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PERINEAL MASSAGE OR WARM COMPRESS TO DECREASE PERINEAL TRAUMA IN
SECOND STAGE OF LABOR

A MASTER'S PROJECT
SUBMITTED TO THE GRADUATE FACULTY
OF THE GRADUATE SCHOOL
BETHEL UNIVERSITY

BY

AMANDA CONDON

COLLEEN WILLIAMS

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF
MASTER OF SCIENCE IN NURSING

MAY 2021

BETHEL UNIVERSITY

PERINEAL MASSAGE OR WARM COMPRESS TO DECREASE PERINEAL TRAUMA IN
SECOND STAGE OF LABOR

Amanda Condon

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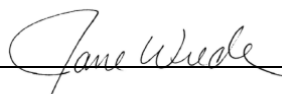
May 2021

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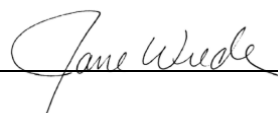
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Acknowledgments

Together we would like to thank with our deepest sincerity our advisor, Alison Meyer, for your willingness to step outside of your comfort zone and broaden your lens further into the world of midwifery. Without your support and guidance, this project would not be possible. We would also like to thank Jane Wrede, our program director, for your support in more ways than we can list. Not only would this capstone project not be possible without your guidance, you have guided our entire midwifery course thus far and for that we are eternally grateful. To our faculty and preceptors, thank you for instilling in us your knowledge and counsel throughout the past three years. Daily, we will strive to be the midwives that we have seen through your example. Lastly, to our classmates, you have become family, sisters. You have supported us, laughed with us, cried and lamented with us for the past three years, and we promise to continue to support each of you in your journey in midwifery moving forward.

-Amanda and Colleen

I would like to thank my family, friends, coworkers, and babysitters who have supported me and our family throughout this journey. To my parents and in-laws, you have supported our family in various ways. You have loved my children when I was away giving my own self to another woman's child. You have encouraged us in ways that I cannot describe. You have raised me in a way in which I will forever be grateful and raised my husband to support a woman who is following her dreams. Specifically, to my mother, Susan and mother-in-law, Ann, you have not only set examples of what a strong and driven woman is and able to accomplish, you have both prayed without ceasing for the past three years. I find empowerment in both of your examples.

I dedicate this capstone project to my children, who come in all shapes and sizes. I promise to be more present in your life in the coming months and years. To Jack, whose own birth set the stage for my journey to midwifery—the child who has truly known my absence the most and who has persevered through it all. To Claire—your prenatal care and birth showed me what empowering care for women truly is. I pray that you remember watching your mother strive for something large and follow her dreams. To Condon baby #3, an early first trimester loss, you taught me the care and sensitivity to provide for women who experience loss. To Evelyn—whose entire pregnancy and birth took the backburner to graduate school, you taught me about overcoming obstacles in unforeseen circumstances surrounding birth. You taught me to appreciate life in its simplest forms and to trust physiologic birth. To Ryan David, who will always live within my heart. You taught me more than you will ever know. You taught me about loss and grief of a mother. You provided for me time to experience obstetric emergency in a way that most providers have not. You have changed me as a midwife and a mother.

Lastly, to my amazing, dedicated, and supportive husband, John. Your support for myself and our family has been sole reason for my success within this journey. You have carried me when I could not carry myself. You have been Daddy and Mommy to our children over the past three years. You have cooked, cleaned, supported our family financially, cuddled and loved our children in ways that I cannot describe. I am eternally grateful for your love, support, and dedication to not only myself, our children but also other women and the future generations. Without you, this journey would not have been possible.

-Amanda Condon

I would like to thank my husband, Greg, who always sees the best in me. I would also like to thank Kennedy, Rowan, Leo, and Keira, who I have missed much time with while

achieving this dream. You all remind me that knowledge for the future is a worthwhile endeavor. To my parents, your love and support throughout my life has allowed me to believe in myself. Finally, I would like to thank the women of my family, who taught me the value of midwifery from an early age. I feel your collective presence when caring for women in the mundane moments and in the sacred power of birth.

-Colleen Williams

Abstract

Background/Purpose: The purpose of this review of research is to determine if the use of perineal massage or warm compress in the second stage of labor decreases perineal trauma, including spontaneous lacerations or the need for an episiotomy.

Theoretical Framework: Betty Neuman's Systems Model asserts that each person will interact with the environment with their own set of variables. Neuman's Systems Model focuses on maintaining health with the prevention of three categories of stressors: primary, secondary and tertiary. Nurse-midwives work to prevent perineal trauma by considering what interventions strengthen the defense of each woman to the environment stressors of physiologic birth.

Methods: Twenty research articles were reviewed with the purpose of determining if perineal trauma, including spontaneous lacerations or the need for an episiotomy, is decreased with the use of perineal massage or warm compress during the second stage of labor. Additional aspects of review analyzed the effects of perineal massage and warm compress on birth outcomes including maternal pain and neonatal Apgar scores. Lastly, components surrounding birth culture and their effects on research were examined.

Results/Findings: This critical review concluded that there are inconsistencies among data in perineal massage and warm compress for perineal protection against lacerations and episiotomies. Conclusions can be made that warm compress shows more benefit in terms of perineal protection and maternal pain perception. Neonatal Apgar scores were unaffected with either intervention. It was also determined the birth culture plays an active role in perineal integrity measures taken by providers.

Implications for Research and Practice: This critical review determined that more research needs to be performed in the United States within a birth culture that operates under the umbrella

of recommendations by organizations such as the American College of Nurse-Midwives (ACNM). Episiotomy rates need to be recorded by nation, region, hospital, and provider in order to focus efforts for optimal rates worldwide. The research for warm compress application is more consistent and can be recommended for nurse-midwives to utilize in the second stage of labor. Nurse-midwives should offer shared decision making and the right to self-determination for all women in regards to measures taken to promote perineal integrity, reduce maternal pain, and support positive neonatal outcomes.

Keywords: perineal trauma, second stage, warm compress perineal massage, perineal protection and perineal integrity.

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Chapter I: Introduction

Birth is constant. The 2020 estimated worldwide birth rate equates to 18.1 births/1,000 population; in turn, this equates to about 259 births per minute worldwide or alternately, 4.3 births every single second (Central Intelligence Agency [CIA], 2021). According to *The State of the World's Midwifery* report (2014), midwives have the ability to deliver 87% of all sexual, reproductive, maternal, and newborn health services. But strikingly, only 22 % of countries have enough adequately trained midwives to meet the basic needs of their vulnerable populations of women and children (*The State of the World's Midwifery*, 2014). In the United States, Certified Nurse-Midwives/Certified Midwives (CNM/CM) attended 12.1% of all vaginal births and 8.3% of total births (American College of Nurse-Midwives [ACNM], 2016).

As the act of birth commences, an important focus for nurse-midwives is maintaining perineal integrity and preventing perineal lacerations (King et al., 2019). Despite this goal, most women who give birth will sustain a perineal laceration; the American College of Obstetrics and Gynecology (ACOG) reports that 53% to 79% of women sustain perineal injury during birth (The American College of Obstetricians and Gynecologists [ACOG], 2018). Primiparity is one risk factor for perineal trauma in childbirth (Leal et al., 2014). Primiparity is an instance in which a woman has reached 20 weeks of pregnancy and given birth one time, as opposed to a multiparous woman, one who has had two or more pregnancies that reached 20 weeks of gestation and has given birth more than once (King et al., 2019).

Perineal trauma occurs when there is a loss of integrity in the perineum and damage to the genital region occurs. The majority of perineal trauma occurs during the second stage of labor, frequently called the pushing phase. This is the time period during the birth process when the cervix is dilated to 10 cm and there is an urge to bear down until the birth of the infant (King

et al., 2019). Perineal trauma can be sustained in the form of spontaneous lacerations or due to an episiotomy; however, the goal is an intact perineum, to which no trauma occurs. Lacerations are classified based on severity, with a rating of first degree through fourth degree with first being the least extensive and fourth being the highest level of trauma. A first-degree laceration refers to injury to the perineal skin; a second-degree laceration results in injury to the perineal skin that extends to the perineal muscles, but does not include injury to the anal sphincter; a third-degree laceration results in injury through to the anal sphincter complex; a fourth-degree laceration is diagnosed when there is injury to the anal sphincter and the anal/rectal epithelium (Toglia, 2020).

Alternatively, episiotomy is the surgical enlargement, using scissors or scalpel, of the vaginal opening during the final portion of the second stage of labor (Berkowitz & Foust-Wright, 2020). Episiotomy is from the Greek word “episton” which refers to the pubic area (Cunningham et al., 2014). Literature discussion of episiotomies dates back to 1742. The first public discussion and advocacy for mediolateral episiotomy at all births for nulliparous women was made by Dr. Joseph DeLee in 1920 at the American Gynecological Society meeting held in Chicago (Gabbe, 2002). There are two types of episiotomies, mediolateral and midline. A midline episiotomy is cut at six o’clock in the vaginal opening incised posteriorly. A mediolateral episiotomy is cut at either seven o’clock or five o’clock at the vaginal opening. Mediolateral episiotomies are associated with more than a 400% decrease in severe perineal lacerations. However, a midline episiotomy is less likely to result in poor healing, significant blood loss, and painful intercourse (Cunningham et al., 2014).

The trauma associated with episiotomies is associated with both immediate and delayed morbidities. Currently, episiotomy rates and techniques vary greatly among nations (Rodrigues

et al., 2019). In the United States, midline episiotomies are performed more frequently. However, in Europe mediolateral episiotomies are more commonly utilized (King et al., 2019). ACOG (2018) recommends restrictive episiotomy over routine use, citing that women who experience routine episiotomy during birth receive no immediate or future benefit. In fact, routine episiotomies are associated with postpartum anal incontinence and painful intercourse.

Perineal trauma can be influenced by many factors. Each woman giving birth will have a different combination of factors with varying degrees of influence. Such factors include: parity, maternal age, birthing position, induction of labor, fetal malpresentation, gestational age of the newborn, instrument-assisted birth, shoulder dystocia, precipitous labor, length of the second stage, a male infant, birth in a private hospital, maternal education, labor augmentation, the weight of the newborn, and maternal race (Abedzadeh-Kalahroudi et al., 2019).

ACOG has collected evidence and developed a position statement regarding the effects of the following factors on perineal integrity: episiotomies, instrumental birth, maternal ethnicity, fetal positioning, epidurals, maternal parity, labor augmentation, maternal age, familiar risk, maternal body mass index, management of the second stage of labor, and the onset of pushing (ACOG, 2018). In regards to anal sphincter injury, ACOG concludes that the strongest risk factors for severe perineal trauma are instrument assisted birth, fetal macrosomia, and midline episiotomy. The greatest incidence of severe perineal trauma occurs with the combination of a forceps delivery and a midline episiotomy. Lower risk factors for perineal trauma include primiparity, Asian race, epidural anesthesia, persistent occiput posterior fetal positioning, familial history of perineal trauma, and labor augmentation. Maternal age, gestation, body mass index, and duration of the second stage were factors that did not significantly affect the occurrence of severe perineal trauma.

It is important to limit perineal trauma due to a variety of multifaceted factors including improved physical maternal outcomes related to injury surrounding childbirth, immediate issues with infant bonding and initiation of breastfeeding. There are also longer-term outcomes such as infection, pelvic floor muscle tone, urinary and/or fecal incontinence, and painful intercourse. Additionally, nurse-midwives seek to support women surrounding childbirth and with their overall health outcomes while also advocating for low intervention techniques to support physiologic birth (ACNM, 2020).

Statement of Purpose

Nurse-midwifery is as much an art as it is a science. Nurse-midwives value the promotion of birth as a state of wellness and seek to provide high-touch and low-tech care throughout the intrapartum experience. This review concentrates on management of the second stage of labor with two specific interventions: perineal massage or application of warm compress to the perineum. The use of massage and warm compresses are easy to implement, may be independently completed by the nurse-midwives, and serves to support the midwifery model of care honoring physiologic birth (ACNM, 2012).

Evidence Demonstrating Need

During birth, the most commonly injured area of a woman's genitalia is the perineal body. The perineal body contains connective tissue and muscle. The muscles involved include the transverse perineal muscles which attach to the bulbocavernosus muscles. The anal sphincter complex is below the perineal body and includes internal and external sphincters that encircle the external anal sphincter. With severe lacerations or the extension of an episiotomy, the anal sphincter can be damaged. Additionally, any or all areas of the female genitalia can be injured during childbirth. This includes the mons pubis, labia minora, clitoris, labia majora, vaginal

vestibule, and the perineal body. Perineal trauma occurs as a result of spontaneous birth as well as episiotomies (ACNM, 2012).

Immediate morbidities of perineal trauma include hematoma, hemorrhage, infection, abscess, sutures, weak pelvic floor muscles, and urinary and/or fecal incontinence. Additionally, there are psychological risk factors associated with perineal trauma that can affect maternal relationships with intimate partners and with newborn bonding (Abedzadeh-Kalahroudi et al., 2019). One of the most severe complications from perineal trauma is related to bleeding. Postpartum hemorrhage, the leading cause of maternal deaths worldwide, occurs in two to three percent of all births in the United States. There are four general components of a postpartum hemorrhage, including tone, tissue, thrombin, and trauma. Limiting or avoiding the component of trauma during birth will result in fewer postpartum hemorrhages to women across the globe (King et al., 2019).

Unfortunately, poor outcomes of perineal trauma are not limited to the immediate postpartum period. There also are lasting effects for women who experience perineal trauma. At six months postpartum, women who suffered perineal trauma reported more symptoms of urinary and anal incontinence, pelvic organ prolapse, and painful intercourse (Leeman et al., 2016). As a result, they were slightly less likely than their peers who had an intact perineum to be engaging in sexual activity (Leeman et al., 2016). Complete avoidance of perineal trauma may not be possible, but there does appear to be benefit to limiting the degree of trauma. The natural process of vaginal delivery often results in some degree of perineal trauma; however, the trauma of laceration is often favored over that of episiotomy.

Until the 1970s, episiotomies were utilized for almost all nulliparous women due to the false belief that a surgical incision would be an easier repair and would result in an easier

postpartum experience. Additionally, many birth providers falsely believed that episiotomies would prevent future pelvic floor dysfunction. Later evidence demonstrated that in addition to the increased incidence of anal sphincter trauma, episiotomies also contributed to fecal incontinence and placed women at risk for a reoccurrence of perineal trauma in subsequent births (Cunningham et al., 2014). As a result of adverse outcomes, ACOG recommends against the use of all kinds of routine episiotomies; although this practice is discouraged in the United States, it is still a common birth intervention in various parts of the world (ACOG, 2018). Episiotomies must only be utilized when necessary and may be considered in specific situations. A shoulder dystocia, breech presentation, occiput posterior position, or a newborn weight of 4,000 grams or greater may present such a scenario (Cunningham et al., 2014). Additionally, an episiotomy may be considered under some conditions, such as risk of fetal acidemia that requires swift vaginal birth (King et al., 2019). In these situations, the episiotomy may increase the size of the vaginal opening allowing the birth provider to perform the necessary interventions to deliver the infant safely.

Episiotomy rates in the United States have varied over time and continue to vary among health providers. In the U.S. from 1979 to 2006, the National Hospital Discharge Survey found a 75% reduction in the rates of episiotomies (Cunningham et al., 2014). More recently, according to the Leapfrog Group, the organization charged with gathering yearly data from American hospitals, episiotomies in 2017 occurred in eight percent of vaginal. Nurse-midwives perform episiotomies less than the national average, with a rate of 3.6% compared to 25% nationally (ACNM, 2012). Statistically, the longer birth providers have been practicing, the more likely they are to perform an episiotomy. Additionally, rates vary widely among birth institutions. For

example, in Los Angeles in 2019, there was one hospital with an episiotomy rate of 0.5%, and another with an episiotomy rate of 47% (Willyard, 2020).

When considering the episiotomy rate reduction in the United States in recent decades, the same cannot be said about various other nations. In Portugal, Poland, Cyprus, and Romania, episiotomies are still used in 70% of vaginal births. Episiotomies are used the least frequently in Iceland (7.2%), Sweden (6.6%), and Denmark (4.9%) (Rodrigues et al., 2019). In teaching hospitals in Iran, the rates of episiotomy have been reported as high as 97% (Khani et al., 2012).

