mesh inlay for the cystocele also had their posterior vaginal wall repair augmented with polyglactin mesh.

- Ultralateral anterior vaginal wall repair versus anterior vaginal wall repair with polyglactin mesh (Vicryl) inlay

Weber evaluated the efficacy of standard anterior vaginal wall repair (n = 33), ultra-lateral anterior vaginal wall repair (n = 24) and standard anterior vaginal wall repair plus polyglactin mesh inlay (n = 26) in women who underwent surgery for anterior vaginal wall prolapse (Weber 2001). Other concomitant prolapse surgery was performed as required but women who required a continence operation were excluded. However, no data for continence outcomes were provided.

Anterior vaginal wall repair (anterior colporrhaphy) versus repair with synthetic non-absorbable mesh

Nine trials compared anterior colporrhaphy to a variety of synthetic non-absorbable mesh repair techniques and were considered similar enough to combine in meta-analyses (Al-Nazer 2007; Ali 2006 abstract; Altman 2011; Menefee 2011; Nguyen 2008; Nieminen 2008; Sivaslioglu 2008; Thijs 2010 abstract; Menefee 2011; Vollebregt 2011).

Al-Nazer et al compared anterior colporrhaphy (n = 23) and vaginal repair with mesh (n = 21) in women with anterior vaginal wall prolapse. Patients with Stage 2 or more vaginal prolapse were included although the inclusion criteria did not distinguish between the various vaginal compartments and exclusion criteria included prior colposuspension or vaginal surgery, need for continence surgery, contemplating pregnancy, immunocompromised or diabetic. Self-styled armless soft polypropylene (Gynemesh) mesh was utilised in the mesh group and results at two years were reported (Al-Nazer 2007). A 2007 abstract reports intervention between 2003 and 2005 and the manuscript reports 2005 to 2007 recruitment.

Ali and colleagues evaluated the anterior colporrhaphy with (n = 54) and without (n = 54) a tension-free polypropylene (Gynemesh PS) mesh in patients with Grade 3 or 4 cystourethrocele (Baden-Walker halfway system). Failure was defined as Grade 2 or worse anterior vaginal wall prolapse. Six month results were presented (Ali 2006 abstract).

Altman and colleagues in a multicenter, multi-surgeon study (funded by Karalinska Institute and Ethicon unrestricted grants) compared anterior colporrhaphy (n = 182) to anterior transvaginal trocar mesh kit (Prolift) (n = 186) in women with symptomatic stage II or greater cystocele at one year. Although concomitant prolapse and continence surgery were exclusions it is difficult to understand how women with posterior and apical compartment prolapse well beyond the introitus were included. Reviewers were unblinded and surgeons were reviewers. Urogenital distress inventory (UDI) and Pelvic Organ Prolapse /Urinary Sexual Questionnaire (PISQ-12) were completed at one year (Altman 2011). In a secondary analysis of a subcategory of women with lateral defects on examination, 107 women were allocated to anterior colporrhaphy (n = 45) or anterior transvaginal trocar mesh kit (Prolift) (n = 61) (Altman 2011).

Carey 2009 and colleagues compared traditional anterior and posterior fascial plication using polydioxanone sutures (n = 63) to anterior and posterior Gynemesh PS overlay (n = 61) in the management of women with Grade 2 or more POP-Q cystocele or rectocele, or both, with no apical prolapse to the introitus. This was an update of a previous abstract. In 10 women the study protocol was breached and 11 more recruited. No data on randomisation process or allocation concealment was supplied and reviewers attempted to remain blinded and surgeons not blinded. Pre-operatively there was significant limitation in data recording with prior prolapse surgery and dyspareunia rate being recorded in only 51 of 70 recruited in the sutures group.

Nguyen and colleagues reported on anterior colporrhaphy (n = 38 women) (2/0 PDS sutures for plication) and anterior colporrhaphy plus polypropylene mesh kit repair (n = 38) (Perigee, American Medical Systems) at one year with a full published paper and two year abstract (Nguyen 2008). One patient in the mesh group withdrew. Adequate randomisation and patient allocation concealment were described, with assessors of outcome blinded to allocation. The CONSORT statement was included and outcomes were recorded on an intention-to-treat basis.

