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 USA, 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 April 2007 (BMJ 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

Non-suturing of perineal skin alone in first- and second-degree tears and episiotomies (reduced dyspareunia compared with conventional suturing) 9

Likely to be ineffective or harmful

Non-suturing of muscle and skin in first- and second-degree perineal tears (poorer wound healing than with suturing) 10

REPAIRING THIRD- AND FOURTH-DEGREE TEARS

Unknown effectiveness

Different methods and materials for primary repair of obstetric anal sphincter injuries (third- and fourth-degree tears) 14

To be covered in future updates

Potential new questions:

What are the effects of postnatal interventions to reduce morbidity associated with perineal trauma

Potential new options:

Third trimester and intrapartum perineal massage

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 USA, 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 compared with catgut sutures. Rapidly absorbed synthetic sutures reduces the need for suture removal. Continuous sutures reduce short-term pain.
- Early primary overlap repair forthird- and fourth-degree anal sphincter tears seems to be associated with lower risks for faecal urgency and anal incontinence symptoms .
- We dont know whether immersion in water during the first or second stage of labour has any effect on rates of perineal trauma.

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 less than 50% of the external anal sphincter is torn; 3b where more than 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 60–70% 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 USA. [5] [6] [7] Sutured spontaneous tears are reported in about a third of women in the USA [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 23–42% of women continue to have pain and discomfort for 10–12 days postpartum, and 7–10% 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; 3–10% 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

Quality of life; 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; stress incontinence; faecal incontinence; adverse effects of treatment.

METHODS

BMJ Clinical Evidence search and appraisal April 2007. For this review, various sources were used for the identification of studies: Medline 1966 to April 2007, Embase 1980 to April 2007, and the Cochrane Library 2007 Issue 1. Additional searches were carried out on the NHS Centre for Reviews and Dissemination (CRD) databases, Turning Research into Practice (TRIP), and NICE websites. Abstracts of studies retrieved in the search were assessed independently by two information specialists. Predetermined criteria were used to identify relevant studies. Study design criteria included systematic reviews and RCTs, in any language. Studies were at least single blind. We excluded all studies described as “open”, “open label”, or non-blinded (unless the interventions could not be blinded). The minimum number of individuals in each trial was 20. Size of follow-up was 80% or more. There was no minimum length of follow-up. We have performed a GRADE evaluation of the quality of evidence for interventions included in this review (see table, p 17).

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

OPTION **RESTRICTIVE VERSUS ROUTINE USE OF EPISIOTOMY**

Reducing 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 not at reducing severe vaginal or perineal trauma, third-degree tears, dyspareunia or urinary incontenence at 3 months, or dyspareunia at 3 years. Restrictive use of episiotomy seems less effective at reducing rates of anterior perineal trauma (which carries minimal morbidity) (moderate-quality evidence).

For GRADE evaluation of interventions for perineal care, see table, p 17 .

Benefits: We found one systematic review [15] and one subsequent RCT [16] comparing restricted versus routine episiotomy. The systematic review (search date not reported, 6 RCTs, 4850 women) reported that 1752/2409 (73%) women in the routine episiotomy group had an episiotomy compared with 673/2441 (28%) women in the restricted group. [15] The types of episiotomy performed were mediolateral in five of the trials and midline in the sixth. 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, and Argentina. The systematic review found that restricted use of episiotomy was associated with significantly lower rates of posterior perineal trauma, less perineal pain at discharge from hospital, less suturing, and fewer healing complications compared with routine use of episiotomy (posterior perineal trauma: 4 RCTs, 2079 women; 744/1039 [72%] with restricted *v* 849/1040 [82%] with routine; RR 0.88, 95% CI 0.84 to 0.92; NNT 10, 95% CI 8 to 16; perineal pain at discharge from hospital: 1 RCT, 2422 women; 371/1207 [31%] with restricted *v* 516/1215 [42%] with routine; RR 0.72, 95% CI 0.65 to 0.81; NNT 9, 95% CI 7 to 12; suturing: 5 RCTs, 4133 women; 1327/2080 [64%] with restricted *v* 1768/2053 [86%] with routine; RR 0.74, 95% CI 0.71 to 0.77; NNT 4, 95% CI 4 to 5; healing complications: 1 RCT, 1119 women; 114/555 [21%] with restricted *v* 168/564 [30%] with routine; RR 0.69, 95% CI 0.56 to 0.85; NNT 11, 95% CI 7 to 23). The review found no significant difference between groups in overall rates of severe vaginal or perineal trauma, dyspareunia within 3 months or dyspareunia in the next 3 years, or urinary incontinence at 3 months (severe vaginal or perineal trauma: 3 RCTs, 4284 women; 87/2155 [4.0%] with restricted *v* 77/2129 [3.6%] with routine; RR 1.11, 95% CI 0.83 to 1.50; dyspareunia within 3 months: 1 RCT, 895 women; 96/438 [22%] with restricted *v* 82/457 [18%] with routine; RR 1.22, 95% CI 0.94 to 1.59; dyspareunia in the next 3 years: 1 RCT, 674 women; 52/329 [16%] with restricted *v* 45/345 [13%] with routine; RR 1.21, 95% CI 0.84 to 1.75; and urinary incontinence at 3 months: 2 RCTs, 1569 women; 140/775 [18%] with restricted *v* 147/794 [19%] with routine; RR 0.98, 95% CI 0.79 to 1.20). The subsequent RCT compared mediolateral episiotomies and was of good methodological quality. It reported that 46/60 (77%) German women in the liberal (routine) episiotomy group had an episiotomy compared with 20/49 (41%) women in the restricted group. [16] The RCT found that restricting episiotomy to specific fetal indications increased the proportion of women with intact perineum compared with liberal (routine) episiotomy policy, but found no significant difference in rates of anterior perineal trauma or third-degree tears (109 women; intact perineum: 14/49 [29%] with restricted *v* 6/60 [10%] with liberal [routine]; RR 2.9, 95% CI 1.2 to 6.9; anterior perineal trauma: 27/49 [55%] with restricted *v* 25/60 [42%] with liberal [routine]; RR 1.1, 95% CI 0.8 to 1.8; third-degree tears: 2/49 [4%] with restricted *v* 5/60 [8%] with liberal [routine]; RR 0.43, 95% CI 0.1 to 2.1).

