

## REVIEW ARTICLE

## Obstetrics

# Efficacy of perineal massage during the second stage of labor for the prevention of perineal injury: A systematic review and meta-analysis

Andrea Marcos-Rodríguez<sup>1</sup> | Raquel Leirós-Rodríguez<sup>2</sup>  | Pablo Hernandez-Lucas<sup>3</sup>

<sup>1</sup>Nursing and Physical Therapy Department, University of Leon, Ponferrada, Spain

<sup>2</sup>SALBIS Research Group, Nursing and Physical Therapy Department, University of Leon, Ponferrada, Spain

<sup>3</sup>Functional Biology and Health Sciences Department, University of Vigo, Pontevedra, Spain

## Correspondence

Raquel Leirós-Rodríguez, SALBIS Research Group, Nursing and Physical Therapy Department, University of Leon, Astorga Ave., Ponferrada 24401, Spain.  
Email: [rleir@unileon.es](mailto:rleir@unileon.es)

## Abstract

**Background:** Numerous interventions to reduce perineal trauma during childbirth have been studied in recent years, including perineal massage.

**Objective:** To determine the efficacy of perineal massage during the second stage of labor to prevent perineal damage.

**Search Strategy:** Systematic search in PubMed, Pedro, Scopus, Web of Science, ScienceDirect, BioMed, SpringerLink, EBSCOhost, CINAHL, and MEDLINE with the terms Massage, Second labor stage, Obstetric delivery, and Parturition.

**Selection Criteria:** The articles must have been published in the last 10 years; the perineal massage was administered to the study sample; and the experimental design consisted of randomized controlled trial.

**Data Collection and Analysis:** Tables were used to describe both the studies' characteristics and the extracted data. The PEDro and Jadad scales were used to assess the quality of studies.

**Main Results:** Of the 1172 total results identified, nine were selected. Seven studies were included in the meta-analysis and indicated a statistically significant decreased number of episiotomies in perineal massage.

**Conclusions:** Massage during the second stage of labor appears to be effective in preventing episiotomies and reducing the duration of the second stage of labor. However, it does not appear to be effective in reducing the incidence and severity of perineal tears.

## KEYWORDS

delivery, episiotomy, labor onset, lacerations, parturition, perineum, soft-tissue therapy

## 1 | BACKGROUND

Vaginal birth can result in perineal trauma, with short-term and long-term consequences for women.<sup>1</sup> It is therefore important to explore interventions that can reduce it. Perineal trauma can be described as the loss of perineal integrity or other damage to the genital region

of the woman.<sup>2</sup> It may be spontaneous in the form of perineal tears, due to episiotomy, or a combination of both.<sup>2,3</sup> Perineal tears can be classified according to their extent into: grade I (tearing of the vaginal epithelium and/or skin), grade II (which also involves the superficial and/or deep perineal musculature, but not the anal sphincter), grade III (in which, together with the above, the anal sphincter

This is an open access article under the terms of the [Creative Commons Attribution](https://creativecommons.org/licenses/by/4.0/) License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited.

© 2023 The Authors. *International Journal of Gynecology & Obstetrics* published by John Wiley & Sons Ltd on behalf of International Federation of Gynecology and Obstetrics.

musculature is affected), and grade IV (in which, in addition, the anal epithelial layer is affected). Grade III, in turn, can be divided into: grade IIIa (less than 50% of the external anal sphincter is affected), grade IIIb (more than 50% of the external anal sphincter is affected) and grade IIIc (both external and internal anal sphincter are affected).<sup>3,4</sup>

Up to 85% of women with vaginal delivery suffer perineal trauma.<sup>5,6</sup> The weight of the baby, the use of instruments, fetal malposition, maternal position during labor, and prolonged pushing times have been defined as probable predisposing factors.<sup>4</sup> The incidence of intact perineum in vaginal deliveries increases with the number of deliveries: from 6.6% in nulliparous women to 18.6% in multiparous women.<sup>2</sup>

Urinary and fecal incontinence,<sup>7</sup> pelvic organ prolapses,<sup>8</sup> and sexual problems such as dyspareunia,<sup>9</sup> among others, have been identified as common problems resulting from perineal damage in childbirth. Stress and urge incontinence after 1 year are present in 21% and 8% of women, respectively.<sup>10</sup> These are all dysfunctions with major economic implications for the health system.<sup>11</sup>

In parallel, all of the above result in changes in all areas of the woman's life, which will affect her quality of life and may compromise her mental health.<sup>12</sup>

Numerous interventions have been studied in recent years to see which may be most effective in reducing perineal trauma during childbirth. These include hot<sup>5,13,14</sup> and cold<sup>5</sup> packs, Ritgen maneuver,<sup>5,13</sup> fundal pressure,<sup>13</sup> perineal gel application,<sup>13</sup> and perineal massage. The latter increases muscle relaxation and vasodilatation, which may prevent tearing and facilitate delivery of the baby,<sup>15</sup> and reduces the severity of pain during labor.<sup>16</sup> As a result of these data, it has been introduced in recent years as a technique in many delivery rooms,<sup>5,13,17</sup> although without establishing a protocol or its efficacy.

Taking all this into account, a systematic review and meta-analysis was deemed necessary with the objective of determining the efficacy of perineal massage during the second stage of labor to prevent perineal damage.