Nieminen 2008 and colleagues compared anterior colporrhaphy alone and anterior colporrhaphy plus a self-styled mono-filament mesh (Parietene light, Sofradim, France) in post-menopausal women with symptomatic anterior compartment prolapse at the hymen or beyond. The data were reported in two full-text publications, at one and two years. There were two inconsistencies between the data reported at one year and two years (Nieminen 2008). The reduction in mesh exposures from 17% at one year to 8% at two years is difficult to explain. Furthermore, the percentage of patients having undergone previous prolapse surgery at one year was 27% in the anterior colporrhaphy group and 18% in the mesh group, while the two year report quoted 20% and 14% respectively. Three year data has been recently reported.

Sivaslioglu 2008 and colleagues evaluated a site-specific polyglactin 910 repair (n = 45) and self-styled four-armed polypropylene (Parietene, Sofradim) mesh (n = 45) in "women having primary cystocele". One year outcomes were reported. Those with SUI, rectocele or enterocele were excluded. The management of concomitant apical prolapse was not specified in either group and assessment was performed by non-blinded reviewers.

[Thijs 2010 abstract](#) and colleagues compared anterior colporrhaphy (n = 48) and polypropylene transobturator mesh kit (Perigee) (n = 48) with stage 2 or greater cystocele at one year. If anterior compartment was not the dominant site of prolapse patients were excluded. Concomitant prolapse, hysterectomy and continence surgery were performed.

[Vollebregt 2011](#) and colleagues compared anterior colporrhaphy (n = 51) and polypropylene transobturator mesh kit (Avulta) (n = 53) in women with stage 2 or greater cystocele at one year review. Women with indication for hysterectomy or continence surgery were excluded. Urogenital distress Inventory (UDI) and Incontinence Impact Questionnaire were completed pre and post-operatively.

There were some variations between the studies in the performance of anterior colporrhaphy.

Suture types (where reported) were:

- PDS sutures ([Altman 2011](#); [Carey 2009](#); [Nguyen 2008](#)),
- multi-filament 0 or 2/0 ([Nieminen 2008](#)),
- Vicryl plication sutures ([Feldner 2010](#)), and
- site-specific polyglactin 910 repair ([Sivaslioglu 2008](#)).

Mesh types were:

- mesh overlay ([Al-Nazer 2007](#); [Ali 2006 abstract](#); [Carey 2009](#) (Gynemesh PS); [Menefee 2011](#)),
- armed transobturator meshes ([Altman 2011](#) (Prolift); [Nguyen 2008](#); [Thijs 2010 abstract](#) (Perigee); [Nieminen 2008](#); [Sivaslioglu 2008](#) (self-styled); [Vollebregt 2011](#) (Avulta)), and
- anterior colporrhaphy plus polypropylene mesh repair ([Ali 2006 abstract](#); [Nguyen 2008](#); [Nieminen 2008](#)).

Anterior vaginal wall repair versus anterior vaginal wall repair with biological grafts

Six trials compared anterior vaginal wall repair with anterior vaginal wall repair with biological graft overlays ([Menefee 2011](#); [Feldner 2010](#); [Hviid 2010](#); [Gandhi 2005](#); [Guerette 2009](#); [Meschia 2007](#)).

- Anterior vaginal wall repair versus anterior vaginal wall repair with cadaveric fascial lata (Tutoplast)

[Gandhi et al](#) compared anterior colporrhaphy without (n = 78) and with cadaveric fascial lata (Tutoplast 2 x 4 cm) (n = 76) for primary or recurrent anterior vaginal wall prolapse Stage 2 or more ([Gandhi 2005](#)). Standardised concomitant surgery included vaginal hysterectomy and McCall sutures for uterine prolapse and sacrospinous colpopexy for vault prolapse. For SUI a Cooper's ligament sling was initially used, later suburethral slings were performed. Success rates for stress incontinence were not published.

- Anterior vaginal wall repair versus anterior vaginal wall repair with porcine dermis inlay (Pelvicol)

[Meschia 2007](#) reported outcomes of anterior colporrhaphy (fascial plication) without (n = 91) and with porcine dermis inlay (Pelvicol) (n = 85) for primary anterior vaginal wall prolapse Stage 2 or more ([Meschia 2007](#)). Concomitant surgery was standardised and included vaginal hysterectomy with culdoplasty for uterine prolapse, posterior repair for posterior compartment defects and suburethral slings for SUI as required.

[Hviid 2010](#) reported single centre randomised controlled trial comparing vicryl plication anterior colporrhaphy (n = 26) and Pelvicol porcine dermis 4 x 7 cm graft (n = 28) for symptomatic anterior compartment prolapse at one year. Appropriate randomisation and allocation concealment described. No concomitant surgery performed and non-blinded surgeons reviewed the patients. POP-Q findings and P-QOL reported.

