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Title Page

Title:Third- and Fourth-degree tears: a review of the current evidence for prevention and management

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Abstract

Background: Third- and fourth-degree tears are associated with significant pain, discomfort and impact on quality of life and intimate relationships. Australian women experience comparatively higher rates of third- and fourth-degree tears relative to countries of similar economic development.

Aims: We aimed to conduct a comprehensive review of the literature, published over the past 5 years, to identify the best ways to prevent and manage third- and fourth-degree perineal tears in Australian maternity centres.

Materials and Methods: We searched the literature using the Cochrane Database of Systematic Reviews, EMBASE, MEDLINE, Maternity and Infant Care Database and Google Scholar for articles published since 2013 using key search terms. A review of reviews was undertaken given the extensive amount of literature on this topic.

Results: Twenty-six systematic reviews were identified. The most common risk factors reported in the literature for third- and fourth-degree tears, included primiparity, mother's ethnicity, large for gestational age infants and certain interventions used in labour and birth, such as, instrumental deliveries. Preventative practices with varying degrees of effectiveness and often dependant on parity included: antenatal perineal massage, different maternal birthing positions, water births, warm compresses, protection of the perineum and episiotomy for instrumental births.

Conclusions: Third- and fourth-degree perineal tears are associated with immediate and long term implications for women and health systems. Evidence-based approaches can reduce the number of women who sustain a severe perineal tear and alleviate the associated disease burden for those who do.

Introduction

Severe perineal tears include third- and fourth-degree tears and may also be known as obstetric anal sphincter injuries (OASI). A third-degree tear is an injury to the perineum involving the anal sphincter, and a fourth-degree tear involves the anal sphincter and the anal mucosa (Box 1).³ Of all women who gave birth vaginally in Australia in 2016, 24% had an intact perineum and three percent had a third- or fourth- degree perineal tear.⁴ Whilst small numbers of woman are affected⁴; the rate is above the reported average for similar Organisation for Economic Cooperation and Development (OECD) countries and there is significant variation across the country.⁵ According to the OECD, between 2010 to 2015, rates of obstetric trauma in Australia during vaginal instrumental delivery (7.2 per 100 births) and vaginal delivery without instruments (2.5 per 100 births) were higher than the OECD all country average for both outcomes (5.7 and 1.5 respectively).⁶

Third- and fourth-degree perineal tears, if not recognised early and appropriately repaired, can have serious long-term consequences for women, including continued perineal pain, faecal and flatal incontinence, painful sexual intercourse, reduced quality of life and depression.³ Significant social and emotional implications can affect women's psychological well-being and family relationships.⁷ It is essential that 'at risk' women are recognised and that any women who sustain a third or fourth degree tear are identified and the injury promptly repaired with follow-up and debriefing.

****Box 1: Classification of perineal tears****

In 2017, the Australian Commission for Safety and Quality in Health Care analysed data on third- and fourth-degree perineal tears.⁵ The number of women experiencing severe perineal trauma across 301 local areas (Statistical Area 3) ranged from 6 to 71 per 1,000 vaginal births. There was also variation by jurisdiction; from 22 per 1,000 vaginal births in Western Australia (WA) to 45 in the Australian Capital Territory (ACT). Reasons for national variation is unclear but may be related to socioeconomic status, hospital practices and clinician skills. The higher rates observed in Australia may also reflect better diagnosis and reporting of perineal tears.⁸

Many Australian maternity services have taken initiatives to up-skill their own staff in perineal tear diagnosis and repair to reduce rates of severe perineal tears.⁸ Nationally, there are a number of initiatives working to reduce harm to women from severe perineal tears; such as the Quality Improvement Collaborative Project led by Women's Healthcare Australasia (WHA) and the NSW Clinical Excellence Commission.⁹

Given the current momentum to reduce the number of women sustaining third- and fourth-degree tears, the aim of this paper was to conduct a comprehensive review of the literature to examine the evidence for the prevention and management of third- and fourth-degree perineal tears

Materials and Methods

Due to the large amount of evidence in this area, we conducted a review of systematic reviews. Where systematic review level evidence was lacking on a particular intervention, we undertook a search of more recent randomised controlled trials or other evidence sources that were directly relevant, including cohort studies, case-controlled studies or qualitative studies.

We searched the literature using the Cochrane Database of Systematic Reviews, EMBASE, MEDLINE, Maternity and Infant Care Database and Google Scholar for articles published in English from 2013 to the 3rd October 2018, in order to capture the most recent research relevant to current clinical policy and practice. Key search terms (Box 2) were used to ensure relevant studies were not missed.

