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Prevention of Perineal Tearing During Childbirth: A Literature Review

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PREVENTION OF PERINEAL TEARING DURING CHILDBIRTH: A LITERATURE REVIEW

by

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Abstract

Perineal lacerations can be caused by a variety of risk factors such as a large fetal head circumference, birthing positions that place strain on the sacrum, and first-time births. Preventing perineal tears can be challenging for laboring women. Exploring the possible prevention methods to decrease the severity of perineal tearing or preventing it altogether can be beneficial for laboring women's physical and mental health. The primary purpose of this literature review was to examine which interventions are most likely to prevent perineal tearing during childbirth. The secondary purpose was to evaluate natural perineal tears in comparison to surgical incision, or episiotomy, and the time to recovery outcomes. A comprehensive literature review examining various prevention methods was conducted from several databases. Peer-reviewed research articles from 2003-2022 regarding the use of perineal massages, birthing positions, manual perineal protection, warm compress, and Kegel exercises were analyzed and included in this literature review. Although many articles suggested factors such as large fetal head circumference and first-time childbirth were factors often challenging to manipulate, the data indicates that several prevention methods may prove to be beneficial in limiting the severity of perineal tearing.

Dedications

To my mom, dad, and sister, who have always given me their unconditional love and support. I would not be the person I am today without you three.

To my extended family and friends, who have always given me a helping hand when needed.

To my partner, thank you for your unwavering support and understanding.

I love you all.

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Introduction

Non-surgical childbirth termed ‘natural’ or ‘vaginal’ birth can cause significant damage to the perineal area during fetal passage. Approximately 9 in 10 first time mothers will experience some level of perineal tearing during a vaginal birth. The perineum is the area of skin between the vaginal opening and anus, which is commonly injured during childbirth. Perineal trauma can be either spontaneous or iatrogenic, and often results from failure of the vaginal outlet to stretch and accommodate the fetal head. Perineal tears, or lacerations, occur during vaginal birth when the baby’s head is being expulsed from the vaginal opening. If the head is too big or the vagina fails to stretch adequately, a perineal tear can happen.

Several methods can be used by health care providers, specifically nurses, to prevent perineal tears from occurring during the birth process. Methods used include birth techniques with full dilation and effacement, physically stretching the perineum during labor, Kegel or pelvis floor exercise during pregnancy, skin lubricants or emollients, episiotomy, number of prior births, delivery of multiple infants, and size of the infant. Tearing of the perineum often occurs without warning despite methods to reduce trauma to the perineum during the childbirth process. Any type of tear can cause problems after delivery that can persist throughout the woman’s life, interfering with urination, defecation, and sexual intercourse. Exploring methods to prevent perineal trauma in women during childbirth is of value to protecting genitourinary, gastrointestinal, and reproductive health.

Problem

Perineal tears during childbirth can contribute to many long-term consequences for women including complications with their genitourinary, gastrointestinal, and reproductive health. While first degree tears are minimal and heal without treatment, second-, third-, and fourth-degree tears are considered severe and require stitches. The involvement of the anal sphincter in third- and fourth-degree tears may cause fecal incontinence, painful sexual intercourse, and bladder dysfunction. There is lack of knowledge on the preventative factors for perineal tearing. The methods nurses and patients can implement to prevent perineal trauma during childbirth must be further evaluated.

The use of perineal massage, manual perineal protection, birthing positions, and Kegel exercises in the prevention of perineal tears is not fully understood. Although much of the research done for this topic was of smaller sample sizes and limited, the evidence suggests that the preventative methods discussed are beneficial for decreasing the incidence of severe perineal tearing. However, the data indicates that the decrease in perineal tearing is not significantly major when utilizing the preventative methods. The results in current research for the preventative measures to decrease perineal tearing in laboring women advocates for further research on this topic to be done.

Purpose

The purpose of this literature review is to examine which interventions are most likely to prevent perineal tearing during childbirth. There is a lack of knowledge of perineal tears and its risk factors. Additionally, there is insufficient research done on the effectiveness of methods to decrease the severity or prevent perineal trauma, and when these methods should be started. Most of the research that has been done has been with a smaller sample size and does not consider various factors such as multiparous women or multiple child births.