Harms: We found no reports of serious adverse effects associated with restricted use of episiotomy apart from higher rates of anterior perineal trauma, which carries minimal morbidity, in the systematic review (4 RCTs, 4342 women; 425/2144 [20%] with restricted *v* 243/2198 [11%] with routine; RR 1.79, 95% CI 1.55 to 2.07; NNH 11, 95% CI 9 to 16). [15] The subsequent RCT did not report any serious adverse effects associated with restricted use of episiotomy. [16]

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

OPTION MIDLINE VERSUS MEDIOLATERAL EPISIOTOMY INCISION

Reducing 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. Midline episiotomy incision may be more effective at reducing perineal bruising (very low-quality evidence).

For GRADE evaluation of interventions for perineal care, see table, p 17 .

Benefits: We found no systematic review comparing mediolateral versus midline episiotomy incisions. We found one quasi-randomised trial (407 primigravidas, 24% withdrawals) [17] and one abstract (no detailed data, no description of treatment allocation method) [18] comparing midline versus mediolateral episiotomies. The first trial had an increased risk of selection bias due to quasi-random treatment allocation, and because analysis was not by intention to treat. [17] The trials were of poor quality and 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.

Harms: The quasi-randomised trial found that midline episiotomies significantly increased the risk of third- or fourth-degree tears (39/163 [24%] with midline episiotomy *v* 22/244 [9%] with mediolateral episiotomy, RR 2.7, 95% CI 1.6 to 4.3, NNH 6, 95% CI 4 to 13). [17] However, these results must be approached with care, as the study limitations compromise their validity. Two retrospective cohort studies, including 5376 primiparous and 341 multiparous women, also found that midline episiotomies

were associated with a fourfold increased risk of third- and fourth-degree tears after allowing for multiple confounders (CI not reported). [19] [20]

Comment: **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

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

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

For GRADE evaluation of interventions for perineal care, see table, p 17 .

Benefits: We found one systematic review (search date 2005, 21 RCTs, 6664 women) comparing epidural analgesia versus other forms of analgesia or no analgesia in labour. [21] 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. One RCT found no significant difference between epidural analgesia and non-epidural analgesia in rates of perineal trauma requiring suturing, although more women having epidural anaesthesia had perineal trauma (1 RCT, 141/184 [77%] with epidural analgesia *v* 135/185 [73%] with non-epidural analgesia, RR [fixed] 1.05, 95% CI 0.93 to 1.18). [22] Seventeen RCTs (6162 women) reported that instrumental delivery was significantly more frequent in the group randomised to epidural analgesia compared with non-epidural analgesia or no analgesia (17 RCTs, 587/3044 [19%] with epidural analgesia *v* 442/3118 [14%] with non-epidural analgesia, RR [fixed] 1.38, 95% CI 1.24 to 1.53). [21]

Harms: The systematic review found that women allocated epidural analgesia compared with non-epidural analgesia had an increased risk of urinary retention (3 RCTs, 27/126 [21%] with epidural analgesia *v* 1/157 [1%] with non-epidural analgesia, RR [fixed] 17.05, 95% CI 4.82 to 60.39) and maternal fever (defined as a temperature above 38 °C: 3 RCTs, 205/956 [21%] with epidural analgesia *v* 56/956 [6%] with non-epidural analgesia, RR [fixed] 3.67, 95% CI 2.77 to 4.86). [21]

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

Reducing 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).

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).

For GRADE evaluation of interventions for perineal care, see table, p 17 .

Benefits: We found one systematic review [23] and three subsequent RCTs. [24] [25] [26] The systematic review (search date 1999, 10 RCTs, comparing vacuum extraction versus forceps delivery, 2885 women; the RCTs varied in quality regarding treatment allocation, with some using quasi-randomisation) found that women allocated to vacuum extraction rather than forceps were significantly less likely to suffer severe perineal injury and severe perineal pain at 24 hours (severe perineal injury: 7 RCTs, 2582 women, 127/1296 [10%] with vacuum *v* 261/1286 [20%] with forceps; RR 0.46, 95% CI 0.38 to 0.56, NNT 10, 95% CI 8 to 12; severe perineal pain: 1 RCT, 495 women, 21/247 [9%] with vacuum *v* 37/248 [15%] with forceps, RR 0.57, 95% CI 0.34 to 0.94, NNT 16, 95% CI 10 to 119). [23] None of the trials attempted to “blind” the allocated intervention during the postnatal assessments. The trials took place in different countries (UK, USA, 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. The subsequent RCTs (carried out in teaching hospitals in Mexico, Sri Lanka, and Ireland) found that fewer women had severe perineal trauma [24] [25] and third-degree tears [26] with vacuum extraction compared with forceps delivery, but the difference was not significant (perineal trauma: 2/70 [3%] with vacuum *v* 4/70 [6%] with forceps, RR 0.50, 95% CI 0.10 to 2.64; [24] and 2/204 [1.0%] with vacuum *v* 4/238 [1.7%] with forceps, RR 0.58, 95% CI 0.19 to 3.15; [25] third-degree tear: 5/69 [7%] with vacuum *v* 10/61 [16%] with forceps, RR 0.44, 95% CI 0.16 to 1.22 [26]). The second subsequent RCT had an additional control group of 70 women having a spontaneous vaginal delivery. [24] The third subsequent RCT failed to achieve adequate power to detect a 20% difference between vacuum and forceps in morbidity, but found that vacuum extraction significantly reduced the proportion of women complaining of altered faecal continence at 3 months after birth compared with forceps (intention-to-treat analysis; 23/69 [33%] with vacuum *v* 36/61 [59%] with forceps; RR 0.35, 95% CI 0.17 to 0.71). [26]