- Anterior vaginal wall repair versus anterior wall repair with bovine pericardium collagen

[Guerette and colleagues](#) reported, a multi-centre RCT comparing anterior colporrhaphy (n = 46) with anterior colporrhaphy plus bovine pericardium collagen matrix graft reinforcement (n = 44). Randomisation was computer generated and allocation concealment appropriately performed. Neither the participant or the reviewers were blinded. Concomitant continence and prolapse surgery was performed and POP-Q findings, Quality of life outcomes (Urogenital Distress Inventory-6 and PISQ-12) and complications are reported ([Guerette 2009](#)).

- Anterior vaginal wall repair versus non-cross linked xenograft porcine small intestine submucosa (SIS)

[Feldner 2010](#) in a single centre RCT compared anterior colporrhaphy vicryl sutures (n = 27) versus SIS (7 x 10 cm) fixed to suprapubic arch with 0-prolene sutures (n = 29). Randomisation and allocation concealment was not described and concomitant surgery was allowed. Blinded reviewers reported outcomes at one year including POP-Q findings and P-QOL questionnaire.

- Anterior vaginal wall repair versus paravaginal repair with biological or synthetic graft

[Menefee 2011](#) reported a double blinded triple arm RCT comparing anterior colporrhaphy (n = 32) versus vaginal paravaginal repair (Pelvicol) (n = 31) versus vaginal paravaginal repair using self-styled polypropylene mesh (n = 36). Randomisation allocation concealment

was not reported and concomitant surgery was performed. At two years the authors report POP-Q, quality of life questionnaires including PFIQ, PFDI, PISQ.

One type of graft (synthetic mesh or biological) versus another type of graft in anterior vaginal wall prolapse repair (also Comparison 7)

Anterior vaginal wall repair comparing different types of mesh or grafts with each other

Two trials addressed this comparison ([De Ridder 2004 abstract](#); [Natale 2009](#)) comparing synthetic absorbable ([De Ridder 2004 abstract](#)) or non-absorbable ([Natale 2009](#)) mesh with repairs using biological grafts.

[De Ridder 2004 abstract](#) and colleagues performed a four-defect cystocele repair and reinforced the repair with porcine dermis (Pelvicol) (n = 65) or polyglactin mesh (Vicryl) (n = 69) for primary or recurrent Stage 3 anterior vaginal wall prolapse. Concomitant surgery included vaginal hysterectomy and posterior repair ([De Ridder 2004 abstract](#)).

[Natale 2009](#) and colleagues prospectively compared self-styled ('armed') polypropylene mesh (Gynemesh PS) (n = 96) with similarly styled porcine biological graft Pelvicol (n = 94) in the management of symptomatic Stage 2 or greater anterior vaginal wall prolapse. Women did not require an anti-incontinence procedure and patients with diabetes mellitus or collagen disease were excluded. Two-year results were reported.

3. One type posterior vaginal wall prolapse repair versus another (Comparison 3)

Seven trials included women with posterior vaginal wall prolapse ([Farid 2010](#); [Kahn 1999](#); [Nieminen 2004](#); [Paraiso 2006](#); [Sand 2001](#); [Sung 2012](#); [Vijaya 2011 abstract](#)).

Three trials ([Farid 2010](#); [Kahn 1999](#); [Nieminen 2004](#)) compared vaginal and transanal approaches for the management of rectocele. In addition, another trial provided data for women with rectocele undergoing posterior repair with and without absorbable mesh ([Sand 2001](#)). A fourth trial compared rectocele repair using traditional posterior colporrhaphy (n = 28), site-specific repair (n = 27) and site-specific repair augmented with a porcine small intestine submucosa graft inlay (Fortagen, Organogenesis) (n = 26) ([Paraiso 2006](#)). [Vijaya 2011 abstract](#) compared fascial and levator ani muscle plication. Finally [Sung 2012](#) evaluated native tissue posterior colporrhaphy with native tissue repair with porcine small intestine submucosa graft.

Several authors evaluated posterior wall native tissue repairs and polypropylene mesh repairs ([Carey 2009](#); [Iglesia 2010](#); [Withagen 2011](#)); however, these trials included a wide range of operations. The inclusion criteria and outcome data were not specifically limited to the posterior compartment and so cannot be evaluated in this comparison. These trials will be fully evaluated in Comparison 6 (no graft versus use of graft (synthetic mesh or biological graft)).