This literature review will also evaluate natural perineal tears in comparison to surgical incision tears, their recovery, and their outcomes. Research that has been done on episiotomies indicate it is both detrimental and beneficial for perineal tearing, depending on the type of delivery. However, most of the research done on episiotomies and how they may prevent or worsen perineal trauma is limited and raises the need for more research to be done.

Method

A literature review was performed using research articles available from 2003 to 2022 regarding the use of perineal massages, manual perineal protection, birthing positions, and Kegel exercises in the prevention of perineal tearing during childbirth. Databases used included CINAHL, ERIC, Ebsco Host, and Medline. Searches included a combination of the following terms: perineal tearing, massage*, manual perineal protection*, birthing positions*, Kegel exercises*, episiotomy*, benefit*, and risk*. Inclusion criteria consisted of 1) published research articles in the English language, 2) perineal prevention methods used for 'natural' or vaginal childbirth, and 3) recovery time after an episiotomy compared to a natural perineal laceration.

Each research article was analyzed to assess for relevance to the topic. Research studies utilized for this review consists of literature reviews, as well as quantitative and qualitative data studies that were all published from 2003-2022. The origin of publication of these studies includes the United States, Australia, Czech Republic, Austria, Turkey, Sweden, Israel, Canada, Spain, and The Netherlands. The articles were critiqued and synthesized, and data was extracted. Recommendations for future research related to the topic and limitations to the studies were also mentioned.

Background

Perineal tears can be categorized as first, second-, third-, or four-degree tears, denoting the severeness of the tears. First degree tears are small tears that solely affect the outer layer of the skin. These tears are minor and usually heal quickly and without medical intervention. Second degree tears affect the skin and the muscle of the perineum, usually requiring stitches. Third degree tears partially affect the anal sphincter, while fourth degree tears completely involve the anal sphincter. Since both third- and fourth-degree tears involve the anal sphincter, repair is often needed in the operating room (Cleveland Clinic, 2020).

The recovery time for perineal tears vary depending on the severity of the tear. In most cases, first degree tears do not require stitches, therefore relief of pain is usually resolved within two weeks. Recovery for second-, third-, and fourth-degree tears are relative to the stitches and degree of tissue involved. If the degree of tear requires stitches, it usually takes around six weeks for it to dissolve. Third- and fourth-degree tears are arguably the most painful and complex, as it encompasses the perineum and anal sphincter. These tears are repaired in the operating room, requiring spinal or epidural anesthesia, as the layers of tear are stitched together (International Urogynecological Association, 2022). The recovery for third- and fourth-degree tears is more intensive than first- and second-degree tears since it also includes pharmacological interventions like stool softeners and antibiotics to prevent straining and decrease the risk of infection.

In the past century, laboring women have often given birth lying down in the supine or lithotomy position. While many factors could influence why a women would deliver on the lithotomy position, such as administration of epidural or anesthetic agents, larger perineal tears are often seen in these birthing positions. However, there are various positions that might decrease the risk of perineal tearing during childbirth. In comparison to the traditional flat lying

position, delivering in an upright, side lying, kneeling, or squatting position could lower the chances of a perineal tear. Flexible sacrum positions are beneficial for laboring women to minimize tearing as the weight is not entirely on the sacrum, allowing for the pelvic outlet to expand (Edqvist et al., 2016). Ultimately, letting the birthing woman choose the position she will birth in has been associated with a decrease in tears.

Manual perineal protection is one of many interventions' nurses can implement on a woman during childbirth to decrease the extent of perineal trauma. The healthcare professional, or nurse, can manually support the perineal area as the fetus is being expelled from the vaginal opening. This technique is used for a short period and can help reduce the severity of tearing in the laboring mother (Jansova et al., 2017). In addition to manual support, the nurse may also place a warm compress against the perineum during the delivery. As the fetus' head stretches the vagina and places pressure on the perineum, the warm compress may help reduce the severity of perineal tearing and aid in alleviation (Magoga et al., 2019).