Harms: The systematic review and two of the subsequent RCTs found that babies delivered by vacuum extraction were at higher risk of cephalhaematoma (systematic review: [23] 6 RCTs, 1966 women, 98/995 [10%] with vacuum *v* 40/971 [4%] with forceps, RR 2.34, 95% CI 1.64 to 3.35, NNH 17, 95% CI 10 to 35; first subsequent RCT: [24] 6/70 [9%] with vacuum *v* 2/70 [3%] with forceps, RR 3.0, 95% CI 0.63 to 14.36; second subsequent RCT: [25] 12/204 [6%] with vacuum *v* 2/238 [1%] with forceps, RR 7.00, 95% CI 1.59 to 30.91). The systematic review also found that vacuum extraction was associated with significantly higher rates of retinal haemorrhage and failed delivery vacuum extraction compared with forceps (retinal haemorrhage: 5 RCTs, 445 women, 109/224 [49%] with vacuum *v* 74/221 [34%] with forceps, RR 1.46, 95% CI 1.17 to 1.83, NNH 7, 95% CI 4 to 17; failed delivery with selected instrument: 9 RCTs, 2849 women, 166/1436 [12%] with vacuum *v* 102/1413 [7%] with forceps, RR 1.60, 95% CI 1.27 to 2.02, NNH 23, 95% CI 14 to 51). [23]

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 on rates of perineal trauma of intrapartum non-surgical interventions?

OPTION CONTINUOUS SUPPORT DURING LABOUR

Reducing perineal trauma
Continuous support during labour 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 may be more effective at reducing perineal trauma (defined as episiotomy or laceration requiring suturing) or at reducing rates of episiotomy (low-quality evidence).

For GRADE evaluation of interventions for perineal care, see table, p 17 .

Benefits: We found one systematic review (search date 2005, 15 RCTs, at least 12,791 women) comparing continuous one-to-one intrapartum support from a professional nurse, midwife, or lay person versus usual care. [27] The RCTs were of reasonable quality, with one trial using a central computerised randomisation service for treatment allocation, 12 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 between trials. The pragmatic trials took place in different countries (Australia, Belgium, Botswana, Canada, Finland, France, Greece, Guatemala, Mexico, South Africa, and the USA). The systematic review found that continuous support significantly reduced assisted vaginal birth (vacuum extraction or forceps) compared with usual care (14 RCTs, 12,757 women, 1039/6344 [16%] with continuous support *v* 1159/6413 [18%] with usual care, RR 0.89, 95% CI 0.83 to 0.96). The review found no significant difference in the overall rate of episiotomy or perineal trauma (episiotomy: 1 RCT, 6915 women, 894/3454 [25.9%] with continuous support *v* 919/3461 [26.5%] with usual care, RR 0.97, 95% CI 0.90 to 1.05; perineal trauma, defined as episiotomy or laceration requiring suturing: 2 RCTs, 7328 women, 1996/3663 [54%] with continuous support *v* 2026/3665 [55%] with usual care, RR 0.99, 95% CI 0.95 to 1.03).

Harms: The trials in the review examined a wide range of outcomes, but none revealed harmful effects. [27]

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

Reducing perineal trauma
Upright position during delivery 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).

Adverse effects
Upright position during delivery 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 greater than 500 ml (very low-quality evidence).

For GRADE evaluation of interventions for perineal care, see table, p 17 .

Benefits: 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, the results of which should be interpreted with caution because of the variable qualities of the trials, and diversity of the treatment interventions. [28] 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. Ther review found that the upright position significantly reduced the episiotomy rate compared with supine or lithotomy positions, but this was offset by an increase in second-degree tears (episiotomy: 12 RCTs, 4081 women, 742/2039 [36%] in upright position *v* 870/2042 [43%] in supine or lithotomy position, RR 0.84, 95% CI 0.79 to 0.91, NNH 17, 95% CI 12 to 35; second-degree tears: 11 RCTs, 4492 women, 405/2225 [18%] in upright position *v* 352/2267 [16%] in supine or lithotomy position, RR 1.23, 95% CI 1.09 to 1.39, NNH 40, 95% CI 20 to 57). There was a marginal but significant reduction in assisted vaginal deliveries in the upright group, and no significant difference in rates of third- and fourth-degree tears (assisted vaginal delivery: 18 RCTs, 5506 women, 277/2737 [10%] in upright position *v* 326/2769 [12%] in supine or lithotomy position, RR 0.84, 95% CI 0.73 to 0.98; third- and fourth-degree tears: 4 RCTs, 1478 women, 5/719 [0.7%] in upright position *v* 6/759 [0.8%] in supine or lithotomy position, RR 0.91, 95% CI 0.31 to 2.68).

Harms: The review found that women delivering in the upright position were slightly more at risk of blood loss estimated to be greater than 500 ml, and there was a non-significant increase in blood transfusion (blood loss greater than 500 ml: 11 RCTs, 4542 women, 160/2256 [7%] in upright position *v* 96/2286 [4%] in supine or lithotomy position, RR 1.68, 95% CI 1.32 to 2.15, NNH 36, 95% CI 21 to 82; blood transfusion: 2 RCTs, 1747 women, 14/891 [2%] in upright position *v* 8/856 [1%] in supine or lithotomy position, RR 1.66, 95% CI 0.70 to 3.94). [28]

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

Reducing perineal trauma
Passive fetal descent in the second stage of labour 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).

For GRADE evaluation of interventions for perineal care, see table, p 17 .

Benefits: We found one RCT (252 women), which compared passive fetal descent versus active pushing from the start of the second stage of labour. [29] It found no significant difference between bearing down methods for rates of perineal laceration or instrumental delivery (laceration rate in primiparous women: 46.9% with passive descent *v* 46.2% with active pushing; P = 0.94; laceration rate in multiparous women: 36% with passive descent *v* 33% with active pushing; P = 0.73; rate of instrumental delivery in primiparous women: 23% with passive descent *v* 30% with active pushing;

P = 0.36; rate of instrumental delivery in multiparous women: 3% with passive descent *v* 13% with active pushing; P = 0.078; CI not reported).

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

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

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

Reducing perineal trauma

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

For GRADE evaluation of interventions for perineal care, see table, p 17 .

