

# Does water immersion during labour and birth increase the risk of severe perineal trauma? A critical review

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## ORIGINAL

### Introduction

Water immersion has been found to have many benefits, including decreased need for epidurals, shorter first stage of labour, fewer instrumental births and increased maternal satisfaction (Cluett & Burns 2009). Albers *et al* (2007) found that perineal trauma is sustained by 85% of women during childbirth, but does water immersion in labour increase the risk of women sustaining third and fourth degree perineal tears?

In humans, the skin covers all the bodily structures and has many functions, from preventing infection and excreting waste products, to performing endocrine functions such as absorbing vitamin D, regulating temperature, providing sensations and protecting the body (Grice & Segre 2011). The skin is made up of two layers: the dermis and the epidermis. Skin wrinkles when it has been immersed in water for long periods of time. One existing theory is that the skin absorbs moisture through osmosis, which would support a theory of increasing perineal trauma when immersed in water, as the skin is saturated. This theory has since been discredited. Instead skin wrinkling is caused by the sympathetic nervous system and creates peripheral resistance, therefore creating skin wrinkling in hands and feet. The

epidermis is a waterproof membrane coating the skin all over the body which prevents any water or fluids entering the body through the skin. Therefore there is no physiological reasons for water immersion to increase the risk of severe perineal trauma through saturation of the skin (Wilder-Smith 2003).

### Review of the literature

Cluett & Burns (2009) undertook a Cochrane review on water immersion in childbirth. Of the 12 studies included in the review there were five randomised controlled trials which looked into the incidences of perineal trauma and found no statistical differences in perineal trauma rates in immersion in water during labour or birth. One limitation of this review is that the randomised controlled trials reviewed had small



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numbers of participants in each study. van Limbeek *et al* (2016) undertook a systematic review of severe perineal trauma and found that water immersion in labour was not a risk factor, but that there are multiple risk factors which increase the incidences of severe perineal trauma. These include: instrumental deliveries, episiotomies, ethnicity, prolonged second stages, shoulder dystocia, inductions or augmentations of labour, maternal age, maternal nutrition status, fetal malpositions (especially direct occipito posterior), birth weight and fetal gender.

With water immersion in labour, observational and cross-sectional cohort studies are more prevalent as it gives women choices and more autonomy regarding their care. Although the validity of such studies is less than with randomised controlled trials, there are larger numbers of participants and data available to analyse (Cartwright 2010). These studies can also be more ethical than randomised controlled trials because women have more control over their birthing choices. Dahlen *et al* (2013) undertook a descriptive cross-sectional study of births occurring in a birth centre in Sydney between 1996 and 2008. The authors found that women who chose the birthing pool were less likely to sustain severe perineal trauma and less likely to sustain a postpartum haemorrhage than those women who used a birthing stool on dry land.

Lower episiotomy rates have been cited by many studies comparing water immersion and non-water immersion groups (Mollamahmutoglu *et al* 2012). Henderson *et al* (2014), over a period of three years, observed 2505 women in labour using a birthing pool in obstetric-led units, 114 women in labour using water immersion not in an obstetric-led unit and 459 who did not use water immersion at all in an obstetric unit. Henderson *et al* reported significantly lower episiotomy rates in nulliparous women who used water immersion for labour and birth. They did however find that second degree tear rates increased in nulliparous women who had water immersion. There was no difference in extensive perineal lacerations between the women who did or did not have water immersion. Menakaya *et al* (2013) also found, using a retrospective audit, that women who had water immersion in labour had no episiotomies in comparison to the 33 women who did not use water immersion in a study of 438 women.

There may be an increased risk of minor perineal trauma and second degree perineal tears with the use of water immersion in labour and birth.

Mollamahmutoglu *et al* (2012) undertook a prospective clinical trial and compared multiple outcomes of 207 women having water births, 204 women having 'conventional vaginal births' and 191 women having epidurals. Whilst there were no statistical differences in severe perineal trauma sustained between all three groups, the incidences of minor perineal lacerations were higher in the water

birth group. These findings are supported by Suto *et al* (2015) who undertook a retrospective descriptive study of women birthing in midwife-led centres in Japan. Suto found that water immersion increased the incidence of second degree lacerations in multiparous women. This is further supported by the findings of Bovbjerg (2016) who found that genital trauma was 11% higher in women using water immersion than in those that did not. This study however included all trauma including labial tears, first and second degree tears and did not comment specifically on severe perineal trauma rates, though it appears that third and fourth degree tear rates were lower in the water immersion groups than the non-water immersion groups. From the results table included in the study, 0.6% sustained a third of fourth degree tear in the non-water immersion group, compared with 0.4% of those women who achieved a water birth. The authors also mention in their conclusions that their results conflict with previous researchers' findings that perineal trauma is reduced with water immersion in labour.

An increase in minor perineal lacerations and genital trauma could be explained by the physiology of the skin when dehydration occurs. Long periods of water immersion can cause the top layer of skin to lose moisture and become dehydrated. Also, the physiological effects of labour upon the woman's body can cause a woman to become dehydrated. Symptoms such as tiredness, pain, nausea and vomiting can prevent labouring women from having adequate oral intake. Therefore this increases the risks of dehydration which could cause further dryness of the skin. This could explain why water immersion increases the risks of minor perineal and genital tract lacerations because the skin is more dehydrated at the time of birth than in those women who choose not to have water immersion (Williams *et al* 2007, Popkin *et al* 2011).

### Conclusion

These studies conclude that water immersion does not prevent women from sustaining perineal trauma and potentially increases the risk of minor lacerations for all women and second degree perineal lacerations for multiparous women. However, immersion in water does decrease the risk for episiotomies in labour especially for nulliparous women. Considering 85% of women will sustain some degree of perineal trauma in childbirth, the benefits of using water immersion outweigh the risks of minor perineal trauma. There is no statistical difference between women who choose water immersion for labour and birth and those who do not, in terms of sustaining severe perineal trauma. Further research is needed to determine if the length of time immersed in water and water temperature have differing effects on perineal trauma rates.

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