



## ORIGINAL RESEARCH – QUANTITATIVE

## Length of perineal pain relief after ice pack application: A quasi-experimental study



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## ABSTRACT

**Introduction:** Ice pack is effective for alleviating postpartum perineal pain in primiparous women while multiparous women's levels of perineal pain appear to be poorly explored. Ice pack is a low-cost non-invasive localised treatment that can be used with no impact on breastfeeding. However, how long perineal analgesia persists after applying an ice pack is still unknown.

**Objective:** To evaluate if perineal analgesia is maintained up to 2 h after applying an ice pack to the perineum for 20 min.

**Method:** A quasi-experimental study, using a pre and post-test design, was undertaken with a sample size of 50 multiparous women in Brazil. Data was collected by structured interview. The intervention involved a single application of an ice pack applied for 20 min to the perineal area of women who reported perineal pain  $\geq 3$  by use of a numeric rating scale (0–10), with intact perineum, 1st or 2nd degree lacerations or episiotomy, between 6 and 24 h after spontaneous vaginal birth. Perineal pain was evaluated at three points of time: before, immediately after and 2 h after applying an ice pack.

**Results:** Immediately after applying an ice pack to the perineal area, there was a significant reduction in the severity of perineal pain reported (5.4 vs. 1.0,  $p < 0.0005$ ), which continued for 1 h 35 min up to 2 h after the local application.

**Conclusion:** Ice pack application for 20 min is effective for alleviating postpartum perineal pain and continues to be effective between 1 h 35 min for up to 2 h.

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### 1. Background

Following spontaneous vaginal birth, women can experience varying levels of perineal pain and there is evidence to suggest that the severity of the pain is linked to the severity of perineal injury.<sup>1</sup> However, women with an intact perineum can also suffer from pain and discomfort.<sup>2</sup> Postpartum perineal pain can commence in the first few hours after birth and may persist up to one year.<sup>3</sup> In the early postnatal period, perineal pain can affect a woman's

mobility and also her ability to perform self-care and care of her newborn infant. In addition, over a longer period of time, persistent pain can also lead to irritability, exhaustion and even maternal depression, and this can have numerous negative effects during the transition to motherhood and ultimately, cause family relationship problems.<sup>4–6</sup> Therefore, alleviating perineal pain is an important aspect of maternal health. Health professionals need to actively promote ways to assist women to manage their experience of perineal pain as this will help them to adjust easier to motherhood.<sup>7</sup>

Pharmacological methods, such as non-steroidal anti-inflammatories, analgesic and narcotic drugs, are often used for relieving postpartum perineal pain. However, these methods can cause side effects such as, constipation, nausea, gastric irritation, dizziness and even prolonged uterine bleeding. It has also been reported that some effects from pharmacological methods may be transferred to the baby through the breast milk.<sup>8</sup>

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Additionally, the high rates of women who report perineal pain even after taking analgesia indicates the ineffectiveness of pharmacological methods in alleviating the pain effectively.<sup>9</sup> Thus, postpartum care should include therapies that can replace or complement the pharmacological treatment, such as cryotherapy, transcutaneous electrical stimulation of the nerve (TENS), ultrasound and low-level laser therapy.<sup>10</sup> Nonetheless, for the majority of these non-pharmacological methods, except cryotherapy, trained health professionals and specific equipment are required, which make woman self-care and home-use difficult.

Cryotherapy is the therapeutic application of cold substances that remove the body's heat and reduce the local tissue temperature.<sup>10</sup> In maternity care, an ice pack is the most common cryotherapy technique<sup>2,11</sup>; this is a low cost, easy to prepare, non-invasive treatment and compatible with breastfeeding.<sup>12</sup> The local physiological responses post-ice application include decrease of the tissue temperature and cellular metabolism. As a result, circulatory and inflammatory responses are modified, reducing the pain, the muscle spasm, and the oedema.<sup>13</sup> However, there are limited research results regarding the duration of and the intervals between the cooling applications and this makes the development of guidelines for clinical practice challenging.

## 2. Literature review

A recent Cochrane systematic review<sup>14</sup> analysed 10 randomised controlled trials comparing the effectiveness of local cooling treatments applied to the perineum with no treatment and other local and systemic treatments. The authors identified that ice packs are often applied for 10–20 min, and during this time period, a reduction in perineal temperature between 10 °C and 15 °C is considered ideal to achieve an analgesic effect.<sup>14,15</sup> However, there is no clear evidence to make a recommendation about the interval time between ice pack applications to the perineal region.