## 2 | MATERIALS AND METHODS

### 2.1 | Search strategy

This study was prospectively registered on PROSPERO (ID: CRD42022313654) and followed the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA), the recommendations for their implementation in Exercise, Rehabilitation, Sport Medicine, and Sports Science (PERSiST),<sup>18</sup> and the reporting guidelines and the recommendations from the Cochrane Collaboration.<sup>19</sup> The PICO question was then chosen as follows: P—population: pregnant women; I—intervention: perineal massage; C—control: hands off or routine care; O—outcome: occurrence of perineal tears, need for episiotomy, and duration of second stage of labor; S—study designs: randomized controlled trials.

A systematic search of publications was conducted in March 2022 in the following databases: PubMed, Pedro, Scopus, Web of Science, ScienceDirect, BioMed, SpringerLink, EBSCOhost, Cumulative Index to Nursing and Allied Health Literature (CINAHL), and MEDLINE. The search strategy included different combinations with the following Medical Subject Headings (MeSH) terms: Massage, Second labor stage, Obstetric delivery, and Parturition. The search strategy according to the focused PICOS question is presented in [Table 1](#).

### 2.2 | Selection criteria

After removing duplicates, two reviewers (AM-R and RL-R) independently screened articles for eligibility. In the case of disagreement, a third reviewer (PH-L) made the final decision on whether the study should be included or not. For the selection of results, the inclusion criteria established that: (1) the articles must have been published in the last 10 years (from 2012 to the present); (2) the perineal massage was administered to the study sample; and (3) the experimental design consisted of randomized controlled trial. Studies were excluded from this review if: (1) they had a non-experimental methodology (i.e., reviews, meta-analyses, editorials); (2) their full text was not available; (3) the intervention was not applied during the second stage of labor; and (4) the intervention did not include perineal massage.

After screening the data, and extracting, obtaining and screening the titles and abstracts for inclusion criteria, the selected abstracts were obtained in full texts. Titles and abstracts lacking sufficient information regarding inclusion criteria were also obtained as full texts. Full-text articles were selected in case of compliance with inclusion criteria by the two reviewers using a data extraction form.

### 2.3 | Data collection and analysis

Two reviewers (AM-R and RL-R) independently extracted data from included studies using a customized data extraction table in Microsoft EXCEL.

The data extracted from the included articles for further analysis were: demographic information (title, authors, journal, and year), characteristics of the sample (age, gestational age, delivery number, inclusion and exclusion criteria, and number of participants), study-specific parameters (study type, form of application of perineal massage, duration of the massage, time of application, and use of lubricants), follow-up and dropout rates of participants, and results obtained (variables analyzed, instruments used, and results throughout the follow up). Tables were used to describe both the studies' characteristics and the extracted data.

The Physiotherapy Evidence Database (PEDro) scale and the Jadad scale were used to assess the quality of studies.

For each sub-study, odds ratios (OR) with their corresponding 95% confidence intervals (CI) were calculated from the summary data provided. When these data were not available in the study they

TABLE 1 Search strategy according to the focused question (PICO).

Database	Search equation
PubMed	("massage" [Mesh]) AND ("Delivery, Obstetric" [Mesh]) ("massage" [Mesh]) AND ("Parturition" [Mesh]) ("massage" [Mesh]) AND ("Labor Stage, Second" [Mesh])
ScienceDirect	(MH "massage") AND (MH "Delivery, Obstetric") (MH "massage") AND (MH "Parturition") (MH "massage") AND (MH "Labor Stage, Second")
CINAHL	(MH "massage") AND (MH "Delivery, Obstetric") (MH "massage") AND (MH "Parturition") (MH "massage") AND (MH "Labor Stage, Second")
Medline	(MH "massage") AND (MH "Delivery, Obstetric") (MH "massage") AND (MH "Parturition") (MH "massage") AND (MH "Labor Stage, Second")
EBSCOhost	(MH "massage") AND (MH "Delivery, Obstetric") (MH "massage") AND (MH "Parturition") (MH "massage") AND (MH "Labor Stage, Second")
SpringerLink	"massage" AND "Delivery, Obstetric" "massage" AND "Parturition" "massage" AND "Labor Stage, Second"
BioMed	"massage" AND "Delivery, Obstetric" "massage" AND "Parturition" "massage" AND "Labor Stage, Second"
PEDro	"massage" AND "Delivery, Obstetric" "massage" AND "Parturition" "massage" AND "Labor Stage, Second"
Web of Science	("massage" [Mesh]) AND ("Delivery, Obstetric" [Mesh]) ("massage" [Mesh]) AND ("Parturition" [Mesh]) ("massage" [Mesh]) AND ("Labor Stage, Second" [Mesh])
Scopus	("massage" [Mesh]) AND ("Delivery, Obstetric" [Mesh]) ("massage" [Mesh]) AND ("Parturition" [Mesh]) ("massage" [Mesh]) AND ("Labor Stage, Second" [Mesh])

were requested from the authors by email. The  $I^2$  statistic was used to determine the degree of heterogeneity, where the percentages quantified the magnitude of heterogeneity: 25%, low; 50%, medium; and 75%, high heterogeneity.<sup>20</sup> The meta-analysis was performed using the random-effects model, because of the observed heterogeneity. Analyses were performed with Comprehensive Meta-Analysis (CMA) version 2 software (Biostat).

### 3 | MAIN RESULTS

Of the 1172 total results identified, 799 records were duplicates, so 373 were screened for their title and abstract to see if they met the inclusion criteria. Of these, 253 were then excluded by applying the inclusion and exclusion criteria. Of the 120 articles screened, nine were finally selected (Figure 1).

All studies scored between 6 and 9 points on the PEDro scale<sup>21–29</sup> (Table 2). In two cases the women were blinded.<sup>21,25</sup> In addition, in one of them the therapist who performed the massage was also blinded.<sup>21</sup> In parallel, the minimum score obtained on the Jadad scale was 2 points.<sup>24,26</sup> In two other cases, the maximum score was obtained<sup>21,25</sup> (Table 3).

