

The Analysis Study of Risk Factor and Management for Severe Perineal Lacerations during Childbirth: A Comprehensive Systematic Review

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ABSTRACT

Background: The aim of this study to show about risk factor and management for severe perineal lacerations during childbirth. **Methods:** By the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) 2020, this study was able to show that it met all of the requirements. **Result:** Eight publications were found to be directly related to our ongoing systematic examination after a rigorous three-level screening approach. Subsequently, a comprehensive analysis of the complete text was conducted, and additional scrutiny was given to these articles. **Conclusion:** Various independent risk factors have been recognized to be associated with these severe perineal lacerations. Increased maternal age, nulliparity, induction of labor, epidural analgesia, prolonged duration of second stage of labor, fetal macrosomia, persistent occipitoposterior position and instrumental delivery are the most frequently reported. Suture repair is relatively contraindicated for hemostatic perineal lacerations. Conservative management is preferred for hemostatic lacerations. For lacerations with persistent bleeding or anatomical distortion requiring repair, treatment should be delayed if an appropriately trained clinician is unavailable. **Keyword:** Perineal lacerations, severe, childbirth, perineum.

INTRODUCTION

Vaginal birth is occasionally accompanied by complications such as severe perineal lacerations, cervical lacerations, and vaginal tears. Perineal injuries are divided into 4 categories according to the anatomic structures involved. As proposed by the National Institute for Health and Care Excellence, third-degree lacerations involve the anal sphincter complex (including its external and internal components), whereas fourth-degree lacerations extend to the rectal mucosa, exposing the intestinal lumen. The incidence of third- and fourth-degree tears in the USA is 6.4%. The impact of severe perineal tearing on the postoperative quality of life varies.¹

In obstetrics, one important complication is the occurrence of perineal lacerations in the course of a vaginal delivery. Perineal lacerations occur in up to two-thirds of women and have been claimed to cause social problems and affect a mother's psychological well-being. The classification of perineal lacerations

is well-known: first or second degree lacerations include the skin, subcutaneous and muscle layers, but exclude the anal sphincter. The third- or fourth degree category (severe perineal lacerations) include partial or complete tears to the anal sphincter or the rectum, respectively.^{2,3}

Risk factors for severe perineal lacerations include increasing birth weight, operative vaginal deliveries, labor induction and augmentation. Moreover, manual protection of the perineum could not be proven to be beneficial according to meta-analyses of randomized trials. It has, however, been argued that randomized trials only investigated separate, specific interventions, and, thus, might not be appropriate for the evaluation of the highly complex process of delivery, which integrates several different maneuvers. This includes communication between the midwife/obstetrician and the delivering woman, perineal support, and a delivery position that would allow visualization of the perineum

during the last few minutes of delivery, among other factors.^{2,4}

Seeking to prevent the occurrence of perineal trauma, since 2018, the World Health Organization (WHO) has been recommending that, during the expulsive period, some techniques should be performed, such as perineal massage, perineal application of warm compresses, and manual perineum protection (“hands on”), always considering the preference of each parturient. Episiotomy, which represents the second most frequent type of perineal trauma, is defined by an incision made in the perineum during the expulsive period, aiming to increase vaginal diameter, facilitating birth. It was described by Ould in 1742, to be performed in “difficult births”. However, it began to be performed globally after DeLee, in 1920, defended its routine use. There are seven techniques described in the literature. The most used are mid-lateral and median episiotomies, the first being the one commonly used in the medical practice in Europe and Brazil, and the second, in the United States. Since the beginning of the last

century, episiotomy became part of the birth care routine, being performed on most parturients, despite the lack of studies. Today, however, it is known that it should be used selectively, that is, only in cases in which there is an indication for it. In these situations, it is estimated that it provides a reduction of up to 30% in the risk of occurrence of a severe laceration.⁵⁻⁸

METHODS

Protocol

By following the rules provided by Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) 2020, the author of this study made certain that it was up to par with the requirements. This is done to ensure that the conclusions drawn from the inquiry are accurate.