In addition to ACOG, the World Health Organization (WHO) discourages the routine use of episiotomies. They also have made several other recommendations for the second stage of labor that promote the natural process of infant delivery. Choosing a birth position in which the mother is comfortable, regardless of whether epidural anesthesia is being used, is one such stance. Upright birth positions are encouraged in the second stage of labor as they may lead to a reduced instrumental birth and episiotomy. However, there may be an increased incidence of second-degree lacerations and postpartum hemorrhage (King et al., 2019). It is important to note that the evidence supporting these claims is of low certainty.

Additionally, for mothers utilizing epidural anesthesia, once the second stage of labor occurs, pushing should be deferred until an urge to push is present, or for up to two hours. Of note, WHO emphasizes safety, indicating delayed pushing should only be encouraged if fetal hypoxia can be monitored. Perineal massage, warm compresses, and guarding of the perineum are techniques recommended for women in the second stage of labor, provided they are in line with a laboring mother's preferences. The WHO reports warm compresses may be protective against third- and fourth-degree perineal lacerations, while perineal protection and guiding may

prevent against first degree lacerations. The Ritgen's maneuver, the process of pulling the fetal chin between the maternal coccyx while the birth provider's other hand is on the fetal occiput, is not recommended (WHO, 2018).

Concurrently, midwifery literature suggests that the birth of the fetal head should occur between contractions, with communication between the laboring mother and the midwife, to promote perineal integrity (King et al., 2019). Nurse-midwives support the evidence-based recommendations from WHO and ACOG. According to ACNM's hallmarks of midwifery, nurse-midwives strive for the incorporation of evidence-based care into clinical practice and for the skillful communication, guidance, and counseling of patients (ACNM, 2020).

Significance to Nurse-Midwifery

A CNM is an advanced practice registered nurse who provides healthcare to women across the continuum from menarche to menopause, including the antepartum, intrapartum, and postpartum period. Nurse-midwives also care for newborns in the first 28 days of life. Founded in 1955, the American College of Nurse-Midwives is the professional organization that was initiated to provide oversight, guidance, and instruction to nurse-midwives. By 1960, nurse-midwives were seeking standardized education and accreditation of educational institutions. In 1982 the U.S. Department of Education recognized the now named Accreditation Commission for Midwifery Education (ACME), which remains the educational credential body for nurse-midwifery programs in the United States. Nurse-midwives within the United States are educated at either the master's or doctoral level. Additionally, all nurse-midwives in the U.S. must pass national certification to practice (King et al., 2019). As of May 2015, there were 11, 194 CNMs within the United States (ACNM, 2016).

Education for midwives varies from nation to nation. This review will include the nations of Iran, Turkey, Israel, Spain, Egypt, India, Australia, and Sweden. Midwives in Iran are educated at a medical university for at least four years of study without previous nursing experience. Midwives in Iran are not independent providers, and work as assistants to physicians. According to critics, this has resulted from the medicalization of midwifery care, and lack of trust in physiologic birth (TorkZahrani, 2008). In Turkey, since 1996, midwives have been required to hold a bachelor's degree, and since 2000 an increasing number of midwives have received graduate education. Like in the United States, Turkish midwives are expected to perform a minimum number of births, labor management, newborn assessments, contraception counseling, and antepartum encounters (Ejder Apay et al., 2012). In Israel, midwives are registered nurses, with an additional year of advanced education. Israeli midwives, as in the United States, must pass a national certification exam (Ben Natan & Ehrenfeld, 2011). Nurses in Spain with three years of education can apply to train as a midwife. This training takes an additional two years (Meehan-Ryan, 2013). In Egypt, midwives have a standardized three-year education, with a minimum number of supervised births (United Nations Population Fund [UNFPA], 2014). Midwives in India completed either a three-and-a-half-year vocational program, or a four-year university-based program in midwifery (Sharma et al., 2015). Midwives in Sweden are master's prepared (Hermansson & Martensson, 2013) while Australian midwives must earn a bachelor's degree or graduate education (Tierney et al., 2018). Ultimately, while the education for midwives varies worldwide, there are similar overall goals and health outcomes across the globe. One unifying goal is maintaining perineal integrity during birth. Consideration must be upheld that these factors of education, scope of practice, and levels of independence demonstrated within varying cultures may result in differing perineal integrity outcomes. While

this study is written as a part of a United States nurse-midwife program, the goal is to consider all available research in order to best understand the evidence available.

The American College of Nurse-Midwives promotes pearls of midwifery in promotion of birth as a state of wellness. One such pearl is the avoidance of routine episiotomy and aggressive perineal massage in the second stage. Midwives should only perform episiotomies in the case of fetal or maternal distress. The second stage of labor may be assisted by warm heat application, oil for comfort, low lighting, birth of the fetal head between contractions, and discouragement of the Valsalva maneuver (King & Pinger, 2014).

Nurse-midwives believe in the “incorporation of evidence-based care into clinical practice” and the “ability to provide safe and effective care across settings including home, birth center, hospital, or any other maternity care service” (ACNM, 2020, p. 3). Nurse-midwives are called to uphold these hallmarks as pillars of the profession while providing evidence-based care to women in promotion of physiologic birth. Nurse-midwives must seek to promote physiologic birth in all settings with easily implemented interventions. As a vehicle to promote consistent structure for change, nursing theories can be utilized to further understand systematic principles within a theoretical framework.

Theoretical Framework

Nursing theories provide theoretical frameworks in which practices and trends can be studied. More specifically, Neuman’s Systems Model is a theoretical framework that can be applied to research and practice regarding maintaining perineal integrity in childbirth. Neuman’s Systems Model asserts that each person will interact with their environment with their own set of variables (Petiprin, 2020). The Neuman Systems Model focuses on maintaining health by preventing stressors, and is divided into primary prevention, secondary prevention, and tertiary

prevention. In this theory, prevention is the first intervention and occurs when stressors to health can be avoided (Petiprin, 2020). Ultimately, primary prevention works via health promotion. Secondary prevention refers to when a patient is reacting to a stressor. During secondary prevention, the focus of the nurse is on preventing damage, strengthening the patient's internal resistance to the stressor, and eliminating the stressor. Tertiary prevention occurs once a patient has been assisted through secondary prevention. This is a supportive phase that focuses on increasing the patient's energy (Petiprin, 2020).

Neuman's theory, recognizing that humans are multidimensional, emphasizes five variables, which include physio-chemical structure, psychological structure, socio-cultural structure, developmental structure, and spirituality (Petiprin, 2020). The patient's environment encompasses their own variables in addition to outside stressors. This theory is focused on wellness, and according to Neuman, the role of the nurse is to help control the variables a person may experience that bring stress. They do this by addressing the whole person and promoting interventions that reduce stress (Petiprin, 2020). Within Neuman's theory, the ultimate goal for the nurse is to maintain a stable system, strengthen a patient's resistance to outside stressors, and promote wellness. The model supports the belief that each woman will have a normal response to the environment, or a line of defense in maintaining wellness. Nurse-midwives must consider what interventions, if any, will strengthen the line of defense for laboring women and maintain wellness, perineal integrity, and promote physiologic birth (Petiprin, 2020).

Summary

Nurse-midwives seek to walk with women and promote physiologic birth as a state of wellness. The intrapartum period is an opportunity to empower women through shared decision making and minimal interventions. Application of warm compresses and perineal massage in the

second stage of labor are low-risk, easily-implemented interventions that may promote perineal integrity. These interventions also keep with the midwifery model of care in promoting physiologic birth. Utilizing Neuman's Systems Model framework of wellness promotion, nurse-midwives can empower women in birth and maintain optimal perineal integrity.

Chapter II: Methods

In order to determine if perineal massage or warm compresses used in the second stage of labor offer perineal protection, a systematic approach was used to find scholarly sources. These methods assisted in identifying, evaluating, and appraising the literature appropriate for this review. The researchers defined perineal protection as a decrease in rates of trauma from either episiotomy or from lacerations. In doing this research, the authors asked the question: do women who have active management of the second stage of labor, such as perineal massage or warm compress, have less perineal trauma than women who receive standard care? Appropriate search terms were used to identify and analyze articles for their appropriateness to this review through multiple databases available from the Bethel University library. Articles were also found by data mining once appropriate articles were identified. The final 20 articles used in this review were selected after inclusion and exclusion criteria were met.

Search Strategies

The review of literature included studies that were dated between the years 2010 and 2021. Boolean logic and data mining were utilized in the search. The databases consulted in the search method include: PubMed, CINAHL, Google Scholar, ScienceDirect, and Cochrane Reviews. The terms searched as keywords included: *perineal trauma*, *second stage*, *warm compress perineal massage*, *perineal protection*, and *perineal integrity*. For databases yielding large results, such as Google Scholar, “perineal trauma AND second stage” was used to limit results. The Boolean “NOT” operator was used to exclude the antepartum period. This was required as there is growing research discussing antepartum perineal massage in the prevention of perineal tearing. These words and phrases were used to identify if women who have perineal

massage or warm compress as active management during the second stage of labor have less perineal trauma than women who receive standard care.

Criteria for Inclusion and Exclusion

The articles selected for this capstone were chosen based on the shared goal of achieving perineal protection in the second stage of labor. The interventions included in this review of literature were perineal massage and warm compress specifically. Inclusion criteria included experimental designs and currency, with only studies published between 2010 and 2021 included due to adequate recent research being widely available. The studies included births attended by nurse-midwives or OB/GYNs as well as various other birth providers world-wide. All of the studies took place in hospitals. Although midwives in the United States do not routinely utilize episiotomy during childbirth, it became quite evident in our search internationally that the term *perineal protection* needed to include the absence of an episiotomy as an outcome or intervention for childbirth.

Exclusion criteria included management occurring prior to the second stage of labor. Any discussion of second stage management methods outside of those included in this paper (perineal massage and warm compress) were excluded in order to keep this review focused. Lastly, studies older than ten years of age, with an evidence level less than III, and/or a quality level less than B were excluded from review.

Summary of Evaluated Studies

Of the studies evaluated, 17 were randomized control trials (RCTs). One quasi-experimental design study was utilized, in addition to one experimental prospective cohort study. Lastly, a single retrospective observational study was used. Geographic location was not a limiting factor in this literature review; therefore, research was included from Europe, Australia,

Asia, and Africa. There were no applicable studies from North America, South America, or Antarctica. A significant majority of the studies assessed included trials that were performed in the Middle East, with nine studies conducted in Iran, three from Egypt, two from Israel, and two from Turkey. Abstracts were reviewed for relevance with 87 abstracts being read. By adding additional search terms and refining inclusion and exclusion criteria as described above, and after removing duplicates, 20 studies were included in this literature review.

Evaluation Criteria

Article quality was assessed using The Johns Hopkins Research Evidence Appraisal Tool. Level I evidence includes RCTs and systematic reviews of RCTs. Level II evidence refers to quasi-experimental studies, or systematic review of combination RCTs. Level III evidence includes non-experimental studies. While the John Hopkins Research Evidence Appraisal tool extends to level V evidence, this study does not include evidence above a level III rating. While utilizing the Johns Hopkins Research Evidence Appraisal Tool, once the level of the evidence is defined, it is then important to determine the quality of the evidence being used. Quality rating A or high quality provides consistent, generalizable results, and possesses a strong control, a large sample size, and is definitive in the conclusions found. Quality rating B or good quality evidence includes a sufficient sample size, study control, and reasonably consistent results, with reference to scientific evidence. Quality rating C is low quality evidence and this type of evidence was not utilized in this study due to inconsistent results, insufficient sample size, and/or lack of conclusions (Dang & Dearholt, 2018).

Inclusion criteria for this review focused on RCTs, and excluding systematic reviews of RCTs and meta-analyses. However, systematic reviews and meta-analyses were reviewed by the researchers in order to familiarize themselves with the extent of literature available regarding this

topic and for data mining purposes. Studies with an evidence level I, II, and III were included in this review. The quality of the articles included quality A and quality B evidence. Level I evidence with quality A is extremely limited on the topic of perineal protection in the second stage of labor. According to our critiques, this is largely based on limitations identified, including that the studies were not blinded due to their nature as well as the use of episiotomy being at the discretion of the midwife or birth provider. This lack of Level I evidence with quality A suggests that additional research is necessary. Quality rating B evidence is often the highest quality regarding perineal protection in the second stage, and thus was included most frequently in this review, with all 20 of the included studies receiving a quality rating of B. Additionally, studies without an experimental design, expert opinions, case studies, and quality improvement studies were excluded (Dang & Dearholt, 2018).

Summary

Multiple databases were searched to identify appropriate articles. The articles were included based on quality of evidence and relevance to the stated question. This review was limited to 20 articles, based on the principles described above, with the John Hopkins Research Evidence Tool used as a guide to identify the level and quality of the studies appraised. Moving forward we will further analyze the results from the studies to develop themes relevant to the clinical practice question: "Does the use of perineal massage or warm compresses in the second stage of labor offer perineal protection?"

Chapter III: Literature Review and Analysis

Synthesis of Matrix

The scientific literature in this capstone review includes 17 experimental RCTs, one secondary analysis with data from an experimental prospective cohort study, one retrospective observational study, and one quasi experimental clinical trial. Each matrix layout includes the purpose, sample, setting, level of evidence, quality of evidence, design including methods and instruments, results, conclusions, strengths, limitations, author recommendations, and a summary related to the current clinical practice question (see Appendix). The Johns Hopkins Research Evidence Appraisal Tool was utilized to evaluate the level of evidence and quality of each research study (Dang & Dearholt, 2018).

Synthesis of Major Findings

The 20 articles included in this matrix synthesis evaluate warm compresses or perineal massage in the second stage of labor and their subsequent effects on perineal integrity and birth outcomes. Warm compress is defined as the application of heat to the perineal tissues through a moist cloth or heating pad, while perineal massage is defined as manipulation of the perineal tissue with the hands with an agent used as a lubricant. These low-tech interventions are examined within the context of birth culture and will evaluate maternal and neonatal outcomes. The chapter will conclude by acknowledging the strengths and limitations of the studies used in this matrix synthesis.

Perineal Integrity

All 20 of the articles in this review focused on preserving perineal integrity with two primary interventions of perineal massage or application of warm compresses to the perineum.

Throughout the course of this review, massage and warm compress were examined independently from one another; however, in two studies, they were compared directly. In the context of this review, perineal trauma encompasses both episiotomies and spontaneous perineal lacerations; rates of each are examined separately. This review begins with the effectiveness of perineal massage in the second stage of labor.

Perineal Massage in the Second Stage of Labor. The first intervention discussed in this review is massage to the perineum during the second stage of labor. Of the 20 studies reviewed, 13 evaluated the use of perineal massage (Akhlaghi et al., 2019; Ashwal et al., 2016; Demirel & Golbasi, 2015; Edqvist et al., 2018; Fahami et al., 2012; Geranmayeh et al., 2011; Harlev et al., 2013; Ibrahim et al., 2017; Karaçam et al., 2012; Mohamed et al., 2011; Raja et al., 2019; Romina et al., 2020; Zare et al., 2014). The technique used for this varied slightly among studies but could be replicated in future research.

Perineal Massage as Protective Against Spontaneous Lacerations. Of the 20 studies, only one study found perineal massage as protective against spontaneous lacerations, but the results were not statistically significant. Fahami et al. (2012), studying primiparous women only, concluded from their quasi-experimental study (N = 99) that 78.8% of women experienced spontaneous perineal laceration after perineal massage, compared to 81.8% of women in the control group. Although the study did not indicate perineal massage to be statistically protective against lacerations, the results regarding episiotomy are significantly different.