The interval time between ice pack applications might be determined by measuring how long perineal analgesia persists. Two studies<sup>12,16</sup> have explored this topic by evaluating perineal pain intensity up to 40 min after applying an ice pack. The researchers identified that perineal analgesia was maintained during this time period. Nevertheless, there is no research investigating whether perineal analgesia could exceed 40 min. In sports injury management, where cryotherapy is widely implemented, guidelines recommend that ice packs are applied to local sport injuries for 15–30 min, every 2 h, for the first 24 and 72 h after injury,<sup>10,13</sup> but there is no evidence to substantiate whether the same protocol is safe and effective to use for alleviating postpartum perineal pain.

Main factors for effectiveness and safety of this therapy are the time and the interval between ice applications. The depth and the degree of cooling, as well as the adverse effects after cooling, such as an ice burn and an ulcer are associated with continuously exposure time after longer than 1 h.<sup>13</sup>

Therefore, this study aims to evaluate the duration of perineal analgesia (up to 2 h) after applying an ice pack to the perineum for 20 min after spontaneous vaginal birth.

## 3. Method

A quasi-experimental study, using a pre and post-test design, with participants being their own control group. This study design was chosen because there is previous evidence from a blinded randomised, placebo controlled trial,<sup>12</sup> about the effectiveness of ice pack applications in alleviating postpartum perineal pain. Therefore, in considering ethical implications, we decided to not deprive any participant of our study from an effective treatment.

This investigation was performed at the rooming-unit (RU) of a midwife-led alongside birth centre for women with low to medium-risk pregnancy, in Sao Paulo, Brazil. In this hospital, nurse-midwives provide the care during labour and spontaneous vaginal birth to women with no medical or obstetric complications and the decision of protecting the perineum, performing episiotomy and suturing perineal trauma vary according to the health professional that provides the care. In the RU, postpartum women and healthy newborns remain together for approximately 48 h; afterwards both mother and newborn return to their home. In the study hospital, there are no guidelines for using non-pharmacological methods to relieve postpartum perineal pain. However, if perineal oedema or haematomas occur during the immediate postpartum period, ice packs are often applied. In addition, all postpartum women are routinely prescribed analgesics and anti-inflammatory drugs, regardless of the severity of perineal trauma and reported pain. During this study, anti-inflammatory drugs were not routinely given, in order to control any localised inflammatory effect.

The inclusion criteria were: full-term pregnancy (37–42 weeks) women  $\geq 18$  years of age, within 6–24 h after childbirth, with at least one previous vaginal birth (which was the criterion adopted to classify women as multiparous), with perineal pain reported  $\geq 3$  points on numeric rating scale, with intact perineum or perineal trauma, with no 3rd or 4th degree laceration, oedema or haematoma. Not having received epidural anaesthesia, ice packs and anti-inflammatory drugs after birth or analgesics up to 3 h prior to inclusion in the study. Women who received anti-inflammatories and/or analgesic drugs up to 2 h after enrolment were excluded.

Recruitment and data collection took place in the RU. The assessments and data were collected daily by one of the authors (CSBP), over a three months period (from December 2012 to February 2013). The following data collection process included: a structured interview, an initial assessment of perineal pain, measurement of ward environment temperature, body and perineal temperature, intervention and then two further assessments of perineal pain. The interview included closed questions about mode, date and time of birth, type and repair of birth-related perineal trauma and severity of perineal pain. To assess perineal pain, all recruited women were asked: 'Do you feel any pain in the perineum right now?'. If the answer was Yes, women were asked to rate their pain intensity by pointing to the score on the 11-points numeric rating scale (0 = no pain and 10 = worst pain imaginable).

The intervention consisted of a single application of an ice pack to the perineum for 20 min. Perineal pain was assessed by the researchers at three time points: pre (T1), immediately after (T2) and 2 h (T3) post the ice pack application. To find out the duration of the analgesic effect, the women were given a watch, paper and pen to record the exact time of perineal pain increase between T2 and T3.

The ice pack was prepared by the researcher and consisted of a plastic bag measuring 8 cm  $\times$  22 cm, containing 250 ml of water. It was kept in the freezer, removed in the form of ice and applied to the perineum. During this intervention, all women were asked to remain in the lithotomy position, to ensure the ice pack was applied to and remained in the perineal region. To avoid direct contact with the skin, the ice packs were wrapped in thin cotton gauze prior to local application.

Women's perineal and axillary temperatures as well as ice packs and ward environment temperatures were measured. Ward environment was measured before the intervention using the thermometer Incoterm<sup>TM</sup> model TA 60.02. Perineal and ice pack temperatures were measured before and immediately after the intervention, using a digital thermometer dual channel (model MT 405 MINIPA<sup>TM</sup> Company, Sao Paulo, Brazil), composed of an

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