Shahoei et al.<sup>26</sup> measured the severity of perineal damage and pain using an ad hoc questionnaire recorded by telephone. Another study analyzed the occurrence of perineal injury and its severity in a face-to-face interview and/or via telephone.<sup>24</sup>

One study measured pain intensity using a numerical scale from 0 to 10.<sup>29</sup> The remaining studies<sup>21–23,25,27,28</sup> do not mention or describe the assessment and recording instruments.

In all the articles reviewed the women gave birth in the lithotomy position<sup>21–29</sup> (Table S1). In seven of the studies perineal massage was applied in isolation,<sup>21,22,24–27,29</sup> while in two of them a combined intervention with warm compresses was performed<sup>23,28</sup> (Table 3).

Massage was started in two of the cases<sup>21,27</sup> after checking that the bowel and bladder were empty. Then, two fingers were inserted into the vagina, 2–3 cm, with gloves and a few drops of lubricant, pressing on both sides of the vaginal wall for 2 min.<sup>21,27</sup> In another case they specify that petroleum jelly was applied to the vestibule, clitoris and labia majora and labia minora and that the massage consisted of rotating and sweeping movements during uterine contractions until the expulsion of the baby's head.<sup>22</sup>

Massage was applied with sterile gloves by inserting the index and middle fingers into the vagina, making a lateral movement in semicircles on both sides with light pressure towards the rectum.<sup>23–26,28,29</sup> Each movement lasted 1 second, and sustained pressure was avoided. The intensity was such that the parturient did not feel pain.<sup>23–26,28,29</sup> In addition, in some cases massage was coordinated with pushing and contractions.<sup>23,25,28,29</sup> Shahoei et al.<sup>26</sup> described the application of a 1-minute lateral movement in which pressure was exerted at the 3:00 and 9:00 positions if a clock were displayed in the vaginal introitus. Furthermore, in one investigation they clarified that massage started from 6 cm of dilatation<sup>21</sup> and in another from 8 cm.<sup>24</sup>

In four of the studies, massage was applied in both the first and second stages of labor.<sup>21,24,25,27</sup> In two of them it was applied four times during the first stage of labor and for 10 min in the second stage.<sup>21,27</sup> In another case they applied 5–10 min of massage with 30 min of rest before the next application, periodically, during the first and second stages of labor.<sup>25</sup> The remaining investigations applied perineal massage only during the second stage of labor.<sup>22,23,26,28,29</sup> Of these, the only study that gives details on the timing of the intervention indicates that the massage was applied for 30 min.<sup>26</sup> The remaining studies only describe that they applied massage in coordination with uterine contractions.<sup>22,23,28,29</sup>

Hot compresses were applied between contractions and pushes.<sup>23,28</sup> In the case of Goh et al.<sup>23</sup> the sterile compresses were immersed in water at 50°C until they reached 38–44°C and in the other investigation they were immersed in water between 45 and

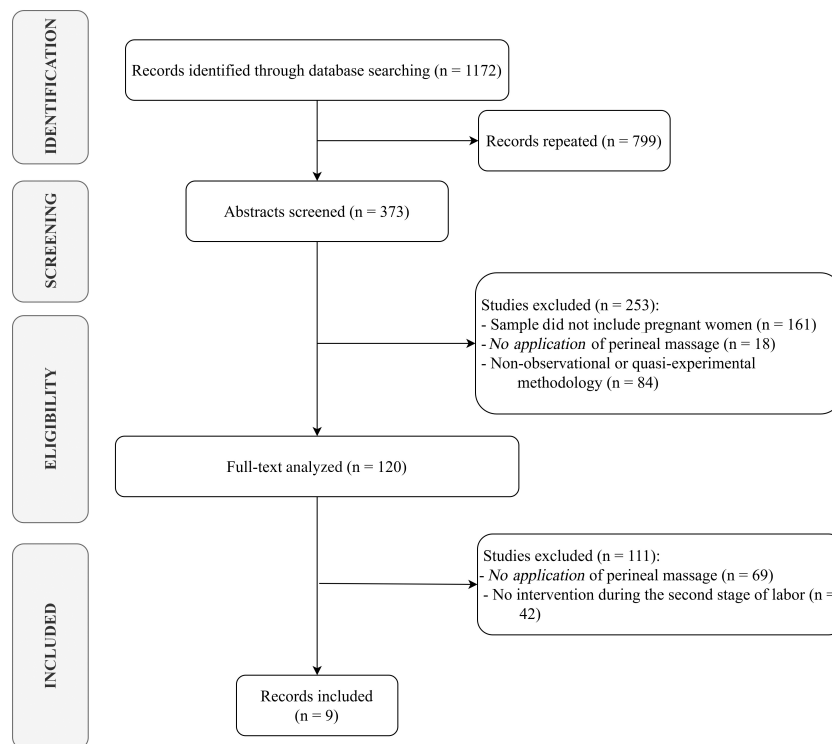


FIGURE 1 PRISMA flow diagram.