Perineal Massage as Protective Against Episiotomy. Six studies demonstrated that perineal massage was helpful in preventing episiotomies (Akhlaghi et al., 2019; Demirel & Golbasi, 2015; Geranmayeh et al., 2011; Karaçam et al., 2012; Raja et al., 2019; Romina et al.,

2020). Two of the six aforementioned studies found that perineal massage, while helpful in episiotomy prevention, saw an increase in the rate of spontaneous lacerations (Akhlaghi et al., 2019; Geranmayeh et al., 2011). Four of the studies determined that perineal massage was protective against episiotomies and had no significant effect on spontaneous perineal lacerations (Demirel & Golbasi, 2015; Karaçam et al., 2012; Raja et al., 2019; Romina et al., 2020). An RCT conducted on primiparous women in Iran (N = 90) revealed that perineal massage correlated with a lower episiotomy rate, but alternately found a higher rate of first- and second-degree perineal tears ($p < 0.001$) (Geranmayeh et al., 2011). Akhlaghi et al. (2019), also studying primiparous women in Iran, determined through an RCT that women receiving perineal massage were significantly less likely to need an episiotomy ($p = 0.05$) but were significantly more likely to experience lacerations ($p = 0.05$). One difference in the latter study is that when comparing severity of spontaneous lacerations, women who received perineal massage were more likely to experience first-degree lacerations, while those who did not receive perineal massage were more likely to experience second-degree lacerations (Akhlaghi et al., 2019). Alternately, four studies determined perineal massage to be protective against episiotomies with no significant difference in lacerations (Demirel & Golbasi, 2015; Karaçam et al., 2012; Raja et al., 2019; Romina et al., 2020). In an RCT on primiparous women from Turkey (N = 396), Karaçam et al. (2012) found a significantly lower percentage of women in the massage group had episiotomies together with spontaneous lacerations ($p = 0.012$). None of the women included in this study sustained a third- or fourth-degree laceration. Demirel and Golbasi (2015) from Turkey conducted an RCT on primiparous and multiparous women (N = 284) and discovered that perineal massage was protective against episiotomies but had no effect on spontaneous lacerations. Episiotomy was performed among 31.0% (N = 44) in the massage group and 69.7%

(N = 99) in the control group ($p = 0.001$). Lacerations were recorded among 4.2% (N = 13) in the massage group and 4.2% (N = 6) in the control group ($p = 0.096$) (Demirel & Golbasi, 2015). In an RCT on primiparous women in India (N = 150), women with perineal massage received an episiotomy 80% of the time and women without massage received an episiotomy 93.3% of the time ($p = 0.016$). However, there was no statistical difference ($p = 0.22$) between the groups regarding spontaneous perineal lacerations. The incidence of intact perineum in the intervention group, 4%, was not significantly different ($p = 0.08$) from those in the control group. It is, however, important to note that no women in the control group remained intact following birth (Raja et al., 2019). As in previous studies, an RCT on primiparous women in Iran (N = 77) found that perineal massage with ostrich oil resulted in statistically fewer episiotomies ($p < 0.001$); however, there was no change to spontaneous perineal lacerations (Romina et al., 2020).

Perineal Massage with No Significant Benefits. In contrast, perineal massage provided no significant benefit in two studies, which included an experimental prospective cohort study on primiparous women (N = 704) in Sweden (Edqvist et al., 2018) and an RCT on primiparous women in Iran (N = 145) (Zare et al., 2014). In the literature it was found that various oils, gels, or waxes applied to the perineum also had no supporting evidence to promote perineal integrity. An RCT on primiparous and multiparous women in Israel (N = 164) that compared wax and oil perineal massage found there was no statistical difference between each group in terms of perineal lacerations, grade of lacerations, suturing time, or number of sutures (Harlev et al., 2013). There was also no significant difference in episiotomy rates (Harlev et al., 2013). Ashwal et al. (2016) conducted an RCT on primiparous and multiparous women in Iran (N = 200) to evaluate an obstetric gel, Dianadtal, applied to the perineum. Unfortunately, no statistically significant benefit was found.

Application of Warm Compresses to the Perineum during the Second Stage of

Labor. The second intervention discussed in this review is application of heat to the perineum with warm compresses during the second stage of labor. Of the 20 studies reviewed ten evaluated the use of warm compresses (Akbarzadeh et al., 2016; Alihosseni et al., 2018; Borrman et al., 2020; Essa & Ismail, 2015; Ganji et al., 2013; Ibrahim et al., 2017; Mohamed et al., 2011; Terré-Rull et al., 2014; Türkmen et al., 2020). The technique used for this varied slightly among studies but could be replicated in future research.

Warm Compress as Protective Against Spontaneous Lacerations and Episiotomies.

Three studies determined that warm compresses were helpful in decreasing both spontaneous lacerations and episiotomies (Akbarzadeh et al., 2016; Borrman et al., 2020; Essa & Ismail, 2015). An Egyptian RCT on primiparous women (N = 160) found that women who received warm compresses were less likely to experience perineal tearing and those who did tear required less suturing ($p = 0.000$). Of the women who received warm compresses, 62.5% remained intact post birth, whereas only 2.5% of women in the control group maintained an intact perineum ($p = 0.000$). Additionally, in the control group, 48% of women experienced a third-degree perineal tear, and no women in the intervention group sustained a third-degree perineal tear ($p = 0.000$) (Essa & Ismil, 2015). Akbarzadeh et al. (2016) in Iran conducted an RCT on primiparous and multiparous women (N = 150) that found increased incidence of intact perineum in the intervention group (27%) compared with the control group (6.7%) ($p < 0.001$). Episiotomy rates were also decreased to 45% in the intervention group compared with 90.7% in the control group ($p < 0.001$). In regards to lacerations, a significant difference was found between the intervention and control groups when considering the rate of first- and second-degree lacerations (19% vs. 1.3%), as well as third- and fourth-degree lacerations (8.1% vs. 1.3%). There was a significant

difference between the two groups regarding the frequency of the location of the laceration ($p = 0.019$) (Akbarzadeh et al., 2016). A recent Australian retrospective observational study on primiparous women ($N = 4128$) found that the application of warm compresses was statistically significant ($p < 0.001$) against severe perineal trauma (Borrman et al., 2020). For the purpose of Borrman et al.'s study (2020), severe perineal trauma was defined as any tear involving the anal sphincter or rectal mucosa. Lastly, there was a 37% reduction in severe perineal trauma with spontaneous vaginal birth and a 26% reduction with instrument assisted birth ($p < 0.001$) (Borrman et al., 2020).

Warm Compress as Protective Against Episiotomy. Two studies found that the use of warm compresses decreased rates of episiotomy but did not significantly affect the rate of spontaneous perineal lacerations (Alihosseni et al., 2018; Türkmen et al., 2020). In Israel, Türkmen et al. (2020) conducted an RCT on primiparous women ($N = 100$) that demonstrated decreased episiotomy in the intervention group and an increase in lacerations ($p = 0.003$). Of the lacerations in the control group, it was determined that all were first-degree lacerations and did not require suturing; thus the need for perineal suturing was significantly higher ($p = 0.016$) in the control group compared to the warm compress application group (Türkmen et al., 2020). In a similar finding, an Iranian RCT on primiparous women ($N = 114$) revealed that the application of a heating pad decreased episiotomy rates. Women in the intervention group sustained episiotomies at a rate of 20.8%, while 40.7% of women in the control group received episiotomies ($p = 0.025$). There was no significant difference between the two groups regarding spontaneous first- and second-degree lacerations (Alihosseni et al., 2018).

Warm Compress with No Significant Benefit. In contrast to the above research findings, Ganji et al. (2013), in an Iranian RCT on primiparous women ($N = 64$), found no significant

impact on laceration or episiotomy rates ($p > 0.05$) with application of warm compresses. Similarly, Türkmen et al. (2020) discovered that the application of warm compresses may contribute to first-degree spontaneous perineal lacerations. In a Spanish RCT on primiparous and multiparous women ($N = 198$), the application of heat, both wet and dry, was examined. Although an extensive study, Terré-Rull et al. (2014) did not find any statistically significant differences among the groups. The only statistically significant finding in this study was regarding the application of warm compress increasing likelihood of first-degree perineal laceration ($p = 0.001$) (Terré-Rull et al., 2014).

Combination of Perineal Massage and Warm Compress in the Second Stage of Labor. Two of the studies in this review compared the effectiveness of both warm compresses and perineal massage as independent variables against a control group (Ibrahim et al., 2017; Mohamed et al., 2011). Ibrahim et al. (2017) conducted an Egyptian RCT on primiparous women ($N = 304$) and determined that the use of perineal massage decreased the severity of tears compared with both warm compresses and standard care ($p = 0.012$). In contrast, Mohamed et al. (2011) also conducted an Egyptian RCT but on primiparous and multiparous women ($N = 200$), discovering warm compresses were more protective against perineal trauma. In this study, 68% of women who received warm compress application remained intact post birth, whereas 47% remained intact in the perineal massage group ($p = 0.00$). There was no statistical significance between the groups in episiotomy rates ($p = 0.19$) (Mohamed et al., 2011).

Birth Culture

Birth culture is being defined for the purpose of this paper as the variables that vary among births and may be further impacted by geographic location. This synthesis includes studies from Europe, Australia, Asia, and Africa with most of the studies assessed including

trials that were performed in the Middle East, with nine studies from Iran, three from Egypt, two from Israel, and two from Turkey. For this review, variables that are impacted by geographic location include birth provider (midwife, OB/GYN, or both), episiotomy use, use of pitocin, amniotomies, or fundal pressure, spontaneous versus directed pushing, and birthing position.

Birth Provider. When considering variables surrounding delivery provider, fifteen of the twenty studies included only midwives (Akbarzadeh et al., 2016; Akhlaghi et al., 2019; Alihosseni et al., 2018; Borrman et al., 2020; Edqvist et al., 2018; Essa & Ismail, 2015; Fahami et al., 2012; Ganji et al., 2013; Karaçam et al., 2012; Mohamed et al., 2011; Romina et al., 2020; Terré-Rull et al., 2014; Türkmen et al., 2020; Zare et al., 2014). Two of the studies did not mention a professional category of the birth provider (Demirel & Golbasi, 2015; Raja et al., 2019), and three of the studies noted to contain mixed company of midwives and physicians (Ashwal et al., 2016; Harlev et al., 2013; Ibrahim et al., 2017).

Episiotomy Use. The most widespread observation in regards to birth culture found within the research studies analyzed involved the use of episiotomy. Of the 20 studies, one single RCT on primiparous women in Iran (N = 99) controlled for the variable of episiotomies by not allowing use of them during birth (Fahami et al., 2012). In contrast, 19 of 20 studies included the use of episiotomy (Akbarzadeh et al., 2016; Akhlaghi et al., 2019; Alihosseni et al., 2018; Ashwal et al., 2016; Borrman et al., 2020; Demirel & Golbasi, 2015; Edqvist et al., 2018; Essa & Ismail, 2015; Ganji et al., 2013; Geranmayeh et al., 2011; Harlev et al., 2013; Ibrahim et al., 2017; Mohamed et al., 2011; Raja et al., 2019; Romina et al., 2020; Terré-Rull et al., 2014; Türkmen et al., 2020; Zare et al., 2014). Interestingly, one article mentioned that episiotomies were used “selectively” within the study, but also noted a cumulative rate of 39.5% use among all of the participants (Terré-Rull et al., 2014).

Use of Pitocin or Amniotomies. When considering the use of pitocin or amniotomies, five articles mentioned the use of one or both techniques as augmentation for labor. There were no statistical differences found surrounding the use of pitocin or amniotomies between the study and control groups (Ashwal et al., 2016; Edqvist et al., 2018; Geranmayeh et al., 2011; Ibrahim et al., 2017; Karaçam et al., 2012).

Fundal Pressure. Alternately the birth cultural practice of fundal pressure was analyzed in three of the studies (Edqvist et al., 2018; Karaçam et al., 2012; Mohamed et al., 2011). One study conducted in Turkey found that fundal pressure was provided in more than 42% of the participants in both the massage and the control groups (Karaçam et al., 2012), while another from Sweden noted that the practice was performed in 15% of the total participants (Edqvist et al., 2018). Additionally, Mohamed et al. (2011), of Egypt, noted that over one third of women received fundal pressure and of those women, specifically those in the warm compress group (31.25%), were less likely to have perineal trauma than those who received perineal massage (43.3%). This was not a statistically significant finding ($p = 0.32$).

Spontaneous Versus Directed Pushing Techniques. In regards to pushing techniques, two studies measured differences between either exhalation pushing and Valsalva pushing (Terré-Rull et al., 2014) or directed pushing (Edqvist et al., 2018); however, none of the methods showed statistically significant results in terms of perineal integrity.

Birth Position. Birth position is a factor that can also contribute to perineal integrity and was a focus in five of the studies (Akbarzadeh et al., 2016; Demirel & Golbasi, 2015; Edqvist et al., 2018; Karaçam et al., 2012; Terré-Rull et al., 2014). While the lithotomy position was predominantly used in four of the five studies, two studies made note of other positions. Terré-Rull et al. (2014) included lithotomy, vertical, and neutral positions. Edqvist et al. (2018)

included positions of sitting, lithotomy, lateral, kneeling, all fours, and birth seat. In both studies, there was not significant evidence of birth position impact on perineal integrity. Of note, Karaçam et al. (2012) stated that all of the women gave birth in the lithotomy position, but stirrups were used at a rate that was significantly less in the intervention group than in the control group (massage, 85.8% [N = 169]; control, 91.9% [N = 182]) ($p = 0.053$).

Birth Outcomes

This review finds three themes in regards to birth outcomes correlated with the use of the interventions of perineal massage or warm compresses. These include duration of the second stage of labor, maternal pain perception, and newborn Apgar scores as a measure of newborn health.

Duration of the Second Stage of Labor. Of the 20 studies included in this review, 11 discussed the duration of the second stage of labor. Five found that perineal massage decreased the duration (Akhlagi et al., 2019; Ashwal et al., 2016; Demirel & Golbasi, 2015; Geranmayeh et al., 2011; Raja, et al., 2019). Findings from Geranmayeh et al. (2011) indicated that the second stage of labor was significantly shorter in the massage group than in the control group ($p = 0.038$) with the length of labor lasting 46 +/-19 minutes in the control group and 37 +/- 20 minutes in the massage group. In a similar finding, Demirel and Golbasi (2015) discovered that the mean duration of the second stage of labor was significantly shorter in the massage group than in the control group ($p = 0.01$) for both primiparous and multiparous women. Akhlagi et al. (2019) noted that the second stage of labor lasted for a mean duration of 45 minutes in the intervention group, compared to 55 minutes in the control group ($p = 0.002$). Raja et al. (2019) also found that perineal massage shortened the second stage of labor, resulting in women who received massage having a mean second stage duration of 42.13 +/- 14.19 minutes, compared to

51.45 +/- 14.45 in the control group. Although statistically insignificant, Ashwal et al. (2016) determined application of obstetric gel resulted in a mean reduction of 15.4%, or 6.9 minutes, in the second stage of labor ($p > 0.05$).

In contrast, two RCTs on primiparous women in Iran and Egypt found no significant impact on the duration of the second stage of labor in their intervention groups compared with their control groups (Ibrahim et al., 2017; Zare et al., 2014). Although it was not statistically significant, Fahami et al. (2012), who performed an RCT on primiparous women in Iran (N = 99), was the only study to report that perineal massage resulted in a longer duration in the second stage of labor. This study found women who received perineal massage experienced a 49.09-minute (SD = 29.35) second stage of labor whereas women that did not experience perineal massage experienced a 38.48 minute (SD = 20.30) mean duration (Fahami et al., 2012).

The effect of warm compress was split, with one study reporting no statistical difference and another finding shortened duration of labor. Essa and Ismail (2015), in a study of primiparous women (N = 160), found no statistically significant correlation between warm compress and the duration of the second stage. In contrast, Alihosseni et al. (2018), while also studying primiparous women (N = 114), found that application of warm compresses resulted in a significantly shorter second stage of labor ($p = 0.034$). Mohamed et al. (2011) included both the use of perineal massage and warm compress application as separate interventions. This Egyptian RCT found there was no statistically significant difference ($p = 0.23$) among women who received perineal massage, warm compresses, or standard care.

Maternal Pain Perception. The second theme to emerge regarding birth outcomes is that of maternal pain perceptions both during birth and the postpartum period. Of the 20 studies included in this review, eight studies examined maternal pain regarding the interventions, either

perineal massage or warm compress. Two of the eight noted no significant difference in maternal pain perception. These two studies were both RCTs that evaluated pain at one day, ten days, three weeks, and one year postpartum (Geranmayeh et al., 2011; Karaçam et al., 2012). Six of the eight concluded that maternal pain perception was improved (Akbarzadeh et al. 2016; Essa & Ismail, 2015; Ganji et al. 2013; Ibrahim et al., 2017; Raja et al. 2019; Türkmen et al. 2020).