Three trials evaluated transanal versus transvaginal repair of rectocele ([Farid 2010](#); [Kahn 1999](#); [Nieminen 2004](#)). Each trial had slightly different inclusion criteria. Kahn included women who had symptoms of prolapse or impaired rectal evacuation with incomplete emptying on isotope defecography and normal compliance on anorectal manometry ([Kahn 1999](#)). Nieminen included women with symptomatic rectocele not responding to conservative treatment ([Nieminen 2004](#)). Importantly, women with compromised anal sphincter function and other symptomatic genital prolapse were excluded. In both trials the vaginal repair was performed by gynaecologists and the transanal repair by colorectal surgeons. In Kahn's trial the posterior vaginal wall repair was performed using levator plication and in Nieminen's trial the rectovaginal fascia was plicated. The trials were considered to be similar enough to be combined in a meta-analysis. In another trial ([Farid 2010](#)) the inclusion criteria were rectocele larger than 2 cm on defecography and symptoms including digitation, incomplete evacuation, excessive straining and dyspareunia. The exclusion criteria excluded those with compromised anal sphincter complexes, recurrent prolapse, rectal prolapse, intussusception and anismus. The surgery was performed within the surgery department and blinded examiners utilised defecography, anal manometry and a modified obstructed defecation syndrome patient questionnaire to report outcomes.

The Paraiso trial was funded from an unrestricted research grant from Organogenesis ([Paraiso 2006](#)). The trialists included women with posterior wall prolapse, although women could have prolapse at other vaginal sites or urinary incontinence. They excluded women who required other colorectal surgery or had a pork allergy. Outcomes were independently assessed by nurse assessors blinded to treatment allocation and used prolapse quantification and validated prolapse, bowel, bladder and sexual function questionnaires.

In a further trial ([Sand 2001](#)) included women had a central cystocele, with or without urinary incontinence, for which they required an anterior repair. The majority of the women were also having a posterior repair for rectocele (132 out of 143, 92%). The women

allocated to the mesh augmentation arm for their anterior repair also had their posterior repair augmented with mesh; recurrence rates of rectocele were reported separately. However, no clinical outcomes relating to urinary, bowel or sexual function were reported. [Vijaya 2011 abstract](#) compared levator ani posterior plication (n = 26) versus fascial plication (n = 26) in women with posterior compartment prolapse. Block randomisation was performed without reporting allocation concealment, power analysis or status of reviewers. At six months the authors reported the POP-Q point Ap finding and performed a variety of quality of life assessments without reporting the data.

4. Any type of surgical prolapse repair versus conservative treatment

There were no trials which compared surgery with either conservative treatment.

5. Any type of surgical prolapse repair versus mechanical devices

There were no trials which compared mechanical devices.

6. No graft versus use of graft (synthetic mesh or biological graft) in vaginal prolapse surgery

Twenty-one trials compared standard (no graft or mesh) vaginal prolapse repairs with those which included mesh or graft material: porcine small intestine submucosa graft inlay ([Fortagen](#)):

- polyglactin mesh (absorbable synthetic Vicryl) ([Allahdin 2008](#); [Sand 2001](#); [Weber 2001](#)),
- porcine dermis graft (biological, Pelvicol) ([Meschia 2007](#); [Hviid 2010](#) (anterior compartment)),
- porcine small intestine submucosa graft inlay ([Fortagen](#)) ([Paraiso 2006](#); [Sung 2012](#) (posterior compartment); [Feldner 2010](#) (anterior compartment)),
- cadaveric fascia lata graft (biological, Tutoplast) ([Gandhi 2005](#) (anterior compartment)),
- bovine pericardium collagen matrix graft reinforcement (biological) ([Guerette 2009](#) (anterior compartment)),
- non-absorbable synthetic mono-filament polypropylene mesh ([Al-Nazer 2007](#); [Ali 2006 abstract](#); [Carey 2009](#); [Nieminen 2008](#); [Sivaslioglu 2008](#); [Altman 2011](#); [Nguyen 2008](#); [Thijs 2010 abstract](#); [Vollebregt 2011](#); [Iglesia 2010](#); [Withagen 2011](#); [Halaska 2012](#)).

