Non-surgical intrapartum practices for the prevention of severe perineal trauma: a systematic review protocol

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Review question/objective: The objective of this review is to determine the effectiveness of non-surgical intrapartum practices in reducing the incidence of severe perineal trauma (third and fourth degree tears) during childbirth.

Keywords Birth; perineal trauma; prevention; protect; technique

Background

Perineal trauma is commonly associated with childbirth, occurring either spontaneously or as a result of episiotomy.1,2 Severe perineal trauma (a third or fourth degree tear) greatly affects a woman’s ability to transition to motherhood and frequently results in both short and long term morbidity.3–8 Following severe perineal trauma, women have an increased likelihood of hemorrhage, hematoma, abscess or fistula formation.3 This can impact a woman’s ability to sleep, breastfeed and care for her baby, setting off the emotional and psychological sequelae evident in the literature.6,9,10 Herron-Marx et al.11 found that women who had experienced severe perineal trauma had reduced self-esteem and confidence and did not access services as they felt embarrassed and that they were to blame for their condition. Williams et al.9 found that women had unresolved emotional and psychological distress, particularly regarding planning for future pregnancies and resumption of sexual intercourse. In the long term, women may suffer perineal pain and pelvic floor dysfunction, which can result in dyspareunia and anal incontinence.4–8 While there is a higher prevalence of minor trauma, the outcomes of severe perineal trauma can be debilitating and long term.6,9,10

A broad approach to trauma

Past research on prevention has focused on all degrees of perineal trauma.12,13 A systematic review undertaken by Eason et al.12 examined the effects of interventions on all degrees of perineal trauma, from lacerations to fourth degree tears, including sutured perineums and episiotomies. Their meta-analysis of seven studies determined that the only intervention to significantly reduce severe perineal trauma was the use of vacuum extraction rather than forceps during assisted birth (risk difference [RD] 0.06; 95% confidence Interval [CI] 0.02–0.10). In a more recent systematic review and meta-analysis by Aasheim et al.,13 a high degree of heterogeneity secondary to differing classifications and groupings of outcomes was found. The need for a further systematic review and meta-analysis, focusing on severe perineal trauma, is clear.

Classification

Severe perineal trauma encompasses both third and fourth degree tears.14 A third degree tear involves all or part of the external anal sphincter and may include the internal sphincter.14 Third degree tears are classified further as either 3a, involving less than 50% of the external anal sphincter; 3b, involving more than 50% of the external anal sphincter; or 3c, where both the internal and external anal sphincters are torn.15 A fourth degree tear involves the complete anal sphincter and penetration of the rectal mucosa.14

Risk factors

There are differences in opinion on the antepartum and intrapartum risk factors for severe perineal
There is some evidence on Dahlen. There is sufficient evidence in Australia, rates differ between countries, including Australia. Several studies used logistic regression techniques to consider other potential confounding factors, based on covariates well documented in the literature. These included parity, ethnicity, mode of birth, epidural, and fetal gender. The study by Dahlen and Homer also accounted for the onset of labor, impacted shoulders, episiotomy and birth weight. Due to limitations of information on potential confounders, the study undertaken by Dahlen and Homer was unable to control for significant confounders, including shoulder dystocia and occipital posterior positions. The systematic review undertaken by Pergialiotis et al. neglected to provide information of its included studies confound and bias.

The association between severe perineal trauma and women from Asian descent is believed to be associated with an anatomically shorter perineal length, which is considered less likely to stretch. However there are conflicting findings from the literature as to whether Asian women have shorter perineal lengths in comparison to Caucasian women, or whether shorter perineums are associated with a higher risk of tearing. In any case, Asian women birthing in their home countries have comparable risks to Caucasian women in Australia, which suggests there are additional underlying influences. These may include: nutritional status changes, increased fetal birth weight and an increased risk of instrumental birth and episiotomy. However, the possibility of inadequate culturally sensitive care which fails to provide sufficient presence, support and effective communication cannot be disregarded. It is clear that Asian ethnicity is a major risk factor for severe tears and with the increasing migration of women from Asia to Australia, a clearer understanding of whether this association is due to their anatomy or current practice is needed.