Benefits: We found one systematic review (search date 1993, 5 trials, of which 2 were known to be RCTs, 471 women), which compared bearing down by sustained breath holding (Valsalva) versus exhalatory or spontaneous pushing. [30] 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. Only two of the trials provided data on perineal trauma requiring suturing, and they found no significant difference between the two interventions (2 RCTs, 338 women; 57/172 [33%] with sustained Valsalva *v* 66/166 [40%] with exhalatory bearing down; RR 0.83, 95% CI 0.61 to 1.10). 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.

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

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.

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

Reducing 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 occurence 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).

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).

For GRADE evaluation of interventions for perineal care, see table, p 17 .

Benefits: 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] [31] The RCT was a large, robust, multicentre, pragmatic trial carried out in the UK and the results are likely to be generalisable. [2] Both trials found that the "hands-poised" method of delivery reduced episiotomy rates compared with the "hands-on" method. The RCT (5471 women) found that the "hands-poised" method significantly reduced the episiotomy rate compared with the "hands-on" method (280/2740 [10%] with "hands-poised" *v* 351/2731 [13%] with "hands-on"; RR 0.79, 95% CI 0.65 to 0.96; NNT 38, 95% CI 23 to 106). [2] It found no significant difference between methods in the risk of perineal trauma requiring suturing, or in third- and fourth-degree tears (suturing required: 1636/2740 [60%] with "hands-poised" *v* 1605/2731 [59%] with "hands-on"; RR 1.02, 95% CI 0.97 to 1.06; third- and fourth-degree tears: 40/2740 [1.5%] with "hands-poised" *v* 31/2731 [1.2%] with "hands-on"; RR 1.3, 95% CI 0.81 to 2.05). The second, quasi-randomised trial (1161 women) found that the "hands-poised" method significantly reduced episiotomy rates and third-degree tears (episiotomy: 51/502 [10%] with "hands-poised" *v* 103/574 [18%] with "hands-on"; RR 0.57, 95% CI 0.41 to 0.78; third-degree tears: 5/502 [1%] with "hands-poised" *v* 16/574 [3%] with "hands-on"; RR 0.36, 95% CI 0.13 to

0.97). [31] 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. There was no significant difference in the rate of first- and second-degree perineal trauma (175/502 [35%] with "hands-poised" *v* 171/574 [30%] with "hands-on"; RR 1.17, 95% CI 0.98 to 1.39).

Harms: The RCT found that the "hands-poised" method significantly increased the risk of requiring manual removal of the placenta, and significantly increased perineal pain 10 days after delivery (manual removal: 71/2740 [2.6%] with "hands-poised" *v* 42/2731 [1.5%] with "hands-on"; RR 1.69, 95% CI 1.16 to 2.46; NNH 95, 95% CI 45 to 417; perineal pain: 910/2669 [34%] with "hands-poised" *v* 823/2647 [31%] with "hands-on"; RR 1.10, 95% CI 1.02 to 1.19; NNH 33, 95% CI 18 to 212). [2]

Comment: The two RCTs show 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 New

Reducing perineal trauma

Immersion in water versus 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).

For GRADE evaluation of interventions for perineal care, see table, p 17 .

Benefits: We found one systematic review (search date 2003, 8 RCT's, 2939 women) comparing immersion in water versus no immersion during the first or second stage of labour. [32] Seven of the RCTs included in the review relate to immersion in water during the first stage of labour, and one RCT included in the review relates to immersion in water during the second stage of labour. The review included published and unpublished trials. The quality of the RCTs was variable, with no clear definition of what constituted water immersion, differences with type and size of pool used, variations regarding whether water was still or moving (e.g. whirlpool, Jacuzzi), and differences with compliance with trial allocation. One of the RCTs [33] reported that 183/396 (46%) women allocated to water immersion did not actually use water, and four other RCTs reported some crossover between groups. [34] [35] [36] [37] The review found no significant difference between water immersion and no water immersion during the first or second stage of labour in rates of perineal trauma (first stage of labour: 3 RCTs, episiotomy: 171/550 [31%] with immersion *v* 186/554 [34%] with no immersion, OR 0.89, 95% CI 0.68 to 1.15, P value not reported; second-degree tears: 95/550 [17%] with immersion *v* 104/554 [19%] with no immersion, OR 0.90, 95% CI 0.66 to 1.23, P value not reported; third- and fourth-degree tears: 4 RCTs, 39/1162 [3%] with immersion *v* 29/1179 [2%] with no immersion, OR 1.38, 95% CI 0.85 to 2.24, P value not reported; second stage of labour: 1 RCT, episiotomy: 3/60 [0.5%] with immersion *v* 4/59 [0.7%] with no immersion, OR 0.72, 95% CI 0.15 to 3.38, P value not reported; second-degree tears: 13/60 [2%] with immersion *v* 11/59 [2%] with no immersion, OR 1.21, 95% CI 0.40 to 2.96, P value not reported). [32]

Harms: 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 to the validity and reliability of the trials. [32]

Comment: **Clinical guide:**
There is no evidence of benefit or harm when comparing immersion in water with no immersion during the first or second stage of labour. However, the RCTs included in the systematic review were of variable methodological quality, and used small sample sizes. The results should therefore be interpreted with caution.

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

Reducing 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).

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).

For GRADE evaluation of interventions for perineal care, see table, p 17 .

Benefits: 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. [38] [39] The two RCTs were pragmatic studies, and the results are likely to be generalisable. The RCTs found different results for perineal pain. The first large 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) found no significant difference in the proportion of women reporting perineal pain at 10 days after birth (221/886 [25%] with skin unsutured *v* 244/885 [28%] with skin sutured; RR 0.91, 95% CI 0.77 to 1.06). [38] The second RCT was a multicentre trial conducted in Nigeria (823 women who sustained a second-degree tear or episiotomy). [39] 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. The study found that leaving the perineal skin unsutured significantly reduced the proportion of women with perineal pain at 48 hours, 14 days, 6 weeks, and 3 months after delivery (48 hours: 237/417 [57%] with skin unsutured *v* 265/406 [65%] with skin sutured; RR 0.87, 95% CI 0.78 to 0.97; 14 days: 93/417 [22%] with skin unsutured *v* 117/406 [29%] with skin sutured; RR 0.77, 95% CI 0.61 to 0.98; 6 weeks: 41/417 [10%] with skin unsutured *v* 62/406 [15%] with skin sutured; RR 0.64, 95% CI 0.44 to 0.93; 3 months: 4/417 [1%] with skin unsutured *v* 21/406 [5%] with skin sutured; RR 0.19, 95% CI 0.06 to 0.54). Both RCTs found that leaving the perineal skin unsutured significantly reduced superficial dyspareunia at 3 months after birth (first RCT: [38] 128/828 [16%] with skin unsutured *v* 162/836 [19%] with skin sutured; RR 0.80, 95% CI 0.64 to 0.99; NNT 26, 95% CI 14 to 345; second RCT: [40] 26/417 [6%] with skin unsutured *v* 49/406 [12%] with skin sutured; RR 0.52, 95% CI 0.33 to 0.81).

