ClinicalEvidence

Perineal care

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ABSTRACT

INTRODUCTION: Over 85% of women having a vaginal birth suffer some perineal trauma. Spontaneous tears requiring suturing are estimated to occur in at least a third of women in the UK and US, with anal sphincter tears in 0.5% to 7% of women. Perineal trauma can lead to long-term physical and psychological problems. METHODS AND OUTCOMES: We conducted a systematic review and aimed to answer the following clinical questions: What are the effects of intrapartum surgical and non-surgical interventions on rates of perineal trauma? What are the effects of different methods and materials for primary repair of first- and second-degree tears and episiotomies? What are the effects of different methods and materials for primary repair of obstetric anal sphincter injuries (third- and fourth-degree tears)? We searched: Medline, Embase, The Cochrane Library, and other important databases up to March 2010 (Clinical Evidence reviews are updated periodically, please check our website for the most up-to-date version of this review). We included harms alerts from relevant organisations such as the US Food and Drug Administration (FDA) and the UK Medicines and Healthcare products Regulatory Agency (MHRA). RESULTS: We found 38 systematic reviews, RCTs, or observational studies that met our inclusion criteria. We performed a GRADE evaluation of the quality of evidence for interventions. CONCLUSIONS: In this systematic review we present information relating to the effectiveness and safety of the following interventions: active pushing, spontaneous pushing, and sustained breath-holding (Valsalva) method of pushing; continuous support during labour; conventional suturing; different methods and materials for primary repair of obstetric anal sphincter injuries; episiotomies (midline and mediolateral incisions); epidural analgesia; forceps; methods of delivery ("hands-on" method, "hands poised"); water births; non-suturing of muscle and skin (or perineal skin alone); passive descent in the second stage of labour; positions (supine or lithotomy positions, upright position during delivery); restrictive or routine use of episiotomy; sutures (absorbable synthetic sutures, catgut sutures, continuous sutures, interrupted sutures); and vacuum extraction.

QUESTIONS

INTERVENTIONS

INTRAPARTUM SURGICAL INTERVENTIONS

Beneficial

Trade off between benefits and harms

Unlikely to be beneficial

Likely to be ineffective or harmful

INTRAPARTUM NON-SURGICAL INTERVENTIONS

Beneficial

Trade off between benefits and harms

Unknown effectiveness

REPAIRING FIRST- AND SECOND-DEGREE TEARS

Beneficial

Likely to be beneficial

Likely to be ineffective or harmful

REPAIRING THIRD- AND FOURTH-DEGREE TEARS

Unknown effectiveness

Key points

- Over 85% of women having a vaginal birth suffer some perineal trauma.

  Spontaneous tears requiring suturing are estimated to occur in at least one third of women in the UK and US, with anal sphincter tears in 0.5% to 7% of women.

  Risk factors include first vaginal delivery, large or malpositioned baby, older or white mother, abnormal collagen synthesis, poor nutritional state, and forceps delivery.

- Perineal trauma can lead to long-term physical and psychological problems.

  Up to 10% of women continue to have long-term perineal pain; up to 25% will have dyspareunia or urinary problems, and up to 10% will report faecal incontinence.

- Restricting routine use of episiotomy reduces the risk of posterior perineal trauma.

  Using episiotomies only when there are clear maternal or fetal indications increases the likelihood of maintaining an intact perineum, and does not increase the risk of third-degree tears.

- We don't know whether pain or wound dehiscence are less likely to occur with midline episiotomy compared with mediolateral incision.

  Midline incisions may be more likely to result in severe tears, although we can't be sure about this.

- Instrumental delivery increases the risk of perineal trauma.

  The risk of instrumental delivery is increased after epidural analgesia. Vacuum extraction reduces the rate of severe perineal trauma compared with forceps delivery, but increases the risk of cephalhaematoma and retinal haemorrhage in the newborn.

- Continuous support during labour reduces the rate of assisted vaginal births, and thus the rate of perineal trauma.
- The "hands-poised" delivery method is associated with lower rates of episiotomy, but increased rates of short-term pain and manual removal of the placenta. Likewise, an upright position during delivery is associated with lower rates of episiotomy, but no significant difference in overall rates of perineal trauma.
- Non-suturing of first- and second-degree tears (perineal skin and muscles) may be associated with reduced wound healing up to 3 months after birth. However, leaving the perineal skin alone unsutured (vagina and perineal muscles sutured) reduces dyspareunia and may reduce pain at up to 3 months.
- Absorbable synthetic sutures for repair of first- and second-degree tears and episiotomies are less likely to result in long-term pain than catgut sutures. Rapidly absorbed synthetic sutures reduce the need for suture removal. Continuous sutures reduce short-term pain.
- Early primary overlap repair for third- and fourth-degree anal sphincter tears seems to be associated with lower risks for faecal urgency and anal incontinence symptoms than end-to-end approximation.
- We don't know whether immersion in water during the first or second stage of labour has any effect on rates of perineal trauma or whether passive descent is better than active pushing.
- It is unclear whether the sustained breath holding (Valsalva) method is more effective at reducing rates of perineal trauma compared with exhalatory or spontaneous pushing.

DEFINITION Perineal trauma is any damage to the genitalia during childbirth that occurs spontaneously or intentionally by surgical incision (episiotomy). Anterior perineal trauma is injury to the labia, anterior vagina, urethra, or clitoris, and is usually associated with little morbidity. Posterior perineal trauma is any injury to the posterior vaginal wall, perineal muscles, or anal sphincter. [1] Spontaneous tears are defined as **first degree** when they involve the perineal skin only; **second-degree** tears involve the perineal muscles and skin; **third-degree** tears involve the anal sphincter complex (classified as 3a where <50% of the external anal sphincter is torn; 3b where >50% of the external anal sphincter is torn; 3c where the internal and external anal sphincter is torn); **fourth-degree** tears involve the anal sphincter complex and anal epithelium. [1]

INCIDENCE/ PREVALENCE

Over 85% of women having a vaginal birth sustain some form of perineal trauma, [2] and 60% to 70% receive stitches — equivalent to approximately 400,000 women a year in the UK in 1997. [2] [3] There are wide variations in rates of episiotomy: 8% in the Netherlands, 99% in east European countries, 13% in England, [4] and 25% in the US. [5] [6] [7] Sutured spontaneous tears are reported in about one third of women in the US [7] and the UK, [8] but this is probably an underestimate because of inconsistencies in both reporting and classification of perineal trauma. The incidence of anal sphincter tears varies between 0.5% in the UK, 2.5% in Denmark, and 7% in Canada. [9]

AETIOLOGY/ RISK FACTORS

Perineal trauma occurs during spontaneous or assisted vaginal delivery, and is usually more extensive after the first vaginal delivery. [10] Associated risk factors also include increased fetal size, mode of delivery, and malpresentation and malposition of the fetus. Other maternal factors that may increase the extent and degree of trauma are ethnicity (white women are probably at greater risk than black women), older age, abnormal collagen synthesis, and poor nutritional state. [11] Clinicians' practices or preferences in terms of intrapartum interventions may influence the severity and rate of perineal trauma (e.g., use of ventouse *v* forceps).

PROGNOSIS

Perineal trauma affects women's physical, psychological, and social wellbeing in the immediate postnatal period as well as in the long term. It can also disrupt breastfeeding, family life, and sexual relations. In the UK, about 23% to 42% of women continue to have pain and discomfort for 10 to 12 days postpartum, and 7% to 10% of women continue to have long-term pain (3–18 months after delivery); [2] [3] [12] 23% of women experience superficial dyspareunia at 3 months; 3% to 10% report faecal incontinence; [13] [14] and up to 24% have urinary problems. [2] [3] Complications depend on the severity of perineal trauma, and on the effectiveness of treatment.

AIMS OF INTERVENTION

To reduce the rate and severity of trauma; to improve the short- and long-term maternal morbidity associated with perineal injury and repair.

OUTCOMES

Incidence and severity of perineal trauma; rates of episiotomy, assisted vaginal delivery (indirectly associated with an increased risk of episiotomy and perineal trauma, especially with forceps delivery); psychological trauma; short- and long-term perineal pain; blood loss; infection; wound dehiscence; superficial dyspareunia; urinary incontinence or retention; faecal incontinence; **quality of life**; **adverse effects** of treatment.

METHODS

Clinical Evidence search and appraisal March 2010. The following databases were used to identify studies for this systematic review: Medline 1966 to March 2010, Embase 1980 to March 2010, and The Cochrane Database of Systematic Reviews 2010, Issue 2 (1966 to date of issue). An additional search within The Cochrane Library was carried out for the Database of Abstracts of Reviews of Effects (DARE) and Health Technology Assessment (HTA). We also searched for retractions of studies included in the review. Abstracts of the studies retrieved from the initial search were assessed by an information specialist. Selected studies were then sent to the contributor for additional assessment, using predetermined criteria to identify relevant studies. Study design criteria for inclusion in this review were: published systematic reviews of RCTs and RCTs in any language, at least single blinded, and containing >20 individuals of whom >80% were followed up. There was no minimum length of follow-up required to include studies. We excluded all studies described as "open", "open label", or not blinded unless blinding was impossible. We included systematic reviews of RCTs and RCTs where harms of an included intervention were studied applying the same study design criteria for inclusion as we did for benefits. In addition we use a regular surveillance protocol to capture harms alerts from organisations such as the FDA and the MHRA, which are added to the reviews as required. To aid readability of the numerical data in our reviews, we round many percentages to the nearest whole number. Readers should be aware of this when relating percentages to summary statistics such as relative risks (RRs) and odds ratios (ORs). We have performed a GRADE evaluation of the quality of evidence for interventions included in this review (see table, p 38). The categorisation of the quality of the evidence (high, moderate, low, or very low) reflects the quality of evidence available for our chosen outcomes in our defined populations of interest. These categorisations are not necessarily a reflection of the overall methodological quality of any individual study, because the Clinical Evidence population and outcome of choice may represent only a small subset of the total outcomes reported, and population included, in any individual trial. For further details of how we perform the GRADE evaluation and the scoring system we use, please see our website (www.clinicalevidence.com).

QUESTION What are the effects of intrapartum surgical interventions on rates of perineal trauma?

OPTION RESTRICTIVE VERSUS ROUTINE USE OF EPISIOTOMY

- For GRADE evaluation of interventions for Perineal care, see table, p 38 .
- Restricting routine use of episiotomy reduces the risk of posterior perineal trauma.
- Using episiotomies only when there are clear maternal or fetal indications increases the likelihood of maintaining an intact perineum, and does not increase the risk of third-degree tears.

Benefits and harms

Restrictive versus routine use of episiotomy:

We found one systematic review (search date 2008, 8 RCTs, 5441 women, see further information on studies) [15] one additional RCT, [16] and one subsequent RCT [17] comparing restricted versus routine episiotomy.