Perineal massages are directed towards manually stretching the tissue between the vaginal opening and the anus using one or two fingers. The aim is to keep the perineal tissue flexible and prepared for childbirth. These massages can be performed individually, or together with a partner, to prepare the perineal muscles and skin. Before performing a perineal massage, the persons involved will wash their hands and verify nails are trimmed to avoid unnecessary injury. A comfortable position that allows easy access to the perineum is also recommended. The use of massage gel or lubricants are based on personal preferences but may aid in the fluidity of the massage. The thumbs, index, or middle fingers can be utilized for the purpose of the massage and are inserted one inch inside the vagina. The goal of the massage is to gently stretch the back portion of the vaginal canal, massaging downward towards the anus and then to each side,

applying more pressure over time. The pressure should not be painful, but it might be expected to experience a slight burning sensation as the perineal tissues are being stretched (American Pregnancy Association, 2022).

The pelvic floor is a group of muscles that hold the pelvic organs in place. These organs include the bladder, urethra, intestines, rectum, uterus, cervix, and vagina. Pelvic floor exercises, or Kegel exercises, are a series of exercises that are aimed at strengthening and conditioning the pelvic floor. These exercises are beneficial for laboring women as they are associated with decreased levels of episiotomies and perineal tears, especially in first time mothers who are most likely to experience a tear. Kegel exercises are also beneficial for maintaining bowel and urinary function, which can become impaired in perineal tearing (Leon-Larios et al., 2017).

Episiotomy is the surgical incision of the vaginal orifice during the second stage of labor. Episiotomies may be performed for the intention of delivering the baby swiftly during emergency, or with the intent of causing less trauma to the perineum. It has been believed for many years that episiotomies are more helpful for laboring women than naturally tearing. However, it has been shown that routine episiotomy can be more painful then helpful for tears. Several complications that can arise from an episiotomy include cutting the anal sphincter, vaginal prolapse, recto-vaginal fistula, increased blood loss, sexual dysfunction, and infection (Carroli & Mignini, 2009).

Forceps delivery is a type of assisted delivery that can aid women deliver their infants vaginally, which can be helpful when labor is not advancing. Although it is unsure if assisted delivery increases the risk of perineal trauma during childbirth, there is evidence suggesting that forceps delivery can cause third- and fourth- degree tears compared to non-assisted vaginal deliveries. Research shows that in about 10% of forceps deliveries, third- and fourth-degree

perineal tears occur. Despite perineal tears being decreased when episiotomies are performed in forceps delivery, the incidence of perineal tearing is evidently still increased (Hudelist et al., 2005).

Primiparous women are women who are pregnant for the first time and have birthed only one child. Multiparous women have been pregnant for more than one time. In respect to perineal tears, primiparous women are much more likely to experience perineal trauma in comparison to multiparous women. Trends indicate that the percentage of perineal tears decreases with an increased number of pregnancies (Smith et al., 2013).

A larger infant head circumference might be a risk factor for perineal trauma during childbirth. During delivery, the vaginal canal must accommodate the size of the infant's head for the infant to be expelled. In doing so, the perineal muscles and fascia become flexible and stretch. In the instance of an infant with a larger head circumference, the perineum might tear to deliver the infant.

Results

The research studies analyzed for the topic of perineal tearing and its preventative measures indicated that there is a decrease in perineal tearing when health care providers use multiple preventative methods during the labor process to reduce perineal tears. These studies also demonstrated that there was no harm in performing non-invasive preventative measures such as perineal massages, Kegel exercises, and manual perineal protection during pregnancy and labor.

Birthing positions

All reviewed articles in the analysis indicated flexible sacral birthing positions are beneficial for laboring women to minimize tearing as the weight of the fetus is not entirely on the sacrum, allowing for the pelvic outlet to naturally expand. Birthing in a side-lying position has been shown to decrease the severity of tearing by allowing the presenting part to descend slower in comparison to other positions. The studies suggest that laboring women who deliver utilizing flexible sacral birthing positions are less likely to experience severe perineal tearing. A comfortable birthing position that deviates from the traditional flat lying position is ultimately best for a woman during childbirth to avoid severe tearing.