The non-absorbable mesh category was further subdivided into:

- mesh overlay ([Al-Nazer 2007](#); [Ali 2006 abstract](#); [Carey 2009](#));
- self-styled or armed transobturator mesh ([Nieminen 2008](#); [Sivaslioglu 2008](#));
- transobturator mesh kits ([Altman 2011](#) (anterior Prolift mesh kit); [Nguyen 2008](#) (Perigee mesh kit); [Thijs 2010 abstract](#) (Perigee mesh kit); [Vollebregt 2011](#) (Avulta mesh kit); [Iglesia 2010](#) (anterior or total Prolift); [Withagen 2011](#) (anterior, posterior or total Prolift mesh kit); [Halaska 2012](#) (total Prolift)).

In two trials outcome data were available for women who underwent a posterior vaginal wall repair ([Paraiso 2006](#); [Sand 2001](#)).

The data from five trials included women with multiple compartment prolapse who were undergoing repair with polypropylene mesh ([Carey 2009](#); [Iglesia 2010](#); [Withagen 2011](#)) and polyglactin ([Allahdin 2008](#); [Sand 2001](#)).

In the trials from [Allahdin 2008](#), [Carey 2009](#), [Iglesia 2010](#) and [Withagen 2011](#) outcomes were not differentiated for anterior and posterior pelvic organ prolapse.

[Iglesia 2010](#) reported a multi-centre double blinded RCT with grade 2 or greater vaginal prolapse undergoing native tissue repair (n = 33) or transobturator polypropylene vaginal mesh kit (Prolift) (n = 32) surgery. The native tissue group underwent uterosacral colpopexy with polytetrafluoroethylene sutures (n = 29) or sacrospinous colpopexy (Gortex sutures) (n = 4). Women in the mesh group underwent total Prolift if point C or D on POP-Q was ≥ -3 apical suspension and if Cor D was < -3 anterior Prolift utilised. In both groups concomitant surgery including hysterectomy and continence surgery was performed.

Randomisation process, allocation concealment and power calculation were described. Recruitment to the study was ceased at 65 of the desired sample size of 90 having undergone the intervention by the ethics committee after a pre-determined stopping criteria of mesh erosion rate $> 15\%$ being reached. Three months outcome data was reported ([Iglesia 2010 NEW](#)) and updated with 12 months review ([Sokol 2011](#)).

[Withagen 2011](#) reported a multi-centre (13), multi-surgeon (22) non-blinded RCT in women with recurrent Stage 2 or greater anterior or posterior vaginal compartment prolapse comparing conventional surgery versus transobturator polypropylene tension-free vaginal mesh kit (Prolift). Conventional surgery (n = 84) was performed at the discretion of the surgeon with absorbable sutures specified and hysterectomy permitted. In the mesh group (n = 83) surgeons underwent specific transvaginal mesh training and surgery was performed as described by [Faton](#) ([Faton 2007](#)) and hysterectomy was not permitted. Randomisation process and full power calculation was

described. Allocation concealment was not reported. Prior to surgical intervention the two groups were significantly different with mesh group having a greater degree of prolapse at POP-Q points Ap, Bp and GH and prior sacral colpopexy being three times more frequent in the mesh group as compared to the conventional surgery group. The authors definition of success is unorthodox and defined differently in the Methodology (\geq grade 2 prolapse in the treated site) and Results (\geq grade 2 prolapse in the treated site or subsequent prolapse surgery) section. Furthermore the definition of the treated compartment varies between all surgical sites in the conventional surgery group and excludes sites where mesh had not been utilised. At one year the authors reported POP-Q assessment and PGI-I. The authors in a separate manuscript reported the sexual function outcomes 28 of the conventional surgery group and 32 of the transvaginal mesh group who were sexually active pre-surgery and completed PISQ pre and 12 months post-operatively (Milani 2011).

7. One type of graft (synthetic mesh or biological graft) versus another type of graft

Two trials compared two different types of material overlay in women having anterior repairs:

- non-absorbable mono-filament polypropylene mesh (Gynemesh, Prolene Soft, Gynecare) and biological graft (Pelvicol, Bard) (Natale 2009),
- biological porcine dermis graft (Pelvicol) with absorbable synthetic polyglactin mesh (Vicryl) (De Ridder 2004 abstract).

One trial used different materials as mesh bridges for sacral colpopexy in both arms, in women with vault prolapse:

- biological cadaveric fascia lata graft (Tutoplast) versus non-absorbable polypropylene mesh (Trexel) (Culligan 2005) with a 5 year update (Tate 2011).