Warm compresses were found to be helpful in preventing maternal pain in four of the studies included in this review. Akbarzadeh et al. (2016) noted that the mean intensity of maternal pain on the first day postpartum was significantly lower in women who received warm compresses ($p < 0.001$). Türkmen et al. (2020) found that women who received warm compress experienced significantly less pain immediately after the intervention ($p < 0.0001$), immediately post birth ($p < 0.0001$), and two hours after birth ($p = 0.028$). Ganji et al. (2013) revealed maternal pain perception was significantly lower for women in labor who received warm compress application ($p = 0.002$). Of note, this study utilized both warm compresses and cool compresses intermittently. Essa and Ismail (2015) noted similar results of the application of a warm compress being very effective in controlling pain. Utilizing a visual analogue scale, Essa and Ismail discovered the use of warm compresses significantly decreased pain ($p = 0.000$). They determined the women in the intervention group experienced pain relief when considering the following: visual measures, tense muscles, restlessness, grimacing, and vocalization ($p = 0.000$). Additionally, while 45% of women in the control group requested additional pain relief measures in the second stage of labor, only 7% of women receiving warm compresses requested pain relief measures during the same time (Essa & Ismail, 2015).

Raja et al. (2019) found that women who received perineal massage experienced significantly less ($p = 0.038$) pain than women who did not. Of the articles included in this

review, Raja et al. (2019) was only study that concluded that perineal massage in the second stage of labor was effective in improving maternal pain perception.

Finally, Ibrahim et al. (2017), in an RCT of primiparous women (N =304) that looked at both perineal massage and warm compresses, determined that both interventions improve maternal pain perceptions. A pain analogue scale was used to observe behavioral pain parameters among the participants. The variables associated with the behavioral pain parameters included tense muscles, restlessness, grimacing, and patient sounds. This study first observed tense muscles. At 15 minutes prior to the interventions, tense muscles were observed in 30.4% of the warm compress group and in 35.3% of the perineal massage group. Fifteen minutes after the intervention, 18.6% of women in the warm compress group had tense muscles, and 20.6% of women in the perineal massage group still experienced tense muscles. Additionally, 29.4% of women in the warm compress group and 31.4% of women in the perineal massage group were observed as very restless 15 minutes prior to intervention. These rates decreased to 23.5% and 26.5%, respectively, at 15 minutes post intervention. Constant grimacing was observed in 53.9% of the warm compress group and in 56.9% of the perineal massage group 15 minutes prior to intervention. These rates decreased to 38.2% post warm compress application and 37.3% post perineal massage. Finally, crying and sobbing were reduced 15 minutes post intervention: women in the warm compress group began at 43.1% and reduced to 25.5%; and, women in the perineal massage group began at 42.2% and decreased to 36.3%. Regarding behavioral response patterns, pain reduction was highly significant in the intervention groups ($p = 0.000$) (Ibrahim et al., 2017).

Newborn Apgar Scores. A third emerging theme discovered among these studies refers to newborn Apgar scores as one measure of newborn health. Of the 20 articles included for

review, nine specifically mentioned Apgar scores. None of the studies that included Apgar scores reported any statistical difference between the intervention groups and the control group (Akhlaghi et al., 2019; Alihosseni et al., 2018; Ashwal et al., 2016; Edqvist et al., 2018; Ganji et al., 2013; Geranmayeh et al., 2011; Raja et al., 2019; Terré-Rull et al., 2014; Zare et al., 2014). No other adverse neonatal effects were noted as a result of the interventions performed within the studies critiqued.

Critique of Strengths and Weaknesses

The main strengths of the studies reviewed in this paper tend to be present as themes throughout most of the studies. One strength includes that 17 of the 20 studies were RCTs, exhibiting the highest level of evidence because they require a control group, with a defined intervention on the study group for comparison. Within the studies presented, most found that not only was the sample size sufficient for the study design, but that the majority of the groups contained participants that were homogenous in terms of demographic data. Standardized, well-studied tools and methods such as SPSS version 24 and Kolmogorov-Smirnov test were often used to examine the data. Additionally, t-test, chi-square, and Mann-Whitney U test were commonly used to compare the two groups within studies. Several of the trials initiated pilot studies to test clarity and applicability of the study tools for the researchers. Many of the studies' results agree with several other researchers.

There are a few other strengths identified as outliers among the studies. Of note, Akhlaghi et al. (2019) included methods that blinded the delivery midwives to the performance of perineal massage prior to the completion of the second stage. Additionally, Alihosseni et al. (2018) included a single-blind method design that involved the midwife who applied the warm

compress, the delivery midwife, and the outcome-measuring midwife to all be three different people who were unaware of the study intervention performed.

Limitations of the studies include the fact that performing an episiotomy is ultimately at the discretion of the birth provider, as only one study noted that none of the participants received an episiotomy (N = 99) (Fahami et al., 2012). Many of the geographical locations of the studies have high rates of episiotomies including trials that were performed in the Middle East, with nine studies coming out of Iran, three from Egypt, two from Israel, and two from Turkey. Blinding of the birth provider was only completed in two of the studies (Akhlaghi et al., 2019; Alihosseni et al., 2018). Another limiting factor was that a few of the trials utilized self-reporting for healing and pain assessments (Akbarzadeh et al., 2016; Essa & Ismail, 2015; Fahami et al., 2012; Ganji et al., 2013; Harlev et al., 2013; Ibrahim et al., 2017; Karaçam et al., 2012; Raja et al., 2019; Türkmen et al., 2020), and two of the trials implemented various methods simultaneously; therefore, direct correlation between outcomes was difficult (Borrman et al., 2020; Edqvist et al., 2018).

Summary

In conclusion, chapter three outlines the synthesis of articles reviewed for the purpose of this paper. Twenty research articles were critically analyzed in order to determine if active management of the second stage of labor with perineal massage or warm compress impacts outcomes related to perineal integrity. The 20 research articles were appraised using the Johns Hopkins Research Evidence Appraisal Tool. In regards to the levels of evidence, 17 of the 20 articles were level I, one was level II, and two were level III studies. The major themes identified in our analysis include the effects of interventions such as perineal massage or warm compress on perineal integrity, the impact of birth culture variables in relation to perineal integrity, and the

birth outcomes and safety in which these interventions can be implemented. Finally, major themes among the strengths and limitations of the studies were considered to incorporate a comprehensive review of the evidence provided.

Chapter four will focus on the implications of perineal massage or warm compress on the practice of nurse-midwifery. Practice guidelines will be investigated to make recommendations for nurse-midwifery practice in order to actively manage the second stage of labor.

Recommendations for future research will aid in practice changes as well as recommendations for safety, birth outcomes, and ultimately decreased perineal trauma during and as a result of vaginal childbirth.

Chapter IV: Discussion, Implications and Conclusions

Literature Synthesis

This review considered two low-tech interventions, perineal massage or warm compress application, in the second stage of labor and their effect on perineal integrity. This review focused on both episiotomy prevention and spontaneous perineal lacerations that can occur with the act of birth. The effectiveness of both strategies was reviewed and synthesized in this capstone. This review examined a total of 20 relevant articles that were evaluated via the Johns Hopkins Research Evidence Appraisal Tool. Chapter three of this review was used to synthesize the available research associated with both interventions in regards to perineal integrity, birth culture, and birth outcomes. Chapter three was also used to analyze and assign their relevance for nurse-midwifery practice. This review adopted the framework of Neuman's Systems Model.

This critical review explored research related to the clinical practice question: "Does the use of perineal massage or warm compresses in the second stage of labor offer perineal protection?" Unfortunately, findings were inconsistent among studies, some of which came to opposing conclusions. The main finding is that there needs to be additional research regarding both interventions in relation to perineal integrity in the second stage of labor.

Warm Compress Application and Perineal Integrity

The effectiveness of warm compresses application was more consistent than perineal massage. Three of the studies included in this review found that the application of a warm compress in the second stage of labor was preventative against spontaneous lacerations (Akbarzadeh et al., 2016; Borrman et al., 2020; Essa & Ismail, 2015). An additional two studies

determined that warm compress application in the second stage of labor is protective against episiotomies (Alihosseni et al., 2018; Türkmen et al., 2020). However, one study did find that warm compress application may increase first-degree spontaneous lacerations (Terré-Rull et al., 2014). An additional study determined there to be no harm, but also no statistical benefit to warm compress application in the second stage of labor (Ganji et al., 2013). Thus, out of the seven studies that exclusively examined warm compress application to the perineum in the second stage of labor, six indicated benefit or no statistically significant change in regards to perineal integrity.

Perineal Massage and Perineal Integrity

This review also examined perineal massage in the second stage of labor. There were greater inconsistencies in the effectiveness of perineal massage than warm compresses. Of the 20 studies included in this review, only one concluded that perineal massage in the second stage of labor was helpful in maintaining perineal integrity in the form of spontaneous laceration prevention (Fahami et al., 2012). However, six of the studies determined that perineal massage was helpful in episiotomy prevention (Akhlaghi et al., 2019; Demirel & Golbasi, 2015; Geranmayeh et al., 2011; Karaçam et al., 2012; Raja et al., 2019; Romina et al., 2020). Notably, two of these studies reported that while perineal massage was helpful in preventing episiotomies, it increased the occurrence of spontaneous perineal lacerations (Akhlaghi et al., 2019; Geranmayeh et al., 2011). Furthermore, two other studies found that although perineal massage in the second stage of labor did not contribute to perineal trauma, it also provided no benefit (Edqvist et al., 2018; Zare et al., 2014).

Comparing Perineal Massage and Warm Compress Application Regarding Perineal Integrity

Two of the studies included in this review took a comparative perspective, evaluating the effectiveness of warm compress application to perineal massage in the second stage of labor. Researchers wanted to know which method was more effective in maintaining perineal integrity. The results were inconsistent. One study found that perineal massage was more effective in maintaining perineal integrity than either warm compress application or standard care (Ibrahim et al., 2017). In contrast, the other study concluded that warm compresses were more protective against perineal trauma than perineal massage (Mohamed et al., 2011).

Use of Specific Oils, Gels, Waxes in Maintaining Perineal Integrity

This review also considered whether oils or waxes could improve perineal integrity. This review found no evidence that one gel, oil, or wax, would improve perineal integrity compared to another (Ashwal et al., 2016; Harlev et al., 2013).

Maternal Pain Perception

This capstone also studied the effects of perineal massage and warm compresses on maternal pain perception. Of the 20 articles reviewed, nine included maternal pain perception following intervention. Of these, two found that there was no statistically significant benefit from either intervention on maternal pain perception (Geranmayeh et al., 2011; Karaçam et al., 2012). Crucially, no study revealed that either intervention increased maternal pain perception. A majority, however, seven of the nine studies, found statistically significant improvement in maternal pain perception after either intervention (Akbarzadeh et al. 2016; Essa & Ismail, 2015,

Fahami et al., 2012; Ganji et al. 2013; Ibrahim et al., 2017; Raja et al., 2019; Türkmen et al., 2020).

Current Trends and Gaps in the Literature

Currently, most of the literature on the topic of warm compress application and perineal massage in the second stage of labor is written outside of the United States. Iran, Turkey, Israel, Spain, Egypt, India, Australia, and Sweden were included in this review. There is very little research conducted domestically within the last ten years. Additionally, the vast majority of studies included in this review examined only nulliparous women. Thus, there is no consistent data on multiparous women regarding the benefits and limitations of these two interventions.

Finally, the American College of Obstetrics and Gynecology recommends restrictive episiotomy over routine use, due to the fact that routine episiotomy offers no immediate or future benefits and is associated with dyspareunia and postpartum anal incontinence (ACOG, 2016). However, the rates of routine episiotomy vary greatly among nations.

The highest rates of episiotomies in this study can be found in Iran, where in teaching hospitals the rates of episiotomy have been reported as high as 97% (Khani et al., 2012). In Turkey, one study found the episiotomy rate to be 93.3% in nulliparous women and 30.2% for multiparous women. In Spain, the rates of episiotomy vary among public and private hospitals, with one study indicating public hospitals averaged 23.6% and private hospitals 30.0% (Escuriat et al., 2015). One study in Israel reported an episiotomy rate of 21% (Steiner et al., 2012). In Australia, the episiotomy rate is reported as 16.9%; however, there is great variation between Australian-born women, with an episiotomy rate of 15.1%, and Vietnamese-born women, with an episiotomy rate of 29.9% (Trinh et al., 2013). In a study conducted in India, the episiotomy

rate was as high as 93.3% in nulliparous women (Raja et al., 2019). The nation with the lowest episiotomy rates included in this study is Sweden, with an episiotomy rate of 6.6% (Rodrigues et al., 2019). Interestingly, the Swedish study found that, while not harmful, there was no benefit to performing perineal massage in the second stage of labor to promote perineal integrity (Edqvist et al., 2018).

Finally, in Egypt, some studies suggest the episiotomy rate is as high as 97% (Ibrahim et al., 2017). Yet the applicability of Egypt's findings in the United States are limited. According to the World Health Organization, in 2003, 94.6% of married women in Egypt experienced some degree of female genital mutilation, which refers to partial or complete cutting of the female external genitalia for non-medical reasons (Tag-Eldin et al., 2008). Thus, there remains a persistent third variable problem in studies conducted where female genital mutilation is widespread.

Furthermore, it is difficult to find comparative national episiotomy rates. Barring a few exceptions, this information is not well documented. The lack of research on this topic, both internationally and within the United States, places women at risk of receiving unnecessary interventions during birth.

Implications for Nurse-Midwifery Practice

According to the hallmarks for midwifery that are defined by ACNM, nurse-midwives promote the empowerment of women and people as partners in their own healthcare by incorporating evidenced based care into clinical practice. They do this by informed consent and skillful communication (ACNM, 2020). Given the findings of the matrix synthesis, the research for warm compress application is more consistent and can be recommended for nurse-midwives

to utilize in the second stage of labor. The research for perineal massage is less consistent. However, the available data suggests it is safe for the newborn and has been shown to be helpful in episiotomy prevention. Thus, nurse-midwives can make this decision on a case-by-case basis if the birthing person desires this intervention, or if the nurse-midwife is concerned about the possibility of a necessary episiotomy. Ultimately, nurse-midwives work to promote physiologic birth through low-tech and high-touch interventions while also supporting the birthing person as a whole and this practice can be implemented in a variety of ways including the studied interventions.

Recommendations for Future Research

Given the limited research in the United States, large randomized controlled trials are needed to discover if these low-risk interventions are useful in maintaining perineal integrity. Additionally, the effectiveness of these two interventions must be studied in both primiparous and multiparous women. Due to the low-risk nature of warm compress application in the second stage of labor, this practice can be recommended for birth providers. Perineal massage in the second stage of labor has more inconsistent data, but has been shown to be safe in terms of newborn health. Thus, if desired by a laboring mother, this intervention may be performed with the act of shared decision making. As aforementioned, episiotomy rates by nation need to be recorded and easily accessible in order to achieve optimal rates worldwide.

Integration of Neuman's System Theory

Nurse-midwives view birth as a state of wellness. Neuman's System Theory can be integrated into the midwife's role of maintaining perineal integrity in the second stage of labor, and therefore assist birthing women with enhancing wellness. Neuman's theory states the

following: “Each patient has evolved a normal range of responses to the environment referred to as the normal line of defense. It can be used as a standard by which to measure health deviation” (Petiprin, 2020). Neuman’s theory recognizes that each patient possesses individual variables that can be protective in maintaining health, but if stressed, may result in illness. By remembering these principles, nurse-midwives can enhance the “line of defense” by promoting perineal integrity in the second stage of labor. Neuman’s theory recognizes the multifaceted existence of each woman. While each laboring woman will present in labor with their own stressors, nurse-midwives should promote interventions to reduce stress. Nurse-midwives can honor shared decision making by presenting women with two low-tech and high-touch interventions as well as summarizing the associated research available. This step will enable a mutual decision on such interventions within the second stage of labor and will strengthen the line of defense for laboring women, promoting physiologic birth and maintaining perineal integrity (Petiprin, 2020).

Conclusion

This critical review of the literature analyzed the use of warm compresses and perineal massage in the second stage of labor. These two interventions were reviewed in the context of maintaining perineal integrity. Findings suggest that there are inconsistencies among the available data regarding these interventions, which may be partly explained by the fact that most current research occurs internationally. However, in all 20 of the articles included in this review, neonatal outcomes were unaffected by either intervention. Additionally, pain may be improved with either interventions and thus, overall improve maternal satisfaction. Additionally, birth culture has been found to play an active role in perineal integrity measures taken by providers.

The findings for warm compress use were more consistent than that of perineal massage. Thus, warm compresses should be offered to women in the second stage of labor. As the research is inconsistent, perineal massage may be offered on a case-by-case basis, though it may be particularly useful in episiotomy prevention. If the nurse-midwife has suspicion that an episiotomy may be necessary for a safe birth, perineal massage may be offered prior to a more invasive intervention. Additionally, the available research finds that warm compress application and perineal massage in the second stage of labor offers decreased maternal pain perception.