Perineal massages

One study in Turkey found that the use of perineal massages during active labor decreased the frequency of episiotomy procedures performed. However, another study in Israel indicated that perineal massages had no beneficial or detrimental effect on laboring mothers. A very slight benefit was found in the study, in which one massage group experienced a decrease in

first-degree and lateral tears. The study concluded that although perineal massages did not significantly increase the probability of an intact perineum, it was not harmless. Many of the results found regarding perineal massages are inconclusive or severely limited, suggesting a need for further research to be conducted.

Fetal head circumference

Several articles found nurses' knowledge of fetal head circumference and the use of warm compress and manual stretching of the vaginal outlet for perineal protection can reduce the severity of perineal tearing by minimizing the degree of perineal tissue involvement. Research studies have suggested a link between large head circumference and a prolonged second stage of labor, both risk factors for severe perineal trauma (Komorowski et al., 2014). The Childbirth and Pelvic Symptoms Study found that larger infant head circumference is associated with severe perineal trauma. Increased head circumference was also associated with an increased risk of levator ani muscle injury and was seen in women who underwent postpartum ultrasounds. The risk of levator ani muscle injury was increased even further when the second stage of labor was prolonged in the laboring women.

Presence of previous deliveries

In one study, the entirety of women with an intact perineum after delivery was over three times higher in multiparous women than primiparous women. Trends indicate the percentage of perineal tears decreases with an increased number of pregnancies. A study of over 2,000 delivers in Sahlgrenska University Hospital, Sweden concluded that a higher percentage of nulliparous women (16.6%) compared to parous women (9.4%) had severe perineal trauma after vaginal

delivery. Similarly, the study found that nulliparous women are significantly more likely to experience an episiotomy in comparison to parous women.

Episiotomies

Routine episiotomy can be more painful than helpful for managing perineal tears and causes more scaring of the sensitive area between the vagina and anus. Several complications that can arise from an episiotomy include cutting the anal sphincter, vaginal prolapse, recto-vaginal fistula, increased blood loss, sexual dysfunction, and infection. While majority of the research articles indicated that episiotomies are likely to more difficult to recover from than natural perineal tears, one study conducted in Semmelweis Women's Hospital Vienna suggests that episiotomies might be beneficial in the prevention of perineal tears under certain circumstances. The study concluded that the frequency and severity of perineal tears were lower during forceps assisted delivery when an episiotomy was performed (Bodner-Adler et al., 2003). Similarly, another study conducted showed that mediolateral episiotomies may prevent chronic fecal incontinence in nulliparous women by decreasing harm to the anal sphincter during labor.

Discussion

The studies explored in this literature review provide valuable insight regarding the different risk factors and preventative measures for laboring women experiencing a natural delivery. The research findings showed that several factors such as birthing positions, fetal head circumference, previous deliveries, and use of episiotomies or forceps can all contribute to the severity of a perineal laceration during labor. Likewise, majority of the research articles concluded that preventative measures such as flexible birthing positions, perineal massages, warm compress, and Kegel exercises can all aid in decreasing the severity of tearing. Factors that aren't preventative such as presence of a previous delivery and fetal head circumference also play a significant role in determining the outcome of perineal lacerations.

Studies regarding perineal massages and its effectiveness in decreasing perineal tearing was limited and mostly inconclusive, although many articles suggested performing perineal massages does not cause any harm. While the massages may not have any significant benefit, they also do not provide any significant disadvantages, therefore they are still overall recommended in the preventative measures related to perineal tearing.

In the study by DiFranco, delivering in the side-lying position was found to be the most beneficial in preventing perineal trauma during labor. The study mentions the increased benefits of any position in which the sacrum is allowed to be flexible such as hands-and-knees, squatting, or side-lying. In addition to positions in which allow sacral flexibility, positions that allow gravity to facilitate in the delivery of the fetus is also highly encouraged, as it decreases maternal fatigue and reduce labor time, which is one risk factor for perineal trauma.

Both Poen and Samuelsson concluded in their separate studies that nulliparous women are more likely to experience perineal tearing in comparison to multiparous women. While there

are several risk factors of anal sphincter tears, the studies indicated that women who have never experienced labor prior are more likely to experience these severe tears. Likewise, both studies also concluded that nulliparous women are more likely to experience an episiotomy procedure compared to parous women.