8. One type of suture versus another type of suture

One small trial (Allahdin 2008) compared two different suture types (polyglactin, Vicryl versus polydioxanone, PDS) in women having anterior or posterior vaginal wall surgery, or both. Findings on examination were reported at 3 months and quality of life and satisfaction at at two years.

9. Prolapse surgery with and without continence surgery

Occult urinary incontinence is diagnosed in women with prolapse and without symptoms of stress urinary incontinence who have demonstrable stress urinary incontinence when the prolapse is reduced. Two trials included women with occult stress urinary incontinence and provided data separately for their urinary outcomes (Meschia 2004, Schierlitz 2007a). Eight trials included only continent women or reported outcomes separately for a continent subsample (Brubaker 2008; Cervigni 2005; Natale 2009; Colombo 1996a; Colombo 1997; Lo 1998; Maher 2004; Sivaslioglu 2008); and one other trial included as a single group both continent women and those with 'potential' incontinence (the term 'potential' was interpreted as 'occult') (Bump 1996a).

1. UI in anterior vaginal wall prolapse trials

In one Italian trial in women with anterior prolapse, all the women were continent but a continence procedure was only performed in one arm (pubourethral ligament plication in addition to a standard colpopexy) (Colombo 1996a). In another Italian trial, all the women were continent but demonstrated to have occult stress urinary incontinence on preoperative prolapse reduction (Meschia 2004). Another included a mixed sample of women, with and without incontinence (Colombo 1997). However, data were presented separately, allowing assessment of prolapse surgery on urinary outcomes in the 73 continent women with occult incontinence. In Bump's trial, 20 out of 29 women (10 out of 15 in the fascia plication group and 10 out of 14 in the needle colposuspension group) had urodynamically defined potential stress incontinence (defined as a mean pressure transmission ratio of less than 90% for the proximal three quarters of the urethra or a positive stress test during barrier testing) (Bump 1996a). However, all the women were symptomatically continent and both arms included a continence procedure. Data from this trial were aggregated with those from Colombo 1997.

In two trials of two different types of mesh (mono-filament polypropylene and porcine dermis (Pelvicol, Bard)) (Cervigni 2005, Natale 2009), women who required a concomitant anti-incontinence procedure were excluded. Cervigni 2005 reported pre and post-operative overactive bladder rates but not post-operative continence rates, while Natale 2009 reported on both. In one further trial comparing polyglactin with polypropylene mesh, women with stress urinary incontinence were excluded Sivaslioglu 2008.

2. *UI in upper vaginal prolapse trials.* Although Lo did not report the total number of women who developed new urinary incontinence after surgery, he did report how many women required subsequent surgery for incontinence (Lo 1998). In another trial, Maher performed additional Burch colposuspensions for all women with urodynamically proven or occult stress urinary incontinence in women randomly allocated to abdominal sacral colpopexy (14) or vaginal sacrospinous colpopexy (15) for vaginal vault prolapse (Maher 2004). Women

undergoing concomitant colposuspension were stratified to ensure equal representation in the groups. Occult stress urinary incontinence at baseline was detected in 5 out of 14 women (11% of 46 in whole arm) of the abdominal group and 6 out of 15 (13% of 43) of the vaginal group, but urinary outcomes were not available separately according to this baseline diagnosis. However, data were provided about the occurrence of new urinary incontinence in women previously continent (n = 22 and n = 24 respectively) and new overactive bladder symptoms in women previously unaffected by urgency, detrusor overactivity or overactive bladder syndrome (n = 33 and n = 29).

Three studies determined the effect of including or excluding continence surgery in women undergoing standardised prolapse surgery who had a variable assessment of stress continence status including: stress continent on scoring system (although 19.1% had symptoms of stress urinary incontinence and 39% had positive stress test) (Brubaker 2008), no stress incontinence (Constantini 2007), and stress continent but with a positive stress test with or without prolapse reduced (Schierlitz 2007a).