Perineal trauma

Restrictive use of episiotomy compared with routine use of episiotomy Restrictive use of episiotomy seems more effective at reducing the proportion of women with posterior perineal trauma, perineal pain at discharge, healing complications, and the need for suturing, but we don't know whether it is more effective at reducing severe vaginal and perineal trauma, dyspareunia, or urinary incontinence at 3 months. Restrictive use of episiotomy seems less effective at reducing rates of anterior perineal trauma (which carries minimal morbidity) (moderate-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Perineal trauma					
[15] Systematic review	2079 women 4 RCTs in this analysis	**Proportion of women with posterior perineal trauma** 744/1039 (72%) with restricted use of episiotomy 849/1040 (82%) with routine use of episiotomy	RR 0.88 95% CI 0.84 to 0.92 NNT 10 95% CI 8 to 16	●○○	restricted use
[15] Systematic review	4404 women 7 RCTs in this analysis	**Proportion of women with severe perineal trauma** 62/2214 (3%) with restricted use of episiotomy 93/2190 (4%) with routine use of episiotomy	RR 0.67 95% CI 0.49 to 0.91	●○○	restricted use
[15] Systematic review	4838 women 5 RCTs in this analysis	**Proportion of women with severe vaginal and perineal trauma** 111/2426 (4.6%) with restricted use of episiotomy 120/2412 (5.0%) with routine use of episiotomy	RR 0.92 95% CI 0.72 to 1.18	⟷	Not significant
[16] RCT	402 women, in Spain	**Proportion of women with first- and second-degree tears** 60/200 (30%) with selective use of episiotomies at operative vaginal delivery 27/202 (13%) with routine use of episiotomies at operative vaginal delivery 169/202 (84%) of women in the routine group and 118/200 (59%) in the selective use group had an episiotomy	RR 1.552 95% CI 1.287 to 1.872	●○○	routine use
[17] RCT	200 women, in Scotland and England	**Proportion of women with anal sphincter tears**	OR (routine use *v* restrictive use) 0.72	⟷	Not significant

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
		11/101 (11%) with restrictive use of episiotomies at operative vaginal delivery 8/99 (8%) with routine use of episiotomies at operative vaginal delivery Primary outcome	95% CI 0.28 to 1.87		
[15] Systematic review	4896 women 6 RCTs in this analysis	**Proportion of women with anterior trauma** 498/2415 (21%) with restricted use of episiotomy 280/2481 (11%) with routine use of episiotomy	RR 1.84 95% CI 1.61 to 2.10	●○○	routine use
[16] RCT	402 women, in Spain	**Proportion of women with anterior perineal trauma** 23/200 (12%) with selective use of episiotomies at operative vaginal delivery 15/202 (7%) with routine use of episiotomies at operative vaginal delivery 169/202 (84%) of women in the routine group and 118/200 (59%) in the selective use group had an episiotomy	RR 1.245 95% CI 0.943 to 1.643	⟷	Not significant
Perineal pain					
[15] Systematic review	2422 women Data from 1 RCT	**Proportion of women with perineal pain , at discharge from hospital** 371/1207 (31%) with restricted use of episiotomy 516/1215 (42%) with routine use of episiotomy	RR 0.72 95% CI 0.65 to 0.81 NNT 9 95% CI 7 to 12	●○○	restricted use
Suturing					
[15] Systematic review	4133 women 5 RCTs in this analysis	**Proportion of women with suturing** 1327/2080 (64%) with restricted use of episiotomy 1768/2053 (86%) with routine use of episiotomy	RR 0.74 95% CI 0.71 to 0.77 NNT 4 95% CI 4 to 5	●○○	restricted use
Healing complications					
[15] Systematic review	1119 women Data from 1 RCT	**Proportion of women with healing complications** 114/555 (21%) with restricted use of episiotomy 168/564 (30%) with routine use of episiotomy	RR 0.69 95% CI 0.56 to 0.85 NNT 11 95% CI 7 to 23	●○○	restricted use
Primary postpartum haemorrhage					
[17] RCT	200 women, in Scotland and England	**Proportion of women with primary postpartum haemorrhage** 27/101 (27%) with restrictive use of episiotomies at operative vaginal delivery	OR (routine use *v* restrictive use) 1.57 95% CI 0.86 to 2.86	⟷	Not significant

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
		36/99 (36%) with routine use of episiotomies at operative vaginal delivery			
Dyspareunia					
[15] Systematic review	895 women Data from 1 RCT	**Proportion of women with dyspareunia , within 3 months** 96/438 (22%) with restricted use of episiotomy 82/457 (18%) with routine use of episiotomy	RR 1.22 95% CI 0.94 to 1.59	⟷	Not significant
[15] Systematic review	674 women Data from 1 RCT	**Proportion of women with dyspareunia , in the next 3 years** 52/329 (16%) with restricted use of episiotomy 45/345 (13%) with routine use of episiotomy	RR 1.21 95% CI 0.84 to 1.75	⟷	Not significant
Urinary incontinence					
[15] Systematic review	1569 women 2 RCTs in this analysis	**Proportion of women with urinary incontinence , 3 months** 140/775 (18%) with restricted use of episiotomy 147/794 (19%) with routine use of episiotomy	RR 0.98 95% CI 0.79 to 1.20	⟷	Not significant

Adverse effects

No data from the following reference on this outcome. [15] [16] [17]

Further information on studies

[15] The systematic review reported that 2035/2708 (75%) women in the routine episiotomy group had an episiotomy compared with 776/2733 (28%) women in the restricted group. The types of episiotomy performed were mediolateral in 6 of the trials and midline in two of the trials, and the rate of episiotomy varied between studies for the intervention and control groups. The method of randomisation was not clear in one trial. The trials varied in quality, performed intention-to-treat analysis, and took place in the UK, Canada, Argentina, and Germany.

Comment: **Clinical guide:**
There is strong evidence of benefit for restricted use of episiotomy compared with routine episiotomy.

OPTION MIDLINE VERSUS MEDIOLATERAL EPISIOTOMY INCISION

- For GRADE evaluation of interventions for Perineal care, see table, p 38 .
- Midline incisions may be more likely to result in severe tears, although we can't be sure about this.
- We don't know whether pain or wound dehiscence are less likely to occur with midline episiotomy compared with mediolateral incision.

Benefits and harms

Midline versus mediolateral episiotomy incision:

We found no systematic review comparing mediolateral versus midline episiotomy incisions but found one quasi-randomised trial. [18] See comment for further information on third- and fourth-degree tears from observational studies.

Perineal trauma

Midline episiotomy incision compared with mediolateral episiotomy incision Midline episiotomy incision may be less effective at decreasing the proportion of women with third- or fourth-degree tears (very low-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Perineal trauma					
[18] Pseudo-randomised trial	407 primigravidas, 24% withdrawals	**Proportion of women with third- or fourth-degree tears** 39/163 (24%) with midline episiotomies 22/244 (9%) with mediolateral episiotomies	RR 2.7 95% CI 1.6 to 4.3 NNH 6 95% CI 4 to 13 Results must be interpreted with caution, as the study limitations compromise their validity; see further information on studies	●●○	mediolateral episiotomies

Adverse effects

No data from the following reference on this outcome. [18]

Further information on studies

[18] The trial had an increased risk of selection bias because of quasi-random treatment allocation, and because analysis was not by intention to treat. The trial found no evidence of a difference in perineal pain or wound dehiscence. Women who had midline episiotomy had significantly less perineal bruising, and resumed sexual intercourse earlier.

Comment: Two retrospective cohort studies, including 5376 primiparous and 341 multiparous women, also found that midline episiotomies were associated with a 4-fold increased risk of third- and fourth-degree tears after allowing for multiple confounders (CI not reported). [19] [20] We found one abstract (no detailed data, no description of treatment allocation method) that we excluded as it did not meet *Clinical Evidence* inclusion criteria. [21]

Clinical guide:
It is claimed that midline incision is easier to repair, and is associated with less blood loss, better healing, less pain, and earlier resumption of sexual intercourse. We found no reliable evidence to support these claims.

OPTION EPIDURAL ANALGESIA

- For GRADE evaluation of interventions for Perineal care, see table, p 38 .
- The risk of instrumental delivery is increased after epidural analgesia. Instrumental delivery increases the risk of perineal trauma.

Benefits and harms

Epidural analgesia versus other forms of analgesia or no analgesia:

We found one systematic review (search date 2005, 21 RCTs, 6664 women; see further information on studies) comparing epidural analgesia versus other forms of analgesia or no analgesia in labour. [22]

Perineal trauma

Compared with non-epidural analgesia Epidural analgesia may be less effective at decreasing the proportion of women with instrumental delivery (instrumental deliveries are associated with an increased risk of perineal trauma) and may increase rates of urinary retention (low-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Perineal trauma					
[23] RCT	369 women In review [22]	**Proportion of women with perineal trauma requiring suturing** 141/184 (77%) with epidural analgesia 135/185 (73%) with non-epidural analgesia	RR (fixed) 1.05 95% CI 0.93 to 1.18	⟷	Not significant
Instrumental delivery					
[22] Systematic review	6162 women 17 RCTs in this analysis	**Proportion of women with instrumental delivery** 587/3044 (19%) with epidural analgesia 442/3118 (14%) with non-epidural analgesia	RR (fixed) 1.38 95% CI 1.24 to 1.53	●○○	non-epidural analgesia
Urinary retention					
[22] Systematic review	283 women 3 RCTs in this analysis	**Proportion of women with urinary retention** 27/126 (21%) with epidural analgesia 1/157 (1%) with non-epidural analgesia	RR (fixed) 17.05 95% CI 4.82 to 60.39	●●●	non-epidural analgesia

Adverse effects

Compared with non-epidural analgesia Epidural analgesia may be less effective at decreasing the proportion of women with maternal fever (defined as a temperature above 38 °C) (low-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Adverse effects					
[22] Systematic review	1912 women 3 RCTs in this analysis	**Proportion of women with fever (defined as a temperature above 38 °C)** 205/956 (21%) with epidural analgesia 56/956 (6%) with non-epidural analgesia	RR (fixed) 3.67 95% CI 2.77 to 4.86	●●○	non-epidural analgesia

Further information on studies

[22] The quality of the trials was variable, in that information regarding the randomisation process was clearly described in only 16 of the trials included in the review.

Comment: **Clinical guide:**
There is fairly strong evidence that epidural analgesia increases the risk of instrumental delivery compared with non-epidural analgesia or no analgesia in labour (this is a confounding effect, in that instrumental deliveries are associated with an increased risk of perineal trauma).

OPTION VACUUM EXTRACTION VERSUS FORCEPS

- For GRADE evaluation of interventions for Perineal care, see table, p 38 .
- Vacuum extraction reduces the rate of severe perineal trauma compared with forceps delivery, but increases the risk of cephalhaematoma and retinal haemorrhage in the newborn.