TABLE 2 PEDro scale scores.<sup>a</sup>

Reference	1	2	3	4	5	6	7	8	9	10	11	Score
Akhlaghi et al. (2019) <sup>21</sup>	✓	✓	✓	✓	✓	✓	✗	✓	✓	✓	✓	9
Demirel et al. (2015) <sup>27</sup>	✓	✓	✗	✓	✗	✗	✗	✓	✓	✓	✓	6
Geranmayeh et al. (2012) <sup>22</sup>	✓	✓	✗	✓	✗	✗	✗	✓	✓	✓	✓	6
Goh et al. (2021) <sup>23</sup>	✓	✓	✓	✓	✗	✗	✗	✓	✓	✓	✓	7
Hong et al. (2022) <sup>28</sup>	✓	✓	✓	✓	✗	✗	✗	✓	✓	✓	✓	7
Karaçam et al. (2012) <sup>24</sup>	✓	✓	✗	✓	✗	✗	✗	✓	✓	✓	✓	6
Raja et al. (2019) <sup>29</sup>	✓	✓	✓	✓	✗	✗	✗	✓	✓	✓	✓	7
Romina et al. (2020) <sup>25</sup>	✓	✓	✓	✓	✓	✗	✗	✓	✓	✓	✓	8
Shahoei et al. (2017) <sup>26</sup>	✓	✓	✗	✓	✗	✗	✗	✓	✓	✓	✓	6

<sup>a</sup>(1) Choice criteria specified (not to be used for scoring); (2) Participants randomly assigned into groups; (3) Assignment blinded; (4) Groups are similar at baseline with respect to the most important prognostic factors; (5) All participants were blinded; (6) Therapists were blinded; (7) Evaluators who measured at least one key outcome were blinded; (8) Measures of at least one of the key outcomes were obtained from more than 85% of the participants initially assigned to the groups; (9) Results were presented for all participants who received treatment or were assigned to the control group; (10) Results of statistical comparisons between groups were reported for at least one key outcome; (11) Point and variability measures for at least one key outcome.

59°C.<sup>28</sup> In both cases, they were then wrung out, applied to the perineum and immersed again to maintain the temperature.

As for the lubricant used, two articles simply mention the use of the same lubricant.<sup>21,23</sup> Three of them used water-based lubricant<sup>24,26,28</sup> (only one of them specifies the use of the commercial brand “K-Y”<sup>26</sup>). The remaining studies used glycerol,<sup>27</sup> petroleum jelly,<sup>22</sup> 2% lidocaine

gel,<sup>29</sup> and ostrich oil.<sup>25</sup> In addition, Karaçam et al.<sup>24</sup> indicate that it was only used in the absence of natural lubrication.

In relation to the intervention performed in the control group, most of them applied routine care without specifying what it comprised.<sup>21–24,26,27</sup> Along with this, researchers applied the Ritgen maneuver in one investigation<sup>25</sup> and vulval pads in another.<sup>29</sup>

TABLE 3 Methodologic characteristics of the studies analyzed.

Authors	Design	Sample size	Intervention		Duration of massage	Period and frequency of application	Jadad Scale		FS	
			Experimental group	Control group			RD <sup>a</sup>	BD <sup>b</sup>		WD <sup>c</sup>
Akhlaghi et al. (2019) <sup>21</sup>	RCT	99	Perineal massage from 6 cm of dilatation until expulsion	Routine care	2 min in the 1st stage of labor +10 min in the 2nd stage	4 massages every 30 min during the 1st stage +1 massage during the 2nd stage	2	2	1	5
Demirel et al. (2015) <sup>27</sup>	RCT	284	Perineal massage with water-based lubricant (glycerol) during the active phase of the 1st and 2nd stage of labor	Routine care	10 min in the 1st stage +10 min in the 2nd stage	4 massages every 30 min during the 1st stage +1 massage during the 2nd stage	2	0	1	3
Geranmayeh et al. (2012) <sup>22</sup>	RCT	90	Perineal massage with sterile petroleum jelly in the 2nd stage of labor	Routine care	Not described	During uterine contractions in the 2nd stage	2	0	1	3
Goh et al. (2021) <sup>23</sup>	RCT	119	Perineal massage in the 2nd stage of labor with aqueous-based gel up to the water-based gel up to the crowning of the crown of the baby & application of hot sterile compresses between 38 and 44°C during pushing	Routine care (hands off)	Not described	During uterine contractions in the 2nd stage	2	0	1	3
Hong et al. (2022) <sup>28</sup>	RCT	277	Perineal massage with water-based lubricant and warm compresses between 45 and 59°C	Perineal massage with water-based lubricant	All of the 2nd stage	During uterine contractions in the 2nd stage	2	0	1	3
Karaçam et al. (2012) <sup>24</sup>	RCT	396	3 informative sessions of 30 min during pregnancy & perineal massage from 8 cm dilatation to expulsion, with natural lubrication if possible (if not, water-based lubricant)	Routine care	10–15 min	During the 1st and 2nd stages of labor	2	0	0	2
Raja et al. (2019) <sup>29</sup>	RCT	150	Perineal massage with lidocaine 2%	Routine care & vulvar pads	All of the 2nd stage	During uterine contractions in the 2nd stage	2	0	1	3
Romina et al. (2020) <sup>25</sup>	RCT	77	Perineal massage with ostrich oil during the 1st and 2nd stages of labor	Routine care & Ritgen maneuver	5–10 min	Every hour during the 1st stage + every 30 min during the 2nd stage	2	2	1	5
Shahoei et al. (2017) <sup>26</sup>	RCT	163	Perineal massage with sterile aqueous lubricant (K-Y) from complete cervical dilatation to expulsion	Routine care	30 min	Not described	2	0	0	2

Abbreviation: FS, final score; RCT, randomized controlled trial.

<sup>a</sup>RD: Randomization (1 point if randomization is mentioned; 2 points if the method of randomization is appropriate).<sup>b</sup>BD: Blinding (1 point if blinding is mentioned; 2 points if the method of blinding is appropriate).<sup>c</sup>WD: Withdrawals (1 point if the number and reasons in each group are stated).