Harms: The two RCTs found that leaving the perineal skin unsutured but apposed increased rates of wound gaping at 48 hours compared with suturing (first RCT: [38] 203/885 [23%] with skin unsutured *v* 40/889 [4%] with skin sutured; RR 5.10, 95% CI 3.68 to 7.06; second RCT: [39] 107/417 [26%] with skin unsutured *v* 21/406 [5%] with skin sutured; RR 4.96, 95% CI 3.17 to 7.76). The first RCT found that non-suturing of the skin increased wound gaping at 10 days, but the second RCT found no significant differences in wound gaping at 14 days after birth (first RCT; [38] 10 days: 227/886 [26%] with skin unsutured *v* 145/885 [16%] with skin sutured; RR 1.56, 95% CI 1.30 to 1.88; second RCT; [39] 14 days: 86/417 [21%] with skin unsutured *v* 67/406 [17%] with skin sutured; RR 1.25, 95% CI 0.94 to 1.67; longer-term results were not reported in the second RCT). The second RCT judged wounds as gaping if the edges were more than 0.5 cm apart. [39] It found no significant differences in wound breakdown at 14 days (13/417 [3%] with skin unsutured *v* 10/406 [2%] with skin sutured; RR 1.27, 95% CI 0.56 to 2.85).

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 dysparunia. 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

Reducing perineal trauma
Non-suturing of muscle and skin in first- and second-degree perineal tears 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 in reducing the proportion of women with "burning sensation" (not further defined) or with soreness at 2–3 days after birth, or in reducing pain scores at 10 days, and at 6 weeks (very low-quality evidence).

Adverse effects
Non-suturing of muscle and skin in first- and second-degree perineal tears 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 in reducing "healing" (not further defined; not clear how assessed) at 2–3 days and at 8 weeks after birth (very low-quality evidence).

For GRADE evaluation of interventions for perineal care, see table, p 17 .

Benefits: We found no systematic review. We found two small RCTs comparing non-suturing versus suturing of first- and second-degree tears. [41] [40] Results from the first small RCT (78 primiparous women in Sweden) should be interpreted with caution, because the study limitations compromise the validity of the results. [41] 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. The RCT found no significant difference between suturing and non-suturing in rates of a "burning sensation" and in soreness at 2–3 days after birth, although women not having suturing reported higher rates for both outcomes (burning sensation: 9/40 [23%] in non-sutured *v* 4/38 [11%] in sutured; RR 0.47, 95% CI 0.16 to 1.39; soreness: 3/40 [8%] in non-sutured *v* 1/38 [3%] in sutured; RR 0.35, 95% CI 0.04 to 3.23). It found no significant difference in healing at 2–3 days and at 8 weeks after birth (see comment below). The second RCT (74 primiparous women in Scotland) found no significant difference in McGill pain scores at 10 days and at 6 weeks between the non-sutured and sutured groups (P = 0.8 at both 10 days and 6 weeks), but found that wound healing was significantly poorer with non-suturing at up to 6 weeks after delivery (proportion of women with a closed tear: 16/36 [44%] in non-sutured *v* 26/31 [84%] in sutured; RR 0.53, 95% CI 0.36 to 0.79). [40] 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.

Harms: See benefits above. No additional harms were reported in the two identified RCTs. [41] [40]

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

Reducing perineal trauma
Absorbable synthetic sutures compared with catgut 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).

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, but not in reducing overall perineal pain, pain on sitting, or dyspareunia (very low-quality evidence).

For GRADE evaluation of interventions for perineal care, see table, p 17 .

Benefits: **Absorbable synthetic sutures versus catgut:**
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 USA), [42] and three subsequent RCTs (carried out in Australia, [43] USA, [44] and Canada [45]). It was not possible to "blind" outcome assessment because of the obvious differences in method and materials used. Most of the trials included in the review used "intention to treat" as the method of analysis. [42] The systematic review found that absorbable synthetic material significantly reduced pain and analgesia use up to 10 days (analgesic use: 5 RCTs, 2820 women; AR 262/1422 [18%] with absorbable synthetic *v* 338/1398 [24%] with catgut; RR 0.74, 95% CI 0.65 to 0.85; NNT 18, 95% CI 13 to 35; perineal pain: 3 RCTs, 2044 women; AR 232/1024 [23%] with absorbable synthetic *v* 298/1020 [29%] with catgut; RR 0.78, 95% CI 0.67 to 0.90. There was no significant difference at 3 months in perineal pain or dyspareunia between absorbable synthetic sutures and catgut (perineal pain: 2 RCTs; AR 92/1061 [9%] with absorbable synthetic *v* 112/1068 [11%] with chromic catgut; RR 0.86, 95% CI 0.64 to 1.08; dyspareunia: 3 RCTs; AR 171/1086 [16%] with absorbable synthetic *v* 180/1089 [17%] with chromic catgut; RR 0.95, 95% CI 0.79 to 1.15). At 12 months after birth (1 RCT, 793 women, reported in two papers), rates of dyspareunia were lower with absorbable synthetic sutures than with chromic catgut (AR 30/395 [8%] with absorbable synthetic *v* 51/398 [13%] with chromic catgut; RR 0.59, 95% CI 0.39 to 0.91; NNT 20, 95% CI 11 to 106). [46] [47] The first subsequent RCT compared absorbable synthetic (standard polyglactin 910 or polyglycolic acid) versus catgut suture material for perineal repair. [43] 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%. It found no significant difference in perineal pain at 3 days or at 3 months between absorbable