****Box 2: Key search terms****

Results

A total of 10,383 papers were identified (See Figure 1). Selection of articles focussed on systematic reviews of third- and fourth degree perineal tears. Results were narrowed to 2983 articles. Conference papers, abstracts, opinion pieces and duplicates were excluded. Titles and abstracts of papers were reviewed and excluded if they did not address the main overarching research question. Twenty-six systematic review papers were identified and examined in detail.

We undertook a summary of the main features of each publication, including the research purpose, study design, population, intervention and comparator, outcomes (Supplementary table 1). From this table, a summary and synthesis of the findings was developed using the time periods – i) Antenatal considerations to reduce severe perineal tears, (ii) Practices during labour and birth to reduce severe perineal tears and iii) Management and care during the immediate postpartum period.

****Figure 1: Selection of sources of evidence****

(i) Antenatal considerations to reduce severe perineal tears

Risk factors for severe perineal tears: Various risk factors are associated with an increased risk of third- and fourth-degree tears, and may be identified and discussed with women in the antenatal period.¹⁰ Many risk factors are non-modifiable, such as, primiparity, ethnicity and age and it is important to clarify this with women. Risk factors with a clear increased risk of severe perineal tears include:

- Infants with a higher birth weight¹⁰
- Episiotomy (all types)¹⁰ (OR 3.69, 95% CI 1.45-9.38, p<0.001, 15 studies, 590 642 women)

- Median episiotomy (OR 3.82, 95% CI, 1.96–7.42; P < 0.001, 9 studies, 460 584 women)
- Mediolateral episiotomy was not associated with an increased risk of third- and fourth-degree tears (OR 1.72, 95% CI, 0.81–3.65; P = 0.16, 10 studies, 541 368 women).
- Operative vaginal births (odds ratio 5.10, 95% CI, 3.33–7.83, p<0.001, 18 studies, 590 883 women)

Other risk factors which also have an association with an increased risk include¹⁰:

- Primiparity (odds ratio 3.24, 95% CI 2.20-4.76, p<0.001, 12 studies, 515 161 women)
- Asian ethnicity (in a western setting) (odds ratio 2.74, 95% CI 1.31-5.72, p<0.001, 4 studies, 111 687 women)
- Epidural anaesthesia (odds ratio 1.95, 95% CI 1.63–2.32, p<0.001, 11 studies, 66 044 women)
- Labour induction (odds ratio 1.08, 95% CI 1.02–1.14, p=0.01, 9 studies, 468 204 women)
- Labour augmentation (odds ratio 1.95, 95% CI 1.56-2.44, p<0.0001, 8 studies, 43 006 women)
- Persistent occiput posterior presentation (OR 3.09, 95% CI 1.81–5.29, p<0.001, 7 studies, 353 965 women)

Perineal massage: Antenatal perineal massage from approximately 35 weeks' gestation may reduce the incidence of perineal trauma requiring suturing (mainly episiotomies).^{11 12}

A systematic review found that women who performed perineal massage during pregnancy were 16% less likely to have an episiotomy (risk ratio 0.84; 95% CI 0.74 to 0.95, four trials, 2480 women).¹¹ This result was statistically significant in nulliparous women (risk ratio 0.83; 95% CI 0.73 to 0.95, four trials, 1988 women). There was no impact on the incidence of perineal tears. However, women who have had a previous vaginal birth and practised perineal massage during pregnancy were less likely to report perineal pain at three months postpartum (regardless of whether an episiotomy was performed) (risk ratio 0.45; 95% CI 0.24 to 0.87, one trial, 376 women).¹¹

There is little evidence regarding women's views about practising massage. One study which surveyed women found that most considered the practice acceptable and believed it assisted them to prepare for birth.¹³ Initially, women reported the practice to be uncomfortable and associated with a painful or burning sensation, however, these experiences decreased or were absent by the second or third week of massage. Almost 80% of women reported that they would massage again in a subsequent pregnancy and almost all (87%) would recommend it.¹³ A subsequent narrative review also found women who practised antenatal perineal massage felt more in control and positive about their own labour preparation.¹⁴

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Use of devices: Epi-No is a device which is designed to 'reduce the risk of perineal tearing and episiotomy during birth'.¹⁵ The woman inserts the device into her vagina during the latter part of pregnancy to theoretically stretch the perineum and therefore, reduce tearing at the time of vaginal birth. A meta-analysis found that Epi-No did not reduce episiotomy rates or reduce the incidence of severe perineal tears (risk ratio 1.31, 95% CI 0.72-2.37, $p=0.38$, two studies, 705 women).¹⁶ Women's views and acceptability were not reported.