The incidence of perineal trauma (tearing and/or episiotomy) was lower among the women in the intervention group in the investigations that applied vaseline massage<sup>22</sup> and 2% lidocaine gel.<sup>29</sup> Although the result was significant only in the first case.<sup>22</sup> As for the incidence of episiotomy in isolation, all interventions achieved a significant reduction,<sup>21-27,29</sup> with the exception of the study in which massage was combined with warm compresses.<sup>28</sup> In that case, the combined application did not reduce the incidence of episiotomy compared with the massage-only group.<sup>28</sup>

The incidence of tears was higher among women in the experimental group in four cases<sup>21,24,27,29</sup> (only in one case was the difference significant<sup>21</sup>). In contrast, in two other clinical trials the number of tears identified was lower in the intervention group (although the difference was not statistically significant).<sup>25,28</sup> Episiotomy together with tears was found in a significantly lower percentage of women in the intervention group on one occasion.<sup>24</sup> The remaining studies did not analyze the total incidence of tears.<sup>22,23,26</sup>

The severity of tears in the parturients did not differ between the experimental and control groups in one of the investigations.<sup>21</sup> In the studies using petroleum jelly massage<sup>22</sup> and warm compresses,<sup>23</sup> the intervention group identified significantly more grade I tears, a lower rate of episiotomy and no grade III or IV tears. However, women who received the massage with petroleum jelly<sup>22</sup> showed significantly more grade II tears than their controls and those who received warm compresses showed significantly fewer.<sup>23</sup>

Following interventions by Karaçam et al.<sup>24</sup> and Raja et al.,<sup>29</sup> grade I tears were the majority of those identified, followed by grade II and III tears (but with no statistical difference in severity compared with the control group). No grade IV tears were identified in either group among the women who received massage, and Raja et al.<sup>29</sup> did not identify grade III tears either. The application of massage together with warm compresses versus massage alone<sup>28</sup> showed no difference in the severity of perineal damage.

Finally, in those investigations that looked at the anatomical location of tears,<sup>23,24,26</sup> none had significant results.

As for perineal suturing, it was significantly lower in the intervention group after two of the interventions<sup>23,24</sup> and similar with the application of massage alone and combined with warm compresses.<sup>28</sup>

In several investigations the mean duration of the second stage of labor was significantly shorter in the perineal massage group.<sup>21,22,27,29</sup> The only intervention that compared the duration in primiparous women, multiparous women, and combined primiparous and multiparous women concluded that the duration was statistically lower with perineal massage in all subgroups.<sup>27</sup> In contrast, Karaçam et al.<sup>24</sup> recorded similar durations of the first and second stages of labor between the experimental groups.

Participants' satisfaction was higher with the application of perineal massage and warm compresses than with the hands-off intervention<sup>23</sup> but similar to that achieved with massage alone.<sup>28</sup>

Research measuring the incidence and severity of postpartum perineal pain found significantly lower differences in the intervention group on the 3rd, 10th and 90th days.<sup>26</sup>

Finally, only three of the results took into account the use of epidural anesthesia.<sup>23,28,29</sup> In one of the cases its use was a reason for exclusion<sup>29</sup> and in the other two they analyzed its use without finding differences between the groups.<sup>23,28</sup>

Nine studies included<sup>21-29</sup> in this systematic review analyzed the number of perineal injuries. Seven studies<sup>21-23,25-27,29</sup> were included in the meta-analysis with a total sample size of 1262 participants. The analysis indicated a statistically significantly decreased number of episiotomies in the perineal massage group than in the control group (OR 0.25, 95% CI 0.12-0.45;  $P < 0.001$ ;  $I^2 = 78\%$ ). The forest plot can be seen in Figure 2.

The funnel plot for Figure 3 shows no evidence of publication bias. Begg and Mazumdar's test for rank correlation gave a  $P$  value of 0.158, indicating no evidence of publication bias. Egger's test for a regression intercept gave a  $P$  value of 0.094, indicating no evidence of publication bias.

## 4 | DISCUSSION

The aim of this review was to evaluate the efficacy of perineal massage during the second stage of labor to prevent perineal damage. On analysis of the results, massage during the second stage of labor appears to be effective in preventing episiotomies and reducing the duration of the second stage of labor. However, it does not appear to be effective in reducing the incidence and severity of perineal tears.

All investigations identified a lower incidence of episiotomies if perineal massage was applied. It should be emphasized that the decision to perform episiotomy is made by the healthcare team attending the delivery, based on professional judgment guided by experience, training, and decision-making capacity in relation to possible complications.<sup>30</sup> Such an intervention is usually performed to prevent perineal tears or, if they do occur, to reduce their severity.<sup>31,32</sup> Evidence to date has shown that routine episiotomies do not reduce perineal trauma and that a protocol to reduce episiotomies is safer for mother and baby.<sup>31</sup>

It is congruent that the reduction in episiotomies is associated with an increase in grade I and II tears.<sup>33</sup> Which would explain why in the study by Akhlaghi et al.<sup>21</sup> they obtained a significant increase when differentiating spontaneous tears from episiotomy injuries. It could therefore be concluded that the increase in tears mentioned would not be clinically relevant as an episiotomy would be equivalent in extent to a grade II tear, guaranteeing perineal trauma,<sup>5</sup> and this percentage seems to be significantly reduced with massage.