Brubaker and colleagues (Brubaker 2008) reported a multi-centre RCT evaluating stress continent women with POPQ stage 2-4 prolapse with Aa greater or equal to -1. Stress continence was defined based on responses of 'never' or 'rarely' to 6 of the 9 SUI questions on the MESA questionnaire (medical, epidemiological and social aspects of ageing questionnaire). Pre-operatively 19.2% of the participants had SUI defined by the PFDI (Pelvic Floor Distress Inventory), 10% had bothersome stress urinary incontinence according to the PFDI and 39% had a positive stress test with or without prolapse reduction prior to surgery. Two year results were reported on Group A (n = 157): abdominal sacrocolpopexy with Burch colposuspension, and B (n = 165): abdominal sacrocolpopexy without Burch colposuspension (control group). The groups were comparable at baseline regarding age, race, ethnic group, marital status, education, parity, method of delivery, distribution of women with positive stress test, OAB, prior hysterectomy continence and prolapse surgery. Concomitant surgery included paravaginal repair in group A (31/157, 20%) and group B (34/165, 20.6%) and hysterectomy in A (29%) and B (28%). While surgery was standardised for colposuspension neither the paravaginal repair nor sacral colpopexy was standardised with variation in use of suture type and graft materials: 17% biological grafts, 43% Mersilene, 39% polypropylene 6% Gore-tex. No data on further performed surgeries is provided in the publication. Different and complicated definitions were used to categorise stress continence prior to and after the interventions making it more difficult to be classified as stress continent post-interventions than prior to the intervention (see included studies tables). Thirty-nine per cent of women classified as stress continent prior to surgery would have been classified as stress incontinent using the post-intervention definition. The use of imputation in the two year results is to be applauded by the authors. The process utilised ensures that in women undergoing further continence surgery that the continence status prior to the second intervention or after the surgical intervention outcomes, whichever is worse, is included in the final outcome data (Brubaker 2008). In the CARE study surgeons were unaware of urodynamic findings including urodynamic stress incontinence or stress incontinence with or without the prolapse reduced. Further data on the outcomes of sacral colpopexy performed with and without colposuspension depending upon status of occult stress incontinence was made available in a new report (Visco 2008) from a previously included trial (Brubaker 2008). The prolapse reduction during preoperative stress testing was performed with 5 different methods (swab, manual, speculum, pessary or forceps) with each woman undergoing two types of prolapse reduction. Data from all prolapse reductions (two for each patient) were reported as a total and in analysing the post-intervention continence status of women who did and did not have occult stress incontinence pre-operatively a decision was made to half the reported total numbers for the analysis.

Constantini and colleagues 2007 evaluated continent women with severe POP who underwent sacral-colpopexy to be randomly allocated to receive prophylactic colposuspension or no colposuspension. The inclusion criteria of severe POP were not clearly defined. Continent women were defined as those with negative stress test before and after prolapse reduction, no pre-operative symptoms of urinary incontinence, negative symptom questionnaire and no leakage during urodynamics. Details of randomisation process, allocation concealment and blinding status of the reviewers were not defined. Primary continence assessments were based on a non-defined stress test, and symptoms from the UDI questionnaire. Urinary incontinence was clinically classified "on the basis of the ICS definition and graded on the Ingelman Sunderberg scale". Pre-operative UDI scores were given but no post-operative UDI scores were available.

Schierlitz and colleagues randomly allocated women with occult stress urinary incontinence to TVT (27) or no TVT (25) at the time of prolapse repair. Occult SUI was defined as symptomatically continent women with urodynamically demonstrable stress incontinence with or without reduction of the prolapse (POP-Q stage 3 or greater). Prolapse surgery was not standardised but was similar between the groups with no bladder neck plications (Schierlitz 2007a).

3. Incontinent women: Borstad 2008 and colleagues randomly allocated women with pelvic organ prolapse and stress urinary incontinence to unspecified prolapse surgery without TVT (group A, n = 94) and with TVT (group B, n = 87). At three months, women in group A with persisting SUI were able to undergo TVT and 53/94 did so. Pre-operatively group B had a significantly lower severity of stress urinary leakage on stress testing. In another trial, Constantini 2008 and colleagues reported four year evaluation of sacral colpopexy with or without colposuspension in women with pelvic organ prolapse and urinary incontinence. All the women had SUI, MUI or were stress continent but had urethral leakage at urodynamics with the prolapse reduced (occult UI). Amongst the 47 women evaluated, 24

presented with uterovaginal prolapse, 13 with vault prolapse and 2 with cystocele and rectocele, but it was not clear which women had each type of incontinence. The assessors were blinded.