synthetic sutures and catgut, although it may have lacked power to detect clinically important effects (391 women who sustained a first- or second-degree tear or episiotomy after a spontaneous vaginal delivery; perineal pain at 3 days: 112/187 [60%] with absorbable synthetic *v* 124/188 [66%] with chromic catgut; RR 0.91, 95% CI 0.78 to 1.06; perineal pain at 3 months: 17/167 [10%] with absorbable synthetic *v* 14/174 [8%] with chromic catgut; RR 1.26, 95% CI 0.64 to 2.48). The RCT found no significant difference between absorbable sutures and catgut in dyspareunia at 3 and 6 months and in perineal pain at 6 months, although rates were higher with absorbable sutures (dyspareunia at 3 months: 35/132 [27%] with absorbable synthetic *v* 27/144 [19%] with chromic catgut; RR 1.41, 95% CI 0.91 to 2.20; perineal pain at 6 months: 9/158 [6%] with absorbable synthetic *v* 5/159 [3%] with chromic catgut; RR 1.81, 95% CI 0.62 to 5.28; dyspareunia at 6 months: 24/148 [16%] with absorbable synthetic *v* 19/147 [13%] with chromic catgut; RR 1.25, 95% CI 0.72 to 2.19). [43] The second subsequent RCT compared fast-absorbing synthetic (rapidly absorbed polyglactin 910) versus chromic catgut suture material for perineal repair. [44] 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 6–8 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 24–48 hours; the study did not assess perineal pain or carry out a power calculation based on analgesia use. The RCT found no significant difference in analgesia use at 24–48 hours and at 10–14 days following birth (908 women with sustained perineal laceration or episiotomy; 24–48 hours: 375/459 [82%] with fast-absorbing *v* 383/449 [85%] with chromic catgut; P = 0.14; 10–14 days: 81/430 [19%] with fast-absorbing *v* 88/416 [21%] with chromic catgut; difference reported as non-significant; P value and CI not reported). The RCT did not report on rates of perineal pain. [44] The third subsequent RCT (192 women) compared three types of suture material for repair of second-degree perineal lacerations or uncomplicated episiotomy (median or mediolateral): chromic catgut, standard polyglactin 910, and fast-absorbing polyglactin 910. [45] 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 36–48 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. The RCT found no significant difference in McGill pain scores between all three groups at 48 hours (P = 0.25), 6 weeks (P = 0.68) and 3 months (P = 0.40) after birth. However, the median use of analgesia up to 48 hours was significantly lower with fast-absorbing polyglactin 910 compared with standard polyglactin 910 (P less than 0.5). The RCT found that women in the fast-absorbing polyglactin 910 group reported significantly less dysparunia at 6 weeks postpartum compared with the chromic-catgut group (P less than 0.05). However, there was no significant difference reported between all three groups at 3 months (P = 0.84). No other figures were reported for these outcomes. [45]

Different types of absorbable synthetic suture:
We found no systematic review. We found three RCTs comparing rapidly absorbed polyglactin 910 versus standard polyglactin 910. [48] [49] [50] The first RCT did not report data in a format suitable for inclusion here (153 women in Northern Ireland). [48] The other two RCTs both found that rapidly absorbed sutures significantly reduced pain on walking in the 2 weeks postpartum compared with standard absorbable sutures (308 primiparous women in Demark: AR 46/138 [33%] with rapidly absorbed *v* 65/134 [49%] with standard; RR 0.69, 95% CI 0.51 to 0.92; [49] 1542 women in the UK: AR 259/769 [34%] with rapidly absorbed *v* 314/770 [41%] with standard; RR 0.83, 95% CI 0.73 to 0.94). [50] They found no significant difference between rapidly absorbed and standard absorbable sutures in overall perineal pain, pain on sitting, or dyspareunia. The third RCT also compared continuous versus interrupted sutures for all layers (see continuous sutures, p 13). [50] 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.

Harms:

Absorbable synthetic sutures versus catgut:
The systematic review [42] found that suture removal was significantly more common in the absorbable-synthetic group than in the catgut group up to 3 months after birth (2 RCTs, 2129 women: 191/1061 [18%] with absorbable synthetic *v* 108/1068 [10%] with chromic catgut; RR 1.78, 95% CI 1.44 to 2.20; NNH 13, 95% CI 8 to 22). [41] [47] The first subsequent RCT found that significantly more women reported problems with absorbable synthetic sutures at 6 weeks compared with catgut, although the difference was not significant (8/184 [4%] with absorbable synthetic *v* 3/184 [2%] with chromic catgut; OR 2.61, 95% CI 0.59 to 12.41). [43] The second and third subsequent RCTs did not report any adverse effects. [44] [45]

Different types of absorbable synthetic suture:
The first and second RCTs did not report any adverse effects. [48] [49] In the third RCT, rapidly absorbed sutures were removed significantly less frequently during the 3 months postpartum than standard absorbable sutures (22/769 [3%] with rapidly absorbed *v* 98/770 [13%] with standard; RR 0.23, 95% CI 0.14 to 0.35). [50]

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 FIRST- AND SECOND-DEGREE TEARS

Reducing perineal trauma
Continuous subcuticular suture for repair of perineal skin compared with interrupted sutures Continuous subcuticular suture for repair of perineal skin is more effective at reducing the proportion of women with pain at 10 days, but not at 3 months (high-quality evidence).

Loose continuous suture for the repair of all layers compared with interrupted sutures Loose continuous suture for repair of all layers seems more effective at reducing the proportion of women with pain at 10 days, but not at 3 months or 12 months, or at reducing dyspareunia at 3 months (moderate-quality evidence).

For GRADE evaluation of interventions for perineal care, see table, p 17 .