Jansova and Komorowski performed separate studies related to fetal head circumference and its effects on perineal trauma during childbirth. Both studies indicated that larger head circumference of the fetus is correlated to an increase in perineal tearing during delivery. While it is mainly seen in large for gestation age babies, it is not the sole factor. In Jansova's study, it was concluded that manual perineal protection is beneficial and reduces the severity of tearing in fetuses with large head circumference.

In conclusion, the research articles indicate there is a decrease in perineal tearing when mothers and health care providers use multiple preventative methods during the labor process to reduce perineal tears. The results suggest a need for further research to assess best practices for preventative measures to decrease perineal tearing in laboring women based on length of labor and in high-risk labor conditions.

Limitations

This literature review contained several limitations. Several of the studies had a small sample size. This could be due to several factors, such as participants delivering in different hospitals than the one performing the study. In many cases, participants refused to participate in the studies towards labor, although the reasons are not clearly defined, it could be assumed participants refused inclusion of the study due to invasion of privacy. Due to the small sample sizes and limited studies done, further research is still required.

One major limitation to the literature review is the absence of preventative measures during the entirety of pregnancy. Majority of the studies conducted measured perineal massages during labor, but excluded the time before a woman goes into childbirth. Although many of the studies included a 24-to-72-hour period in which they conducted perineal massages prior to delivery of the fetus, they did not consider the effectiveness of perineal massages prior to labor. Further research on the effectiveness of perineal massages throughout the entirety of the pregnancy is needed to fully examine its usefulness in preventing perineal tears.

Implications for Nursing

Perineal tearing can cause serious complications in a woman's genitourinary, gastrointestinal, reproductive, and mental health. Fecal incontinence, bladder incontinence, sexual discomfort or pain, and hesitancy or fear to become pregnant again can all occur after a woman experiences a perineal tear. While tears vary in severity, all tears can cause some degree of physiological and psychological consequences. Preventative measures can aid in decreasing the severity of the perineal tears or limit them altogether. Continuing research on perineal trauma and its possible preventative measures will decrease possible complications and infections in laboring women and help professionals better understand the risk factors behind it. Healthcare providers and nurses should continue to educate patients on perineal tears and the measures they can take to decrease the severity of them such as warm compress, manual perineal protection, Kegel exercises, perineal massages, and flexible sacral birthing positions.

Appendix A: Table

Table 1: Table of evidence

Reference	Study Design & Purpose	Sample Size & Screening Measures	Results	1=useful 2=inconclusive 3=not useful
Bodner-Adler, B., Bodner, K., Kimberger, O., Wagenbichler, P., & Mayerhofer, K. (2003). Management of the perineum during forceps delivery. Association of episiotomy with the frequency and severity of perineal trauma in women undergoing forceps delivery. *The Journal of reproductive medicine*, *48*(4), 239–242.	Retrospective study Analyzed all forceps deliveries at the Semmelweis Women's Hospital Vienna between February 1999 and July 1999.	N= 87 76 underwent forceps delivery. 49 underwent mediolateral episiotomy procedure. 27 underwent midline episiotomy procedure.	In the instance of a forceps delivery, the performance of episiotomies decreases the risk perineal tears.	1
Carroli, G., & Mignini, L. (2009). Episiotomy for vaginal birth. *The Cochrane database of systematic reviews*, (1), CD000081. https://doi.org/10.1002/14651858.CD000081.pub2	Systematic literature review Assessed the effects of restrictive use of episiotomy compared with routine episiotomy during vaginal birth.	Systematic literature review that analyzed 8 studies (N= 5,541 women in total).	In comparison to routine episiotomies, restrictive episiotomies have several benefits such as less complications and no difference in severe perineal trauma. There was an increased risk of anterior perineal trauma with	2