Benefits and harms

Vacuum extraction versus forceps delivery:

We found one systematic review (search date 1999, 10 RCTs, comparing vacuum extraction versus forceps delivery, 2885 women; see further information on studies) [24] and three subsequent RCTs (carried out in teaching hospitals in Mexico, Sri Lanka, and Ireland). [25] [26] [27]

Perineal trauma

Vacuum extraction compared with forceps delivery Vacuum extraction may be more effective at decreasing the proportion of women with severe perineal injury, severe perineal pain at 24 hours, and altered faecal continence at 3 months (low-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Perineal trauma					
[24] Systematic review	2582 women 7 RCTs in this analysis	**Proportion of women with severe perineal injury** 127/1296 (10%) with vacuum extraction 261/1286 (20%) with forceps delivery	RR 0.46 95% CI 0.38 to 0.56 NNT 10 95% CI 8 to 12	●●○	vacuum extraction
[26] RCT	442 women undergoing instrumental delivery in the second stage	**Proportion of women with severe perineal trauma** 2/204 (1.0%) with vacuum extraction 4/238 (1.7%) with forceps	RR 0.58 95% CI 0.19 to 3.15	⟷	Not significant
[25] RCT **3-armed trial**	210 women The remaining arm evaluated a additional control group (70 women having a spontaneous vaginal delivery)	**Proportion of women with severe perineal trauma** 2/70 (3%) with vacuum extractor 4/70 (6%) with forceps	RR 0.50 95% CI 0.10 to 2.64	⟷	Not significant
[27] RCT	130 primiparous women (in whom an instrumental delivery was indicated)	**Proportion of women with third-degree tears** 5/69 (7%) with vacuum assistance 10/61 (16%) with forceps	RR 0.44 95% CI 0.16 to 1.22	⟷	Not significant
Perineal pain					
[24] Systematic review	495 women Data from 1 RCT	**Proportion of women with severe perineal pain , at 24 hours** 21/247 (9%) with vacuum extraction	RR 0.57 95% CI 0.34 to 0.94 NNT 16 95% CI 10 to 119	●○○	vacuum extraction

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
		37/248 (15%) with forceps delivery			
Faecal incontinence					
[27] RCT	130 primiparous women (in whom an instrumental delivery was indicated)	**Proportion of women complaining of altered faecal continence, at 3 months after birth** 23/69 (33%) with vacuum assistance 36/61 (59%) with forceps	RR 0.35 95% CI 0.17 to 0.71 Intention-to-treat analysis	●●○	vacuum assistance

Adverse effects

Vacuum extraction compared with forceps delivery Vacuum extraction may be less effective at decreasing the proportion of babies with cephalhaematoma or retinal haemorrhage, or at decreasing the proportion of failed deliveries with the selected instrument (low-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Cephalhaematoma					
[24] Systematic review	1966 women 6 RCTs in this analysis	**Proportion of babies with cephalhaematoma** 98/995 (10%) with vacuum extraction 40/971 (4%) with forceps delivery	RR 2.34 95% CI 1.64 to 3.35 NNH 17 95% CI 10 to 35	●●○	forceps
[26] RCT	442 women undergoing instrumental delivery in the second stage	**Proportion of babies with cephalhaematoma** 12/204 (6%) with vacuum extraction 2/238 (1%) with forceps	RR 7.00 95% CI 1.59 to 30.91	●●●	forceps
[25] RCT **3-armed trial**	210 women The remaining arm evaluated a additional control group (70 women having a spontaneous vaginal delivery)	**Proportion of babies with cephalhaematoma** 6/70 (9%) with vacuum extractor 2/70 (3%) with forceps	RR 3.0 95% CI 0.63 to 14.36	⟷	Not significant
Retinal haemorrhage					
[24] Systematic review	445 women 5 RCTs in this analysis	**Proportion of babies with retinal haemorrhage** 109/224 (49%) with vacuum extraction 74/221 (34%) with forceps delivery	RR 1.46 95% CI 1.17 to 1.83 NNH 7 95% CI 4 to 17	●○○	forceps
Delivery failure					
[24] Systematic review	2849 women 9 RCTs in this analysis	**Rates of failed delivery with selected instrument** 166/1436 (12%) with vacuum extraction 102/1413 (7%) with forceps delivery	RR 1.60 95% CI 1.27 to 2.02 NNH 23 95% CI 14 to 51	●○○	forceps

No data from the following reference on this outcome. [27]

Further information on studies

[24] The RCTs identified by the review varied in quality regarding treatment allocation, with some using quasi-randomisation. None of the trials attempted to "blind" the allocated intervention during the postnatal assessments. The trials took place in different countries (UK, US, South Africa, Denmark, Sweden, and Greece), and the procedures in the studies were comparable to everyday practice when an assisted delivery is required. Although some studies were performed in teaching hospitals, they were pragmatic, with wide inclusion criteria. The evidence is likely to be generalisable.

[27] The RCT failed to achieve adequate power to detect a 20% difference between vacuum and forceps in morbidity.

Comment: **Clinical guide:**
There is strong evidence that vacuum extraction reduces the rate of severe perineal trauma compared with forceps deliveries.

QUESTION **What are the effects of intrapartum non-surgical interventions on rates of perineal trauma?**

OPTION **CONTINUOUS SUPPORT DURING LABOUR**

- For GRADE evaluation of interventions for Perineal care, see table, p 38 .
- Continuous support during labour reduces the rate of assisted vaginal births, and thus the rate of perineal trauma.

Benefits and harms

Continuous support during labour versus usual care:

We found one systematic review (search date 2007, 16 RCTs, at least 13,391 women) comparing continuous one-to-one intrapartum support from a professional nurse, midwife, or lay person versus usual care (see further information on studies). [28]

Perineal trauma

Compared with usual care Continuous support during labour may be more effective at decreasing the proportion of women with assisted (vacuum extraction or forceps) vaginal birth (instrumental deliveries are associated with an increased risk of perineal trauma). We don't know whether continuous support during labour is more effective at reducing perineal trauma (defined as episiotomy or laceration requiring suturing) (low-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Perineal trauma					
[28] Systematic review	7328 women 2 RCTs in this analysis	**Proportion of women with perineal trauma (defined as episiotomy or laceration requiring suturing)** 1996/3663 (54%) with continuous support 2026/3665 (55%) with usual care	RR 0.99 95% CI 0.95 to 1.03	⟷	Not significant
Assisted birth					
[28] Systematic review	13,357 women 15 RCTs in this analysis	**Rates of assisted vaginal birth (vacuum extraction or forceps)** 1052/6644 (16%) with continuous support 1181/6713 (18%) with usual care	RR 0.89 95% CI 0.82 to 0.96	●○○	continuous support

Adverse effects

No data from the following reference on this outcome. [28]

Further information on studies

[28] The RCTs were of reasonable quality, with one trial using a central computerised randomisation service for treatment allocation, 13 using sealed opaque envelopes, and two using methods that were centrally controlled but not concealed. Although the experimental intervention was always described as one-to-one support, the experience, relationship to the labouring woman, timing, and duration of support varied among trials. The pragmatic trials took place in different countries (Australia, Belgium, Botswana, Canada, Finland, France, Greece, Guatemala, Mexico, South Africa, and the US). The trials in the review examined a wide range of outcomes, but none revealed harmful effects.

Comment: **Clinical guide:**
There is some evidence of benefit of continuous support during labour compared with usual care, in terms of reducing the rate of assisted vaginal birth. However, the overall rates of perineal trauma were not reduced.

OPTION UPRIGHT POSITION DURING DELIVERY

- For GRADE evaluation of interventions for Perineal care, see table, p 38 .
- An upright position during delivery is associated with lower rates of episiotomy, but no significant difference in overall rates of perineal trauma.

Benefits and harms

Upright position versus supine or lithotomy positions during delivery:

We found one systematic review (search date 2005, 19 RCTs, 5764 women) comparing any upright position for delivery (birthing chairs, stools, Gardosi cushion, and squatting) versus supine or lithotomy positions (see further information on studies). [29]

Perineal trauma

Compared with delivery in the supine or lithotomy positions The upright position for delivery may be more effective at reducing the proportion of women with episiotomies and assisted vaginal deliveries, but not third- and fourth-degree tears. The upright position for delivery may be less effective at decreasing the proportion of women with second-degree tears (very low-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Episiotomy					
[29] Systematic review	4081 women 12 RCTs in this analysis	**Proportion of women with episiotomy** 742/2039 (36%) with upright position 870/2042 (43%) with supine or lithotomy positions	RR 0.84 95% CI 0.79 to 0.91 NNH 17 95% CI 12 to 35	●○○	upright position
Second-degree tears					
[29] Systematic review	4492 women 11 RCTs in this analysis	**Proportion of women with second-degree tears** 405/2225 (18%) with upright position	RR 1.23 95% CI 1.09 to 1.39 NNH 40	●○○	supine or lithotomy positions

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
		352/2267 (16%) with supine or lithotomy positions	95% CI 20 to 57		
Third- and fourth-degree tears					
[29] Systematic review	1478 women 4 RCTs in this analysis	**Proportion of women with third- and fourth-degree tears** 5/719 (0.7%) with upright position 6/759 (0.8%) with supine or lithotomy positions	RR 0.91 95% CI 0.31 to 2.68	⟷	Not significant
Assisted delivery					
[29] Systematic review	5506 women 18 RCTs in this analysis	**Rates of assisted vaginal delivery** 277/2737 (10%) with upright position 326/2769 (12%) with supine or lithotomy positions	RR 0.84 95% CI 0.73 to 0.98	●○○	upright position

Adverse effects

Compared with delivery in the supine or lithotomy positions The upright position for delivery may be less effective at decreasing the proportion of women with blood loss estimated at >500 mL (very low-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Blood loss					
[29] Systematic review	4542 women 11 RCTs in this analysis	**Proportion of women with blood loss >500 mL** 160/2256 (7%) with upright position 96/2286 (4%) with supine or lithotomy position	RR 1.68 95% CI 1.32 to 2.15 NNH 36 95% CI 21 to 82	●○○	supine or lithotomy position
[29] Systematic review	1747 women 2 RCTs in this analysis	**Proportion of women with blood transfusion** 14/891 (2%) with upright position 8/856 (1%) with supine or lithotomy position	RR 1.66 95% CI 0.70 to 3.94	⟷	Not significant

Further information on studies

[29] The results of this review should be interpreted with caution because of the variable qualities of the trials, and diversity of the treatment interventions. The reviewers state that the main outcome measures may have been affected as a result of exclusion of participants from some of the trials after randomisation, and several women allocated to deliver in the upright position had difficulty complying.

Comment: **Clinical guide:**
There is very weak evidence of benefit that any upright position for delivery reduces episiotomies compared with supine or lithotomy positions. Further well-designed trials should be undertaken, with particular attention given to methodological and clinical heterogeneity, observer bias, intention-to-treat analyses, and standardised objective measurements of blood loss.

OPTION PASSIVE DESCENT IN THE SECOND STAGE OF LABOUR

- For GRADE evaluation of interventions for Perineal care, see table, p 38 .
- We don't know whether passive fetal descent in the second stage of labour reduces instrumental delivery or perineal laceration.

Benefits and harms

Passive descent versus active pushing in the second stage of labour:

We found one RCT, which compared passive fetal descent versus active pushing from the start of the second stage of labour. [30]

Perineal trauma

Compared with active pushing We don't know whether passive fetal descent in the second stage of labour is more effective at reducing the proportion of women with instrumental delivery (instrumental deliveries are associated with an increased risk of perineal trauma) or perineal laceration (low-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Perineal trauma					
[30] RCT	312 women with epidural anaesthesia randomised; 252 women completed protocol Subgroup analysis Analysis of primiparous women (number not reported)	**Proportion of women with perineal laceration** 47% with passive fetal descent 46% with active pushing from the start of the second stage of labour Absolute numbers not reported	P = 0.94	⟷	Not significant
[30] RCT	312 women with epidural anaesthesia randomised; 252 women completed protocol Subgroup analysis Analysis of multiparous women (number not reported)	**Proportion of women with perineal laceration** 36% with passive fetal descent 33% with active pushing from the start of the second stage of labour Absolute numbers not reported	P = 0.73	⟷	Not significant
Instrumental delivery					
[30] RCT	312 women with epidural anaesthesia randomised; 252 women completed protocol Subgroup analysis Analysis of primiparous women (number not reported)	**Rate of instrumental delivery** 23% with passive fetal descent 30% with active pushing from the start of the second stage of labour Absolute numbers not reported	P = 0.36	⟷	Not significant
[30] RCT	312 women with epidural anaesthesia randomised; 252 women completed protocol Subgroup analysis Analysis of multiparous women (number not reported)	**Rate of instrumental delivery** 3% with passive fetal descent 13% with active pushing from the start of the second stage of labour Absolute numbers not reported	P = 0.078	⟷	Not significant

Adverse effects

No data from the following reference on this outcome. [30]

Further information on studies

Comment: There is weak evidence of benefit for passive fetal descent compared with immediate active pushing.