Criteria for Eligibility

For the purpose of this literature review, we compare and contrast risk factor and management for severe perineal lacerations during childbirth. It is possible to accomplish this by researching of the risk factor and management for severe perineal lacerations during childbirth. As the

primary purpose of this piece of writing, demonstrating the relevance of the difficulties that have been identified will take place throughout its entirety.

In order for researchers to take part in the study, it was necessary for them to fulfil the following requirements: 1) The paper needs to be written in English, and it needs to determine about the risk factor and management for severe perineal lacerations during childbirth. In order for the manuscript to be considered for publication, it needs to meet both of these requirements. 2) The studied papers include several that were published after 2014, but before the time period that this systematic review deems to be relevant. Examples of studies that are not permitted include editorials, submissions that do not have a DOI, review articles that have already been published, and entries that are essentially identical to journal papers that have already been published.

Search Strategy

We used "risk factor and management for severe perineal lacerations during childbirth." as

keywords. The search for studies to be included in the systematic review was carried out using the PubMed, SagePub, and Sciencedirect databases.

Data retrieval

After reading the abstract and the title of each study, the writers performed an examination to determine whether or not the study satisfied the inclusion criteria. The writers then decided which previous research they wanted to utilise as sources for their article and selected those studies. After looking at a number of different research, which all seemed to point to the same trend, this conclusion was drawn. All submissions need to be written in English and cannot have been seen anywhere else.

Only those papers that were able to satisfy all of the inclusion criteria were taken into consideration for the systematic review. This reduces the number of results to only those that are pertinent to the search. We do not take into consideration the conclusions of any study that does not satisfy our requirements. After this, the findings of the research will be

analysed in great detail. The following pieces of information were uncovered as a result of the inquiry that was carried out for the purpose of this study: names, authors, publication dates, location, study activities, and parameters.

Quality Assessment and Data Synthesis

Each author did their own study on the research that was included in the publication's title and abstract before making a decision about which publications to explore further. The next step will be to evaluate all of the articles that are suitable for inclusion

in the review because they match the criteria set forth for that purpose in the review. After that, we'll determine which articles to include in the review depending on the findings that we've uncovered. This criteria is utilised in the process of selecting papers for further assessment. in order to simplify the process as much as feasible when selecting papers to evaluate. Which earlier investigations were carried out, and what elements of those studies made it appropriate to include them in the review, are being discussed here.

Table 1. Search Strategy

Database	Search Strategy	Hits
Pubmed	((<i>"Childbirth"</i> [MeSH Subheading] OR <i>"Complications"</i> [All Fields] OR <i>"Perineal lacerations"</i> [All Fields]) AND (<i>"Risk factor"</i> [All Fields] OR <i>"Managemnet"</i> [All Fields]) AND (<i>"Outcome"</i> [All Fields] OR (<i>"Prognosis"</i> [All Fields]))	4493
Science Direct	((<i>"Childbirth"</i> [MeSH Subheading] OR <i>"Complications"</i> [All Fields] OR <i>"Perineal lacerations"</i> [All Fields]) AND (<i>"Risk factor"</i> [All Fields] OR <i>"Managemnet"</i> [All Fields]) AND (<i>"Outcome"</i> [All Fields] OR (<i>"Prognosis"</i> [All Fields]))	2229
Sagepub	((<i>"Childbirth"</i> [MeSH Subheading] OR <i>"Complications"</i> [All Fields] OR <i>"Perineal lacerations"</i> [All Fields]) AND (<i>"Risk factor"</i> [All Fields] OR <i>"Managemnet"</i> [All Fields]) AND (<i>"Outcome"</i> [All Fields] OR (<i>"Prognosis"</i> [All Fields]))	72