Benefits:

For repair of perineal skin:
We found one systematic review comparing continuous subcuticular versus interrupted sutures for perineal skin closure (search date 1999, 4 RCTs conducted in Europe and the UK, 1864 primiparous and multiparous women). [51] It found that continuous sutures significantly reduced the proportion of women with pain at up to 10 days compared with interrupted sutures (3 RCTs, 1588 women; 160/789 [20%] with continuous *v* 218/799 [27%] with interrupted; RR 0.75, 95% CI 0.63 to 0.89; NNT 14, 95% CI 10 to 34). It found no significant difference in the proportion of women with pain at 3 months (1 RCT, 961 women; 58/465 [13%] with continuous *v* 51/451 [11%] with interrupted; RR 1.10, 95% CI 0.77 to 1.57).

For repair of all layers:
We found no systematic review. We found two RCTs comparing a loose continuous suture for all layers versus interrupted sutures. [50] [52] The first RCT (1542 women with second-degree tears or episiotomy in the UK) also compared different types of absorbable sutures (see absorbable sutures, p 11). It was a large, robust trial, and its results are likely to be generalisable. It found that continuous sutures significantly reduced the proportion of women with pain at 10 days (204/770 [26%] with continuous *v* 338/769 [44%] with interrupted; OR 0.47, 95% CI 0.38 to 0.58) and found no significant difference in the proportion of women with pain at 3 months (70/751 [9%] with continuous *v* 95/741 [13%] with interrupted; OR 0.70, 95% CI 0.54 to 1.47) or at 12 months (31/700 [4%] with continuous *v* 47/689 [7%] with interrupted; OR 0.64, 95% CI 0.35 to 1.16). The RCT found no significant difference in rates of local dyspareunia at 3 months (98/581 [16.9%] with continuous *v* 102/593 [17.2%] with interrupted; OR 0.98, 95% CI 0.72 to 1.33) and at 12 months (94/658 [14.3%] with continuous *v* 91/667 [13.6%] with interrupted; OR 1.05, 95% CI 0.77 to 1.43). [50] The second, smaller RCT (212 primiparous women in Italy with a second-degree tear or episiotomy) was of good methodological quality, and used fast-absorbing polyglactin 910 suture material for perineal repair in both comparison groups. [52] The RCT found that continuous sutures significantly reduced the proportion of women with pain at 10 days compared with interrupted sutures (32/99 [32%] with continuous *v* 58/96 [60%] with interrupted; OR 0.32, 95% CI 0.19 to 0.57). However, the RCT found no significant difference between groups in rates of dyspareunia at 3 months (18/87 [16%] with continuous *v* 18/78 [14%] with interrupted; OR 0.87, 95% CI 0.42 to 1.82).

Harms:

For repair of perineal skin:
One RCT identified by the review found that suture removal was significantly more common up to 3 months in the interrupted-suture group than in the continuous group (166/451 [37%] with interrupted *v* 121/465 [26%] with continuous; RR 1.41, 95% CI 1.16 to 1.72). [51]

For repair of all layers:
The first RCT found that suture removal was significantly more common up to 3 months postpartum in the interrupted-suture group than in the continuous group (96/769 [12%] with interrupted *v* 24/770 [3%] with continuous; RR 4.01, 95% CI 2.59 to 6.19). [50] The second RCT gave no information on adverse effects. [52]

Comment: **Clinical guide:**
There is strong evidence of benefit when using a continuous subcuticular suture for perineal closure, and the benefit is increased if the continuous technique is used to repair all layers (vagina, perineal muscles, and skin) compared with interrupted methods.

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)**

Reducing perineal trauma
Overlap technique compared with end-to-end approximation for primary repair of external anal sphincter (third-degree tears) The overlap technique for primary repair of the external anal sphincter (third-degree tears) may be more effective 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).

For GRADE evaluation of interventions for perineal care, see table, p 17 .

Benefits: We found one systematic review comparing overlap versus end-to-end approximation for primary repair of the external anal sphincter after childbirth (third-degree obstetric tears) (search date 2006, 3 RCTs, 279 primiparous and muliparous women). [53] The three RCTs were of good methodological quality, but there was considerable heterogeneity in outcome measures, time points, and reported results. The systematic review found no significant difference in perineal pain, faecal urgency, or faecal incontinence scores at 3 months postpartum (2 RCTs, perineal pain: 22/84 [26%] with overlap *v* 27/88 [31%] with end-to-end; RR 0.85, 95% CI 0.54 to 1.34; 2 RCTs, faecal urgency: 20/84 [24%] with overlap *v* 31/88 [35%] with end-to-end; RR 0.68, 95% CI 0.42 to 1.09; 1 RCT, faecal incontinence: 2/29 [7%] with overlap *v* 9/31 [29%] with end-to-end; RR 0.24, 95% CI 0.06 to 1.01). However, the review found a significantly lower incidence in faecal urgency and anal incontinence scores at 12 months in the overlap group (1 RCT, faecal urgency: 1/27 [4%] with overlap *v* 8/25 [32%] with end-to-end; RR 0.12, 95% CI 0.02 to 0.86; anal incontinence scores: weighted mean difference –1.70, 95% CI –3.03 to –0.37).

Harms: One of the RCTs included in the review assessed the presence of residual defects of the external anal sphincter with ultrasound, and found no significant difference between groups. [54] Two thirds (74/112 [66%]) of women had a residual full-thickness defect in the external anal sphincter ultrasound after primary repair at 3 months postpartum (34/55 [62%] with overlap *v* 40/57 [70%] with end-to-end; RR 0.88, 95% CI 0.67 to 1.15).

Comment: **Clinical guide:**
There is weak evidence of benefit associated with the overlap technique for primary reapir 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

Water birth One systematic review added comparing immersion with no immersion during first and second stage of labour. [32] The review, which identified RCTs of variable methodological quality, found no evidence of benefit or harm for water birth in first or second stage of labour. Catergorisation: Unknown effectiveness.

Absorbable sutures in first- and second-degree tears One RCT was added comparing chromic catgut , standard polyglactin 910, and fast-absorbing polyglactin 910 sutures. [45] The RCT found no difference in perineal pain between suture types but found that fast-absorbing polyglactin 910 reduced analgesia use and dyspanuria. Categorisation unchanged (Beneficial).