It is unclear whether the rate of adverse perineal outcomes is affected by different types of bearing down during the second stage of labour.

OPTION SUSTAINED BREATH HOLDING (VALSALVA) METHOD OF PUSHING IN THE SECOND STAGE OF LABOUR

- For GRADE evaluation of interventions for Perineal care, see table, p 38 .
- It is unclear whether the sustained breath holding (Valsalva) method is more effective at reducing rates of perineal trauma compared with exhalatory or spontaneous pushing.

Benefits and harms

Sustained breath holding (Valsalva) method of pushing versus exhalatory or spontaneous pushing:

We found one systematic review [31] and one subsequent RCT. [32] The systematic review (search date 1993, 5 trials, of which 2 were known to be RCTs, 471 women) compared bearing down by sustained breath holding (Valsalva) versus exhalatory or spontaneous pushing (see further information on studies). [31]

Perineal trauma

Compared with exhalatory or spontaneous pushing in the second stage of labour We don't know whether the sustained breath holding (Valsalva) method is more effective than exhalatory or spontaneous pushing at reducing the rate of perineal trauma in general or of perineal trauma requiring suturing (very low-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Episiotomy					
[32] RCT	100 women	**Proportion of women with episiotomy** 29/50 (58%) with Valsalva pushing technique 39/50 (78%) with spontaneous pushing	P = 0.167	⟷	Not significant
Second-degree tears					
[32] RCT	100 women	**Proportion of women with second-degree perineal tears with episiotomy** 6/50 (12%) with Valsalva pushing technique 4/50 (8%) with spontaneous pushing	Reported as not significant P value not reported	⟷	Not significant

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Perineal trauma requiring suturing					
[31] Systematic review	338 women 2 RCTs in this analysis	**Proportion of women with perineal trauma requiring suturing** 57/172 (33%) with sustained Valsalva 66/166 (40%) with exhalatory bearing down	RR 0.83 95% CI 0.61 to 1.10	⟷	Not significant
Postpartum haemorrhage					
[32] RCT	100 women	**Postpartum haemorrhage** with Valsalva pushing technique with spontaneous pushing Absolute results not reported	P >0.05	⟷	Not significant

Adverse effects

No data from the following reference on this outcome. [31] [32]

Further information on studies

[31] The review included published and unpublished trials. Three of the trials were small and of poor quality. Two of these trials found reduced rates of perineal trauma with spontaneous bearing down, but this was not supported by data from the two subsequent, more robust controlled trials.The systematic review has now been withdrawn from the online version of The Cochrane Library, but it is still available in previous issues on CD.

Comment: **Clinical guide:**
There is weak evidence of benefit for sustained breath holding (Valsalva) compared with spontaneous exhalatory methods of pushing during the second stage of labour.

It is unclear whether the rate of adverse perineal outcomes is affected by different types of bearing down during the second stage of labour.

OPTION "HANDS-POISED" VERSUS "HANDS-ON" METHOD OF DELIVERY

- For GRADE evaluation of interventions for Perineal care, see table, p 38 .
- The "hands-poised" delivery method is associated with lower rates of episiotomy, but increased rates of short-term pain and manual removal of the placenta.

Benefits and harms

"Hands-poised" versus "hands-on" method of delivery:

We found no systematic review. We found one randomised and one quasi-randomised trial comparing the "hands-poised" versus the "hands-on" method of delivery. [2] [33]

Perineal trauma

"Hands-poised" method of delivery compared with "hands-on" method of delivery The "hands-poised" method of delivery may be more effective at reducing the proportion of women with episiotomy, but not at reducing perineal trauma requiring suturing, or the occurrence of third- and fourth-degree tears. The "hands-poised" method may be

less effective than the "hands-on" method at reducing the proportion of women with perineal pain at 10 days (low-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Episiotomy					
[2] RCT	5471 women	**Proportion of women with episiotomy** 280/2740 (10%) with "hands-poised" method 351/2731 (13%) with "hands-on" method	RR 0.79 95% CI 0.65 to 0.96 NNT 38 95% CI 23 to 106	●○○	"hands-poised" method
[33] Pseudo-randomised trial	1161 women	**Proportion of women with episiotomy** 51/502 (10%) with "hands-poised" method 103/574 (18%) with "hands-on" method	RR 0.57 95% CI 0.41 to 0.78	●○○	"hands-poised" method
First- or second-degree tears					
[33] Pseudo-randomised trial	1161 women	**Proportion of women with first- and second-degree perineal trauma** 175/502 (35%) with "hands-poised" method 171/574 (30%) with "hands-on" method	RR 1.17 95% CI 0.98 to 1.39	⟷	Not significant
Third- or fourth-degree tears					
[2] RCT	5471 women	**Proportion of women with third- and fourth-degree tears** 40/2740 (1.5%) with "hands-poised" method 31/2731 (1.2%) with "hands-on" method	RR 1.3 95% CI 0.81 to 2.05	⟷	Not significant
[33] Pseudo-randomised trial	1161 women	**Proportion of women with third-degree tears** 5/502 (1%) with "hands-poised" method 16/574 (3%) with "hands-on" method	RR 0.36 95% CI 0.13 to 0.97	●●○	"hands-poised" method
Suturing					
[2] RCT	5471 women	**Proportion of women with perineal trauma requiring suturing** 1636/2740 (60%) with "hands-poised" method 1605/2731 (59%) with "hands-on" method	RR 1.02 95% CI 0.97 to 1.06	⟷	Not significant
Perineal pain					
[2] RCT	5471 women	**Proportion of women with perineal pain , 10 days after delivery** 910/2669 (34%) with "hands-poised" method 823/2647 (31%) with "hands-on" method	RR 1.10 95% CI 1.02 to 1.19 NNH 33 95% CI 18 to 212	●○○	"hands-on" method

Adverse effects

"Hands-poised" method of delivery compared with "hands-on" method of delivery The "hands-poised" method of delivery is less effective at reducing the proportion of women who require manual removal of the placenta (high-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Manual removal of the placenta					
[2] RCT	5471 women	**Proportion of women with manual removal of the placenta** 71/2740 (2.6%) with "hands-poised" method 42/2731 (1.5%) with "hands-on" method	RR 1.69 95% CI 1.16 to 2.46 NNH 95 95% CI 45 to 417	●○○	"hands-on" method

No data from the following reference on this outcome. [33]

Further information on studies

[2] The RCT was a large, robust, multicentre, pragmatic trial carried out in the UK and the results are likely to be generalisable.

[33] The quasi-randomised trial was carried out in the University Hospital of Vienna, and used alternate allocation based on the date of delivery (even days allocated to "hands-on", and odd days to "hands-poised"). Data were missing for 45 women in the "hands-poised" group, and for 40 in the "hands-on" group.

Comment: The two RCTs showed no difference in benefit between the "hands-poised" method of delivery compared with the "hands-on" method regarding risk of perineal trauma.

OPTION WATER BIRTHS

- For GRADE evaluation of interventions for Perineal care, see table, p 38 .
- We don't know whether immersion in water during the first or second stage of labour has any effect on rates of perineal trauma.

Benefits and harms

Water births versus no immersion in water:

We found one systematic review (search date 2008, 11 RCTs, 3146 women; see further information on studies) comparing immersion in water versus no immersion during the first or second stage of labour. [34]

Perineal trauma

Compared with no immersion in water during the first or second stage of labour We don't know whether immersion in water is more effective at reducing the proportion of women with episiotomies, second-degree tears, or third- or fourth-degree tears (very low-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Episiotomy					
[34] Systematic review	1272 women 5 RCTs in this analysis	**Proportion of women with episiotomy , first stage of labour** 207/644 (32%) with immersion 219/628 (35%) with no immersion	OR 0.89 95% CI 0.70 to 1.13	⟷	Not significant

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
[34] Systematic review	179 women 2 RCTs in this analysis	**Proportion of women with episiotomy , second stage of labour only** 12/100 (12%) with immersion 10/79 (13%) with no immersion	OR 0.70 95% CI 0.27 to 1.80	⟷	Not significant
Second-degree tears					
[34] Systematic review	179 women 2 RCTs in this analysis	**Proportion of women with second-degree tears , second stage of labour only** 21/100 (21%) with immersion 14/79 (18%) with no immersion	OR 1.26 95% CI 0.59 to 2.27	⟷	Not significant
[34] Systematic review	1286 women 5 RCTs in this analysis	**Proportion of women with second-degree tears , first stage of labour** 110/658 (17%) with immersion 112/628 (18%) with no immersion	OR 0.93 95% CI 0.69 to 1.25	⟷	Not significant
Third- or fourth-degree tears					
[34] Systematic review	60 women Data from 1 RCT	**Proportion of women with third-degree tears , second stage of labour only** 1/40 (3%) with immersion 0/20 (0%) with no immersion	OR 1.56 95% CI 0.06 to 39.95	⟷	Not significant
[34] Systematic review	2401 women 5 RCTs in this analysis	**Proportion of women with third- and fourth-degree tears , first stage of labour** 40/1202 (3%) with immersion 29/1199 (2%) with no immersion	OR 1.38 95% CI 0.85 to 2.23	⟷	Not significant

Adverse effects

No data from the following reference on this outcome. [34]

Further information on studies

[34] Eight of the RCTs included in the review involved immersion in water during the first stage of labour only, one RCT involved immersion during the first and the second stages of labour, one RCT compared early versus late immersion in the first stage of labour, and another RCT involved women in the second stage of labour. The review included published and unpublished trials. The quality of the RCTs was variable, and there was diversity in the definitions of water immersion, which makes the comparison of outcomes across RCTs difficult to carry out. There were also differences in the type and size of pools used, depth of water, and if the water was still or moving (e.g., whirlpool, jacuzzi). In addition, there were differences with compliance to treatment allocation. One of the RCTs reported that 183/396 (46%) women allocated to water immersion did not actually use water, another RCT reported that of the 40 women allocated to use water, only 24 used the pool. Four other RCTs reported some crossover between groups, while a fifth RCT did not provide information on crossover.

Comment: The review found no evidence of harmful effects. However, the results should be interpreted with caution, as the small sample sizes, as well as the impossibility of blinding to the intervention, limit the validity and reliability of the trials. [34]

Clinical guide:
There is insufficient evidence of benefit or harm to support or not to support a woman's decision to give birth in water. The RCTs included in the systematic review were of variable methodological quality and used small sample sizes. Therefore there is a high risk of bias, which may limit the reliability and validity of the findings.

Further investigation is needed regarding the effects of immersion in water compared with no immersion during the second stage of labour, as currently there is lack of clear evidence.

QUESTION What are the effects of different methods and materials for primary repair of first- and second-degree tears and episiotomies?