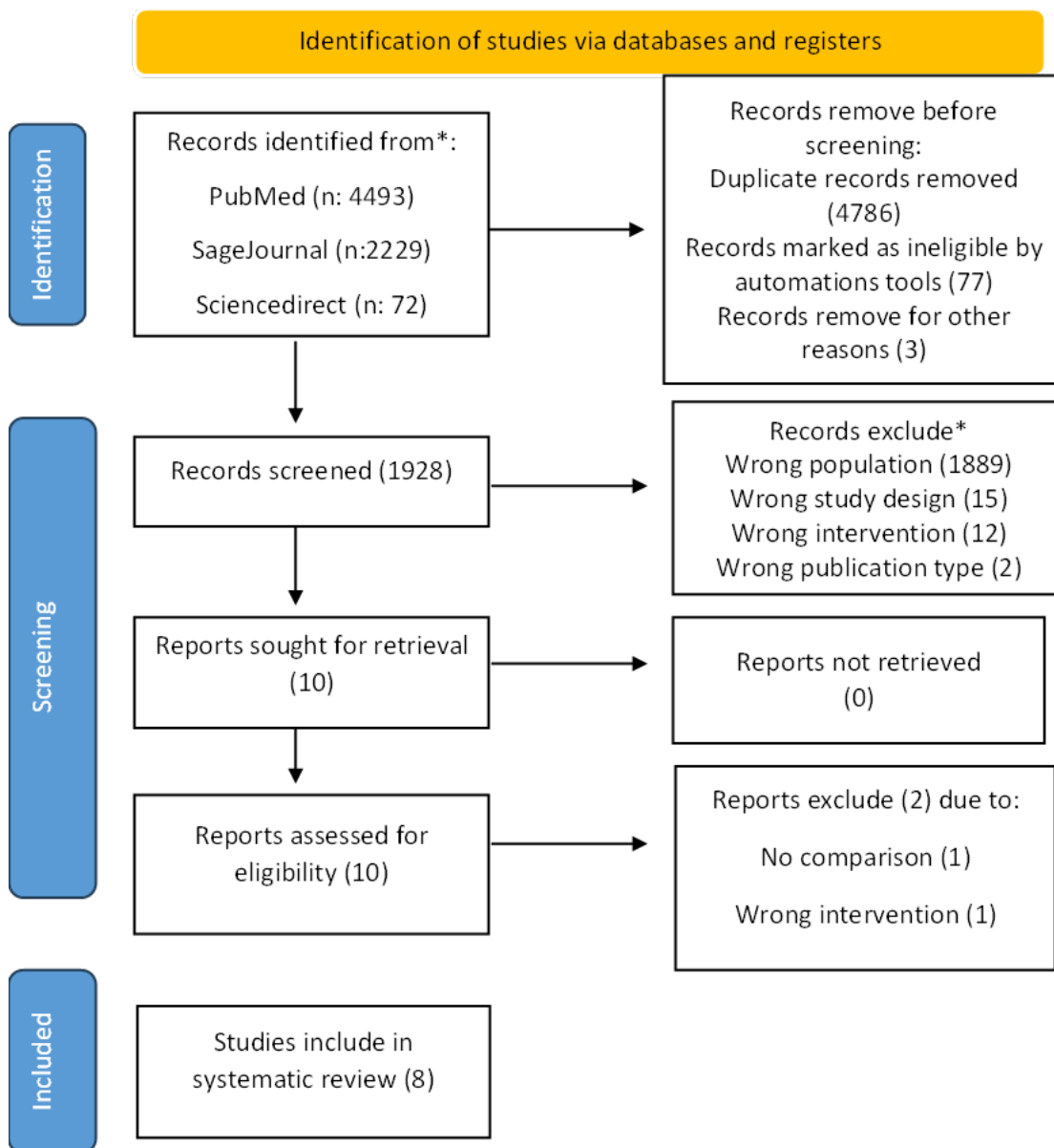


Figure 1. Article search flowchart

Table 2. Critical appraisal of Study

Parameters	(Dendini, M et al., 2024)	(Puisségur, A et al., 2023)	(Longo, VL et al., 2023)	(Baczek, G et al., 2022)	(Cakwira, H et al., 2022)	(Barca, JA et al., 2021)	(Jansson, MH et al., 2020)	(Simic, M et al., 2017)
1. Bias related to temporal precedence								
Is it clear in the study what is the “cause” and what is the “effect” (ie, there is no confusion about which variable comes first)?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2. Bias related to selection and allocation								
Was there a control group?	Yes	Yes	No	Yes	No	No	No	No
3. Bias related to confounding factors								
Were participants included in any comparisons similar?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
4. Bias related to administration of intervention/exposure								
Were the participants included in any comparisons receiving similar treatment/care, other than the exposure or intervention of interest?	No	No	No	No	No	No	No	No
5. Bias related to assessment, detection, and measurement of the outcome								
Were there multiple measurements of the outcome, both pre and post the intervention/exposure?	No	No	No	No	No	No	No	No
Were the outcomes of participants included in any comparisons measured in the same way?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Were outcomes measured in a reliable way?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
6. Bias related to participant retention								
Was follow-up complete and, if not, were differences between groups in terms of their follow-up adequately described and analyzed?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
7. Statistical conclusion validity								
Was appropriate statistical analysis used?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

RESULT

Using reputable resources like Science Direct, PubMed, and SagePub, our research team first gathered 6794 publications. A thorough three-level screening strategy was used to identify only eight papers as directly relevant to our ongoing systematic evaluation. Next, a thorough study of the entire text and further examination of these articles were selected. Table 3 compiles the literature that was analyzed for this analysis in order to make it easier to view.

Table 3. The literature include in this study