The severity of tears was similar with or without the application of massage.<sup>22-28</sup> In the study carried out with petroleum jelly as a lubricant<sup>22</sup> the increase in grade I and II tears could be explained by the decrease in episiotomies, as discussed above. However, the combined application of massage and warm compresses<sup>23</sup> did result in less severe tears. The combination with thermotherapy may have increased vasodilatation and decreased tissue ischemia, resulting in better tissue adaptability.<sup>14</sup> However, Hong et al.<sup>28</sup> found no significant differences between the isolated or combined application of these two interventions. It could be affirmed, in view of the above studies and a previous

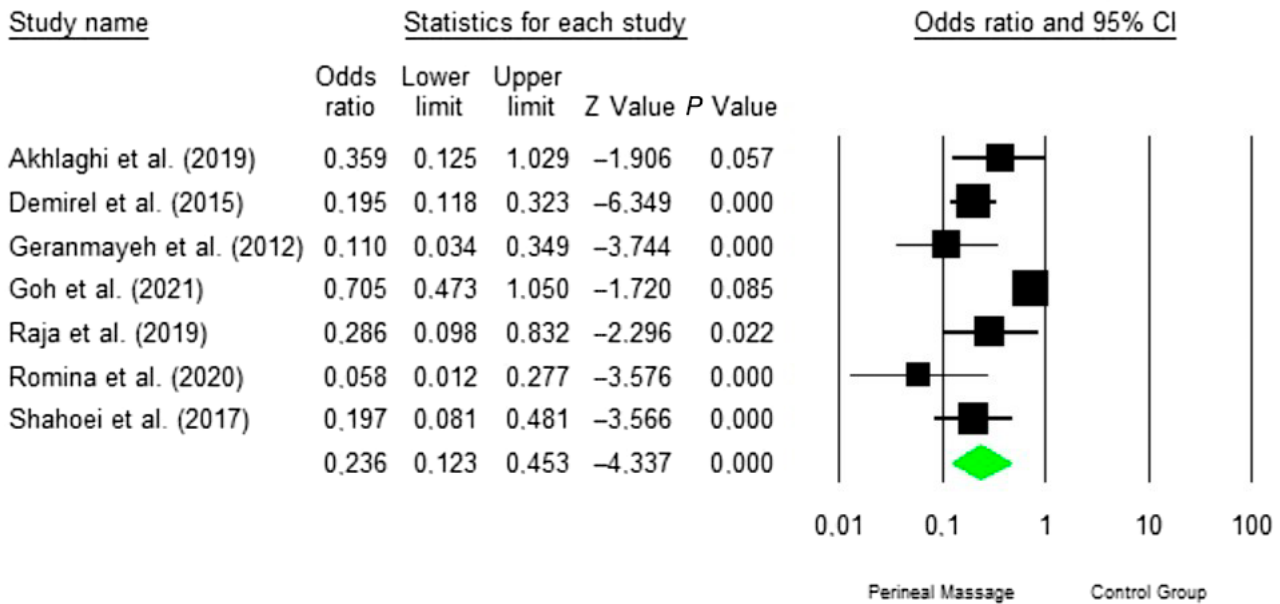


FIGURE 2 Forest plot for the incidence of episiotomies.

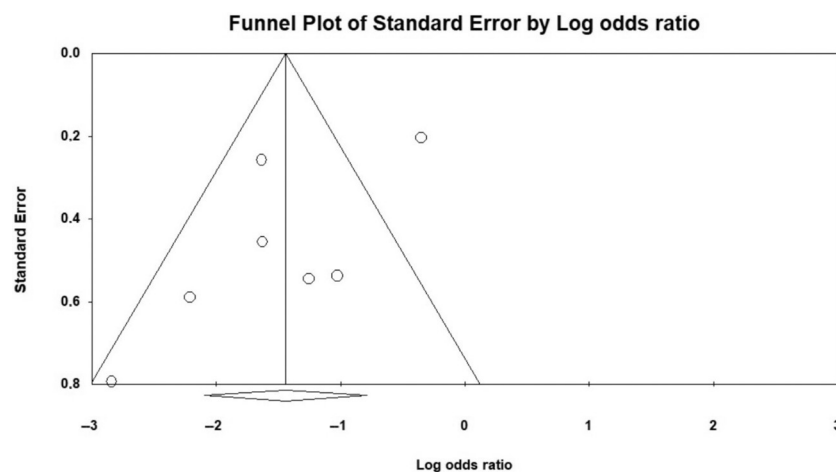


FIGURE 3 Funnel plot of standard error by log odds ratio.

quasi-experimental study,<sup>34</sup> that the effectiveness of perineal massage is greater than that of the application of warm compresses in isolation in reducing the severity of perineal damage. In fact, this would also be congruent with the fact that their combination was the only intervention that failed to reduce the amount of suturing used.<sup>28</sup>

It should be noted that in none of the interventions were pernicious or secondary effects of perineal massage reported. It increases the flexibility of the musculature without reducing its strength and decreases its resistance, which could help perineal stretching to avoid serious tears or episiotomy.<sup>35</sup> It also causes vasodilatation, increased blood supply,<sup>36</sup> and a decrease in the perception of pain<sup>36,37</sup> and the burning sensation during labor.<sup>37</sup> At the same time, endorphins and enkephalins, hormones related to pain reduction, are released, so that massage could act as a natural analgesic.<sup>38</sup> However, these variables were not included in any of the studies analyzed.

The identification of shorter duration of the second stage of labor<sup>21,22,27,29</sup> is consistent with previous research.<sup>17</sup> Although the intervention evaluated by Karaçam et al.<sup>24</sup> did not achieve the same effect. Today the literature provides different values for the ideal duration of the second stage of labor.<sup>39,40</sup> Although it has been established that the usual duration should be 3–4 h in nulliparous women and 2–3 h in multiparous women.<sup>39,40</sup> Taking these data into account, it could be explained that in the study by Karaçam et al.<sup>24</sup> there is no significant improvement as the duration of the second stage is much shorter than that mentioned in the literature (and therefore it is more difficult for such a difference to be significant).