			restrictive episiotomies.	
Demirel, G., & Golbasi, Z. (2015). Effect of perineal massage on the rate of episiotomy and perineal tearing. *International Journal of Gynecology & Obstetrics*, *131*(2), 183–186. https://doi.org/10.1016/j.ijgo.2015.04.048	Randomized control study Examined the effects of perineal massage during active labor in relation to episiotomies and perineal tearing.	N=142 Healthy, pregnant women who were having their first or second delivery were enrolled during the first stage of labor.	The use of perineal massage during labor decreased the frequency of episiotomies.	1
DiFranco, J. T., & Curl, M. (2014). *Healthy Birth Practice #5: Avoid giving birth on your back and follow your body's urge to push*. The Journal of perinatal education. Retrieved April 21, 2023, from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4235063/#:~:text=Birthing%20in%20the%20side%2Dlying,%2C%20%26%20Shorten%2C%202002).	Evidence-based review of the "Lamaze International Care Practices That Promote Normal Birth, Care Practice #5: Spontaneous Pushing in Upright or Gravity-Neutral Positions". Examines the various birthing positions in comparison to the supine birthing position.	Evidenced-based review of the various birthing positions a laboring woman can deliver in.	Giving birth in the side-lying position is the most effective position to decrease fatigue and perineal trauma.	1
Edqvist, M., Hildingsson, I., Mollberg, M.,	Experimental cohort study	N= 597 primiparous women	Evaluate midwifery interventions	1

Lundgren, I., & Lindgren, H. (2017). Midwives' Management during the Second Stage of Labor in Relation to Second-Degree Tears-An Experimental Study. *Birth (Berkeley, Calif.)*, *44*(1), 86–94. https://doi.org/10.1111/birt.12267			designed to reduce second-degree tears in primiparous women.	
Hudelist, G., Gelle'n, J., Singer, C., Ruecklinger, E., Czerwenka, K., Kandolf, O., & Keckstein, J. (2005). Factors predicting severe perineal trauma during childbirth: role of forceps delivery routinely combined with mediolateral episiotomy. *American journal of obstetrics and gynecology*, *192*(3), 875–881. https://doi.org/10.1016/j.ajog.2004.09.035	Retrospective review of 5,377 vaginal deliveries. To identify risk factors for third- and fourth-degree tears in patients having vaginal deliveries, forceps-assisted deliveries, or mediolateral episiotomies.	N= 5,377 Through a database and patient records from 1999-2003.	Although the use of routine episiotomies had an increased risk of perineal trauma, it did not reach statistical significance.	2
Jansova, M., Kalis, V., Rusavy, Z., Räisänen, S., Lobovsky, L., & Laine, K. (2017). Fetal	Study using a computational model. Quasi- incompressible transversely isotopic hyper elastic Mooney- Rivlin material model	Study using a computational model.	There is a reduction in perineal tension when utilizing the proper manual	1

head size and effect of manual perineal protection. *PLOS ONE*, *12*(12). https://doi.org/10.1371/journal.pone.0189842	To evaluate if Viennese method of perineal protection remains the most effective in reducing perineal tension in smaller or larger head circumferences.		perineal protection techniques.	
Komorowski, L. K., Leeman, L. M., Fullilove, A. M., Bedrick, E. J., Migliaccio, L. D., & Rogers, R. G. (2014). Does a large infant head or a short perineal body increase the risk of obstetrical perineal trauma?. *Birth (Berkeley, Calif.)*, *41*(2), 147–152. https://doi.org/10.1111/birt.12101	Prospective cohort-study.	N= 448 vaginal births were observed.	Analysis demonstrated a significant correlation between head circumference at birth and perineal trauma.	1
Leon-Larios, F., Corrales-Gutierrez, I., Casado-Mejía, R., & Suarez-Serrano, C. (2017). Influence of a pelvic floor training programme to prevent perineal trauma: A quasi-randomised controlled trial. *Midwifery*, *50*, 72–77.	Quasi-randomized control trial. To investigate the effects of a pelvic floor training after birth or perineal trauma.	N=466 Women having a singleton pregnancy were randomly selected.	Women who performed pelvic floor interventions showed a higher likelihood of having an intact perineum and fourth-degree tears.	1