Continuous sutures in first- and second-degree tears One RCT added comparing comparing a loose continuous suture for all layers versus interrupted sutures. [52] The RCT found that loose continuous technique for repair of all layers reduced perineal pain at 10 days, supporting the Beneficial categorisaion.

Different methods and materials for primary repair of obstetric anal sphincter injuries One systematic review added comparing overlap with end-to-end approximation for primary repair of the external anal sphincter after childbirth. [55] The RCT found no difference in perineal pain, faecal urgency or incontinence at 3 months, confirming the categorisation of Unknown effectiveness.

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Disclaimer

TABLE **GRADE evaluation of interventions for perineal care**

Important outcomes	Reducing perineal trauma, quality of life, adverse effects								
Number of 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?									
7 (4959) [15] [16]	Reducing perineal trauma	Restrictive use of episiotomy *v* routine episiotomy	4	–1	0	0	0	Moderate	Quality point deducted for weak methods in one RCT
1 (at least 407) [17] [18]	Reducing perineal trauma	Midline episiotomy *v* mediolateral episiotomy	4	–3	0	–1	0	Very low	Quality points deducted for quasi-randomisation, incomplete reporting of results, one report in abstract form only, and no intention-to-treat analysis. Directness point deducted for unclear outcome measurement
18 (at least 6162) [21] [22]	Reducing perineal trauma	Epidural analgesia *v* non-epidural analgesia	4	–2	0	0	0	Low	Quality points deducted for weak methods and use of surrogate outcome (instrumental deliveries)
3 (1912) [21]	Adverse effects	Epidural analgesia *v* non-epidural analgesia	4	–2	0	0	0	Low	Quality points deducted for weak methods and unclear clinical relevance of outcome
11 (3799) [23] [24] [25] [26]	Reducing perineal trauma	Vacuum extraction *v* forceps	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) [23] [24] [25] [26]	Adverse effects	Vacuum extraction *v* forceps	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 14 (at least 12,757) [27]	Reducing perineal trauma	Continuous support during labour *v* 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) [28]	Reducing perineal trauma	Upright position during delivery *v* supine or lithotomy positions	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) [28]	Adverse effects	Upright position during delivery *v* supine or lithotomy positions	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) [29]	Reducing perineal trauma	Passive descent in the second stage of labour *v* active pushing	4	–2	0	0	0	Low	Quality points deducted for incomplete reporting of results and use of surrogate outcome (instrumental deliveries)
5 (471) [30]	Reducing perineal trauma	Sustained breath holding (Valsalva) method of pushing in second stage of labour *v* exhalatory or spontaneous pushing	4	–2	0	–1	0	Very low	Quality points deducted for incomplete reporting, including unpublished trials, and inclusion of non-RCT data. Directness point deducted for limited outcomes measured
2 (6632) [2] [31]	Reducing perineal trauma	"hands-poised" method of delivery *v* "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" method of delivery *v* "hands-on" method of delivery	4	0	0	0	0	High	

Important outcomes	**Reducing perineal trauma, quality of life, adverse effects**								
Number of studies (participants)	**Outcome**	**Comparison**	**Type of evidence**	**Quality**	**Consistency**	**Directness**	**Effect size**	**GRADE**	**Comment**
8 (2939) [32]	Reducing perineal trauma	Immersion in water during first or second stage of labour *v* no immersion	4	–3	0	0	0	Very low	Quality points deducted for different interventions of water immersion in RCTs, crossover between groups, and poor methods
What are the effects of different methods and materials for primary repair of first- and second-degree tears and episiotomies?									
2 (2594) [38] [39]	Reducing perineal trauma	Non-suturing of perineal skin alone in first- and second-degree tears and episiotomies *v* conventional repair	4	–1	–1	0	0	Low	Quality point deducted for no intention-to-treat analysis. Consistency point deducted for conflicting results
2 (2594) [38] [39]	Adverse effects	Non-suturing of perineal skin alone in first- and second-degree tears and episiotomies *v* conventional repair	4	–1	–1	0	0	Low	Quality point deducted for no intention-to-treat analysis. Consistency point deducted for conflicting results
2 (152) [41] [40]	Reducing perineal trauma	Non-suturing of muscle and skin in first- and second-degree tears *v* suturing	4	–3	0	0	0	Very low	Quality points deducted for scarce data, incomplete reporting of results, and unclear outcome measurement
2 (152) [41] [40]	Adverse effects	Non-suturing of muscle and skin in first- and second-degree tears *v* suturing	4	–3	–1	0	0	Very low	Quality points deducted for scarce data, incomplete reporting of results, and unclear outcome measurement. Consistency point deducted for conflicting results
11 (at least 5172) [42] [43] [44] [45]	Reducing perineal trauma	Absorbable synthetic sutures *v* catgut	4	–3	–1	0	0	Very low	Quality points deducted for incomplete reporting of results, no blinding in some RCTs, and incomplete recruiting in one RCT. Consistency point deducted for conflicting results
2 (1811) [49] [50]	Reducing perineal trauma	Different types of absorbable synthetic suture *v* each other	4	–2	–1	0	0	Very low	Quality point deducted for no intention-to-treat analysis in one RCT and incomplete reporting of results. Consistency point deducted for different results for different outcomes
4 (1588) [51]	Reducing perineal trauma	Continuous subcuticular suture for repair of perineal skin *v* interrupted sutures	4	0	0	0	0	High	
2 (1751) [50] [52]	Reducing perineal trauma	Loose continuous suture for repair of all layers *v* interurupted sutures	4	–1	0	0	0	Moderate	Quality point deducted for no intention-to-treat analysis
What are the effects of different methods and materials for primary repair of obstetric anal sphincter injuries (third- and fourth-degree tears)?									
3 (279) [53]	Reducing perineal trauma	Overlap *v* end-to-end approximation for primary repair of external anal sphincter (third-degree tears)	4	–1	–1	0	0	Low	Quality point deducted for heterogeneity of outcome measurement. Consistency point deducted for different results for different outcomes

Type of evidence: 4 = RCT; 2 = Observational; 1 = Non-analytical/expert opinion. Consistency: similarity of results across studies
Directness: generalisability of population or outcomes
Effect size: based on relative risk or odds ratio