OPTION NON-SUTURING OF PERINEAL SKIN ALONE IN FIRST- AND SECOND-DEGREE TEARS AND EPISIOTOMIES

- For GRADE evaluation of interventions for Perineal care, see table, p 38 .
- Leaving the perineal skin alone unsutured (vagina and perineal muscles sutured) reduces dyspareunia and may reduce pain at up to 3 months.

Benefits and harms

Non-suturing of perineal skin versus conventional suturing in first- and second-degree tears and episiotomies:

We found two RCTs that compared leaving the perineal skin unsutured but apposed (the vagina and perineal muscle were sutured) versus a conventional repair in which all three layers were sutured. [35] [36]

Perineal trauma

Non-suturing of perineal skin alone in first- and second-degree tears and episiotomies compared with conventional repair Leaving the perineal skin unsutured but apposed (with the vagina and perineal muscles sutured) may be more effective than conventional repair (in which all three layers are sutured), in women with first- and second-degree tears or episiotomies, at decreasing the proportion of women with superficial dyspareunia at 3 months, but not at reducing pain (low-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Perineal pain					
[35] RCT	1780 primiparous and multiparous women with first- and second-degree tears or episiotomies after spontaneous or assisted vaginal delivery in a single UK centre	**Proportion of women reporting perineal pain , at 10 days after birth** 221/886 (25%) with perineal skin unsutured 244/885 (28%) with perineal skin sutured	RR 0.91 95% CI 0.77 to 1.06	⟷	Not significant
[36] RCT	823 women who sustained a second-degree tear or episiotomy; see further information on studies	**Proportion of women with perineal pain , at 48 hours** 237/417 (57%) with perineal skin unsutured 265/406 (65%) with perineal skin sutured	RR 0.87 95% CI 0.78 to 0.97	●○○	perineal skin unsutured
[36] RCT	823 women who sustained a second-degree tear or episiotomy; see further information on studies	**Proportion of women with perineal pain , 14 days** 93/417 (22%) with perineal skin unsutured 117/406 (29%) with perineal skin sutured	RR 0.77 95% CI 0.61 to 0.98	●○○	perineal skin unsutured

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
[36] RCT	823 women who sustained a second-degree tear or episiotomy; see further information on studies	**Proportion of women with perineal pain , 6 weeks** 41/417 (10%) with perineal skin unsutured 62/406 (15%) with perineal skin sutured	RR 0.64 95% CI 0.44 to 0.93	●○○	perineal skin unsutured
[36] RCT	823 women who sustained a second-degree tear or episiotomy; see further information on studies	**Proportion of women with perineal pain , 3 months after delivery** 4/417 (1%) with perineal skin unsutured 21/406 (5%) with perineal skin sutured	RR 0.19 95% CI 0.06 to 0.54	●●●	perineal skin unsutured
Dyspareunia					
[35] RCT	1780 primiparous and multiparous women with first- and second-degree tears or episiotomies after spontaneous or assisted vaginal delivery in a single UK centre	**Proportion of women with superficial dyspareunia , at 3 months after birth** 128/828 (16%) with perineal skin unsutured 162/836 (19%) with perineal skin sutured	RR 0.80 95% CI 0.64 to 0.99 NNT 26 95% CI 14 to 345	●○○	perineal skin unsutured
[36] RCT	823 women who sustained a second-degree tear or episiotomy; see further information on studies	**Proportion of women with superficial dyspareunia , 3 months after birth** 26/417 (6%) with perineal skin unsutured 49/406 (12%) with perineal skin sutured	RR 0.52 95% CI 0.33 to 0.81	●○○	perineal skin unsutured

Adverse effects

Non-suturing of perineal skin alone in first- and second-degree tears and episiotomies compared with conventional repair Leaving the perineal skin unsutured but apposed may be less effective at decreasing the proportion of women with a gaping wound at 48 hours and at 10 days, but not at 14 days (low-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Wound gaping/wound breakdown					
[35] RCT	1780 primiparous and multiparous women with first- and second-degree tears or episiotomies after spontaneous or assisted vaginal delivery in a single UK centre	**Rates of wound gaping , 48 hours** 203/885 (23%) with perineal skin unsutured but apposed 40/889 (4%) with perineal skin sutured	RR 5.10 95% CI 3.68 to 7.06	●●●	perineal skin sutured
[35] RCT	1780 primiparous and multiparous women with first- and second-degree tears or episiotomies after spontaneous or assisted vaginal delivery in a single UK centre	**Rates of wound gaping , 10 days** 227/886 (26%) with perineal skin unsutured but apposed 145/885 (16%) with perineal skin sutured	RR 1.56 95% CI 1.30 to 1.88	●○○	perineal skin sutured

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
[36] RCT	823 women who sustained a second-degree tear or episiotomy; see further information on studies	**Rates of wound gaping , 48 hours** 107/417 (26%) with perineal skin unsutured but apposed 21/406 (5%) with perineal skin sutured RCT judged wounds as gaping if the edges were >0.5 cm apart	RR 4.96 95% CI 3.17 to 7.76	●●○	perineal skin sutured
[36] RCT	823 women who sustained a second-degree tear or episiotomy; see further information on studies	**Rates of wound gaping , 14 days after birth** 86/417 (21%) with perineal skin unsutured but apposed 67/406 (17%) with perineal skin sutured RCT judged wounds as gaping if the edges were >0.5 cm apart	RR 1.25 95% CI 0.94 to 1.67 Longer-term results were not reported in the RCT	⟷	Not significant
[36] RCT	823 women who sustained a second-degree tear or episiotomy; see further information on studies	**Rates of wound breakdown , 14 days** 13/417 (3%) with perineal skin unsutured but apposed 10/406 (2%) with perineal skin sutured	RR 1.27 95% CI 0.56 to 2.85	⟷	Not significant

Further information on studies

[35] [36] The two RCTs were pragmatic studies, and the results are likely to be generalisable.

[36] The second RCT was a multicentre trial conducted in Nigeria. Initially, 1077 women were recruited into the trial, but only 823 of these responded up to 3 months after birth and were included in the analysis.

Comment: **Clinical guide:**
There is some evidence of benefit associated with leaving the perineal skin unsutured compared with skin sutured in terms of reducing pain and dyspareunia. However, practitioners must be aware that there is an increased risk of wound gaping with non-suturing.

OPTION NON-SUTURING OF MUSCLE AND SKIN IN FIRST- AND SECOND-DEGREE TEARS

- For GRADE evaluation of interventions for Perineal care, see table, p 38 .
- Non-suturing of first- and second-degree tears (perineal skin and muscles) may be associated with reduced wound healing up to 3 months after birth.

Benefits and harms

Non-suturing of muscle and skin versus conventional suturing in first- and second-degree perineal tears:

We found no systematic review. We found two small RCTs comparing non-suturing versus suturing of first- and second-degree tears. [37] [38]

Perineal trauma

Compared with suturing of first- and second-degree tears We don't know whether non-suturing of muscle and skin in first- and second-degree perineal tears is more effective at reducing the proportion of women with "burning sensation" (not further defined) or with soreness at 2 to 3 days after birth, or at reducing pain scores at 10 days or 6 weeks (very low-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Perineal pain					
[37] RCT	78 women in Sweden	**Proportion of women with burning sensation , at 2 to 3 days after birth** 9/40 (23%) with non-suturing of first- and second-degree tears 4/38 (11%) with suturing of first- and second-degree tears	RR 0.47 95% CI 0.16 to 1.39 Results should be interpreted with caution because of study limitations; see further information on studies	⟷	Not significant
[37] RCT	78 women in Sweden	**Proportion of women with soreness , at 2 to 3 days after birth** 3/40 (8%) with non-suturing of first- and second-degree tears 1/38 (3%) with suturing of first- and second-degree tears	RR 0.35 95% CI 0.04 to 3.23 Results should be interpreted with caution because of study limitations; see further information on studies	⟷	Not significant
[38] RCT	74 primiparous women in Scotland	**McGill pain scores , at 10 days** with non-suturing of first- and second-degree tears with suturing of first- and second-degree tears Absolute results not reported	P = 0.8	⟷	Not significant
[38] RCT	74 primiparous women in Scotland	**McGill pain scores , at 6 weeks** with non-suturing of first- and second-degree tears with suturing of first- and second-degree tears Absolute results not reported	P = 0.8	⟷	Not significant

Adverse effects

Compared with suturing of first- and second-degree tears Non-suturing of muscle and skin in first- and second-degree perineal tears may be less effective at reducing the proportion of women with an open tear at 6 weeks after birth, but not at reducing "healing" (not further defined; not clear how assessed) at 2 to 3 days and at 8 weeks after birth (very low-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Wound gaping/non-healing					
[38] RCT	74 primiparous women in Scotland	**Proportion of women with a closed tear , 6 weeks after delivery** 16/36 (44%) with non-suturing of first- and second-degree tears 26/31 (84%) with suturing of first- and second-degree tears	RR 0.53 95% CI 0.36 to 0.79	●○○	sutured
[37] RCT	78 women in Sweden	**Healing , at 2 to 3 days after birth** with non-suturing of first- and second-degree tears with suturing of first- and second-degree tears Absolute results not reported	Results should be interpreted with caution, because of study limitations; see further information on studies	⟷	Not significant

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
[37] RCT	78 women in Sweden	**Healing , at 8 weeks after birth** with non-suturing of first- and second-degree tears with suturing of first- and second-degree tears Absolute results not reported	Results should be interpreted with caution, because of study limitations; see further information on studies	⟷	Not significant

Further information on studies

[37] Results from the first small RCT should be interpreted with caution, because the study limitations compromise the validity of the results. It is unclear how healing was defined and assessed, and the study had an insufficient sample size to detect clinically important differences. This is suggested by the broad confidence intervals in the presence of a large difference in rates between the study groups.

[38] The RCT was of reasonable methodological quality and used sealed opaque envelopes to allocate treatment. It was acknowledged that it was impossible to blind assessors to the allocated treatment, and that this might have biased results.

Comment: **Clinical guide:**
There is limited evidence regarding the benefits and harms of leaving perineal muscle and skin unsutured (first- and second-degree tears). Practitioners must be cautious about leaving this type of trauma unsutured unless it is the explicit wish of the woman.

OPTION ABSORBABLE SUTURES IN FIRST- AND SECOND-DEGREE TEARS

- For GRADE evaluation of interventions for Perineal care, see table, p 38 .
- Absorbable synthetic sutures for repair of first- and second-degree tears and episiotomies are less likely to result in long-term pain than catgut sutures.

Benefits and harms

Absorbable synthetic sutures versus catgut sutures:

We found one systematic review (search date 1999, 8 RCTs, 3681 primiparous and multiparous women; the RCTs varied in quality and in operator skills and training, and were conducted in Europe and the US), [39] and three subsequent RCTs (carried out in Australia, [40] the US, [41] and Canada [42]).

