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Perineal injury associated with hands on/hands poised and directed/undirected pushing: A retrospective cross-sectional study of non-operative vaginal births, 2011–2016

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ABSTRACT

Background: Clinicians hand position and advised pushing techniques may impact on rates of perineal injury.
Objective: To assess the association of four techniques used in management of second stage with risk of moderate and severe perineal injury.
Design: Retrospective cross-sectional study.
Setting: A metropolitan maternity hospital and a private maternity hospital in Brisbane, Australia.
Participants: Term women with singleton, cephalic presentation experiencing a non-operative vaginal birth from January 2011 to December 2016.
Methods: The research sites perinatal database recorded data on clinicians approach to instructing women during second stage and hand position at birth. Women were identified from matching the inclusion criteria (n = 26,393) then grouped based on combinations of hands-on, hand- poised, directed and undirected pushing. The associations with perineal injury were estimated using odds ratios obtained by multivariate analysis. Primary outcomes were the risk of moderate and severe perineal injury. The significance was set at 0.001.
Results: In Nulliparous women there was no difference in the risk of moderate or severe perineal injury between the different techniques. In multiparous women the use of a hands-on/directed approach was associated with a significant increase in the risk of moderate (AOR 1.18, 95% CI 1.10–1.27, $p < 0.001$) and severe perineal injury (AOR 1.50, 95% CI 1.20–1.88, $p < 0.001$) compared to hands-poised/undirected.
Conclusions: A hands poised/undirected approach could be utilised in strategies for the prevention of moderate and severe perineal injury.

What is already known about the topic?

- Evidence regarding the effectiveness of either a hands-on the perineum/vertex or a hands-poised technique remains contradictory.
- Cochrane systematic reviews of randomized controlled trials of effects either hand position or directed/undirected pushing have not demonstrated any benefit of one technique over the other in terms of preventing perineal injury.
- Some non-randomized trials report reductions in severe perineal injury when a package of care including a hands-on approach is used.

What this paper adds

- In nulliparous women differences hand position and pushing technique at birth are not associated with any difference in rates of perineal injury.
- In multiparous women a hands-poised approach combined with undirected pushing may be associated with a lower risk of perineal injury and episiotomy use compared to other technique combinations.
- The hands-on component of care packages designed to reduce severe perineal injury may not be a major contributing factor in reducing risk of severe perineal injury.

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1. Introduction

In countries such as Australia and the United Kingdom some degree of perineal trauma occurs in up to 85% of all vaginal births (Australian Institue of Health and Welfare, 2015; Smith et al., 2013). The majority of these tears occur spontaneously involving the vaginal tissue, underlying perineal muscles and skin (2nd degree) or as episiotomies involving the same anatomical structures (Hauck et al., 2015). Severe perineal injury involving the anal sphincter (3rd degree) or anal epithelium (4th degree), occurs in up to 6% of all vaginal births (Ampt et al., 2015; Ismail and Puyk, 2014) with approximately half resulting in medium to long term health implications such as bowel incontinence (Smith et al., 2013; Suto et al., 2015). Various strategies that can be used by clinicians to reduce the incidence of perineal trauma have been debated in the literature since the 19th century (Goodell, 1871).

A frequently discussed aspect of perineal management is whether pressure should be applied to the advancing vertex and/or the stretching perineum (hands-on) or no/minimal touch unless it is assessed that rapid birth of the head may occur (hands-poised). Systematic reviews of trials comparing a hands-on to a hands-poised approach have reported either no effect (Aasheim et al., 2017) or favoured the hands-on approach (Bulchandani et al., 2015) however, in the latter the effect was only present in the reported non-randomized trials. Other approaches used during birth that may impact on perineal outcomes include either verbally instructing the woman to push with each contraction with or without Valsalva (directed) or allowing the woman to respond to her own expulsive urges (undirected). Again systematic reviews have either reported no effect, (de Tayrac and Letouzey, 2016; Lemos et al., 2017) or favoured the undirected approach (Prins et al., 2011). Complicating factors in randomized controlled trials exploring these separate techniques are that each approach is unlikely to occur in isolation, with combinations of methods used and high rates of crossover between groups, due to strong clinician preference for one method over the other (Hamilton, 2016, McCandlish et al., 1998). This lack of trial fidelity in either or both the treatment and control arms may lead to confounding and threaten the reliability of results (Bannister-Tyrrell et al., 2015). Observational studies may provide useful data when in randomized controlled trials are likely to be affected by high rates of confounding resulting from entrenched practice (Hirayama et al., 2012).