Author	Origin	Method	Sample	Result
Dendini, M et al., 2024 ⁹	Saudi Arabia	The current study is a case-control study where a review of 5000 vaginal delivery records was carried out between March 1, 2018, and March 19, 2023. For the study, cases (n = 71) were female patients who had documented greater than second-degree perineal injury.	309	From the 5000 births analyzed, the cases were 71 patients (1.42% of 5000 births). The mean age at diagnosis in our sample was (28.05 ± 4.66 years). The study's results showed that the following variables significantly affected the occurrence of EPTs: birth weight, labor durations, parity, HCW experience, and mode of delivery. The odds for tears were 3.69 (95% CI: 0.156-0.469) higher in nulliparous patients relative to multiparous patients. Instrumental deliveries resulted in more tears than non-instrumental deliveries with an odds ratio (OR) of 5.901 (95% CI: 2.443-14.525). This study also found that prolonged second-stage labor seems to be associated with an increased risk of perineal damage. HCW experience was looked at in relation to the increased incidence of

				EPTs, which showed that midwives had a lower incidence rate than physicians with an OR of 2.25 (95% CI: 1.169-4.366). Epidural usage has also been significantly associated with a lesser incidence of perineal tears, which indicates that using epidural could protect against the occurrence of EPTs.
Puissegur, A et al., 2023¹⁰	France	We collected ante- and intrapartum characteristics and outcomes at the postpartum visit. In all, 84 cases and 249 control subjects were included.	333	In univariate analysis, primiparity, absence of history of vaginal delivery, a longer second phase of labour, instrumental delivery, and a higher degree of laceration emerged as risk factors for early perineal suture breakdown postpartum. Gestational diabetes, peripartum fever, streptococcus B, and suture technique did not emerge as risk factors for perineal breakdown. Multivariate analysis confirmed that instrumental delivery (OR = 2.18 [1.07; 4.41], $p = 0.03$) and a longer second phase of labour (OR = 1.72 [1.23; 2.42], $p = 0.001$) were risk factors for early perineal suture breakdown.
Longo, VL et al., 2023¹¹	UK	This was an observational retrospective cohort study	41440	Of 41,440 patients screened for eligibility, 22,156 met the inclusion criteria, and 15,992 were balanced after propensity