POP surgery and stress urinary incontinent women

In women with SUI undergoing prolapse surgery, what kind of prolapse procedure and which continence surgery is required concomitantly in order to reduce postoperative SUI rates? The cumulative success rate for SUI after anterior colporrhaphy in two randomised trial arms was 48% (19/40) (Colombo 2000; Hviid 2010). Colombo et al (Colombo 2000) compared Burch colposuspension and anterior repair for the treatment of women with anterior vaginal wall prolapse and SUI. While women benefited more from Burch colposuspension with regards to SUI (cure of SUI 30/35, 86% versus 17/33, 52%), anterior repair better corrected the anterior prolapse (cure of cystocele 23/35 versus 32/33) (Colombo 2000).

Whether a suburethral tape (TVT) is inserted concomitantly or after three months did not result in significantly different success rates based on an 'on-treatment' analysis of Borstad et al. (83/87, 95% versus 47/53, 89% three months later) (Borstad 2010); 27/94 (29%) women were cured of SUI after prolapse surgery alone and did not receive a TVT three months later (Borstad 2010). Costantini et al 2008 compared abdominal sacrocolpopexy or sacrohysteropexy with and without concomitant Burch colposuspension in women with POP and SUI (Costantini 2008). Similarly to their randomised trial in continent women, Burch colposuspension increased the postoperative SUI rate: 13/24 (54%) versus 9/23 (39%) were incontinent (Costantini 2008).

WHAT'S NEW

Last assessed as up-to-date: 20 August 2012.

Date	Event	Description
29 January 2013	New search has been performed	Review updated incorporating 16 new trials
29 January 2013	New citation required but conclusions have not changed	Review updated incorporating 16 new trials

HISTORY

Protocol first published: Issue 1, 2003

Review first published: Issue 4, 2004

Date	Event	Description
14 April 2010	Amended	changed citation, added conflicts
17 November 2009	New citation required but conclusions have not changed	Full reports of 59 potentially eligible studies were assessed; for this update, 23 new eligible studies were assessed (Al-Nazer 2007a; Ali 2006a; Allahdin 2008; Barber 2006; Biller 2008; Borstad 2008; Braun 2007a; Carramao 2008a; Constantini 2008; de Tayrac 2008; Dietz 2008a; Glavind 2007; Guerette 2006a; Lim 2007a; Meschia 2007a; Natale 2007; Natale 2009; Nguyen 2008; Nieminen 2008; Pantazis 2008a;

(Continued)

		Schierlitz 2007a; Segal 2007; Sivaslioglu 2008). Overall, 17 studies were excluded from the review, six during this update (Barber 2006; Biller 2008; Carramao 2008a; Glavind 2007; Meschia 2007a; Segal 2007); full details are given in the Characteristics of Excluded Studies In this the second update, 18 new trials were added (Al-Nazer 2007; Ali 2006; Allahdin 2008; Borstad 2008; Braun 2007a; Constantini 2007; Constantini 2008; de Tayrac 2008; Dietz 2008a; Guerette 2006; Lim 2007; Natale 2007; Natale 2009; Nguyen 2008; Nieminen 2008; Pantazis 2008; Schierlitz 2007; Sivaslioglu 2008) and three previously included studies were updated (Brubaker 2008; Meschia 2007; Roovers 2004)
9 February 2009	New search has been performed	new search feb 2009
10 October 2008	Amended	Converted to new review format.
17 April 2007	New citation required and conclusions have changed	Substantive Update Issue 3 2007. 22 RCTs (8 new included trials). The findings are still insufficient to provide robust evidence to support current and new practice (such as whether to perform a concurrent continence operation, or to use mesh or grafts)

CONTRIBUTIONS OF AUTHORS

All review authors contributed to writing the protocol. Four authors (C Maher, C Schmid, B Feiner, K Baessler) assessed the relevance and eligibility of studies for inclusion in the review. They then assessed the quality of included studies; four (C Maher, C Schmid, K Baessler, and B Feiner) independently extracted data from trial reports, interpreted the results and contributed to the writing of the draft version of the review.

DECLARATIONS OF INTEREST

The lead review author, Christopher Maher, is an author of two of the included trials ([Maher 2004](#); [Maher 2011](#)).

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Internal sources

- No sources of support supplied

External sources

- NIHR, UK.

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INDEX TERMS

Medical Subject Headings (MeSH)

Cystocele [surgery]; Gynecologic Surgical Procedures [methods]; Pelvic Organ Prolapse [*surgery]; Randomized Controlled Trials as Topic; Rectal Prolapse [surgery]; Surgical Mesh; Suture Techniques; Urinary Incontinence [surgery]; Uterine Prolapse [surgery]

MeSH check words

Female; Humans