Prevalence
Studies have estimated that 0.6% to 9% of women will experience severe perineal trauma after childbirth, with rates differing between countries and professional groups. In Australia, rates differ by State and Territory with Australia’s Mothers and Babies reporting rates of severe perineal trauma to be between 1.6% (Tasmania) and 4.1% (Australian Capital Territory). A significant rise in the incidence has been noted over the last three decades in several different countries, including Australia. While the true cause for this is unknown, some literature suggests it is due to an improvement in the clinical diagnosis of severe trauma. This research suggests that with correct recognition and classification of perineal trauma, the realistic rate of severe trauma would be between 11% and 27%. However, anecdotally, midwifery circles question whether the increase is due to anatomical, environmental, social or lifestyle factors, or whether it is due to the interventions introduced into intrapartum care.

Current practice
Research concerning the efficacy of practices to prevent perineal trauma varies in quality. Antepartum interventions evident in the literature include pelvic floor exercises, perineal massage and perineal dilators. There is sufficient evidence to warrant the provision of information on pelvic floor exercises and perineal massage; however the benefit of perineal dilators is less clear. Studies have found a reduction of perineal trauma and/or episiotomies with their use. To date, no studies have investigated the impact of regular distention of the perineum on long term pelvic floor function.

Past systematic reviews have focused on invasive intrapartum interventions such as instrumental birth and episiotomy. These reviews collectively support the use of vacuum assisted versus forceps assisted birth. Episiotomy was once practiced routinely as it was considered to be effective in preventing severe tears and therefore protective of pelvic floor...
function. Past systematic reviews have clearly recommended against its routine use, and recommending its use only to expedite birth to rescue the baby. Although limitations to the quality of a meta-analysis may occur, due to the solid evidence provided by past research, this review will not attempt to further investigate these practices.

The most debated intrapartum interventions are hand maneuvers which aim to decrease the diameter of the emerging head and slow its descent, allowing the perineal tissues to stretch. These include “hands on” or the flexion technique. This maneuver requires the accoucheur to place pressure on the emerging occiput to enhance flexion while the other hand “guards” the perineum. Supporters believe this prevents active extension until crowning, therefore the smallest diameter of the fetal head (the suboccipito-bregmatic) emerges. The Ritgen’s maneuver works in opposition to the “hands on” technique, enhancing extension. One hand places pressure on the fetal occiput while the other hand reaches for the fetal chin through the perineum. Supporters of the “hands off” or “hands poised” technique are ready to place pressure on the fetal head if rapid expulsion occurs, although they do not touch the head or perineum otherwise. They argue that extension occurs before the fetal head reaches the perineum and is a necessary mechanism of birth. They additionally contest that emphasized extension results in a larger diameter (the occipito-frontal) to emerge, thereby placing additional pressure on the perineum.

Warm compresses held to the perineum during the pushing stage are believed to increase blood supply by vasodilation, provide comfort and encourage tissue flexibility. Perineal massage, which involves the insertion of two fingers into the vagina and undertaking firm slow even strokes to stretch the perineum, is believed to improve local circulation, and enhance relaxation and stretching of the tissues. These interventions have been supported by past reviews but are frequently overlooked in current policy and practice. Pushing techniques, either coached or spontaneous, maternal birth position and water birth are additionally considered for their effects on perineal trauma. No recent systematic reviews on intrapartum practices for the prevention of severe perineal trauma have considered the effects of these interventions and therefore they will be the focal point of this research.

Evidence While there are numerous Level I and Level II studies on practices for the prevention of perineal trauma, their quality varies. Significant performance and detection bias is evident throughout this literature, as blinding is rarely possible for clinicians or women. What constitutes the comparison, “standard care”, is likely to differ from woman to woman and clinician to clinician, and is seldom reported, leaving room for confounding.