		conducted at a University Teaching Hospital in Italy. The study was conducted from 2009 to 2019 using a prospectively maintained database.		score matching. Obstetric anal sphincter injuries occurred in 81 cases (0.4%), 67 (0.3%) after spontaneous delivery and 14 (0.8%) after vacuum delivery ($P=.002$). There was an increased odds of severe lacerations of nearly 2-fold for nulliparous women delivering by vacuum delivery (adjusted odds ratio, 2.85; 95% confidence interval, 1.19–6.81; $P=.019$), with a reciprocal reduction in women with spontaneous vaginal delivery (adjusted odds ratio, 0.35; 95% confidence interval, 0.15–0.84; $P=.019$) and at least 1 previous delivery (adjusted odds ratio, 0.51; 95% confidence interval, 0.31–0.85; $P=.005$). Epidural anesthesia was associated with a lower incidence of obstetric anal sphincter injuries (adjusted odds ratio, 0.54; 95% confidence interval, 0.33–0.86; $P=.011$). The risk of severe lacerations was independent of the duration of the second stage of labor (adjusted odds ratio, 1.00; 95% confidence interval, 0.99–1.00; $P=.3$), whereas the risk was reduced when mediolateral episiotomy was performed (adjusted odds ratio, 0.20; 95% confidence interval, 0.11–0.36; $P<.001$). Neonatal
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				risk factors include head circumference (odds ratio, 1.50; 95% confidence interval, 1.18–1.90; $P=.001$) and vertex malpresentation (adjusted odds ratio, 2.71; 95% confidence interval, 1.08–6.78; $P=.033$). Induction of labor (adjusted odds ratio, 1.13; 95% confidence interval, 0.72–1.92; $P=.6$), frequent obstetrical examinations (adjusted odds ratio, 1.17; 95% confidence interval, 0.72–1.90), and women's supine position at birth (adjusted odds ratio, 1.25; 95% confidence interval, 0.61–2.55; $P=.5$) were further evaluated. Among severe obstetrical complications, shoulder dystocia increased the risk of obstetric anal sphincter injuries by nearly 4 times (adjusted odds ratio, 3.92; 95% confidence interval, 0.50–30.74; $P=.2$), whereas postpartum hemorrhage occurred 3 times more often in cases of delivery complicated by severe lacerations (adjusted odds ratio, 3.35; 95% confidence interval, 1.76–6.40; $P<.001$).
Baczek, G et al., 2022 ¹²	Poland	This was a single-center retrospective case-control study. The study included the	15117	The analysis of single-factor logistic regression showed that the factors related to perineal laceration during childbirth are the age of the patients giving birth

		analysis of two groups, the study group featured 7238 patients with spontaneous perineal laceration (any degree of perineal laceration) and the control group featured patients without perineal laceration with 7879 cases.		($p = 0.000$), the BMI before delivery ($p = 0.000$), the number of pregnancies ($p = 0.000$) and deliveries ($p = 0.000$), diagnosed gestational diabetes ($p = 0.046$), home birth ($p = 0.000$), vaginal birth after cesarean (VBAC) ($p = 0.001$), the use of oxytocin in the second stage of childbirth ($p = 0.041$), the duration of the second stage of childbirth ($p = 0.000$), body weight ($p = 0.000$), and the circumference of the newborn head ($p = 0.000$). Independent factors that increase the risk of perineal laceration during childbirth are an older age of the woman giving birth, a history of cesarean section, a higher birth weight of the newborn, and factors that reduce the risk of spontaneous perineal trauma are a higher number of deliveries and home birth.
Cakwira, H et al., 2022 ¹³	Congo	Our cross-sectional, retrospective, and descriptive study focused on patients admitted for childbirth and hospitalized in the	111	A total of 111 deliveries were recorded with a 12.6% frequency of perineal tears. 64.3% of women aged between 26 and 35 and 71.4% of primiparous women were affected by perineal tears. For delivery, 64.3% of births were eutocic deliveries, with 42.9% of children born with a birth weight greater than 4 kg,