https://doi.org/10.1016/j.midw.2017.03.015				
Magoga, G., Saccone, G., Al-Kouatly, H. B., Dahlen G, H., Thornton, C., Akbarzadeh, M., Ozcan, T., & Berghella, V. (2019). Warm perineal compresses during the second stage of labor for reducing perineal trauma: A meta-analysis. *European journal of obstetrics, gynecology, and reproductive biology*, *240*, 93–98. https://doi.org/10.1016/j.ejogrb.2019.06.011	Systematic review and meta-analysis. To evaluate the effectiveness of warm compresses during the second stage of labor.	N= 2,103 Electronic databases were searched.	The intervention group that utilized warm compress showed an increase in intact perineum compared to the control group.	1
Mei-Dan, E., Walfisch, A., Raz, I., Levy, A., & Hallak, M. J. T. I. (2008). Perineal massage during pregnancy: a prospective controlled trial. *The israel medical association journal*, *10*(7), 499.	Single-blinded prospective controlled trial. To evaluate the effectiveness of perineal massage to increase the possibility to giving birth with an intact perineum.	N= 234 nulliparous women with a singleton fetus.	Perineal massages showed neither a protective nor a detrimental effect on perineal trauma.	2

Poen, A. C., Felt-Bersma, R. J. F., Dekker, G. A., Deville, W., Cuesta, M. A., & Meuwissen, S. G. M. (1997). Third degree obstetric perineal tears: risk factors and the preventive role of mediolateral episiotomy. *BJ OG: An International Journal of Obstetrics & Gynaecology, 104*(5), 563-566.	Retrospective case control study. To determine risk factors for third degree perineal tears and give recommendations in preventing them.	N= 822 A teaching hospital in the Netherlands compared 120 cases of vaginal delivery complicated by third-degree perineal tear and 702 uncomplicated vaginal deliveries.	Nulliparous women are at higher risk of sphincter tears compared to multiparous women. Episiotomies may be beneficial in prevention fecal incontinence in nulliparous women.	1
Samuelsson, E., Ladfors, L., Lindblom, B., & Hagberg, H. (2002). A prospective observational study on tears during vaginal delivery: occurrences and risk factors. *Acta obstetricia et gynecologica Scandinavica, 81*(1), 44-49.	Prospective observational study. To ascertain the occurrence and distribution of various types of perineal tears and analyze risk factors for second-degree perineal tears.	N= 2,883 From 1995-1997 in Sahlgrenska University Hospital in Göteborg Sweden. All tears were classified according to an especially designed protocol.	Nulliparous women are more likely to have severe perineal lacerations or episiotomies.	1
Smith, L. A., Price, N., Simonite, V., & Burns, E. E. (2013). Incidence of and risk factors for perineal trauma: a prospective observational study. *BMC pregnancy and childbirth, 13,*	Prospective observational study. To describe the range of perineal trauma in women with a singleton vaginal birth and the effect of maternal and obstetric characteristics on perineal tears.	N= 2,754 Between May and September 2006 in one obstetric unit.	Strong association of perineal trauma with forceps-assisted delivery and vaginal delivery.	1

59. https://doi.org/10.1186/1471-2393-13-59				

References

American Pregnancy Association. (2022, June 13). *Prevent Tearing During Delivery with Perineal Massage*. Perineal Massage During Pregnancy. Retrieved December 8, 2022, from https://americanpregnancy.org/healthy-pregnancy/labor-and-birth/perineal-massage-pregnancy/

Bodner-Adler, B., Bodner, K., Kimberger, O., Wagenbichler, P., & Mayerhofer, K. (2003). Management of the perineum during forceps delivery. Association of episiotomy with the frequency and severity of perineal trauma in women undergoing forceps delivery. *The Journal of reproductive medicine*, *48*(4), 239–242.

Carroli, G., & Mignini, L. (2009). Episiotomy for vaginal birth. *The Cochrane database of systematic reviews*, (1), CD000081. https://doi.org/10.1002/14651858.CD000081.pub2

Cleveland Clinic. (2020, February 20). *Vaginal tears (perineal lacerations)*. Vaginal Tears During Childbirth. Retrieved December 8, 2022, from https://my.clevelandclinic.org/health/diseases/21212-vaginal-tears-during-childbirth#:~:text=How%20long%20does%20it%20take,will%20dissolve%20within%20six%20weeks.