The most notable limitations of the present study are: The small number of articles included and, associated with this, the limited sample size; the fact that only the woman's perception was taken into account in two studies<sup>23,28</sup> and the anatomical region in which the tears

occurred in two others<sup>23,26</sup>; the presence of extraneous variables such as the use of epidural analgesia, the possible disparity in routine hospital care (not described by any of the studies); the geographical location of the studies analyzed; and that none of the research provides differentiated information for primiparous and multiparous women. Finally, we would like to highlight the confounding variable involved in the heterogeneity of the massage protocols evaluated and the lack of international professional consensus on whether or not to perform episiotomy. However, we must emphasize that this is the first review with meta-analysis that has collected the highest methodologic quality evidence available on perineal massage during the second stage of labor.

In conclusion, perineal massage during the second stage of labor seems to be effective in preventing perineal damage linked to episiotomies, but does not seem to reduce perineal tears (neither their incidence nor severity). However, reducing the duration of the second stage of labor probably minimizes maternal-fetal complications and avoids prolonging the suffering of the parturient.

Perineal massage during labor is a low-cost intervention that is easy to apply and greatly reduces episiotomies.

#### AUTHORS CONTRIBUTIONS

Andrea Marcos-Rodríguez, Raquel Leirós-Rodríguez, and Pablo Hernández-Lucas conceptualized and designed the study, drafted the initial manuscript, designed the data collection instruments, collected data, carried out the initial analyses, and critically reviewed the manuscript for important intellectual content. All authors have read and agreed to the published version of the manuscript.

#### CONFLICT OF INTEREST STATEMENT

The authors report no conflict of interest.

#### DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

#### ORCID

Raquel Leirós-Rodríguez  <https://orcid.org/0000-0001-7502-7644>

#### REFERENCES

1. Steen M, Diaz M. Perineal trauma: a women's health and wellbeing issue. *Br J Midwifery*. 2018;26(9):574-584.
2. Rodrigues S, Silva P, Agius A, et al. Intact perineum: what are the predictive factors in spontaneous vaginal birth? *Mater Socio Med*. 2019;31(1):25-30.
3. Sultan AH, Kettle C. Diagnosis of perineal trauma. In: Sultan AH, Thakar R, Fenner DE eds. *Perineal and Anal Sphincter Trauma*. Springer; 2009:13-19.
4. Smith LA, Price N, Simonite V, Burns EE. Incidence of and risk factors for perineal trauma: a prospective observational study. *BMC Pregnancy Childbirth*. 2013;13(1):59-67.
5. Aasheim V, Nilsen ABV, Reinart LM, Lukasse M. Perineal techniques during the second stage of labour for reducing perineal trauma. *Cochrane Database Syst Rev*. 2017;2018(6):CD006672.
6. Frohlich J, Kettle C. Perineal care. *BMJ Clin Evid*. 2015;2015:1401.
7. Woodley SJ, Lawrenson P, Boyle R, et al. Pelvic floor muscle training for preventing and treating urinary and faecal incontinence in antenatal and postnatal women. *Cochrane Database Syst Rev*. 2020;5:CD007471.
8. Romeikienė KE, Bartkevičienė D. Pelvic-floor dysfunction prevention in prepartum and postpartum periods. *Medicina*. 2021;57(4):387.
9. Lagaert L, Weyers S, Van Kerrebroeck H, Elaut E. Postpartum dyspareunia and sexual functioning: a prospective cohort study. *Eur J Contracept Reprod Health Care*. 2017;22(3):200-206.
10. Jansson MH, Franzén K, Tegerstedt G, Hiyoshi A, Nilsson K. Stress and urgency urinary incontinence one year after a first birth—prevalence and risk factors. A prospective cohort study. *Acta Obstet Gynecol Scand*. 2021;100(12):2193-2201.
11. Milsom I, Coyne KS, Nicholson S, Kvasz M, Chen C, Wein AJ. Global prevalence and economic burden of urgency urinary incontinence: a systematic review. *Eur Urol*. 2014;65(1):79-95.
12. Skinner EM, Barnett B, Dietz HP. Psychological consequences of pelvic floor trauma following vaginal birth: a qualitative study from two Australian tertiary maternity units. *Arch Womens Ment Health*. 2018;21(3):341-351.
13. Gimovsky AC, Berghella V. Evidence-based labor management: second stage of labor (part 4). *Am J Obstet Gynecol MFM*. 2022;4(2):100548.
14. Essa RM, Ismail N, Ismail AA. Effect of second stage perineal warm compresses on perineal pain and outcome among primiparae. *J Nurs Educ Pract*. 2016;6(4):48.
15. Abdelhakim AM, Eldesouky E, Elmagd IA, et al. Antenatal perineal massage benefits in reducing perineal trauma and postpartum morbidities: a systematic review and meta-analysis of randomized controlled trials. *Int Urogynecol J*. 2020;31(9):1735-1745.
16. Gallo RBS, Santana LS, Ferreira CHJ, et al. Massage reduced severity of pain during labour: a randomised trial. *J Physiother*. 2013;59(2):109-116.
17. Oglak SC, Obut M. Effectiveness of perineal massage in the second stage of labor in preventing perineal trauma. *Gynecol Obstet Reprod Med*. 2020;26(2):88-93.
18. Ardern CL, Büttner F, Andrade R, et al. Implementing the 27 PRISMA 2020 statement items for systematic reviews in the sport and exercise medicine, musculoskeletal rehabilitation and sports science fields: the PERSiST (implementing prisma in exercise, rehabilitation, sport medicine and Sports science) guidance. *Br J Sports Med*. 2022;56(4):175-195.
19. Cumpston M, Li T, Page MJ, et al. Updated guidance for trusted systematic reviews: a new edition of the cochrane handbook for systematic reviews of interventions. *Cochrane Database Syst Rev*. 2019;10:ED000142.
20. Higgins JP, Thompson SG. Quantifying heterogeneity in a meta-analysis. *Stat Med*. 2002;21(11):1539-1558.
21. Akhlaghi F, Baygi ZS, Miri M, Najafi MN. Effect of perineal massage on the rate of episiotomy. *J Fam Reprod Health*. 2019;13(3):160.
22. Geranmayeh M, Rezaei Habibabadi Z, Fallahkish B, Farahani MA, Khakbazan Z, Mehran A. Reducing perineal trauma through perineal massage with vaseline in second stage of labor. *Arch Gynecol Obstet*. 2012;285(1):77-81.
23. Goh YP, Tan PC, Hong JGS, Sulaiman S, Omar SZ. Combined massage and warm compress to the perineum during active second stage of labor in nulliparas: a randomized trial. *Int J Gynecol Obstet*. 2021;155(3):532-538.
24. Karaçam Z, Ekmen H, Çalişir H. The use of perineal massage in the second stage of labor and follow-up of postpartum perineal outcomes. *Health Care Women Int*. 2012;33(8):697-718.
25. Romina S, Ramezani F, Falah N, Mafi M, Ranjkesh F. Effect of perineal massage with ostrich oil on the episiotomy and lacerations in