		obstetrics department of the Saint Luc Tertiary Clinic for a period from March 2021 to March 2022. During this period, we recorded 111 deliveries with 14 perineal tears.		and the cephalic presentation delivered 86% of children. For degrees of perineal tears, 64.3% of patients had first-degree perineal tears. For postpartum treatment of perineal tears, analgesics help calm the pain, and antibiotic therapy has been considered. For fourth and third-degree tears, episiotomy was performed as a surgical procedure.
Barca, JA et al., 2021¹⁴	Spain	An observational, retrospective, hospital cohort study was carried out in women whose deliveries were attended to in the obstetrics service of the Hospital General Universitario Gregorio Marañón de Madrid (HGUGM), during the period from January 2010 to April 2017.	33026	During the study period, a total of 33,026 patients were included in the study. For maternal variables, the associated increased risk of severe perineal tearing in nulliparous women is OR = 3.48, for induced labor OR = 1.29, and for instrumental delivery by forceps OR = 4.52 or spatulas OR = 4.35; for the obstetric variable of episiotomy, it is OR = 3.41. For the neonatal variables, the weight of the newborns has a directly proportional relationship with the risk of severe tears, and for birth weights of 3000 g (OR = 2.41), 3500 g (OR = 1.97), and 4000 g (OR = 2.17), statistically significant differences were found in each of the groups ($p < 0.05$). Conclusion: Primiparity, induction of labor,

				episiotomy, instrumental delivery with forceps or spatula, and a birth weight of 3000 g or more are significantly associated with an increased risk of third and fourth degree perineal tears.
Jansson, MH et al., 2020¹⁵	Sweden	All nulliparous women registering at the maternity health care in Region Örebro County, Sweden, in early pregnancy between 1 October 2014 and 1 October 2017 were invited to participate in a prospective cohort study.	644	A total of 644 women were included in the study sample. Fetal weight exceeding 4000 g and vacuum extraction were found to be independent risk factors for both second-degree perineal tears (aOR 2.22 (95% CI: 1.17, 4.22) and 2.41 (95% CI: 1.24, 4.68) respectively) and OASI (aOR 6.02 (95% CI: 2.32, 15.6) and 3.91 (95% CI: 1.32, 11.6) respectively). Post-term delivery significantly increased the risk for second-degree perineal tear (aOR 2.44 (95% CI: 1.03, 5.77)), whereas, maternal birth positions with reduced sacrum flexibility significantly decreased the risk of second-degree perineal tear (aOR 0.53 (95% CI 0.32, 0.90)). Heredity of pelvic floor dysfunction and/or connective tissue deficiency, induced labor, vacuum extraction and fetal head circumference exceeding 35 cm were independent risk factors for high vaginal tears (aOR 2.32 (95% CI 1.09,

				4.97), 3.16 (95% CI 1.31, 7.62), 2.53 (95% CI: 1.07, 5.98) and 3.07 (95% CI 1.5, 6.3) respectively).
Simic, M et al., 2017¹⁶	Sweden	This population based cohort study was conducted in the Stockholm/ Gotland region, Sweden, 2008–2014. Study population included 52 211 primiparous women undergoing vaginal delivery with cephalic presentation at term.	52211	Risk of severe perineal lacerations increased with duration of second stage of labor. Compared with a second stage of labor of 1 h or less, women with a second stage of more than 2 h had an increased risk (aOR 1.42; 95% CI 1.28–1.58). Compared with non-instrumental vaginal deliveries, the risk was elevated among instrumental vaginal deliveries (aOR 2.24; 95% CI 2.07–2.42). The risk of perineal laceration increased with duration of second stage of labor until less than 3 h in both instrumental and non-instrumental vaginal deliveries, but after 3 h, the ORs did not further increase. After adjustments for potential confounders, macrosomia (birth weight > 4 500 g) and occiput posterior fetal position were risk factors of severe perineal lacerations.