Demirel, G., & Golbasi, Z. (2015). Effect of perineal massage on the rate of episiotomy and perineal tearing. *International Journal of Gynecology & Obstetrics*, *131*(2), 183–186. https://doi.org/10.1016/j.ijgo.2015.04.048

DiFranco, J. T., & Curl, M. (2014). *Healthy Birth Practice #5: Avoid giving birth on your back and follow your body's urge to push*. The Journal of perinatal education. Retrieved April 21, 2023, from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4235063/#:~:text=Birthing%20in%20the%20side%2Dlying,%2C%20%26%20Shorten%2C%202002).

Edqvist, M., Hildingsson, I., Mollberg, M., Lundgren, I., & Lindgren, H. (2017). Midwives' Management during the Second Stage of Labor in Relation to Second-Degree Tears-An Experimental Study. *Birth (Berkeley, Calif.)*, *44*(1), 86–94. https://doi.org/10.1111/birt.12267

Hudelist, G., Gelle'n, J., Singer, C., Ruecklinger, E., Czerwenka, K., Kandolf, O., & Keckstein, J. (2005). Factors predicting severe perineal trauma during childbirth: role of forceps delivery routinely combined with mediolateral episiotomy. *American journal of obstetrics and gynecology*, *192*(3), 875–881. https://doi.org/10.1016/j.ajog.2004.09.035

International Urogynecological Association. (2022, September 12). *Third and fourth degree perineal tears*. Your Pelvic Floor. Retrieved December 8, 2022, from https://www.yourpelvicfloor.org/conditions/third-and-fourth-degree-perineal-tears/#:~:text=for%20the%20injury.-

,How%20is%20a%20third%20or%20fourth%20degree%20tear%20treated%3F,stitches%20will%20dissolve%20by%20themselves.

Jansova, M., Kalis, V., Rusavy, Z., Räisänen, S., Lobovsky, L., & Laine, K. (2017). Fetal head size and effect of manual perineal protection. *PLOS ONE, 12*(12). https://doi.org/10.1371/journal.pone.0189842

Komorowski, L. K., Leeman, L. M., Fullilove, A. M., Bedrick, E. J., Migliaccio, L. D., & Rogers, R. G. (2014). Does a large infant head or a short perineal body increase the risk of obstetrical perineal trauma?. *Birth (Berkeley, Calif.), 41*(2), 147–152. https://doi.org/10.1111/birt.12101

Leon-Larios, F., Corrales-Gutierrez, I., Casado-Mejía, R., & Suarez-Serrano, C. (2017). Influence of a pelvic floor training programme to prevent perineal trauma: A quasi-randomised controlled trial. *Midwifery*, *50*, 72–77. https://doi.org/10.1016/j.midw.2017.03.015

Magoga, G., Saccone, G., Al-Kouatly, H. B., Dahlen G, H., Thornton, C., Akbarzadeh, M., Ozcan, T., & Berghella, V. (2019). Warm perineal compresses during the second stage of labor for reducing perineal trauma: A meta-analysis. *European journal of obstetrics, gynecology, and reproductive biology*, *240*, 93–98. https://doi.org/10.1016/j.ejogrb.2019.06.011

Mei-Dan, E., Walfisch, A., Raz, I., Levy, A., & Hallak, M. J. T. I. (2008). Perineal massage during pregnancy: a prospective controlled trial. *The israel medical association journal*, *10*(7), 499.

Poen, A. C., Felt-Bersma, R. J. F., Dekker, G. A., Deville, W., Cuesta, M. A., & Meuwissen, S. G. M. (1997). Third degree obstetric perineal tears: risk factors and the preventive role of mediolateral episiotomy. *BJOG: An International Journal of Obstetrics & Gynaecology, 104*(5), 563-566.

Samuelsson, E., Ladfors, L., Lindblom, B., & Hagberg, H. (2002). A prospective observational study on tears during vaginal delivery: occurrences and risk factors. *Acta obstetricia et gynecologica Scandinavica*, *81*(1), 44-49.

Smith, L. A., Price, N., Simonite, V., & Burns, E. E. (2013). Incidence of and risk factors for perineal trauma: a prospective observational study. *BMC pregnancy and childbirth*, *13*, 59. https://doi.org/10.1186/1471-2393-13-59