Perineal trauma

Compared with catgut sutures Absorbable synthetic sutures may be more effective at reducing the proportion of women with perineal pain at up to 10 days, but not at 3 months or 6 months. Absorbable synthetic sutures may be more effective at reducing analgesic use between 48 hours and 10 days; however, results were conflicting between different trials. We don't know whether absorbable synthetic sutures are more effective at reducing the proportion of women with dyspareunia (very low-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Perineal pain/analgaesic use					
[39] Systematic review	2044 women 3 RCTs in this analysis	**Proportion of women with perineal pain , up to 10 days** 232/1024 (23%) with absorbable synthetic sutures 298/1020 (29%) with catgut sutures	RR 0.78 95% CI 0.67 to 0.90	●○○	absorbable synthetic sutures

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
[39] Systematic review	2129 women 2 RCTs in this analysis	**Proportion of women with perineal pain , 3 months** 92/1061 (9%) with absorbable synthetic sutures 112/1068 (11%) with catgut sutures	RR 0.86 95% CI 0.64 to 1.08	⟷	Not significant
[40] RCT	391 women who sustained a first- or second-degree tear or episiotomy after a spontaneous vaginal delivery	**Proportion of women with perineal pain , 3 days** 112/187 (60%) with absorbable synthetic (standard polyglactin 910 or polyglycolic acid) 124/188 (66%) with catgut suture material	RR 0.91 95% CI 0.78 to 1.06 RCT may have lacked power to detect clinically important effects	⟷	Not significant
[40] RCT	391 women who sustained a first- or second-degree tear or episiotomy after a spontaneous vaginal delivery	**Proportion of women with perineal pain , 3 months** 17/167 (10%) with absorbable synthetic (standard polyglactin 910 or polyglycolic acid) 14/174 (8%) with catgut suture material	RR 1.26 95% CI 0.64 to 2.48	⟷	Not significant
[40] RCT	391 women who sustained a first- or second-degree tear or episiotomy after a spontaneous vaginal delivery	**Proportion of women with perineal pain , 6 months** 9/158 (6%) with absorbable synthetic (standard polyglactin 910 or polyglycolic acid) 5/159 (3%) with catgut suture material	RR 1.81 95% CI 0.62 to 5.28	⟷	Not significant
[39] Systematic review	2820 women 5 RCTs in this analysis	**Proportion of women with analgesic use , up to 10 days** 262/1422 (18%) with absorbable synthetic sutures 338/1398 (24%) with catgut sutures	RR 0.74 95% CI 0.65 to 0.85 NNT 18 95% CI 13 to 35	●○○	absorbable synthetic sutures
[41] RCT	908 women with sustained perineal laceration or episiotomy	**Proportion of women requiring analgesia , 24 to 48 hours following birth** 375/459 (82%) with fast-absorbing synthetic (rapidly absorbed polyglactin 910) 383/449 (85%) with chromic catgut suture material	P = 0.14	⟷	Not significant
[41] RCT	908 women with sustained perineal laceration or episiotomy	**Proportion of women requiring analgesia , 10 to 14 days following birth** 81/430 (19%) with fast-absorbing synthetic (rapidly absorbed polyglactin 910) 88/416 (21%) with chromic catgut suture material	Difference reported as not significant P value and CI not reported	⟷	Not significant
[42] RCT **3-armed trial**	192 women (repair of second-degree perineal lacerations or uncomplicated episiotomy [median or mediolateral])	**McGill pain scores , at 48 hours** with fast-absorbing polyglactin 910 with standard polyglactin 910 with chromic catgut suture material Absolute results not reported	Reported no significant difference among all 3 groups P = 0.25	⟷	Not significant

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
[42] RCT **3-armed trial**	192 women (repair of second-degree perineal lacerations or uncomplicated episiotomy [median or mediolateral])	**McGill pain scores , 6 weeks** with fast-absorbing polyglactin 910 with standard polyglactin 910 with chromic catgut suture material Absolute results not reported	Reported no significant difference among all 3 groups P = 0.68	⟷	Not significant
[42] RCT **3-armed trial**	192 women (repair of second-degree perineal lacerations or uncomplicated episiotomy [median or mediolateral])	**McGill pain scores , 3 months** with fast-absorbing polyglactin 910 with standard polyglactin 910 with chromic catgut suture material Absolute results not reported	Reported no significant difference among all 3 groups P = 0.40	⟷	Not significant
[42] RCT **3-armed trial**	192 women (repair of second-degree perineal lacerations or uncomplicated episiotomy [median or mediolateral]) The remaining arm evaluated chromic catgut suture material	**Median use of analgesia , up to 48 hours** with fast-absorbing polyglactin 910 with standard polyglactin 910 Absolute results not reported	P <0.5	○○○	fast-absorbing polyglactin 910
Dyspareunia					
[39] Systematic review	2175 women 3 RCTs in this analysis	**Proportion of women with dyspareunia , 3 months** 171/1086 (16%) with absorbable synthetic sutures 180/1089 (17%) with catgut sutures	RR 0.95 95% CI 0.79 to 1.15	⟷	Not significant
[43] [44] RCT	793 women In review [39]	**Proportion of women with dyspareunia , 12 months after birth** 30/395 (8%) with absorbable synthetic sutures 51/398 (13%) with catgut sutures	RR 0.59 95% CI 0.39 to 0.91 NNT 20 95% CI 11 to 106	●○○	absorbable synthetic sutures
[40] RCT	391 women who sustained a first- or second-degree tear or episiotomy after a spontaneous vaginal delivery	**Proportion of women with dyspareunia , 3 months** 35/132 (27%) with absorbable synthetic (standard polyglactin 910 or polyglycolic acid) 27/144 (19%) with catgut suture material	RR 1.41 95% CI 0.91 to 2.20	⟷	Not significant
[40] RCT	391 women who sustained a first- or second-degree tear or episiotomy after a spontaneous vaginal delivery	**Proportion of women with dyspareunia , 6 months** 24/148 (16%) with absorbable synthetic (standard polyglactin 910 or polyglycolic acid) 19/147 (13%) with catgut suture material	RR 1.25 95% CI 0.72 to 2.19	⟷	Not significant
[42] RCT	192 women (repair of second-degree perineal lacera-	**Dyspareunia , 6 weeks postpartum**	P <0.05	○○○	fast-absorbing polyglactin 910

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
3-armed trial	tions or uncomplicated episiotomy [median or mediolateral]) The remaining arm evaluated standard polyglactin 910	with fast-absorbing polyglactin 910 with chromic catgut suture material Absolute results not reported			
[42] RCT **3-armed trial**	192 women (repair of second-degree perineal lacerations or uncomplicated episiotomy [median or mediolateral])	**Dyspareunia , 3 months** with fast-absorbing polyglactin 910 with standard polyglactin 910 with chromic catgut suture material Absolute results not reported	Reported no significant difference among all 3 groups P = 0.84	⟷	Not significant

Adverse effects

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Adverse effects					
[39] Systematic review	2129 women 2 RCTs in this analysis	**Proportion of women with suture removal , up to 3 months after birth** 191/1061 (18%) with absorbable synthetic sutures 108/1068 (10%) with catgut sutures	RR 1.78 95% CI 1.44 to 2.20 NNH 13 95% CI 8 to 22	●○○	catgut sutures
[40] RCT	391 women who sustained a first- or second-degree tear or episiotomy after a spontaneous vaginal delivery	**Proportion of women reporting problems , at 6 weeks** 8/184 (4%) with absorbable synthetic (standard polyglactin 910 or polyglycolic acid) 3/184 (2%) with catgut suture material	OR 2.61 95% CI 0.59 to 12.41	⟷	Not significant

No data from the following reference on this outcome. [41] [42]

Different types of absorbable synthetic suture versus each other:

We found no systematic review. We found three RCTs comparing rapidly absorbed polyglactin 910 versus standard polyglactin 910. [45] [46] [47] The first RCT did not report data in a format suitable for inclusion here (153 women in Northern Ireland). [45]

Perineal trauma

Different types of absorbable synthetic suture compared with each other Rapidly absorbed polyglactin 910 may be more effective than standard polyglactin 910 at reducing the proportion of women with pain on walking at 2 weeks (moderate-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Perineal pain					
[46] RCT	308 primiparous women in Denmark	**Proportion of women with perineal pain on walking , 2 weeks postpartum** 46/138 (33%) with rapidly absorbed polyglactin 910 65/134 (49%) with standard polyglactin 910	RR 0.69 95% CI 0.51 to 0.92	●○○	rapidly absorbed polyglactin 910
[47] RCT	1542 women in the UK	**Proportion of women with perineal pain on walking , 2 weeks postpartum** 259/769 (34%) with rapidly absorbed polyglactin 910 314/770 (41%) with standard polyglactin 910	RR 0.83 95% CI 0.73 to 0.94	●○○	rapidly absorbed polyglactin 910

Adverse effects

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Suture removal					
[47] RCT	1542 women in the UK	**Suture removal rates , 3 months postpartum** 22/769 (3%) with rapidly absorbed polyglactin 910 98/770 (13%) with standard polyglactin 910	RR 0.23 95% CI 0.14 to 0.35	●●○	rapidly absorbed polyglactin 910

No data from the following reference on this outcome. [45] [46]

Further information on studies

[39] The systematic review reported that it was not possible to "blind" outcome assessment because of the obvious differences in methods and materials used. Most of the trials included in the review used "intention to treat" as the method of analysis.

[40] The RCT used sealed opaque envelopes for treatment allocation, and analysis was by intention to treat. It was not possible to blind operators to allocated treatments because of obvious differences in suture materials. Follow-up was by face-to-face interview until participants were discharged from hospital, and then by telephone interview. The RCT was powered to detect a reduction in short-term pain from 60% to 45%.

[41] The RCT used sealed opaque envelopes for treatment allocation, and analysis was by intention to treat. It would not have been possible to blind participants, operators, or assessors to treatment allocation because of the obvious differences in appearance and handling of suture materials. The RCT also reported results from 6 to 8 weeks of follow-up, but we have not included these, as the follow-up rate was low (175/459 [35%] with fast absorbing *v* 134/449 [30%] with chromic catgut). The RCT was powered to show an 8% difference in vaginal or uterine pain between groups at 24 to 48 hours; the study did not assess perineal pain or carry out a power calculation based on analgesia use.

[42] The RCT used sealed opaque envelopes for treatment allocation, and analysis was by intention to treat. The women were not informed of the suture material used by the operator. The research nurse who evaluated pain scores at 36 to 48 hours following the suturing was also blinded to the suture type. The short form of the McGill Pain Questionnaire was used to measure perineal pain. The RCT originally planned to recruit 1200 women,

but after 6 months the study was stopped when 192 women had been randomised because chromic catgut suture material was withdrawn from the hospital for reasons not related to the trial.

[47] The RCT also compared continuous versus interrupted sutures for all layers (see continuous sutures, p 29). Suture materials were produced by the manufacturers in an identical form in order to "blind" allocated treatments from the participants, operators, and assessors. It was a large, robust trial, and its results are likely to be generalisable.

[46] [47] The RCTs found no significant difference between rapidly absorbed and standard absorbable sutures in overall perineal pain, pain on sitting, or dyspareunia.

Comment: **Clinical guide:**
There is strong evidence of benefit associated with absorbable synthetic suture material compared with catgut. The benefit is even greater if fast-absorbing polyglactin 910 suture material is used.

OPTION CONTINUOUS SUTURES IN SECOND-DEGREE TEARS AND EPISIOTOMIES

- For GRADE evaluation of interventions for Perineal care, see table, p 38 .
- Continuous sutures reduce short-term pain.