DISCUSSION

It is estimated that more than 85% of women had some kind of perineal trauma during childbirth, caused by episiotomy or by the spontaneous rupture (tear or laceration) of tissues during the baby's passage through out the vagina. Spontaneous perineal tears are classified in degrees according to the tissue layers affected. First-degree tears only reach the skin and mucosa, second-degree tears also reach the musculature, third-degree tears affected the anal sphincter and fourth-degree tears harm the rectal mucosa. Complications associated with perineal trauma may harm women's health both in the immediate and long term post-partum period, affecting their mobility, vesical and intestinal elimination, general care towards the newborn and other daily activities. When the trauma is minor, suture and post-partum perineal care are performed properly, the chance of complications are lower. Episiotomy, on the other hand, may cause more severe pelvic floor damages, just as third- and fourth-degree tears. Some

maternal and newborn characteristics may be related to higher occurrences and degree of spontaneous perineal tears.⁵ The place of birth, professionals who provide care and their practices also affect the degree of perineal tears and perineum care after childbirth.¹⁷⁻¹⁹

Risk factors for perineal lacerations include first-time childbirth, operative deliveries, larger babies, certain fetal positions, and specific maternal factors such as age and ethnicity. Episiotomies, particularly the midline type, are linked with higher rates of severe lacerations, although mediolateral episiotomies, while harder to repair, can reduce severe tears. Episiotomy use is now more restricted, with guidelines recommending it only when necessary. Most first-degree lacerations do not require suturing unless there is significant bleeding or anatomical distortion. For second-degree tears, continuous suturing is preferred to reduce postpartum pain. Third- and fourth-degree lacerations involve a more complex repair process, often requiring stepwise techniques to restore both the perineal

and rectal tissues. Follow-up care following perineal laceration repair is crucial and includes pain management, preventing constipation, and monitoring for urinary retention. Infection and wound breakdown are potential complications, with long-term issues including incontinence and dyspareunia. Preventative measures, such as perineal massage in late pregnancy and careful intrapartum techniques, can help reduce the risk and severity of perineal lacerations.²⁰⁻²²

Moderate-quality evidence suggests that warm compresses, and massage, may reduce third- and fourth-degree tears but the impact of these techniques on other outcomes was unclear or inconsistent. Poor-quality evidence suggests hands-off techniques may reduce episiotomy, but this technique had no clear impact on other outcomes. There were insufficient data to show whether other perineal techniques result in improved outcomes.^{23,24}

If the internal anal sphincter can be adequately identified, repair has been recommended either as a part of

the distal portion of the reinforcing second layer of the rectal muscularis using a 3-0 polyglactin suture or separately from the external anal sphincter using a 3-0 monofilament polydioxanone suture.^{25,26}

CONCLUSION

In conclusion, various independent risk factors have been recognized to be associated with these severe perineal lacerations. Increased maternal age, nulliparity, induction of labor, epidural analgesia, prolonged duration of second stage of labor, fetal macrosomia, persistent occipitoposterior position and instrumental delivery are the most frequently reported. Suture repair is relatively contraindicated for hemostatic perineal lacerations. Conservative management is preferred for hemostatic lacerations. For lacerations with persistent bleeding or anatomical distortion requiring repair, treatment should be delayed if an appropriately trained clinician is unavailable. In such cases, wound packing is recommended, with repair deferred for 8 to 12 hours until

an experienced clinician can evaluate and properly address the laceration.

DISCLOSURE STATEMENT

Disclosure Statement : The authors have no conflicts of Interest to declare.

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