A large RCT (n = 5471) known as the “HOOP” trial, undertaken by McClandish et al. compared two hand maneuvers, “hands on” versus “hands poised”. The authors reported the “hands poised” maneuver was associated with an increased risk of manual removal of the placenta (RR 1.69; 99% CI 1.02–2.78) and mild pain at 10 days postpartum (RR 1.10; 95% CI 1.01–1.18), and a decreased risk of episiotomy (RR 0.79; 99% CI 0.65–0.96). McClandish et al. also found that women in the “hands on” group had a 22.5% decreased chance of a third or fourth degree tear. As the study did not investigate differences in outcomes, this finding was labelled not statistically significant. Although the primary focus of the research was perineal pain, readers have erroneously taken it to mean perineal trauma.

The systematic review by Eason et al. examined the effects of techniques purported to prevent perineal trauma during childbirth. The study reported positive effects for vacuum birth (RD 0.06; 95% CI 0.02–0.10, seven studies) versus forceps birth, antenatal perineal massage for primiparous women (RD 0.08; 95% CI 0.04–0.12, three studies) and upright birth positions (RD 0.02; 95% CI 0.05–0.09, seven studies). The study also found a decreased likelihood of operative birth and perineal trauma with Jacuzzi use, although this finding was taken from a cohort study included for descriptive purposes only. The study methodology was questionable and results effected by significant heterogeneity, bias and confounding. The Aasheim et al. review found that warm compresses (RR 0.48; 95% CI 0.28–0.84, two trials) and perineal massage (RR 0.52; 95% CI 0.29–0.94, two studies) were associated with a decreased chance of severe perineal trauma. Additionally, with the “hands off” technique, the perineum was associated with a decreased chance of episiotomy (RR 0.69; 95% CI 0.50–0.96, two trials). While the study methodology was
strong, significant bias and clinical heterogeneity were evident. An earlier systematic review warranted the restrictive use of episiotomy and highlighted the need for further research regarding maternal birth position, style of pushing and antenatal perineal massage. The review was descriptive only, providing no meta-analysis of data.

Current policies
The lack of firm evidence has resulted in the development of inconsistent policies and guidelines. The Royal College of Obstetricians and Gynaecologists (RCOG) states there is conflicting evidence regarding the protective effects of episiotomy and supports a mediolateral incision when episiotomy is indicated. They further their recommendations to encourage a “hands on” approach to receiving the baby and acknowledge the protective effects of warm compresses. The Royal Australian and New Zealand College of Obstetricians and Gynaecologists recommends that all women give birth in a position where they can access treatment in the event of sudden unexpected compromise and should not birth in water. They additionally support a “hands on” approach to receiving the baby and discourage liberal episiotomy practice, but recommend consideration of its implementation if a high likelihood of severe laceration exists, somewhat dissimilar to the evidence. Contrary to this, the National Institute for Health and Care Excellence (2014) in the United Kingdom recommends discouraging women from a supine or semi-supine position for birth, but rather choosing a position based on their comfort. They support spontaneous pushing and only consider coaching if pushing would benefit from encouragement or if the woman requests it. They rule out lidocaine spray, perineal massage, and ambivalent regarding hand maneuvers, stating either “hands on” or “hands poised” is acceptable. This is additionally supported by the United Kingdom’s Royal College of Midwives (RCM) (2007). The RCM’s Evidence Based Guidelines for Midwifery-Led Care in Labour: Care of the Perineum and RCOG (2015) are the only guidelines that encourage the use of warm compresses to the perineum.

A new review
The rising rate of severe perineal trauma, whether due to improved clinical diagnosis, the migration of “at risk” ethnic groups and the less than beneficial practice are issues deserving of investigation. The current lack of strong evidence enables clinicians to view and implement findings dependent on their personal choice, belief and model of care. Intrapartum interventions require scrutiny before their introduction is warranted. This protocol has highlighted the need for further research into non-surgical interventions, such as maternal birth position, warm compresses, perineal massage, hand maneuvers, style of pushing and water birth. A thorough search was undertaken on the Cochrane Database for Systematic Reviews and the Joanna Briggs Institute Database of Systematic Reviews and Implementation Reports, as well as Google Scholar. There is currently no recent systematic review that exists or is underway focusing on non-surgical interventions, with severe perineal trauma as the primary focus. Past reviews of a similar nature, for example, Aasheim et al. only sought randomized controlled trials and therefore have not been able to address the aforementioned non-invasive interventions. Therefore a systematic review of all relevant studies using strong and appropriate methods is required to address the confusion around non-surgical intrapartum practices for the prevention of severe perineal trauma. A consensus must be reached for both directions of practice and for the long term wellbeing of childbearing women.