Benefits and harms

Continuous versus interrupted sutures for repair of all layers or only perineal skin (analysed as a group):

We found one systematic review (search date 2007, 7 RCTs, 3822 primiparous and multiparous women) comparing continuous versus interrupted sutures for repair of episiotomy or second-degree tears. [48]

Perineal trauma

Continuous sutures for perineal repair of all layers or only perineal skin (analysed together as a group) compared with interrupted sutures Continuous sutures for repair seem more effective at reducing the proportion of women with pain at 10 days, but we don't know whether they are more effective at 3 months (moderate-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Perineal pain					
[48] Systematic review	3527 women 6 RCTs in this analysis	**Proportion of women with perineal pain , 10 days** 568/1758 (32%) with continuous sutures (for closure of all layers or only perineal skin) 818/1769 (46%) with interrupted sutures (for closure of perineal muscle with interrupted transcutaneous stitches to close the skin)	RR 0.70 95% CI 0.64 to 0.76	●○○	continuous sutures (for closure of all layers or only perineal skin)
[48] Systematic review	2408 women 2 RCTs in this analysis	**Proportion of women with perineal pain , 3 months** 128/1216 (11%) with continuous sutures (for closure of all layers or only perineal skin) 146/1192 (12%) with interrupted sutures	RR 0.86 95% CI 0.69 to 1.07	⟷	Not significant

Adverse effects

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Suture removal					
[48] Systematic review	2650 women 3 RCTs in this analysis	**Proportion of women with suture removal , 3 months** 145/1334 (11%) with continuous sutures (for closure of all layers or only perineal skin) 262/1316 (20%) with interrupted sutures	RR 0.54 95% CI 0.45 to 0.65	●○○	continuous sutures (for closure of all layers or only perineal skin)

Continuous versus interrupted sutures for repair of all layers:

We found one systematic review (search date 2007, 7 RCTs, 3822 primiparous and multiparous women) comparing continuous versus interrupted sutures for repair of episiotomy or second-degree tears. [48] The review presented subgroup analyses based on whether the continuous group used continuous suture techniques for all layers (including vagina, perineal muscles, and skin) or perineal skin only. We found two subsequent RCTs (carried out in Denmark [49] and Spain [50]).

Perineal trauma

Continuous sutures for perineal repair of all layers compared with interrupted sutures Continuous sutures for repair of all layers seem more effective at reducing pain at 10 days or dyspareunia at 3 months, but we don't know whether they are more effective at reducing dyspareunia in the longer term (moderate-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Perineal pain					
[48] Systematic review	2459 women 4 RCTs in this analysis	**Proportion of women with perineal pain , 10 days** 432/1231 (35%) with continuous sutures (for repair of all layers) 660/1228 (54%) with interrupted sutures	RR 0.65 95% CI 0.60 to 0.71	●○○	continuous sutures (for repair of all layers)
[49] RCT	400 primiparous women with a second-degree tear or episiotomy	**Proportion of women with perineal pain , 10 days** 65/198 (33%) with continuous suture technique for all layers (vagina, perineal muscles, and skin) 72/197 (37%) with interrupted inverted stitches to close perineal muscles and skin (the inverted interrupted skin sutures were placed in the subcutaneous layer and not transcutaneously through the skin) Both groups were sutured using rapidly absorbing polyglactin 910 gauge 2/0, on ½ circle, 36 mm needle (there was a change in the protocol after approximately half of the sample had been recruited to standard polyglactin 910 using the same gauge and needle)	RR 0.90 95% CI 0.68 to 1.18 Intention-to-treat (ITT) analysis	⟷	Not significant
[50] RCT	445 primiparous women with a second-degree tear or episiotomy	**Proportion of women with perineal pain , 2 days** 109/222 (49%) with continuous non-locking suture for all layers (vagina, perineal muscles, and	RR 1.08 95% CI 0.74 to 1.57 ITT analysis	⟷	Not significant

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
		skin were closed with a continuous suture) 113/221 (51%) with continuous locking stitch to close the vagina plus interrupted stitches to close the perineal muscles and skin (transcutaneously) Both groups were sutured using rapidly absorbing polyglactin 910 (gauge 0 on a 36 mm tapercut needle)			
[50] RCT	445 primiparous women with a second-degree tear or episiotomy	**Proportion of women with pain , 10 days** 42/216 (19%) with continuous non-locking suture for all layers (vagina, perineal muscles, and skin were closed with a continuous suture) 41/217 (18%) with continuous locking stitch to close the vagina plus interrupted stitches to close the perineal muscles and skin (transcutaneously) Both groups were sutured using rapidly absorbing polyglactin 910 (gauge 0 on a 36 mm tapercut needle)	RR 0.96 95% CI 0.59 to 1.55 ITT analysis	⟷	Not significant
[50] RCT	445 primiparous women with a second-degree tear or episiotomy	**Proportion of women with perineal pain , 3 months** 6/215 (3%) with continuous non-locking suture for all layers (vagina, perineal muscles, and skin were closed with a continuous suture) 4/207 (2%) with continuous locking stitch to close the vagina plus interrupted stitches to close the perineal muscles and skin (transcutaneously) Both groups were sutured using rapidly absorbing polyglactin 910 (gauge 0 on a 36 mm tapercut needle)	RR 0.68 95% CI 0.19 to 2.46 ITT analysis	⟷	Not significant
Dyspareunia					
[48] Systematic review	2149 women 5 RCTs in this analysis	**Proportion of women with dyspareunia , 3 months** 196/1078 (18%) with continuous sutures (for repair of all layers) 235/1071 (22%) with interrupted sutures	RR 0.83 95% CI 0.70 to 0.98	●○○	continuous sutures (for repair of all layers)
[49] RCT	400 primiparous women with a second-degree tear or episiotomy	**Proportion of women with dyspareunia , 6 months** 47/198 (24%) with continuous suture technique for all layers (vagina, perineal muscles, and skin) 58/197 (29%) with interrupted inverted stitches to close perineal muscles and skin (the inverted interrupted skin sutures were placed in the subcutaneous layer	RR 0.81 95% CI 0.58 to 1.12 ITT analysis	⟷	Not significant

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
		and not transcutaneously through the skin) Both groups were sutured using rapidly absorbing polyglactin 910 gauge 2/0, on ½ circle, 36 mm needle (there was a change in the protocol after approximately half of the sample had been recruited to standard polyglactin 910 using the same gauge and needle)			

Adverse effects

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Suture removal					
[49] RCT	400 primiparous women with a second-degree tear or episiotomy	**Proportion of women with suture removal , 6 months** 25/198 (13%) with continuous suture technique for all layers (vagina, perineal muscles, and skin) 21/197 (11%) with interrupted inverted stitches to close perineal muscles and skin (the inverted interrupted skin sutures were placed in the subcutaneous layer and not transcutaneously through the skin) However, the skin sutures in the interrupted group were inverted and placed in the subcutaneous layer (not transcutaneously through the skin), making the sutures difficult to remove	RR 1.18 95% CI 0.69 to 2.04	⟷	Not significant
[50] RCT	445 primiparous women with a second-degree tear or episiotomy	**Proportion of women with necessary suture removal , 3 months** 25/223 (11%) with continuous non-locking suture for all layers (vagina, perineal muscles, and skin were closed with a continuous suture) 28/222 (13%) with continuous locking stitch to close the vagina plus interrupted stitches to close the perineal muscles and skin (transcutaneously)	RR 0.84 95% CI 0.47 to 1.50	⟷	Not significant
[50] RCT	445 primiparous women with a second-degree tear or episiotomy	**Risk of complications** with continuous non-locking suture for all layers (vagina, perineal muscles, and skin were closed with a continuous suture) with continuous locking stitch to close the vagina plus interrupted stitches to close the perineal muscles and skin (transcutaneously) The RCT found no increased risk of complications with the continuous technique			

No data from the following reference on this outcome. [48]

Further information on studies

[48] The RCTs were heterogeneous in respect of operator skill and were conducted in Europe and the UK.

[49] The RCT reported that the continuous technique was quicker to perform.

[50] The RCT reported that the continuous technique was quicker to perform and used less suture material.

Comment: **Clinical guide:**
There is strong evidence of benefit when using a continuous subcuticular suture for perineal skin closure, and the benefit is increased if the continuous technique is used to repair all layers (vagina, perineal muscles, and skin) compared with methods using interrupted stitches to close perineal muscles with trancutaneous interrupted stitches inserted for skin closure. The first subsequent RCT used vicryl rapide for both groups [50] and the second RCT changed from vicryl rapide to standard vicryl part way through the study. [49] The first subsequent RCT [49] placed the inverted interrupted skin sutures in the subcutaneous layer (not transcutaneously through the skin) in the comparison group, which may have contributed to the non-significant difference in pain at 24 to 48 hours and 10 days following birth.

QUESTION What are the effects of different methods and materials for primary repair of obstetric anal sphincter injuries (third- and fourth-degree tears)?

OPTION DIFFERENT METHODS AND MATERIALS FOR PRIMARY REPAIR OF OBSTETRIC ANAL SPHINCTER INJURIES (THIRD- AND FOURTH-DEGREE TEARS)

- For GRADE evaluation of interventions for Perineal care, see table, p 38 .
- Early primary overlap repair for third- and fourth-degree anal sphincter tears seems to be associated with lower risks for faecal urgency and anal incontinence symptoms than end-to-end approximation.

Benefits and harms

Different methods for primary repair versus each other:

We found one systematic review (search date 2006, 3 RCTs, 279 primiparous and multiparous women) comparing overlap versus end-to-end approximation for primary repair of the external anal sphincter after childbirth (third-degree obstetric tears). [51] The three included RCTs were of good methodological quality, but there was considerable heterogeneity in outcome measures, time points, and reported results.

Perineal trauma

Different methods for primary repair compared with each other The overlap technique for primary repair of the external anal sphincter (third-degree tears) may be more effective than end-to-end approximation at reducing faecal urgency and anal incontinence scores at 12 months, but not at reducing faecal urgency, faecal incontinence, or perineal pain at 3 months (low-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Perineal pain					
[51] Systematic review	172 women 2 RCTs in this analysis	**Proportion of women with perineal pain , 3 months postpartum** 22/84 (26%) with overlap approximation for primary repair of the external anal sphincter after childbirth (third-degree obstetric tears)	RR 0.85 95% CI 0.54 to 1.34	⟷	Not significant

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
		27/88 (31%) with end-to-end approximation for primary repair of the external anal sphincter after childbirth (third-degree obstetric tears)			
Faecal urgency or incontinence					
[51] Systematic review	172 women 2 RCTs in this analysis	**Proportion of women with faecal urgency , 3 months postpartum** 20/84 (24%) with overlap approximation for primary repair of the external anal sphincter after childbirth (third-degree obstetric tears) 31/88 (35%) with end-to-end approximation for primary repair of the external anal sphincter after childbirth (third-degree obstetric tears)	RR 0.68 95% CI 0.42 to 1.09	⟷	Not significant
[51] Systematic review	52 women Data from 1 RCT	**Proportion of women with faecal urgency , 12 months** 1/27 (4%) with overlap approximation for primary repair of the external anal sphincter after childbirth (third-degree obstetric tears) 8/25 (32%) with end-to-end approximation for primary repair of the external anal sphincter after childbirth (third-degree obstetric tears)	RR 0.12 95% CI 0.02 to 0.86	●●●	overlap approximation
[51] Systematic review	60 women Data from 1 RCT	**Proportion of women with faecal incontinence , 3 months postpartum** 2/29 (7%) with overlap approximation for primary repair of the external anal sphincter after childbirth (third-degree obstetric tears) 9/31 (29%) with end-to-end approximation for primary repair of the external anal sphincter after childbirth (third-degree obstetric tears)	RR 0.24 95% CI 0.06 to 1.01	⟷	Not significant
[51] Systematic review	52 women Data from 1 RCT	**Anal incontinence scores , 12 months** 0.74 with overlap approximation for primary repair of the external anal sphincter after childbirth (third-degree obstetric tears) 2.44 with end-to-end approximation for primary repair of the external anal sphincter after childbirth (third-degree obstetric tears)	Weighted mean difference –1.70 95% CI –3.03 to –0.37	○○○	overlap approximation