Pelvic Floor Muscle Training: Antenatal pelvic floor muscle training does not appear to reduce rates of episiotomy or perineal laceration (odds ratio 0.96, 95% CI 0.66 to 1.40, six studies).¹⁷

(ii) Practices during labour and birth to reduce severe perineal tears

Maternal position at birth: Kneeling and all-fours positions to give birth appear to be more closely associated with an intact perineum compared to sitting, squatting and using a birth-stool.¹⁸ Associations between maternal position and degree of perineal tear were not found.¹⁸ Decreased rates of perineal trauma in kneeling and all-fours positions may be due to these positions generally enabling a slower birth of the baby's head due to less vigorous pushing. Water birth may have an increased risk of perineal trauma in nulliparous women but protective for multiparous women.¹⁸

Pushing practices during the second stage of labour: During the second stage of labour, spontaneous versus directed pushing does not result in a clear difference in rates of third or fourth degree tears (risk ratio 0.87; 95% CI 0.45 to 1.66, one study of 320 women) or episiotomy.¹⁹ Similarly, immediate versus delayed pushing in women with an epidural does not result in a clear difference.¹⁹ A review of women's satisfaction of different pushing techniques using a visual analogue scale found no differences in preference for pushing approaches.^{20 21}

'Hands-on' versus 'hands-off' (poised) during crowning of the baby's head: Overall 'hands-on' techniques appear to be associated with a higher incidence of episiotomy,²²⁻²⁵ postpartum pain^{24 25} and postpartum haemorrhage.²⁴ There is little evidence about acceptability of hands-on versus hands-off techniques to women. One systematic review did not find a clear difference in the incidence of third or fourth degree tears with hands-on or hands-off techniques (average RR 0.68, 95% CI 0.21 to 2.26, five studies, Tau² 0.92, I² 72%, 7317 women);²² whilst two other systematic reviews found a significant protective effect of hands-on techniques in reducing the risk of severe perineal trauma.^{23 25} One systematic review evaluated the 'Finnish intervention'. The Finnish intervention is a 'hands on' approach involving good communication, the Finnish manoeuvre (Box 3), visual examination and selected mediolateral episiotomy.²⁶ This review found that the Finnish intervention resulted in a reduction in OASI, however with a low level of evidence.²⁶ Given the overall lack of consistent descriptions and details to define hands-on techniques in the literature, it is difficult to determine the strength of associations with perineal trauma.²⁵

****Box 3: Manoeuvres****

Warm compresses may reduce the incidence of third and fourth degree perineal tears (average RR 0.46, 95% CI 0.27 to 0.79; 1799 women; four studies).²² One Australian trial included in the review found that women considered warm compresses to be highly acceptable, would recommend them to other women and reported less pain during the birth and on days 1 and 2 postpartum.²⁷

Intrapartum perineal massage may reduce the incidence of third- or fourth-degree tears (average RR 0.49, 95% CI 0.25 to 0.94, five studies, 2477 women)²² and increase the incidence of an intact perineum.²² Intrapartum perineal massage may also reduce the incidence of episiotomy, although heterogeneity of studies means that results should be interpreted with caution.²² We could not find evidence on whether this practice was acceptable to women.

Ritgen's manoeuvre (Box 3) was not found to have an effect on the incidence of an intact perineum or incidence of third- or fourth-degree tears (RR 1.24, 95% CI 0.78 to 1.96, 1423 women).²²

Manual rotation of the baby's head may be undertaken to rotate a baby's head from the occipito-posterior to occipito-anterior to reduce the diameter of the head and facilitate a vaginal birth without the use of instruments. A systematic review including one small pilot study of 30 women found no difference in the incidence of third or fourth degree perineal trauma between manual rotation and no manual rotation groups (risk ratio 0.20, 95% CI 0.01 to 3.85).²⁸ Acceptability to women was not reported.

Instrumental vaginal birth: A systematic review on assisted vaginal births found that severe perineal trauma was more likely to occur with a forceps delivery irrespective of whether an episiotomy had been performed.²⁹

Episiotomy: Routine episiotomy does not prevent third and fourth degree perineal tears.³⁰ However, selective use of episiotomy (type not specified) can result in a 30% reduction in the incidence of third and fourth degree perineal tears in women where an unassisted vaginal birth was anticipated (RR 0.70, 95% CI 0.52 to 0.94; 5375 women; eight RCTs).³⁰ In addition, use of mediolateral or lateral episiotomy in vacuum-assisted births in primiparous women may reduce the risk of severe perineal trauma.³¹ Most studies included in systematic reviews did not measure the angle of mediolateral episiotomies to assess whether they were accurately performed.³² One systematic review³² included a prospective study which found a 60° angle mediolateral episiotomy resulted in a decreased incidence of third- and fourth-degree tears.³³ An included prospective survey on episiotomy techniques found a 50% relative reduced risk of third-degree tears with every 6 degrees that the episiotomy was cut away from the perineal midline.³⁴