Inclusion criteria
Types of participants
Studies that comprise samples of primigravid and multigravid women pregnant with a singleton fetus, ≥36 weeks gestation, in any cephalic presentation and planning a vaginal birth, will be considered for inclusion. Participants with a multiple birth, premature birth, planning a cesarean section and/or with a non-cephalic presentation will be excluded from this review.

Types of interventions
The review will consider studies that evaluate prevention techniques used during the intrapartum period, including the flexion/hands on technique, “hands off”/“hands poised” technique, perineal massage, warm compresses, maternal birth position, water birth; and pushing techniques, either coached or spontaneous. Meta-analyses (where possible) will be conducted separately for each intervention,
drawing on studies with comparable intervention and control groups, for example, those that compare the effects of “hands on” versus “hands off” techniques, or those that compare water birth versus land birth on perineal outcomes.

Outcomes
This review will include studies which focus on severe perineal trauma as the primary outcome. No secondary outcomes will be investigated. Severe perineal trauma should be identified by visual inspection of the perineum by a suitably qualified professional and then defined as the presence of a: Third degree tear: a perineal tear involving the four-chette, perineal skin, vaginal mucousal membrane, perineal fascia and muscle, and includes the internal and/or external anal sphincter.19 Fourth degree tear: a perineal tear involving the anatomy as stated above and includes penetration of the rectal mucousa.19 Severe perineal trauma: any and all classifications of third and fourth degree tears.14

The Royal College of Obstetricians and Gynaecologists14 introduces more specific third degree tear definitions introduced by Sultan40 in 1999. These are:
3A degree tear: a perineal tear involving <50% of the external anal sphincter.
3B degree tear: a perineal tear involving >50% of the external anal sphincter.
3C degree tear: a perineal tear involving the entire external sphincter and includes the internal anal sphincter.

The authors are aware that studies found may have differing definitions of perineal trauma due to changes in the way trauma has been classified over time. The authors will give careful consideration to the limitations that may occur during analysis as a result of these differing perineal trauma definitions.

Types of studies
This review will consider studies that provide complete reports of severe perineal trauma as an outcome, focusing on randomized controlled trials. The search will seek both experimental and observational study designs. However, observational studies will only be considered for inclusion in the absolute absence of randomized controlled trials. The authors are aware of the stronger likelihood of bias and confounding, such as reporting and selection bias, with non-randomized study designs. Studies will undergo extensive critique using the standardized critical appraisal tools relevant to each study design. Those found to be heavily affected by bias will be excluded from inclusion. Study designs will be analyzed separately and findings from non-randomized studies will be referred to with caution. Consideration will be given to the higher likelihood of potential confounders and heterogeneity with non-randomized study designs.

Search strategy
The search strategy aims to find both published and unpublished studies. A three-step search strategy will be used in this review. An initial limited search of MEDLINE and CINAHL will be undertaken followed by an analysis of the text words contained in the title and abstract, and of the index terms used to describe the article. A second search using all identified keywords and index terms will then be undertaken across all included databases. Thirdly, the reference list of all identified reports and articles will be searched for additional studies. The authors are aware of significant studies that were undertaken in 1995. As the practice of perineal interventions have not changed over time, studies published in English after 1995 will be considered for inclusion.

The databases to be searched include: CINAHL, MEDLINE, PubMed Clinical Queries, Scopus and Health Source Nursing.

The search for unpublished studies will include Google Advanced, ProQuest and Trove searches.

The initial keywords to be used include: severe; trauma; tear; injury; genital tract; perineum; birth; intrapartum; second stage; protect*; prevent*; technique; support; water birth*; waterbirth*; birth in water; immersion; warm compress*; warm pack; birth*; maternal position; hand; hands on; hands poised; hands off; flexion; coached; valsala; spontaneous; pushing; massage; randomized controlled trial; cohort.