Adverse effects

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Adverse effects					
[52] RCT	112 women In review [51]	**Proportion of women with residual full-thickness defect in the external anal sphincter ultrasound , 3 months postpartum** 34/55 (62%) with overlap approximation for primary repair of the external anal sphincter after childbirth (third-degree obstetric tears) 40/57 (70%) with end-to-end approximation for primary repair of the external anal sphincter after childbirth (third-degree obstetric tears)	RR 0.88 95% CI 0.67 to 1.15	⟷	Not significant

Different materials for primary repair versus each other:

We found one RCT (112 women), which had a factorial 2×2 design, comparing PDS 3/0 versus coated vicryl 2/0 and also overlap versus end-to-end approximation for primary repair of the external anal sphincter. [53]

Perineal trauma

Different materials for primary repair compared with each other We don't know how effective PDS 3/0 and coated vicryl 2/0 are, compared with each other, at reducing suture material related morbidity (including suture migration and/or dyspareunia) at 6 weeks after childbirth (very low-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Perineal trauma					
[53] RCT	112 women The RCT had a factorial 2×2 design, and also compared overlap versus end-to-end approximation for primary repair of the external anal sphincter	**Proportion of women with suture material related morbidity (including suture migration and/or dyspareunia) , 6 weeks after childbirth** 10/50 (20%) with PDS 3/0 for primary repair of the external anal sphincter 9/53 (17%) with coated vicryl 2/0 for primary repair of the external anal sphincter	RR 0.8 95% CI 0.4 to 1.9 P = 0.18	⟷	Not significant

Adverse effects

No data from the following reference on this outcome. [53]

Further information on studies

[53] This RCT, also identified by the systematic review, [51] was small and had a low event rate, therefore the results must be interpreted with caution.

Comment: **Clinical guide:**
There is weak evidence of benefit associated with the overlap technique for primary repair of the external anal sphincter compared with the end-to-end method.

GLOSSARY

Gardosi cushion An obstetric aid used during the second stage of labour, which allows most of the woman's weight to rest on her thighs instead of her feet, while being in a squatting position.

Passive fetal descent An alternative method of bearing down, involving a period of rest to allow passive descent of the fetus before active pushing.

Continuous support during labour The presence of a companion (lay person or healthcare worker) who provides continuous social support for the woman during the intrapartum period; social support may include advice, information, assistance, or emotional support.

End-to-end technique for primary repair of third-degree obstetric anal sphincter tears involves the torn ends of the external anal sphincter being juxtaposed with interrupted sutures.

High-quality evidence Further research is very unlikely to change our confidence in the estimate of effect.

Low-quality evidence Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.

Moderate-quality evidence Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.

Overlap technique for primary repair of third-degree obstetric anal sphincter tears involves the torn ends of the external anal sphincter being overlapped and sutured with interrupted stitches.

Very low-quality evidence Any estimate of effect is very uncertain.

SUBSTANTIVE CHANGES

Continuous support during labour New evidence added. [28] Categorisation unchanged (Beneficial).

Continuous sutures in second-degree tears and episiotomies New evidence added. [48] [49] [50] Categorisation unchanged (Beneficial).

Different methods and materials for primary repair of obstetric anal sphincter injuries (third- and fourth-degree tears) New evidence added. [53] Categorisation unchanged (Unknown effectiveness), as we found insufficient evidence to assess the effects of different materials for primary repair versus each other.

Restrictive versus routine use of episiotomy New evidence added. [15] [16] [17] Categorisation unchanged (Beneficial).

Sustained breath holding (Valsalva) method of pushing in the second stage of labour New evidence added. [32] Categorisation unchanged (Unknown effectiveness), as there remains insufficient evidence to judge the effects of this intervention.

Water births New evidence added. [34] Categorisation unchanged (Unknown effectiveness), as RCTs found were of variable methodological quality and used small sample sizes, which make it difficult to judge the effects of this intervention.

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Competing interests: CK was the lead investigator of one of the included RCTs and first author of two of the included systematic reviews. CK has also developed an episiotomy and second-degree tear training model with Limbs & Things, UK. ST declares that she has no competing interests.
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Disclaimer

GRADE **Evaluation of interventions for Perineal care.**

Important outcomes				Adverse effects, Perineal trauma					
Studies (Participants)	**Outcome**	**Comparison**	**Type of evidence**	**Quality**	**Consistency**	**Directness**	**Effect size**	**GRADE**	**Comment**
What are the effects of intrapartum surgical interventions on rates of perineal trauma?									
at least 8 (at least 5006) [15] [16] [17]	Perineal trauma	Restrictive versus routine use of episiotomy	4	0	–1	0	0	Moderate	Consistency point deducted for conflicting results
1 (at least 407) [18]	Perineal trauma	Midline versus mediolateral episiotomy incision	4	–3	0	0	0	Very low	Quality points deducted for quasi-randomisation, incomplete reporting of results, and no intention-to-treat analysis.
19 (at least 6162) [22]	Perineal trauma	Epidural analgesia versus other forms of analgesia or no analgesia	4	–2	0	0	0	Low	Quality points deducted for weak methods and use of surrogate outcome (instrumental deliveries)
1 (1912) [22]	Adverse effects	Epidural analgesia versus other forms of analgesia or no analgesia	4	–2	0	0	0	Low	Quality points deducted for weak methods and unclear clinical relevance of outcome
11 (3799) [24] [25] [26] [27]	Perineal trauma	Vacuum extraction versus forceps delivery	4	–2	0	0	0	Low	Quality points deducted for inclusion of quasi-randomised RCTs and lack of blinding
at least 11 (at least 3431) [24] [25] [26]	**Adverse effects**	Vacuum extraction versus forceps delivery	4	–2	0	0	0	Low	Quality points deducted for inclusion of quasi-randomised RCTs and lack of blinding
What are the effects of intrapartum non-surgical interventions on rates of perineal trauma?									
at least 15 (at least 13,357) [28]	Perineal trauma	Continuous support during labour versus usual care	4	–2	0	0	0	Low	Quality points deducted for support intervention varying between trials and use of surrogate outcome (instrumental deliveries)
18 (5506) [29]	Perineal trauma	Upright position versus supine or lithotomy positions during delivery	4	–3	0	0	0	Very low	Quality points deducted for exclusion of participants after randomisation, diversity of interventions, and crossover between groups
11 (4542) [29]	Adverse effects	Upright position versus supine or lithotomy positions during delivery	4	–3	0	0	0	Very low	Quality points deducted for exclusion of participants after randomisation, diversity of interventions, and crossover between groups
1 (252) [30]	Perineal trauma	Passive descent versus active pushing in the second stage of labour	4	–2	0	0	0	Low	Quality points deducted for incomplete reporting of results and use of surrogate outcome (instrumental deliveries)
3 (438) [31] [32]	Perineal trauma	Sustained breath holding (Valsalva) method of pushing versus exhalatory or spontaneous pushing	4	–3	0	0	0	Very low	Quality points deducted for incomplete reporting, including unpublished trials, and inclusion of non-RCT data
2 (6632) [2] [33]	Perineal trauma	"Hands-poised" versus "hands-on" method of delivery	4	–2	0	0	0	Low	Quality points deducted for quasi-randomisation and missing data
1 (5471) [2]	Adverse effects	"Hands-poised" versus "hands-on" method of delivery	4	0	0	0	0	High	
at least 5 (at least 2401) [34]	Perineal trauma	Water births versus no immersion in water	4	–3	0	0	0	Very low	Quality points deducted for different interventions of water immersion in RCTs, crossover between groups, and poor methods

Important outcomes — **Adverse effects, Perineal trauma**

Studies (Participants)	Outcome	Comparison	Type of evidence	Quality	Consistency	Directness	Effect size	GRADE	Comment
What are the effects of different methods and materials for primary repair of first- and second-degree tears and episiotomies?									
2 (2594) [35] [36]	Perineal trauma	Non-suturing of perineal skin versus conventional suturing in first- and second-degree tears and episiotomies	4	–1	–1	0	0	Low	Quality point deducted for no intention-to-treat analysis. Consistency point deducted for conflicting results
2 (2594) [35] [36]	Adverse effects	Non-suturing of perineal skin versus conventional suturing in first- and second-degree tears and episiotomies	4	–1	–1	0	0	Low	Quality point deducted for no intention-to-treat analysis. Consistency point deducted for conflicting results
2 (152) [37] [38]	Perineal trauma	Non-suturing of muscle and skin versus conventional suturing in first- and second-degree perineal tears	4	–3	0	0	0	Very low	Quality points deducted for sparse data, incomplete reporting of results, and unclear outcome measurement
2 (152) [37] [38]	Adverse effects	Non-suturing of muscle and skin versus conventional suturing in first- and second-degree perineal tears	4	–3	–1	0	0	Very low	Quality points deducted for sparse data, incomplete reporting of results, and unclear outcome measurement. Consistency point deducted for conflicting results
11 (at least 5172) [39] [40] [41] [42] [43] [44]	Perineal trauma	Absorbable synthetic sutures versus catgut sutures	4	–3	–1	0	0	Very low	Quality points deducted for incomplete reporting of results, no blinding in some RCTs, and incomplete recruiting in 1 RCT. Consistency point deducted for conflicting results
2 (1811) [46] [47]	Perineal trauma	Different types of absorbable synthetic suture versus each other	4	0	0	–1	0	Moderate	Directness point deducted for use of restrictive outcome measure
at least 6 (at least 3527) [48]	Perineal trauma	Continuous versus interrupted sutures for repair of all layers or only perineal skin (analysed as a group)	4	0	–1	0	0	Moderate	Consistency point deducted for different results at different time points
at least 7 (at least 3289) [48] [49] [50]	Perineal trauma	Continuous versus interrupted sutures for repair of all layers	4	0	–1	0	0	Moderate	Consistency point deducted for conflicting results
What are the effects of different methods and materials for primary repair of obstetric anal sphincter injuries (third- and fourth-degree tears)?									
3 (279) [51]	Perineal trauma	Different methods for primary repair versus each other	4	–1	–1	0	0	Low	Quality point deducted for heterogeneity of outcome measurement. Consistency point deducted for different results for different outcomes
1 (112) [53]	Perineal trauma	Different materials for primary repair versus each other	4	–2	0	–1	0	Very low	Quality points deducted for sparse data and methodological weakness. Directness point deducted for composite outcome

We initially allocate 4 points to evidence from RCTs, and 2 points to evidence from observational studies. To attain the final GRADE score for a given comparison, points are deducted or added from this initial score based on preset criteria relating to the categories of quality, directness, consistency, and effect size. Quality: based on issues affecting methodological rigour (e.g., incomplete reporting of results, quasi-randomisation, sparse data [<200 people in the analysis]). Consistency: based on similarity of results across studies. Directness: based on generalisability of population or outcomes. Effect size: based on magnitude of effect as measured by statistics such as relative risk, odds ratio, or hazard ratio.