(iii) Management and care during the immediate postpartum period

Anal incontinence can be a long-term complication resulting from severe perineal trauma. Women who have had an episiotomy are 1.7 times more likely to have anal incontinence; whereas women who experience a third- or fourth-degree perineal tear are 2.7 times more likely to have anal incontinence.³⁵

Clinician assessment of perineal tears: Accurate and timely diagnosis of the degree of perineal trauma is critical to ensure that appropriate management can occur. A integrative systematic review into health professionals (doctors and midwives) knowledge and skills in assessment of perineal tears after childbirth found that both doctors and midwives have poor knowledge in perineal anatomy and lack education and training in clinical assessment and classification of perineal tears.³⁶ In addition, the majority of midwives and doctors considered their own knowledge and training to be poor. This infers that misclassification of perineal tears are likely to be common and may not be inadequately managed.³⁶ A Spanish study, examining the knowledge of perineal anatomy in trainee doctors and midwives, found that over 50% of doctors and midwives who stated they knew which muscles were torn actually named the muscles incorrectly.³⁷ A UK study investigated whether a one-day hands-on workshop in perineal repair for midwives and doctors could change clinical practice.³⁸ The course evaluation found an improvement in clinical knowledge and skills with 67-89% of participants correctly classifying perineal tears after the course.

Use of endoanal ultrasound to assess anal sphincter injuries: A systematic review of one trial of 752 women found some evidence to suggest that endoanal ultrasound performed prior to perineal repair may reduce the risk of severe anal incontinence at 12 months postpartum (risk ratio 0.48, 95% CI 0.24 to 0.97, one study, 684 women).³⁹ This may be due to the use of the ultrasound increasing the diagnosis of severe perineal trauma and therefore resulting in increased rates of primary repair and reduced incidence of anal incontinence. Increased incidence of perineal pain at three months postpartum was observed in women in the ultrasound group.

Obstetric anal sphincter injury repair techniques: A systematic review of six studies found that immediate primary overlap repair compared to end-to-end repair of obstetric anal sphincter injuries appears to be associated with a reduced risk of faecal urgency and anal incontinence symptoms at 12 months. However, at 36 months there appears to be no difference in symptoms between the two techniques but this meta-analysis only included two small trials.⁴⁰

Administration of antibiotics: There is insufficient evidence to determine whether routine administration of antibiotics before or immediately after incision or repair of episiotomy in women with an uncomplicated vaginal birth results in decreased episiotomy wound dehiscence or infection.⁴¹ A review identified one low quality quasi-RCT from a public hospital in Brazil with 73 women. Another review found that prophylactic antibiotics for third and fourth degree tears may reduce the incidence of wound infections at two-weeks postpartum.⁴² In the intervention group, the incidence of perineal wound infection was 8.2% versus 24.1% in the control group (risk ratio 0.34, 95% CI 0.12-0.96).⁴² However, this review was based on one small trial with very high loss to follow-up rates.

Secondary suturing of dehisced perineal wounds: There is insufficient evidence to determine whether secondary suturing of dehisced perineal wounds improves wound healing and dyspareunia. One systematic review⁴³ with two studies, described a trend towards improved wound healing in the re-sutured group, but it was not statistically significant.

Pain relief post repair: Compared to placebo, women with perineal pain in the early postpartum period are more likely to achieve adequate pain relief and less likely to need additional analgesia with non-steroidal anti-inflammatories (NSAIDS) at four and six hours postpartum.⁴⁴ Compared to paracetamol, NSAIDS are also more effective for adequate pain relief at 6 hours postpartum but no difference was seen at four hours postpartum nor was there a difference in the need for additional analgesia.⁴⁴ The results of the systematic review lack generalisability as breastfeeding women were excluded from the studies.