The goal of this capstone is to reveal low-tech and high-touch interventions that can be utilized to promote physiologic birth as a state of wellness and maintain perineal integrity in the act of birth. Nurse-midwives believe in shared decision making and the right to self-determination for all women. The research examined can be shared with women to empower their educated decisions on interventions in the second stage of labor with the goal of maintaining perineal integrity.

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Appendix: Matrix of the Literature

Purpose/Sample	Design (Method/Instruments)	Results	Strengths/Limitations
<p>Purpose: To investigate the effect of warm compress bistage intervention on the rate of episiotomy, perineal trauma, and postpartum pain intensity in the primiparous woman with delayed Valsalva maneuver.</p> <p>Sample/Setting: 150 primiparous women; hospitals in Shiraz, Iran, from July 2012 to March 2013</p> <p>Level of evidence: Level I</p> <p>Quality of evidence: Quality B</p>	<p>Randomized Control Trial 150 women were randomly divided into 2 groups: intervention and control. The intervention group received warm compress bistage intervention at 7-cm and 10-cm dilation and zero position during the first and second stages of labor for 15 to 20 minutes, whereas the control group received the hospitals' routine care. Additionally, in the intervention group, Valsalva maneuver was delayed until the pregnant woman felt spontaneous straining. After delivery, the prevalence of episiotomy; intact perineum; location, degree, and length of rupture; and postpartum pain intensity were assessed in the 2 groups.</p>	<p>The results revealed a significant difference between the intervention and control groups regarding the frequency of intact perineum (27% vs. 6.7%) and the frequency of episiotomy (45% vs. 90.70%). In addition, the frequency of the location of rupture ($p = .019$), mean length of episiotomy incision ($P = .002$), and mean intensity of pain the day after delivery ($p < .001$) were significantly lower in the intervention group compared with the control group. However, the rate of ruptures was higher in the intervention group.</p> <p>Conclusion: Warm compress bistage intervention was effective in reducing episiotomies and the mean length of episiotomy incision, reducing pain after delivery, and increasing the rate of intact perineum. However, the rate of ruptures slightly increased in the intervention group compared with the control group. They also noted a slightly increased rate of lacerations. Warm compress bistage showed no negative effects on delivery outcomes and it may increase women's satisfaction.</p>	<p>Strengths: Randomized Controlled Trial</p> <p>The data were analyzed with SPSS statistical software (version 16) using χ^2 test, t test, and odds ratio.</p> <p>In order to reduce bias, the perinea were examined by an experienced midwife after delivery.</p> <p>Thermotherapy is a simple, safe, effective, and inexpensive non-pharmacological analgesia method that does not require any specific skills.</p> <p>Limitations: Episiotomy was performed based on the opinion of the instructor or the midwives.</p> <p>The study was not blinded to the provider or the patient.</p> <p>Another study limitation was the difference among the pregnant women's tissues, which was almost controlled by random allocation of the women into 2 groups.</p> <p>The pregnant women's pain thresholds were also different, which was again controlled by randomly dividing the participants into 2 groups.</p>
<p>Author Recommendations: The present study findings revealed that warm compress bistage intervention increased the rate of intact perineum, reduced the rate of episiotomy and postpartum pain, and slightly increased the rate of lacerations. In addition, this method had no negative effects on delivery outcomes, including fetal health, instrumental delivery, and uterine contractions. Therefore, this method may increase women's satisfaction and encourage them to select natural vaginal delivery. Thermotherapy is a simple, safe, effective, and inexpensive non-pharmacological analgesic method that does not require any specific skills. Therefore, it can play a key role in a woman's satisfaction with the delivery experience.</p>			
<p>Summary for current clinical practice question: When applying the results of this trial to the clinical practice question of: do women who have active management of the second stage of labor, such as perineal massage or superficial heat have less perineal trauma than women who receive standard care, it can be concluded that this intervention of warm compress decreases episiotomies and the mean length of episiotomy incision, reducing pain after delivery, and increasing the rate of intact perineum. Therefore, this could result in less trauma.</p>			

Source: Akhlaghi, F., Sabeti Baygi, Z., Miri, M., & Najaf Najafi, M. (2019). Effect of perineal massage on the rate of episiotomy. *Journal of Family & Reproductive Health, 13*(3), 160–166. <https://doi.org/10.18502/jfrh.v13i3.2130>

Purpose/ Sample	Design (Method/Instruments)	Results	Strengths/Limitations
<p>Purpose: The aim of study was to investigate the need for perineal massage (PM) during labor on the need for episiotomies.</p> <p>Sample/ Setting: 99 nulliparous women Um-al-Banin Educational- Therapeutic Hospital in Mashhad</p> <p>Level of evidence: Level I</p> <p>Quality of evidence: Quality B</p>	<p>Randomized double-blind clinical Trial</p> <p>The PM was performed on all women in the intervention group from 6cm–10cm and then during the second stage until delivery. All participants lied in the lithotomy position and the PM was performed between contractions. The researchers rubbed two drops of lubricants onto the inner vaginal wall with fingers 2–3 cm and pressed both sides of the vaginal wall for 2 minutes. Each woman had a minimum of 30 minutes of rest before the next massage session. Four sessions were performed during the first stage of labor and at the start of the second stage of labor each participant received a 10-minute massage. Control group women received the routine care of the hospital and underwent routine care. The two groups were examined for frequency of episiotomy, perineal lacerations, and their degrees as well as the duration of the first and second stages of labor, the newborn's weight, and head circumference.</p>	<p>Need for episiotomy: Control: 12.2%, PM: 28%. The need for episiotomy was significantly lower in the PM group than in the control group ($p = 0.05$). Spontaneous perineal tears were significantly higher in mothers of the PM group ($p = 0.05$). The spontaneous tear degree in the 20 mothers who did not require episiotomy ($p = 0.5$) and the degree of perineal tear in mothers who needed an episiotomy ($N = 79$; $p = 0.1$) were not significantly different in the two groups. In the PM group members who did not require episiotomy ($N = 14$) and the mother underwent a spontaneous tear, first-degree tears were more frequent than second-degree ones.</p> <p>The median duration of the active stage of labor: lower in the PM group than in the control group.</p> <p>The median of the second stage duration in the control and intervention groups were 55 and 45 minutes, respectively where the difference was significant ($p = 0.002$), and the median time of completion of the active stage until delivery in the PM group had reduced.</p> <p>Conclusion: The results of this study indicated that PM is effective in reducing the need for an episiotomy. However, the results also showed that among the PM mothers who did tear, first-degree tear of the perineum was of a higher frequency than the second-degree tear. The median duration of the second stage of labor was also significantly reduced in the PM group.</p>	<p>Strengths: Randomized Controlled Trial All the massages were given by one of the research colleagues so that the manner and strength of the massage would be similar. The study was double blinded and the midwife doing the delivery was not aware of the group allocation. There were no significant differences between the two groups in terms of demographic and confounding variables. Appropriate methods were used for statistical analysis.</p> <p>Limitations: The study was not blinded. The decision for performing episiotomy during childbirth in both groups was made at the discretion of the midwife, regarding the diagnosed childbirth factor and indications of episiotomy.</p> <p>The sample size was smaller than other comparable studies.</p>
<p>Author Recommendations: It is also recommended that researchers study the effect of PM in the third trimester of pregnancy on the frequency of episiotomy and perineal tear during labor in nulliparous women.</p>			
<p>Summary for current clinical practice question: Perineal massage decreased the rates of episiotomy as well as lessened the severity of spontaneous perineal lacerations. Perineal massage may shorten the second stage of labor compared to standard care. When considering if women who have active management of the second stage of labor, such as perineal massage and superficial heat, have less perineal trauma than women who receive standard care, this study provides evidence that women who have perineal massage during labor may have lower instances of episiotomy.</p>			

Source: Alihosseni, F., Abedi, P., Afshary, P., Haghighi, M., & Hazeghi, N. (2018). Investigating the effect of perineal heating pad on the frequency of episiotomies and perineal tears in primiparous females. *Medical - Surgical Nursing Journal*, 7(1), 1–5. <https://doi.org/10.5812/msnj.82588>

Purpose/ Sample	Design (Method/Instruments)	Results	Strengths/Limitations
<p>Purpose: To determine the effect of perineal heating pad on the frequency of episiotomies and perineal tears in primiparous females.</p> <p>Sample/Setting: 114 primiparous females Imam Ali Hospital in Andimeshk</p> <p>Level of evidence: Level I</p> <p>Quality of evidence: B</p>	<p>Randomized single-blind clinical trial</p> <p>The heating pads were used in the intervention group with the start of the second stage of labor and the childbirth process was routinely carried out in the control group without any intervention. All of the participants received the Ritgen's Maneuver to control the baby's head at delivery. The data collection tool was a form on demographic information and characteristics of the research subjects, as well as the maternal postpartum data collection form.</p>	<p>Perineum Intact: 15% and 26% in control and intervention respectively. This is not statistically significant ($p = 0.512$).</p> <p>Episiotomy: 41% and 21% in control and intervention respectively. This is statistically significant ($p = 0.025$).</p> <p>First-degree tears: 24% and 26% in control and intervention respectively. This is not statistically significant ($p = 0.25$).</p> <p>Second-degree tears: 17% and 13% in the control and intervention respectively. This is not statically significant ($p = 0.23$)</p> <p>Between the two groups: the perineum was more likely to be intact and less likely to have a second- or third-degree tear in the intervention groups, but none of the results were statistically significant.</p> <p>Conclusion: The results of the current study revealed that the use of perineal heating pad during the second stage can be effective in decreasing the episiotomy rate and also reduce the probability of perineal tears in primiparous females.</p>	<p>Strengths: Randomized Controlled Trial- Single Blinded</p> <p>The midwife was blinded on if the warm compress had been applied or not at the time of delivery. All of the participants received the Ritgen's Maneuver to control the delivery of the head.</p> <p>Data analysis was carried out using chi-square and independent T-test using the SPSS software version 19. P values of < 0.05 were considered significant.</p> <p>Overall, no complications have ever been mentioned in all the limited studies conducted on non-drug perineal treatment methods, including the local heating of the perineum.</p> <p>Limitations: Decisions on whether to practice episiotomy or not were made based on the mother's situation and/or the experience and opinion of the researcher.</p>
<p>Author Recommendations: Since there are a few studies in this regard, it is recommended that researchers carry out further research in this field and other interventions affecting perineal tear and the episiotomy rate.</p>			
<p>Summary for current clinical practice question: When applying the results of this trial to the clinical practice question of: do women who have active management of the second stage of labor, such as perineal massage or superficial heat have less perineal trauma than women who receive standard care, warm compresses during the second stage of labor may decrease trauma by decreasing likelihood of an episiotomy and also reduces the probability of perineal tears in primiparous females; therefore, the intervention decreases the likelihood of trauma.</p>			

<p>Source: Ashwal, E., Aviram, A., Wertheimer, A., Krispin, E., Kaplan, B., & Hirsch, L. (2016). The impact of obstetric gel on the second stage of labor and perineal integrity: A randomized controlled trial. <i>The Journal of Maternal-Fetal & Neonatal Medicine</i>, 29(18), 3024-3029. https://doi.org/10.3109/14767058.2015.1114079</p>			
Purpose/Sample	Design (Method/Instruments)	Results	Strengths/Limitations
<p>Purpose: The researchers aimed to discover if gel application in the second stage would decrease the incidence of perineal trauma and decrease labor duration. The safety of this particular gel was also studied.</p> <p>Sample/Setting: 200 nulliparous and multiparous women</p> <p>Rabin Medical Center, Petha-Tiqua, Israel</p> <p>Level of evidence: Level I</p> <p>Quality of evidence: Quality B</p>	<p>Randomized Control Trial</p> <p>Eligible women were randomly assigned to either labor management without using obstetric gel, or labor management using intermittent application of obstetric gel into the birth canal, starting at 4 cm of dilation upon SVE.</p> <p>Dianatal is a bio-adhesive gliding film which reduces the opposing force to vaginal birth.</p>	<p>Results: There was no statistically increased difference between the two groups on perineal integrity or labor duration.</p> <p>Conclusion: Until additional research is available on Dianatal gel, while it is safe for newborns and mothers, it provides no statistical benefit on labor duration or perineal integrity.</p>	<p>Strengths: Single center, improving internal validity. One of the first large RCTs to investigate safety and impact of a specific obstetric gel.</p> <p>Limitations: Blinded or placebo-controlled study was impossible to carry out due to the nature of the intervention. There was lack of data surrounding the women included in this study such as maternal pre-pregnancy BMI, the amount of gel used by the birth provider, and the dose of oxytocin used for augmentation.</p>
<p>Author Recommendations: Larger randomized controlled trials are needed to suggest that Dianatal gel is helpful in maintaining perineal integrity or in shorter labor duration.</p>			
<p>Summary for current clinical practice question: When applying the results of this trial to the clinical practice question of: do women who have active management of the second stage of labor, such as perineal massage and superficial heat have less perineal trauma than women who receive standard care, it can be concluded that obstetric gel provided no benefit to preserving the perineum.</p>			

Source: Borrmann, M. J., Davis, D., Porteous, A., & Lim, B. (2020). The effects of a severe perineal trauma prevention program in an Australian tertiary hospital: An observational study. *Women and Birth: Journal of the Australian College of Midwives*, 33(4), e371–e376. <https://doi.org/10.1016/j.wombi.2019.07.301>

Purpose/ Sample	Design (Method/Instruments)	Results	Strengths/Limitations
<p>Purpose: To compare the proportion of women experiencing severe perineal trauma before and after implementation of prevention strategy. Secondary aim is to understand factors associated with severe perineal trauma.</p> <p>Sample/ Setting: 4128 nulliparous women</p> <p>A tertiary hospital in Australia</p> <p>Level of Evidence: III</p> <p>Quality of Evidence: A/B</p>	<p>Retrospective observational study Compares outcomes two years before and two years after the implementation of a multidisciplinary severe perineal trauma prevention program. The interventions promoted include antenatal perineal massage; avoidance of instrumental birth (if not possible, vacuum rather than forceps); warm compress in the second stage of labor; controlled birth of the fetal head (with communication OR hands on technique); restricted episiotomy medio-lateral episiotomy (if episiotomy required); and avoidance of lithotomy position wherever possible.</p> <p>Staff members attended workshops to discuss prevention recommendations. Data was then collected and assessed prior to and post prevention strategy education.</p>	<p>Results: Differences between the two groups show: women in the group after staff education on prevention strategies experienced equal rates of instrument assisted birth. However, fewer women experienced a forceps birth.</p> <p>Most importantly, the proportion of women with severe perineal trauma was reduced by 37% for all types of vaginal birth.</p>	<p>Strengths: Large sample size Nulliparous women only included improving internal validity. Data was validated regularly by the system administrator. Categorical data were analyzed using the chi-squared statistic. Continuous data were analyzed using Student's t-test after checking for normality. All tests were two-tailed, and significance was set at $p < 0.05$. Negative outcomes, such as increase in episiotomies after implementation, is fully discussed, lending to study transparency.</p> <p>Limitations: Where prevention strategies include a “bundle” of interventions it is difficult to identify the element of combination of elements that may have made a difference. The use of historical controls means that changes in practice (other than the intervention) could have occurred over time, impacting the results found. This study found an association between time period and rates of severe perineal trauma (SPT) and this should not be interpreted as a cause and effect relationship. As there were many prevention strategies implemented, it is difficult to determine which element made a positive impact on SPT prevention.</p>
<p>Author Recommendations: Future studies would benefit from rigorous documentation. Of note, the hospital the study occurred in reported higher rates of baseline SPT than other maternity services in Australia.</p>			
<p>Summary for current clinical practice question: When applying the results of this trial to the clinical practice question of: do women who have active management of the second stage of labor, such as perineal massage or superficial heat have less perineal trauma than women who receive standard care, it can be concluded that this trial shows that the use of warm packs on the perineum during the second stage of labor may reduce the occurrence of perineal lacerations. However, the evidence is weak since it is done in combination with other interventions and therefore it is difficult to know its true impact.</p>			