- nulliparous women: a randomized controlled clinical trial. *Iran J Nurs Midwifery Res.* 2020;25(2):134-138.
26. Shahoei R, Zaheri F, Nasab LH, Ranaei F. The effect of perineal massage during the second stage of birth on nulliparous women perineal: a randomization clinical trial. *Electron Physician.* 2017;9(10):5588-5595.
  27. Demirel G, Golbasi Z. Effect of perineal massage on the rate of episiotomy and perineal tearing. *Int J Gynecol Obstet.* 2015;131(2):183-186.
  28. Hong JGS, Abdullah N, Rajaratnam RK, et al. Combined perineal massage and warm compress compared to massage alone during active second stage of labour in nulliparas: a randomised trial. *Eur J Obstet Gynecol Reprod Biol.* 2022;270:144-150.
  29. Raja A, Pallavee P, Samal R. Effect of perineal massage in the second stage of labour, on the incidence of episiotomy and perineal tears. *Int J Reprod Contracept Obstet Gynecol.* 2019;8(4):1387-1393.
  30. Moya-Jiménez LC, Sánchez-Ferrer ML, Adoamnei E, Mendiola J. New approach to the evaluation of perineal measurements to predict the likelihood of the need for an episiotomy. *Int Urogynecol J.* 2019;30(5):815-821.
  31. Jiang H, Qian X, Carroli G, Garner P. Selective versus routine use of episiotomy for vaginal birth. *Cochrane Database Syst Rev.* 2017;2(2):CD000081.
  32. Ducarme G, Pizzoferrato A, De Tayrac R, et al. Perineal prevention and protection in obstetrics: CNGOF clinical practice guidelines. *J Gynecol Obstet Hum Reprod.* 2019;48(7):455-460.
  33. Hernández-Martínez A, Pascual-Pedreño AI, Garnés ABB, del Rocio M-JM, Alarcón MM. Variabilidad en la tasa de episiotomías y su relación con desgarros perineales graves y morbilidad neonatal. *Enfer Clin.* 2014;24(5):269-275.
  34. Ibrahim H, Elgzar WTI, Hassan HE. Effect of warm compresses versus lubricated massage during the second stage of labor on perineal outcomes among primiparous women. *IOSR J Nurs Health Sci.* 2017;6(4):64-76.
  35. de Freitas SS, Cabral AL, Pinto DMC, Rogério RAPM, Pereira Baldon VS. Effects of perineal preparation techniques on tissue extensibility and muscle strength: a pilot study. *Int Urogynecol J.* 2019;30(6):951-957.
  36. Albers LL, Sedler KD, Bedrick EJ, Teaf D, Peralta P. Midwifery care measures in the second stage of labor and reduction of genital tract trauma at birth: a randomized trial. *J Midwifery Womens Health.* 2005;50(5):365-372.
  37. Dieb AS, Shoab AY, Nabil H, et al. Perineal massage and training reduce perineal trauma in pregnant women older than 35 years: a randomized controlled trial. *Int Urogynecol J.* 2020;31(3):613-619.
  38. Biana CB, Cecagno D, Porto AR, Cecagno S, Marques VA, Soares MC. Non-pharmacological therapies applied in pregnancy and labor: an integrative review. *Rev Esc Enferm USP.* 2021;55:e03681.
  39. Leveno KJ, Nelson DB, McIntire DD. Second-stage labor: how long is too long? *Obstet Gynecol.* 2016;214(4):484-489.
  40. Polnaszek BE, Cahill AG. Evidence-based management of the second stage of labor. *Semin Perinatol.* 2020;44(2):151213.

## SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

**How to cite this article:** Marcos-Rodríguez A, Leirós-Rodríguez R, Hernández-Lucas P. Efficacy of perineal massage during the second stage of labor for the prevention of perineal injury: A systematic review and meta-analysis. *Int J Gynecol Obstet.* 2023;162:802-810. doi:[10.1002/ijgo.14723](https://doi.org/10.1002/ijgo.14723)