Women's experiences of severe perineal tears postpartum: There is very limited evidence on women's experiences and views in relation to the prevention and management of severe perineal trauma. One meta- ethnographic synthesis on women's experiences of sustaining a third or fourth degree tear during childbirth, found that women experienced social isolation and marginalisation due to associated symptoms and long-lasting impacts on their sense of identity.⁷ In Australia, a small qualitative study of women who had experienced severe perineal trauma during vaginal birth highlighted a disconnect between the expectations and reality of the birth experience and postpartum period; and this impacted upon their ability to mother their newborn child and the sexual relationship they had with their partner.⁷

Gaps in the literature:

This comprehensive review identified several gaps in the evidence base for the prevention and management of severe perineal tears. In particular, there is a need for high quality data about what aspects of OASIS treatment can minimise long-term symptoms. Adequately powered and efficiently designed RCTs are needed to better assess how certain practices impact on severe perineal tear outcomes (Box 4).

****Box 4. Areas needing RCT-level research****

Implications for practice

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Prevention and management of women with third- and fourth- degree tears is an important focus for maternity services in Australia. A number of the findings from this review have particular relevance for the Australian population. Being of Asian ethnicity is a recognised risk factor for perineal tears in Western countries⁴⁵ and with migration the Australian population has an increasing proportion of people with Asian heritage. Of all women who gave birth in Australia in 2016, 18% were born in an Asian country⁴⁶ compared with 13% in 2010⁴⁷ and 8.6% in 2006.⁴⁸

There may also be specific practices in Australia which require consideration (Box 5). The proportion of vaginal births has slightly reduced in the last decade potentially altering the skill-base of providers in relation to supporting perineal integrity. In 2016, two thirds of women (66%) had a vaginal birth compared with 69% in 2006⁴⁸. Forceps deliveries have also become more common increasing from 3.5% of women giving birth in 2006⁴⁸ to 5.2% of women giving birth in 2016.⁴⁶

Anecdotally, the practices around perineum support during second stage has changed in recent years. Historically, the Ritgen's manoeuvre was taught and practised widely, generally with the woman giving birth in the supine or lithotomy position. More recently, women have been giving birth upright, in water or in hands-and-knees positions. This has inevitably altered practices and a hands-off or poised approach has become more common. There is little research on the views and experiences of midwives or doctors in relation to practices around perineal integrity. One study of midwives from five hospitals in New South Wales,⁴⁹ showed that there had been a shift in teaching of hands-on to hands-poised. Almost two-thirds (63%) of midwives preferred hands-off or poised for a woman having a low-risk birth although 84% reported switching to hands-on if they felt there was a risk of impending severe perineal trauma.

Warm compresses to the perineum have increasingly gained traction in Australian maternity settings with many policies now recommending them. Australian research undertaken more than a decade ago showed a high degree of acceptability among midwives with many stating they would use them in the future. A recent systematic review of seven trials has further strengthened the evidence for warm compresses, finding that application of warm compresses during the second stage of labour are associated with a decreased risk of severe perineal trauma and episiotomy and increased incidence of intact perineum.⁵⁰

Ascertainment of perineal tears has also improved in recent years with an increased emphasis in many hospitals on diagnosis and classification. This may be accounting for the higher rates recorded in Australia compared to other OECD countries. However, this increased attention to diagnosis, classification and reporting may not be consistent across all hospital sectors or public/private facilities.

**** Box 5: Key recommendations****

Limitations

A review of reviews approach and selection of English language papers may have respectively excluded certain non-RCT study designs and prevention and management strategies in non-English speaking countries.

Conclusion

This review provides a broad summary of the current evidence base for preventing and managing severe perineal tears. Prevention is best, however, if a woman sustains a third- or fourth-degree tear, correct recognition and repair can alleviate the physical, social, emotional and economic implications and improve her quality of life.

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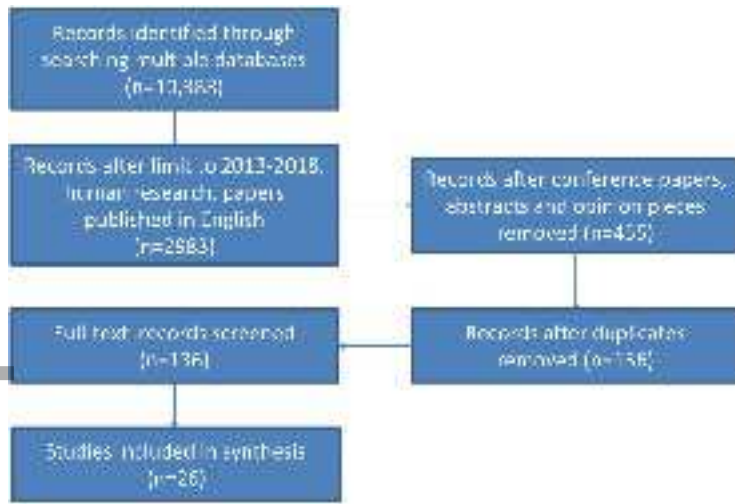
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