1.1. Aim

The aim of this study was to examine the effects of combinations of second stage techniques (hands-on/hands-poised and directed/undirected pushing) on rates of moderate (2nd degree) perineal injury and severe (3rd and 4th degree) perineal injury using data from 63,539 women giving birth between 2011 and 2016.

2. Methods

A retrospective study design was used to determine rates of moderate and severe perineal trauma associated with clinicians hand position and expulsive directions given to the labouring woman during second stage labour and birth.

2.1. Participants and setting

The study population is comprised of women who had vaginal births at two maternity hospitals in Brisbane, Australia between 2011 and 2016. One hospital is a major referral centre providing maternity services to both public and privately insured women with approximately 10,000 births per year (5000 public; 5000 private). The second hospital is a private obstetric unit with approximately 400 births annually.

2.2. Data sources

Data were collected from the research sites perinatal database which contains information related to all births from both hospitals. We extracted de-identified data from January 2011 to December 2016. In 2011 a number of questions were added to the database regarding the hand position of the attending clinician during the birth of the fetal head and the directions provided to the woman with regards to pushing during the second stage. This data was self-reported by the attending midwife after the birth. These consisted of: “No/minimal touch”, where pressure was only applied to the vertex when judged to be advancing rapidly and likely to tear the perineum, referred to in this study as ‘hands-poised’. This is consistent with definitions from previous studies (Mayerhofer et al., 2002; McCandlish et al., 1998). Other options were: “hands-on controlling the head and/or promoting flexion”; “controlling the head and guarding of the perineum”; “guarding of the perineum only” collectively referred to in this study as ‘hands-on’. The descriptions of the three hands-on options are similar to those presented in a Delphi study by Ismail et al. (2015) that reported the view of a panel of expert clinicians that all three manoeuvres constitute an hands-on approach either singularly, or in combination. A similar description of the hands-on technique is provided in the Cochrane review by Aasheim et al. (2017). It may be that clinicians use one or more of the hands-on techniques whilst managing a birth and the data recorded reflects the hands-on technique mostly used during the birth. We also considered that clinicians using either of the hands-on manoeuvres were adopting a similar practice approach to managing the birth. The difference between the two groups (hands-poised versus hands -on) being that in hands-on, pressure (firm enough to promote flexion) is routinely applied to the fetal head and/or perineum whereas, with hands-poised only light pressure is applied to the vertex when considered necessary by the clinician and no pressure is applied to the perineum. Questions regarding advice in second stage were either “listen to and respond to her body’s urges” (undirected pushing) or “actively encouraged each contraction but not Valsalva” and “actively encouraged each contraction and directed to Valsalva” (directed pushing). The only difference between the two directed pushing options was the verbal instruction to the woman to hold her breath during pushing (Valsalva) versus no clear instruction to breath hold. We considered that in either case it would be likely that, even though a woman may instinctively hold her breath briefly when pushing, she would hold that breath longer than normal when following instructions to push and hence we grouped these together. The data was then sorted into four categories, hands-poised/undirected, hands-poised/directed, hands-on/directed, and hands-on/undirected.

2.3. Exclusions and covariates

The final analytical sample was achieved after a series of exclusions (Fig. 1). These exclusions included: cesarean section, gestation < 37 weeks, twin births, malpresentations (e.g. breech, brow, face). Data regarding hands-on/hands-poised or directed/undirected was not recorded for babies born outside of the birth suite or operating theatre (e.g. homebirths) or operative (vacuum and forceps) births so these were excluded. Only data from (non-operative) vaginal births were analysed. Based on existing literature the following covariates were considered as confounders: birthweight, head circumference, gestation, maternal age, body mass index, insurance status, Asian ethnicity, nulliparity, labour induction, oxytocic augmentation, increased second stage, episiotomy, first vaginal birth after cesarean section, shoulder dystocia, epidural and recumbent birth position (Ampt et al., 2013; Baghestan et al., 2010; Garretto et al., 2016; Gurol-Urganci et al., 2013; Jango et al., 2014; Loewenberg-Weisband et al., 2014).

Ethnicity was grouped according to the Australian Bureau of Statistics Standard Australian Classification of Countries (Australian Bureau of Statistics, 2016). Increased second stage was defined as