Source: 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>

Purpose/Sample	Design (Method/Instruments)	Results	Strengths/Limitations
<p>Purpose: To examine the effects of perineal massage during active labor on the frequency of episiotomy and perineal tearing, and to assess the effect of massage on the duration of the second stage of labor.</p> <p>Sample/Setting: 284 women met the inclusion criteria and agreed to participate</p> <p>Sivas State Hospital, Sivas, Turkey</p> <p>Healthy pregnant women presenting for their first or second delivery at 37–42 weeks of pregnancy were enrolled during the first stage of labor.</p> <p>Level of evidence: Level I</p> <p>Quality of evidence: Quality B</p>	<p>Randomized Control Trial</p> <p>Participants were randomly assigned (1:1) to the massage group (10-minute perineal massage with glycerol four times during the first stage and once during the second stage of labor) or control group (routine care). The frequency of episiotomy and perineal tearing were compared between the groups. Participants and investigators were not masked to group assignment. The results of length of second stage were also separated between primiparous women and multiparous women.</p>	<p>Both groups contained 142 participants. Episiotomy was performed among 44 (31.0%) women in the massage group and 99 (69.7%) in the control group ($p = 0.001$). Lacerations were recorded among 13 (9.2%) women in the massage group and 6 (4.2%) in the control group ($p = 0.096$).</p> <p>Conclusion: Application of perineal massage during active labor decreased the frequency of episiotomy procedures.</p>	<p>Strengths: Randomized Controlled Trial The population was well defined and the control and intervention groups have well defined roles within the methods of the study.</p> <p>Both the control and the intervention groups had equal parts primiparous and multiparous women.</p> <p>Limitations: Participants and investigators were not blinded to group assignment. Midwives and doctors had the prerogative to choose episiotomy and they are routinely performed in the country of Turkey. Since the results of the length of the second stage were separated between primiparous and multiparous women, the sample size in this regard is actually smaller than proposed. However, in both populations, the intervention proposed shortened the duration of labor in both groups, so this result may be applied to all women in general that fit the description of the study. Because the present sample included only healthy pregnant women having their first or second birth, the results cannot be generalized to the whole population. However, the findings still have implications for perineal complications associated with labor.</p>
<p>Author Recommendations: Perineal massage is recommended because it improves the elasticity of the perineal muscles, ensures perineal flexibility during delivery, and thereby reduces both spontaneous lacerations and the need for episiotomy.</p>			
<p>Summary for current clinical practice question: When applying the results of this trial to the clinical practice question of: do women who have active management of the second stage of labor, such as perineal massage or superficial heat have less perineal trauma than women who receive standard care, it can be concluded that perineal massage during the first and second stage of active labor could decrease the rate of episiotomy procedures and shorten the duration of the second stage and therefore could result in decreased perineal trauma.</p>			

<p>Source: Edqvist, M., Rådestad, I., Lundgren, I., Mollberg, M., & Lindgren, H. (2018). Practices used by midwives during the second stage of labor to facilitate birth: Are they related to perineal trauma? <i>Sexual & Reproductive Healthcare</i>, 15, 18–22. https://doi.org/10.1016/j.srhc.2017.11.003</p>			
Purpose/ Sample	Design (Method/Instruments)	Results	Strengths/ Limitations
<p>Purpose: To assess if various techniques utilized by nurse-midwives in the second stage of labor affect perineal integrity.</p> <p>Sample/ Setting: 704 nulliparous women</p> <p>Maternity units in Stockholm Sweden</p> <p>Level of Evidence: III</p> <p>Quality of Evidence: Quality A/B</p>	<p>A secondary analysis with data from an experimental prospective cohort study</p> <p>Methods: Compared an intervention during the second stage with the aim of perineal integrity. The interventional study had two parts as routine care is seldom recorded via midwives. Thus, a baseline measurement at the two maternity wards was conducted before the start of the interventional aspect of the study. Data was synthesized via questionnaires completed by the midwives for baseline measurement.</p> <p>The midwives measured the tear and the perineum using a sterile measure stick in cm. The measurements and the methods used during the second stage of labor were recorded in a study questionnaire. If other methods than those discussed on the questionnaire were used, midwives could define those interventions. Descriptive statistics was used to discuss characteristics and outcomes, such as severe perineal trauma.</p>	<p>Results: Most common interventions: directed pushing, towel trick, levator pressure (perineal massage), manipulation of symphysis pubis, and fundal pressure. Approx 33% gave birth on the birth seat, the least common position was hands and knees. Levator pressure was used 41.4% of the time for women giving birth seated and 70.6% of the time in lithotomy position.</p> <p>The utilized techniques were not associated with second degree tears or more severe perineal trauma.</p> <p>Conclusion: Directed pushing, digital stretching, and manual stretching of the perineum was not associated with perineal trauma.</p>	<p>Strengths: Consisted of a detailed study questionnaire with a large sample size of only nulliparous women, who are more likely to experience perineal trauma. The midwives measured perineal trauma with a ruler, limiting bias. Variables such as birth position were discussed.</p> <p>Limitations: A limitation is that not all eligible women were recruited to the study, which means that there might be a potential risk of bias. The midwives were not asked why they used various interventions in the second stage of labor.</p>
<p>Author Recommendations: More research is needed before it is safe to conclude that directed practices do not cause perineal trauma. Additionally, research on a mother's experiences of the second stage and interventions in the second stage require more research.</p>			
<p>Summary for current clinical practice question: When applying the results of this trial to the clinical practice question of: do women who have active management of the second stage of labor, such as perineal massage and superficial heat have less perineal trauma than women who receive standard care, it can be concluded that this trial shows that perineal massage may be effective in decreasing perineal trauma.</p>			

Source: Essa, R., & Ismail, N. (2015). Effect of second stage perineal warm compresses on perineal pain and outcome among primiparae. *Journal of Nursing Education and Practice*, 6(4), 48–58. <https://doi.org/10.5430/jnep.v6n4p48>

Purpose/ Sample	Design (Method/ Instruments)	Results	Strengths/Limitations
<p>Purpose: To determine the effect of second stage perineal warm compresses on perineal pain and outcome among primipara.</p> <p>Sample/Setting: 160 parturient National Medical Institution in Damanhour, Albehera Governorate, Egypt.</p> <p>Level of evidence: Level I</p> <p>Quality of evidence: Quality B</p>	<p>Randomized Controlled Trial</p> <p>The warm compresses group had received usual care during labor until the second stage of labor then warm perineal compress were applied by the researchers during the entire second stage. The method and temperatures were further described within the study. The control group received routine hospital care during the second stage of labor. Data collection tools:</p> <ol style="list-style-type: none"> 1. Sociodemographic and clinical data structured interview schedule. 2. Numerical Pain Rating Score (NPRS) 3. A modified Behavioral Pain Scale (BPS) 4. Assessment tool on second stage and perineal outcome 	<p>The results were statistically significant in relation to the pain scales between the two groups. 62.5% of the study had severe pain before the intervention and only 10% reported such pain after. This is compared to 57.5% and 65% of the control group. 17.5% of the study group reported unbearable pain before the intervention and 0% remained after. This compared to 10% and 15% of the control group that experienced unbearable pain before and after the intervention.</p> <p>Intact Perineum: Study group: 62.5% Control group: 2.5%</p> <p>No vaginal or perineal tear: Control group: 65% and 68.7% Study group: 95% and 97.5%</p> <p>Episiotomy: Control group: 62.5% Study group: 32.5%</p> <p>3rd degree perineal tears: Control group: 48%, 0% in the study group</p> <p>Genital tract repair: Study group: 32.5%, Control group: 97.5%</p> <p>Labial tears: Study group: 2.5%, Control group: 7.5%</p> <p>Conclusion: Based on the findings of this study, it can be concluded that second stage perineal warm compresses had better effects on perineal pain and perineal outcome, specifically on the perineal pain intensity, behavioral pain responses, and on decreasing the episiotomy rate, vaginal and perineal tear rates, and the need to repair rates. It also lowered the overall degree of perineal tears.</p>	<p>Strengths: Randomized Control Trial</p> <p>The tools to collect data were either developed or modified after reviewing relevant literature, and checked for content validity by a jury of 7 experts in the field. Statistical analysis was done after collection of data by methods described in the study</p> <p>A pilot study was carried out on 16 women who were excluded from the study. The results of the present study agree with the results of at least five other studies.</p> <p>Limitations: In the present study performing an episiotomy is a routine intervention nearly for all primiparous births. This may be an issue with the study setting and is a limitation to the generalization of results.</p>
<p>Author Recommendations: There were many recommendations but they all focused on raising awareness among women and providers about perineal warm compresses for management of the second stage of labor. Perineal warm compresses should be incorporated into perineal pain relief and perineal maintaining options available to women during the second stage of labor. It can be encouraged as a beneficial non-medical approach in obstetric practice since it was found to be well accepted by laboring women. Further research is also recommended to assess for the effect of warm compresses on other pain encountered during the maternity cycle, and for the assessment of laboring women's satisfaction with the use of perineal warm compresses for management of second stage of labor. The researchers also recommend replication of the present study at different settings and among different subjects.</p>			
<p>Summary for current clinical practice question: When applying the results of this trial to the clinical practice question of: do women who have active management of labor, such as perineal massage, superficial heat, and guiding, have less perineal trauma than women who receive standard care, it can be concluded that this trial shows that warm compresses had better effects on perineal pain and perineal outcome, specifically on the perineal pain intensity, behavioral pain responses, and on decreasing the episiotomy rate, vaginal and perineal tear rates, and the need to repair rates. It also lowered the overall degree of perineal tears; therefore, the result is overall, less trauma.</p>			

Source: Fahami, F., Shokoohi, Z., & Kianpour, M. (2012). The effects of perineal management techniques on labor complications. *Iranian Journal of Nursing and Midwifery Research*, 17(1), 52-57. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3590696/>

Purpose/Sample	Design (Method/Instruments)	Results	Strengths/Limitations
<p>Purpose: This study aimed to compare the effects of perineal management techniques (hands-off technique, Ritgen's maneuver, and perineal massage using a lubricant during delivery) on the labor complications.</p> <p>Sample/ Setting: 99 primiparous women</p> <p>Daran Hospital, Isfahan, Iran</p> <p>Level of Evidence: Level II</p> <p>Quality of evidence: A/B</p>	<p>Quasi-experimental Clinical Trial</p> <p>The participants were selected using a convenience sampling and randomly assigned to three groups of Ritgen's maneuver, "hands-off" technique, and perineal massage with lubricant. A questionnaire was used to determine the demographic characteristics of the participants and complications after birth. The short form of McGill Pain Questionnaire and the visual analogue scale for pain were also used.</p> <p>The incidence and degree of perineal tears were evaluated immediately after delivery. Additionally, the incidence and severity of perineal pain were assessed at both 24 hours and 6 weeks postpartum.</p>	<p>Results: 78.8% of patients in the massage group experienced spontaneous perineal tearing and 21.2% remained intact.</p> <p>Women who experience perineal massage were slightly more likely to experience less pain at 6 weeks postpartum than the Ritgen's maneuver. The highest pain rates were reported with Ritgen's Maneuver.</p> <p>However, there was no statistical difference in tearing between the non-touch group and the perineal massage group.</p> <p>The frequency of genital pain was higher in the Ritgen's maneuver group but not statistically different between non-touching and perineal massage.</p>	<p>Strengths: Patients were randomly assigned to groups. Participants self-identified pain and complications after birth. Episiotomies were not performed by providers in this study. Perineal tears were assessed immediately after delivery by a provider, followed by self-reporting 24 hours and 6 weeks post-delivery.</p> <p>Limitations: All participants were roughly of the same age (averaging 23 years), BMI, and education. The study took place in a single facility. Generalizability of this study is difficult with a homogeneous sample. The same birth provider assessed perineal tears, which could create bias. However, this could be considered a strength as variability is limited. Additionally, this study is a small sample size.</p>

Author Recommendations: "By recognizing the satisfactory effects of perineal non-touching technique on reducing perineal complications following labor, it appears that in connection with physiological vaginal delivery this method can be used for the delivery of fetal head and also the training of the medical and midwifery students. It can be expected that the mentioned method is also associated with the mothers' greater satisfaction and establishes a positive attitude. This method reduces the mothers' pain severity, therefore, less painkiller medications can be prescribed and this promotes the general health of the mother."

Summary for current clinical practice question: When applying the results of this trial to the clinical practice question of: do women who have active management of the second stage of labor, such as perineal massage or superficial heat have less perineal trauma than women who receive standard care, it can be concluded that perineal massage is more helpful than harmful in terms of postpartum pain, but there was no statistically significant difference in perineal integrity between the perineal massage group and the hands-off group. Therefore, this study finds that perineal massage in the second stage of labor does not lessen perineal trauma.

Source: Ganji, Z., Shirvani, M., Rezaei-Abhari, F., & Danesh, M. (2013). The effect of intermittent local heat and cold on labor pain and child birth outcome. *Iranian Journal of Nursing and Midwifery Research*, 18(4), 298–303.
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3872865/>

Purpose/ Sample	Design (Method/Instruments)	Results	Strengths/Limitations
<p>Purpose: To investigate the effect of intermittent heat and cold on pain severity, as well as various birth outcomes including length of stage of labor and perineal integrity.</p> <p>Sample/ Setting: 64 nulliparous women</p> <p>A labor unit in Imam Ali and Shahid Rajai Hospitals (north of Iran, 2011).</p> <p>Level of evidence: Level I</p> <p>Quality of evidence: Quality B</p>	<p>Randomized Control Trial</p> <p>In the second stage of labor, heat was on the perineum for 15 minutes followed by five minutes of the ice pack. Pain intensity was assessed. Data-gathering instruments were used for the evaluation of pain severity. The control group received routine care. Additionally, the time of each stage of labor (1st, 2nd, and 3rd) was observed for each group. Mothers reported their satisfaction with labor at the end of delivery.</p>	<p>The difference in pain severity was statistically significant between two groups at the end of the acceleration phase.</p> <p>The second stage of labor was shorter in the intervention group.</p> <p>The application of heat and cold had no statistical effect on perineal integrity or newborn health as evidenced by Apgar scores.</p> <p>Mothers in the intervention group rated their birth experience as high and very high, with 43.8% reporting a high satisfaction and 12.5% reporting very high satisfaction.</p> <p>In the control group 65.6% of mothers reported low satisfaction, and 18.8% were dissatisfied.</p> <p>Conclusions: Intermittent cold and warm packs provide comfort measures and reduce the first and third stage of labor. However, there is no benefit to perineal integrity. Additionally, there are no negative effects on delivery outcomes. Intermittent heat and cold application is safe, effective, and inexpensive. It provides pain management when pharmacological options are either not available or not desired by a laboring mother.</p>	<p>Strengths: Internal validity is high due to controlled inclusion/exclusion criteria.</p> <p>A second strength is descriptive tests (frequency, mean, and standard deviation), chi square, and <i>t</i>-test were utilized for data analysis.</p> <p>Limitations: Due to the nature of the study, double blinding is impossible.</p> <p>External validity is low. Most women in the United States receive pharmacological pain management. This limits the number of women this study is useful for. Additionally, in terms of satisfaction, it does not note if women in the control group received the same amount of attention and time from the midwife. This study may be unintentionally finding evidence for the importance of having a labor support person rather than the intervention. Additionally, women with psychological, anatomic, obstetric, or medical disorders were also excluded.</p>

Author Recommendations: The authors had no recommendations.

Summary for current clinical practice question: When applying the results of this trial to the clinical practice question of: do women who have active management of the second stage of labor, such as perineal massage and superficial heat have less perineal trauma than women who receive standard care, it can be concluded that although the intervention of warm compress may improve maternal satisfaction for non-medicated vaginal birth, this study finds that there appears to be no benefit of using warm/ cold compress to preserve perineal integrity.