Assessment of methodological quality
Papers selected for retrieval will be assessed by three independent reviewers for methodological validity prior to inclusion in the review using standardized
critical appraisal instruments from the Joanna Briggs Institute Meta-Analysis of Statistics Assessment and Review Instrument (JBI-MAStARI) (Appendix I). A “majority rules” approach will apply to select the studies to be included in the review, and any disagreements that arise between the reviewers will be resolved through discussion, and by a fourth review.

Data extraction
Data will be extracted from papers included in the review using the standardised data extraction tool from JBI-MAStARI (Appendix II), by an independent data extractor to minimise errors. The data extracted will include specific details about the interventions, populations, study methods and outcomes of significance to the review question and specific objectives.

Data synthesis
Data will, where possible, be pooled in statistical meta-analysis using JBI-MAStARI. All results will be subject to double data entry. Effect sizes will be expressed as odds ratios and their 95% confidence intervals will be calculated for analysis. Heterogeneity will be assessed statistically using the standard Chi-square test. Heterogeneity will additionally be explored using subgroup analyses based on the different study designs that may be identified for inclusion in this review. Where statistical pooling is not possible the findings will be presented in narrative form including tables and figures to aid in data presentation where appropriate.

References


34. Cluett ER, Burns E. Immersion in water in labour and birth. Cochrane Database Of Systematic Reviews 2009; (2).


Appendix I: Appraisal instruments

MASTARI appraisal instrument

**JBI Critical Appraisal Checklist for Randomised Control / Pseudo-randomised Trial**

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
<th>Unclear</th>
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<td>1. Was the assignment to treatment groups truly random?</td>
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<td>4. Were the outcomes of people who withdrew described and included in</td>
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<td>the analysis?</td>
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<td>5. Were those assessing outcomes blind to the treatment allocation?</td>
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<td>6. Were the control and treatment groups comparable at entry?</td>
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<td>7. Were groups treated identically other than for the named interventions</td>
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<td>8. Were outcomes measured in the same way for all groups?</td>
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<td>9. Were outcomes measured in a reliable way?</td>
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Overall appraisal: Include [ ] Exclude [ ] Seek further info. [ ]

Comments (Including reason for exclusion)

________________________________________________________________________

________________________________________________________________________
JBI Critical Appraisal Checklist for Comparable Cohort/ Case Control

Reviewer _______________  Date ____________________
Author _______________  Year ______  Record Number ______

1. Is sample representative of patients in the population as a whole?  
   Y ☐  N ☐  U ☐  NA ☐

2. Are the patients at a similar point in the course of their condition/illness?  
   Y ☐  N ☐  U ☐  NA ☐

3. Has bias been minimised in relation to selection of cases and of controls?  
   Y ☐  N ☐  U ☐  NA ☐

4. Are confounding factors identified and strategies to deal with them stated?  
   Y ☐  N ☐  U ☐  NA ☐

5. Are outcomes assessed using objective criteria?  
   Y ☐  N ☐  U ☐  NA ☐

6. Was follow up carried out over a sufficient time period?  
   Y ☐  N ☐  U ☐  NA ☐

7. Were the outcomes of people who withdrew described and included in the analysis?  
   Y ☐  N ☐  U ☐  NA ☐

8. Were outcomes measured in a reliable way?  
   Y ☐  N ☐  U ☐  NA ☐

9. Was appropriate statistical analysis used?  
   Y ☐  N ☐  U ☐  NA ☐

Overall appraisal:  Include ☐  Exclude ☐  Seek further info. ☐

Comments (Including reason for exclusion)

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Appendix II: Data extraction instruments

**MAStARI data extraction instrument**

**JBI Data Extraction Form for Experimental / Observational Studies**

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**Study Method**

- RCT
- Quasi-RCT
- Longitudinal
- Retrospective
- Observational
- Other

**Participants**

- Setting
- Population

**Sample size**

| Group A | Group B |

**Interventions**

- Intervention A
- Intervention B

**Authors Conclusions:**

**Reviewers Conclusions:**
### Study results

#### Dichotomous data

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#### Continuous data

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