Source: Geranmayeh, M., Rezaei Habibabadi, Z., Fallahkish, B., Farhani, M., Khakbazan, Z., & Mehran, A. (2011). Reducing perineal trauma through perineal massage with Vaseline in second stage of labor. *Archives of Gynecology and Obstetrics*, 285(1), 77–81. <https://doi.org/10.1007/s00404-011-1919-5>

Purpose/ Sample	Design (Method/ Instruments)	Results	Strengths/Limitations
<p>Purpose: to investigate the effect of perineal massage with Vaseline on the rate of episiotomy procedures and perineal tears.</p> <p>Sample/ Setting:</p> <p>Ninety primiparous women between 18 and 30 between 38- and 42-weeks gestation. Imam Sajjad Hospital in Shahryar, Tehran.</p> <p>Level of evidence: Level I</p> <p>Quality of evidence: Quality B</p>	<p>Randomized Control Trial</p> <p>Participants were randomly assigned to 2 groups. Intervention group included perineal massage with Vaseline. In the intervention group, perineal massage was performed in the second stage of delivery. The perineum was examined after the delivery in terms of episiotomy or tear and its severity degree. Control group had no intervention.</p>	<p>The second stage of delivery was significantly shorter in the massage group than the control group and the massage group had significantly more intact perineum ($p = 0.004$). In addition, lower episiotomy and higher first- and second-degree perineal tears were seen in the massage group in comparison with the control one ($p < 0.001$). Neither of the groups suffered from third- or fourth-degree tears.</p> <p>The length of the second stage of birth was significantly shorter in the massage group compared with the control one. Furthermore, in a follow-up within 10 days of delivery, the massage group showed no side effects associated with Vaseline. Less than 10% of mothers in both groups experienced effects such as burning, pain, and inflammation at perineum, rates of which were not significantly different between the two groups ($p = 0.528$).</p> <p>Conclusion: The findings showed that the perineal massage with Vaseline in the second stage of labor increased perineal integrity and decreases perineal traumas (episiotomy and tears). So, it seems that the perineal massage could be an effective way to preserve an intact perineum in labor.</p>	<p>Strengths: Randomized Controlled Trial The two groups were homogeneous in terms of demographic data, weight gain during pregnancy, gestational age, abortion history, and fetal weight.</p> <p>The sample size was sufficient for the study design and there was a control group that had no intervention. The results were consistent with other trials discussed.</p> <p>Limitations: Performing an episiotomy is a decision made by the midwife and is not controlled within the study. This decision may have been delayed due to massage being an assuring method for the delivery agent. The results of this note the perineal massage could be an assuring method for the provider which could decrease the effects of episiotomy and other associated effects.</p> <p>Iran has a high prevalence of episiotomy which could affect study results or may make results difficult to generalize to other populations.</p> <p>Despite random assignment of participants, the pre-pregnancy weight in the massage group was higher than that of the control group, but the weight gain and fetal weight were not significantly different in the two groups.</p>
<p>Author Recommendations: The findings showed that the perineal massage with Vaseline in the second stage of labor increases perineal integrity and decreases perineal traumas (episiotomy and tears.) Perineal massage could be an effective way to preserve an intact perineum in labor.</p>			
<p>Summary for current clinical practice question: When applying the results of this trial to the clinical practice question of: do women who have active management of the second stage of labor, such as perineal massage or superficial heat have less perineal trauma than women who receive standard care, it can be concluded that perineal massage with Vaseline in the second stage of labor increases the integrity of the perineum and reduces traumas (episiotomy and tears).</p>			

<p>Source: Harlev, A., Pariente, G., Kessous, R., Aricha-Tamir, B., Weintraub, A. Y., Eshkoli, T., Dukler, D., Ayun, S., & Sheiner, E. (2013). Can we find the perfect oil to protect the perineum? A randomized-controlled double-blind trial. <i>The Journal of Maternal-Fetal & Neonatal Medicine</i>, 26(13), 1328–1331. https://doi.org/10.3109/14767058.2013.784261</p>			
Purpose/Sample	Design (Method/ Instruments)	Results	Strengths/Limitations
<p>Purpose: To determine whether perineal massage during the second stage of labor using oil enriched with vitamins increases the chances of delivering with an intact perineum as compared to perineal massage using pure liquid wax. We also evaluated the effects of perineal massage on specific tear location, the severity of perineal tears, and the amount of suture material required for repair.</p> <p>Sample/Setting: 164 women- 82 in each group. Soroka University Medical Center Delivery Room</p> <p>Level of evidence: Level I</p> <p>Quality of evidence: Quality B</p>	<p>Randomized Controlled Trial</p> <p>A prospective, randomized, double-blind study was conducted. Women were assigned to liquid wax (jojoba oil) versus purified formula of almond and olive oil, enriched with vitamin B1, B2, B6, E and fatty acids. The caregivers used the oils during the second stage of labor.</p>	<p>No significant differences regarding perineal lacerations, number of sutures, and length of suturing were noted between the two groups. Likewise, while analyzing separately nulliparous and multiparous women, no significant differences were noted. Controlling for birth weight 44000 g, using the Mantel–Haenszel technique, no association was noted between perineal lacerations and the type of oil used (weighted OR ¼ 0.9, 95% CI 0.3–2.4; p ¼ 0.818).</p> <p>Conclusion: The type of the oil used during the second stage of labor for prevention of perineal tears has no effect on the integrity of the perineum. Accordingly, it seems that there is no perfect oil.</p>	<p>Strengths: Randomized Controlled Trial An important strength of the study was the design of a randomized control trial. Neither the parturient nor the caregivers (i.e. midwives and physicians) knew what type of oil was used.</p> <p>Limitations: As a limitation we note that the researchers did not create a third arm of women who had no perineal massage during the second stage. The two main reasons include; first, the benefit of using a lubricant during the second stage was already proven as noted above. Second, the wide use of oil during the second stage in our delivery room by all staff members was difficult to restrict.</p>
<p>Author Recommendations: The synergistic effect of the use of both antenatal perineal massage along with perineal massage during the second stage of delivery by an enriched oil cannot be excluded and requires further investigation.</p>			
<p>Summary for current clinical practice question: The ingredients in the oil does not prove to make a difference in outcomes. Additionally, there was no difference in the specific tear location, the severity of perineal tears, and the amount of suture material required for repair.</p> <p>When applying the results of this trial to the clinical practice question of: do women who have active management of the second stage of labor, such as perineal massage or superficial heat have less perineal trauma than women who receive standard care, it can be concluded that this trial shows inconclusive evidence in the specific tear location, decreasing the severity of perineal tears and the amount of suture material required for repair, therefore the likelihood of trauma is inconclusive.</p>			

<p>Source: Ibrahim, H.-F., Elgzar, W., & Hassan, H. (2017). Effect of warm compresses versus lubricated massage during the second stage of labor on perineal outcomes among primiparous women. <i>Journal of Nursing and Health Science</i>, 6(4), 64–76. https://doi.org/10.9790/1959-0604056476</p>			
Purpose/Sample	Design (Method/Instruments)	Results	Strengths/Limitations
<p>Purpose: To compare the effect of warm compresses versus lubricated massage during the second stage of labor on perineal outcomes among primiparous women.</p> <p>Sample/Setting: 304 parturient women undergoing normal vaginal delivery Beni- Suef general hospital, Beni-Suef city</p> <p>Level of evidence: Level II</p> <p>Quality of evidence: Quality B</p>	<p>Randomized Controlled Trial</p> <p>The participants were randomly assigned to three groups: warm compresses group (102 women), lubricated massage group (102 women), and control group (100 women). Three tools were used for data collection; 1) structured interview schedule to collect data about the women's demographic data, and their current pregnancy profile; 2) second stage and perineal outcome assessment sheet; and 3) pain assessment tools with two parts, pain analogue scale and behavioral pain scale.</p>	<p>There were no significant differences among the three groups regarding the rate of intact perineum, spontaneous tears not requiring repair, tears requiring repair, and episiotomy ($p = 0.174, 0.111, 0.114, \text{ and } 0.660$) respectively. In contrast, a significant difference was observed between the lubricated massage, warm compresses, and control groups in favor of the former regarding the degree of tears ($p = 0.012$). Perineal pain intensity and behavioral response parameters significantly reduced among the warm compress and lubricated massage groups 15 minutes after starting the intervention ($p = 0.000$) with a significant difference among the three groups.</p> <p>Conclusion: Perineal warm compresses and lubricated massage didn't significantly decrease the rate of episiotomy and genital tract tears, but they significantly reduced the degree of tears and the degree of extension of episiotomy when compared to the control group. Lubricated massage was more effective than warm compresses in this respect. Perineal pain intensity and behavioral pain response parameters had significantly reduced in lubricated massage and warm compresses groups than the control group.</p>	<p>Strengths: Randomized Controlled Trial</p> <p>A pilot study was performed to test clarity and applicability of the study tools. Additionally, all tools were tested for content validity and reliability.</p> <p>The sample size was sufficient for the study design and there was a control group that had no intervention as well as two intervention comparison groups. The results were consistent with other trials discussed.</p> <p>Limitations:</p> <p>Performing an episiotomy is a decision made by the provider and is not controlled within the study.</p> <p>There was no information on providers or any other standardization of care within the trial.</p> <p>Epidural and pain management options are extraneous variables that may not be accounted for within the trial.</p> <p>Egypt has a high prevalence of episiotomy which could affect study results or may make results difficult to generalize to other populations.</p>
<p>Author Recommendations: All governmental hospitals should provide adequately planned in-service training programs for maternity nurses regarding the benefits of warm compresses and lubricated massage during the second stage of labor in order to develop their best practice. The researchers also recommended nursing curriculum revisions and further studies to assess patient satisfaction.</p>			
<p>Summary for current clinical practice question: When addressing the research question of: do women who have active management of the second stage of labor, such as perineal massage and superficial heat have less perineal trauma than women who receive standard care, this study did not find significant evidence that warm compress and perineal massage decreased episiotomy and tears, but they did decrease the degree of tears and the degree of episiotomy extension. In this case, perineal massage decreases tears more than warm compress. Perineal pain intensity and behavioral pain response parameters had significantly reduced in lubricated massage and warm compresses groups than the control group. Overall, this results in less perineal trauma.</p>			

<p>Source: Karaçam, Z., Ekmen, H., & Çalışır, H. (2012). The use of perineal massage in the second stage of labor and follow-up of postpartum perineal outcomes. <i>Health Care for Women International</i>, 33(8), 697–718. https://doi.org/10.1080/07399332.2012.655385</p>			
Purpose/ Sample	Design (Method/ Instruments)	Results	Strengths/Limitations
<p>Purpose: To investigate whether perineal massage during labor decreased perineal trauma and trauma-related problems</p> <p>Sample/ Setting: 396 pregnant women who were giving birth for the first time, between March 2007 and February 2009, in Turkey 37-42 weeks/ age 18-35 Aydin State Hospital, Turkey</p> <p>Level of evidence: Level I</p> <p>Quality of evidence: Quality B</p>	<p>Randomized Controlled Trial Data were collected via a questionnaire, a labor observation form, and first-day, third-week, and first-year postpartum survey. Perineal massage was initiated when the cervix was dilated ≥ 8 cm in the massage group. The midwife wore gloves, placed her index and middle fingers within the vagina, moved from the perineal floor toward the lateral aspect in half circles, provided a continuous light pressure, and pressed the perineum downward toward the rectum. When the woman felt uncomfortable, the massage was discontinued.</p>	<p>More than one-half of the gravidas in both the massage and the control groups underwent episiotomies (massage, 52.0% [N = 03]; control, 60.6% [N = 120]). A low percentage of the women had intact perinea (massage, 3.5% [n = 7]; control, 3.5% [N = 7]), however, and a high percentage had spontaneous lacerations (massage, 44.4% [n = 88]; control, 35.9% [N = 71]). A significantly lower percentage of the gravidas in the massage group had episiotomies together with spontaneous lacerations (7.6% [N = 15] vs. 15.7% [N = 31]). Only a low percentage of the gravidas in both groups had second-degree lacerations (massage, 4.6% [N = 9]; control, 2.0% [N = 7]), however, and none of the gravidas developed third-degree lacerations. Spontaneous lacerations mostly occurred in the posterior and anterior regions of the vagina. No significant difference was seen in spontaneous laceration of the anterior regions or perineal pain at day 1 and 3 weeks post-delivery.</p> <p>Conclusion: Perineal massage decreases the amount of suture material required for episiotomy and thereby the size of the episiotomy and the rate of episiotomies and lacerations. Perineal massage in the second stage of labor did not decrease perineal trauma and short- and long-lasting postnatal problems, but it decreased the rate of episiotomies and spontaneous lacerations and the amount of suture material required.</p>	<p>Strengths: Randomized Controlled Trial where both the control group and the intervention group were statistically similar. The sample size was sufficient for the design of the study.</p> <p>Limitations: Midwives and doctors had the prerogative to choose episiotomy and they are routinely performed at this birthing site. All of the spontaneous lacerations were sutured to decrease the risk of bleeding and infection and to facilitate wound healing. This may have altered results. The randomization of the women was not blinded and was performed by one of the researchers. The healing status of perineal trauma and the presence of infections, as well as the data regarding urinary and bowel control, were assessed according to the women's self-reporting. The results of the study concerning episiotomies, perineal trauma, duration of the first and second stages of labor, and recovery time might have been affected by the routine practices at this hospital such as oxytocin administration, amniotomy, lithotomy position, using stirrups, manual fundal pressure, as well as the individual knowledge and skill of the researcher midwife. The internal consistency quotient could not be computed because of the difference in the characteristics of the questions comprising the data collection tools in the present study.</p>
<p>Author Recommendations: It is recommended that midwives develop training programs according to national and international standards to address revision of usual practices regarding perineal massage, episiotomy, supine position, stirrups, fundal pressure, and induction of labor, which have an influence on perineal trauma. The birthing women should be encouraged and assisted to make their own decision on these practices. In addition, further studies on other techniques likely to reduce the risk of perineal trauma and trauma-related factors are warranted.</p>			
<p>Summary for current clinical practice question: When applying the results of this trial to the clinical practice question of: do women who have active management of the second stage of labor, such as perineal massage or superficial heat have less perineal trauma than women who receive standard care, it can be concluded that this trial of perineal massage decreased the rate of episiotomies and spontaneous lacerations and the amount of suture material required; therefore, this could result in less trauma.</p>			

Source: Mohamed, M., Mohamed, S., & Gonied, A. (2011). Comparative study between two perineal management techniques used to reduce perineal trauma during 2nd stage of labor. *Journal of American Science*, 7(11), 228–232. <http://jofamericanscience.org>

Purpose/Sample	Design (Method/Instruments)	Results	Strengths/Limitations
<p>Purpose: compared the effect of two methods used to reduce perineal trauma in the second stage of labor to determine which method was more effective in reducing perineal trauma with vaginal birth and to find out the relation between the prevalence of perineal trauma and the various factors.</p> <p>Sample/Setting: 200 women who were 37 weeks gestation or more Labor unit at Beni Suif and Zagazig University Hospitals</p> <p>Level of evidence: Level I</p> <p>Quality of evidence: B</p>	<p>Randomized Control Trial</p> <p>Group 1 (perineal warm compresses) received usual care during labor until the baby's head began to distend the perineum (Crowning). A sterile metal jug filled with heated tap water was used to soak a sterile perineal pad, which was wrung out before being placed gently on the perineum during contractions. The pad was re-soaked to maintain warmth between contractions. The water in the jug was replaced every 15 minutes until delivery</p> <p>Group 2 (perineal massage with lubricant) was done using gentle, slow massage with two fingers of the midwife's gloved hand, moving from side to side, just inside the patient's vagina. Mild, downward pressure (toward the rectum) was applied with steady, lateral strokes, which lasted one second in each direction. A sterile, water-soluble lubricant was used. Massage was continued during and between pushes.</p>	<p>An intact perineum and tears were observed in 68.0% and 10.0% respectively among perineal warm compresses group and in 47.0% and 23.0% respectively among perineal massage with lubricant group. There were no significant differences between the studied groups as regards episiotomy ($p = 0.19$).</p> <p>According to parity, perineal trauma in warm compresses group was 62.9% compared to 85.7% in perineal massage with lubricant group in primiparous women.</p> <p>While perineal trauma occurred in 15.4% in warm compresses group compared to 35.4% in the perineal massage with lubricant group of multiparous women.</p> <p>Conclusion: The results show that the use of warm packs in the perineum during the expulsive period does reduce the occurrence of perineal laceration when compared to the use of perineal massage.</p>	<p>Strengths: Participants were randomly assigned to 3 groups- 2 intervention groups and 1 control group in order provide an unbiased comparison for the results.</p> <p>There were not statically significant differences between the study groups.</p> <p>There was no statistically significant difference between the two groups when considering mode of vaginal delivery or the duration of the expulsive period. The fetal expulsion was on average, a little longer in the perineal massage with lubricant group (16.5 minutes versus 13.6 minutes in the perineal warm compresses group) and birth weight between the groups. The study size was large for an intervention study.</p> <p>Limitations: Some inconsistent findings with cited comparative studies.</p>
<p>Author Recommendations: These results support the use of perineal warm compresses techniques by trained birth attendants.</p>			
<p>Summary for current clinical practice question: When applying the results of this trial to the clinical practice question of: do women who have active management of labor, such as perineal massage or superficial heat have less perineal trauma than women who receive standard care, it can be concluded that this trial shows that the use of warm packs on the perineum during the second stage of labor may reduce the occurrence of perineal lacerations more than the use of perineal massage.</p>			

Source: Raja, A., P., P., & Samal, R. (2019). Effect of perineal massage in the second stage of labour, on the incidence of episiotomy and perineal tears. *International Journal of Reproduction, Contraception, Obstetrics and Gynecology*, 8(4), 1387. <https://doi.org/10.18203/2320-1770.ijrcog20191186>

Purpose/Sample	Design (Method/Instruments)	Results	Strengths/Limitations
<p>Purpose: To investigate whether perineal massage during the second stage of labor could decrease perineal trauma in the form of episiotomy and perineal tears.</p> <p>Sample: 150 primigravida women</p> <p>Mahatma Gandhi Medical College and Research Institute, Pondicherry.</p> <p>Level of evidence: Level I</p> <p>Quality of evidence: Quality B</p>	<p>Randomized Control Trial</p> <p>Perineal massage was administered by the primary investigator to all women in the massage (intervention) group during the second stage of labor.</p> <p>The control group did not receive perineal massage in the second stage of labor.</p>	<p>Results: The incidence of episiotomy was significantly higher ($p = 0.016$) in the control group (93.3%) than in the massage group (80%) The incidence of perineal tears in the massage group (16%) and control group (9.4%) were similar.</p> <p>The incidence of intact perineum in the massage group (4%) was not significantly different ($p = 0.08$) from those in the control group ($N = 0$).</p> <p>The event rate of episiotomy was 0.933 in the control group and 0.8 in the massage group. The risk of getting an episiotomy in the massage group was 0.874 times less than in the control group. Risk difference for perineal tear was 0.066.</p> <p>Conclusions The study authors conclude that perineal massage significantly reduces the incidence of episiotomy, However, it does not affect the frequency of perineal tears and intact perineum at the end of delivery.</p>	<p>Strengths: Variables were controlled by exclusion criteria.</p> <p>Participants were randomly assigned.</p> <p>Limitations: Double blinding is impossible due to the nature of the study.</p> <p>The participants' demographics, such as age and BMI are not discussed.</p> <p>Women receiving an epidural were not included in this study. This very much limits generalizability as epidurals for pain management are very common in the United States.</p>
<p>Author Recommendations: The authors suggest that perineal massage can be routinely practiced by health professionals to improve quality of life in women post vaginal delivery. Additional studies are warranted.</p>			
<p>Summary for current clinical practice question: When applying the results of this trial to the clinical practice question of: do women who have active management of the second stage of labor, such as perineal massage and superficial heat have less perineal trauma than women who receive standard care, it can be concluded that perineal massage may be effective in lowering the rate of episiotomies. Additionally, it may be protective against third- and fourth-degree lacerations and thus results in overall less perineal trauma.</p>			

Source: Romina, S., Ramezani, F., Falah, N., Mafi, M., & Ranjkesh, F. (2020). Effect of perineal massage with ostrich oil on the episiotomy and lacerations in nulliparous women: A randomized controlled clinical trial. *Iranian Journal of Nursing and Midwifery Research*, 25(2), 134–138. <https://doi.org/10.4103/ijnmr.IJNMR.76.19>

<u>Purpose/Sample</u>	<u>Design (Method/Instruments)</u>	<u>Results</u>	<u>Strengths/Limitations</u>
<p>Purpose: The aim of this study was to examine the effect of perineal massage with ostrich oil on the rates of episiotomy and lacerations in nulliparous women.</p> <p>Sample/Setting: 77 nulliparous women Razi Hospital in Qazvin (Iran)</p> <p>Level of evidence: Level I</p> <p>Quality of evidence: Quality B</p>	<p>Single-blind Randomized Control Trial</p> <p>For the intervention group, in addition to the routine labor care and Ritgen's maneuver, perineal massage with ostrich oil was carried out in the active phase of labor for 5–10 min. every 1 hour, and also in the second stage of labor for 5–10 min every 30 min. For the control group, the routine labor care and Ritgen's maneuver were performed during the second stage of labor.</p>	<p>Perineal massage with ostrich oil in the intervention group significantly decreased the rate of episiotomy compared to the control group ($\chi^2 = 18.32$, $df = 1$, $p < 0.001$). However, there was no statistically significant difference in perineal lacerations between the two groups.</p> <p>Conclusion:</p> <p>The results revealed that perineal massage with ostrich oil could be recommended as an effective, safe, and inexpensive method to decrease the rate of episiotomy in vaginal delivery. Perineal massage can be performed by midwives in the first and second stages of labor.</p>	<p>Strengths: One of the strengths of this study is repeated massage at least 4 times during the first and second stages of labor.</p> <p>The participants of this study were assigned into the intervention and control groups by block randomization technique.</p> <p>The collected data were analyzed by the SPSS version 24. Kolmogorov-Smirnov test was used to examine normal distribution of the data. T-test, chi square, and Mann-Whitney analyses were used to compare the two groups.</p> <p>Both groups were homogeneous in terms of demographic characteristics, history of any diseases, and pregnancy at the beginning of the study.</p> <p>Both groups received Ritgen's maneuver to control the fetal head in order to compare the two groups most distinctly.</p> <p>Limitations: One of the weaknesses of this study was unnecessary interventions in the delivery process by the treatment team.</p> <p>The most important limitation of the present study was the exclusion of high-risk cases from the study, which may increase the episiotomy and perineal lacerations.</p> <p>Another limitation of this study was the researchers did not find oil unlikely to have effect for use in the placebo group.</p>
<p>Author Recommendations: It is suggested that researchers conduct further studies to determine the effect of perineal massage with ostrich oil on high-risk pregnancies.</p> <p>Further research is suggested to compare the impact of different oils on episiotomy rates.</p>			
<p>Summary for current clinical practice question: Based on the results of this study, perineal massage using ostrich oil during labor is a simple, safe, and low-cost measure that could reduce the perineal injuries. This study demonstrates that perineal massage in the second stage of labor with ostrich oil may decrease rates of episiotomies, thus reducing perineal trauma. Reducing perineal injuries may ultimately promote maternal health and provide safe conditions for physiological delivery.</p>			

<p>Source: Terré-Rull, C., Beneit-Montesinos, J., Gol-Gómez, R., Garriga-Comas, N., Ferrer-Comalat, A., & Salgado-Poveda, I. (2014). Application of perineum heat therapy during partum to reduce injuries that require post-partum stitches. <i>Enfermería Clínica, 24</i>(4), 241–247. https://doi.org/10.1016/j.enfcli.2014.03.007</p>			
Purpose/ Sample	Design (Method/ Instruments)	Results	Strengths/Limitations
<p>Purpose: Evaluate the effectiveness of heat, moist or dry, to the perineum during delivery in order to reduce injuries requiring perineal suturing after birth, and to assess its safety in relation to the adaptation of the newborn to extrauterine life.</p> <p>Sample/ Setting: 5 Catalan Hospitals. 198 pregnant women</p> <p>Level of evidence: Level I</p> <p>Quality of evidence: Quality B</p>	<p>Randomized Control Trial The pregnant women were randomized to three study groups: moist heat (MHG), dry heat (DHG), and control (CG). Usual care of the perineum was performed during labor in all groups and MHG or DHG was also applied to the perineum in the intervention groups. When the fetal station reached the third plane of Hodge, the MHG was applied with wet heat to the perineum by compress with water warmed to 45 degrees and drained. The DHG was applied with hot gel packs that were heated in the microwave to 600W for 30 seconds and wrapped in a dry space. During application, the compresses were replaced to maintain temperature and cleanliness. The coloration of the skin was also assessed to prevent burning. The time of the application ranged between a minimum of 10 minutes and a maximum of 30 minutes. At the end of stage two of labor, the status of the perineum was evaluated.</p>	<p>Intact perineum: 37.8% in CG, 24.2% in MHG and 31.8% in DHG. 1st degree laceration: 18.2% in CG, 47.0% in MHG and 30.3% in DHG. 2nd degree laceration: 24.2% in CG, 21.2% in MHG and 22.7% in DHG. 3rd degree laceration: 3.0% in CG, 0.0% in MHG and 0.0% in DHG. Episiotomy: 16.7% in CG, 7.6% in MHG and 15.2% in DHG. There were no 4th degree lacerations in any group. Perineum that required no suturing: MHG 71.2%, DHG 62.1% and Control Group 56.1% Perineum requiring suture: MHG: 28.8%, DHG: 37.9% and CG: 43.9%</p> <p>Conclusion: The application of thermotherapy in the perineum during the second stage of labor does not modify the number of perineal injuries that require postpartum suture. The two applications of thermotherapy, wet or dry, are equally effective in modifying the number of injuries that require suturing. However, they see better results with wet thermotherapy. The application of thermotherapy in the perineum does not hinder adaptation to extrauterine life of the newborn measured using the Apgar test score.</p>	<p>Strengths: Randomized Controlled Trial The care protocol was only applied to pregnant women who experienced natural to childbirth without the use of epidural analgesia since it was considered that the use of analgesia could be a confounding factor in perineal distension and could affect perineal outcomes. All pregnant women who made up the study sample were women without risk factors who gave birth through a normal delivery in a natural way, that is, respecting the physiology, performing minimal obstetric intervention, and without anesthesia.</p> <p>Limitations: All of the studies reviewed in this study refer to the application of moist heat, but the study itself divided the heat into two groups: moist and dry. Neither the participants nor the midwives could be blinded. The study notes that the results of this study could be attributed to the study participants and not the interventions and may have been selective to the pregnant women who received care. If this is the case, these characteristics have limited the results of the study. The researchers believe that the application of thermotherapy could improve perineal outcomes in other studies where the population studies are not so favorable. Episiotomies are performed at the discretion of the provider. In this study, all midwives who participated showed great dexterity in perineal protection and had experience and interest in minimizing perineal lacerations; thus episiotomy was used selectively.</p>
<p>Author Recommendations: We believe the application of thermotherapy could improve perineal results in other areas where the particularities of pregnant women and obstetric conditions are not as favorable. This proposal could represent the continuation of this research line.</p>			
<p>Summary for current clinical practice question: In the study population, the application of heat therapy to the perineum during labor did not significantly reduce perineal suturing after birth. However, better perineal results were observed with moist heat. Heat therapy does not alter neonatal outcomes measured by Apgar score. The authors noted that no harm was done from the application of heat therapy. Additionally, they noted that the results may be different when used with higher risk populations, as these women were low risk, delivering without epidural anesthesia with midwives who rarely used episiotomies.</p>			

Source: Türkmen, H., Çetinkaya, S., Apay, E., Karamüftüoğlu, D., & Kılıç, H. (2020). The effect of perineal warm application on perineal pain, perineal integrity, and postpartum comfort in the second stage of labor: Randomized clinical trial. *Complementary Medicine Research*, 1–8. Advance online publication. <https://doi.org/10.1159/000507605>

Purpose/Sample	Design (Method/Instruments)	Results	Strengths/Limitations
<p>Purpose: To determine if warm compresses provide perineal protection in the second stage of labor as well as provide pain management.</p> <p>Sample/ Setting: 100 primiparous women</p> <p>delivery room of a public hospital in Turkey.</p> <p>Level of evidence: Level I</p> <p>Quality of evidence: Quality B</p>	<p>Randomized Control Trial The intervention group was given a damp and warm application to the perineal region during the second stage of labor. The control group received standard care. Pregnant Introductory Form was used in the collection of data. Perineal pain level was measured prior to and after the intervention, after delivery, and 2 hr. from delivery by means of Visual Analogue Scale. In the postpartum period, the perineal condition was evaluated by the midwife with a questionnaire to determine the perineal condition. Two hours after the delivery, Postpartum Comfort Questionnaire was used to determine the comfort level of the women.</p>	<p>It was found that there was a decrease in the pain levels of the warm application group compared to pre-intervention pain levels ($p < 0.0001$). When the warm application and control groups were compared, there was also statistically significant differences between the pain levels immediately after the intervention (perineal pain: 8.54 ± 1.38 vs. 9.56 ± 0.57, $p < 0.0001$), after delivery (perineal pain: 2.20 ± 1.72 vs. 3.64 ± 2.07, $p < 0.0001$), and 2 hr. after delivery (perineal pain: 0.30 ± 0.78 vs. 0.68 ± 0.98, $p = 0.028$). Perineal integrity was significantly higher in the warm application group compared to the control group ($p = 0.003$). The need for perineal repair was significantly higher in the control group than in the warm application group ($p = 0.016$). In the study, the physical comfort level of the warm application group was found to be significantly higher than the control group (56.06 ± 4.61 vs. 54.30 ± 4.73, $p = 0.012$).</p> <p>Conclusions: In the second stage of labor, warm compresses decreased perineal pain and provided perineal protection and postpartum pain management.</p>	<p>Strengths: Only primiparous and healthy women were included. Primiparous women are more likely to experience perineal trauma. Additionally, this increases internal validity. No funding was accepted or conflicts of interest identified.</p> <p>Limitations: Due to the nature of the study, double blinding could not occur. Generalizability is limited by a homogenous sample size. Episiotomy was used when the perineal tissue was overstretched during delivery. This is very limiting to generalizability, as this is not common practice in the United States.</p>
<p>Author Recommendations: The results of the study support the hypothesis that perineal integrity was better maintained in the warm application group compared to the control group.</p> <p>Based on these results, it can be argued that perineal warm application can be used safely as an effective midwifery intervention to reduce the perception of pain and provide positive comfort. Additionally, further studies are needed to evaluate the effect of perineal warm application in the second stage of labor, to evaluate the reduction in the pain perception, maintenance of perineum integrity, and the increase in comfort level after birth.</p>			
<p>Summary for current clinical practice question: When applying the results of this trial to the clinical practice question of: do women who have active management of the second stage of labor, such as perineal massage or superficial heat have less perineal trauma than women who receive standard care, it can be concluded that warm compresses may preserve perineal integrity and reduce maternal pain, thus resulting in less perineal trauma.</p>			

Source: Zare, O., Pasha, H., & Faramarzi, M. (2014). Effect of perineal massage on the incidence of episiotomy and perineal laceration. *Health, 06*(01), 10–14. <https://doi.org/10.4236/health.2014.61003>

Purpose/Sample	Design (Method/Instruments)	Results	Strengths/Limitations
<p>Purpose: The aim of study was to determine the effect of perineal massage with a sterile lubricant on the incidence of episiotomy and perineal laceration</p> <p>Sample/Setting: 145 nulliparous women who referred to Amol Emam Ali teaching center for normal delivery</p> <p>Level of evidence: Level I</p> <p>Quality of evidence: Quality B</p>	<p>Randomized controlled Trial</p> <p>In massage group, at complete cervical dilation, the midwife inserted two fingers inside vagina and using a sweeping motion gently stretched the perineum with sterile lubricant (a water-soluble substance) for 5 up to 10 minutes, in and between mother's pushing in the second stage of labor. In the control group the Ritgen's Maneuver was applied. Authors compared the rates of intact perineum, episiotomy, and laceration; mean duration of the second stage of labor; and Apgar scores at 1 and 5 minutes.</p>	<p>Intervention group: incidences of intact perineum, episiotomy, and laceration were 22.2% (10), 44.4% (20), and 33.3% (15) respectively. Control group: incidences of intact perineum, episiotomy, and laceration were: 20.2% (20), 49.3% (71), and 28.3% (28) respectively. This difference was not statistically significant. Rate of first-degree laceration was 33.3% (15) in the massage group, while 28.3% (28) in the control group. This difference was not statistically significant. In massage and control groups, second, third and fourth-degree lacerations did not occur. The mean APGAR scores at 1 and 5 minutes were not statistically different between the groups.</p> <p>Conclusion: The results showed that massage with a sterile lubricant provides no apparent and significant advantage or disadvantage in reducing perineal trauma. Therefore, the use of massage as technique for perineal control is safe based on labor criteria and women's preference during delivery.</p>	<p>Strengths: Randomized Controlled Trial The two groups were statistically similar in mean age, education level, and job. Statistical analyses were performed using t-test and chi square to determine potentially significant associations, and a <i>p</i> value less than 0.05 was considered significant.</p> <p>Limitations: The study was not blinded. The decision for performing episiotomy during childbirth in both groups was made at the discretion of the midwife, regarding the diagnosed childbirth factor and indications of episiotomy.</p>
<p>Author Recommendations: The results showed that massage with a sterile lubricant provides no apparent significant advantage or disadvantage in reducing perineal trauma. The authors recommend more research regarding the effect of perineum massage with oil essences in the second stage labor.</p>			
<p>Summary for current clinical practice question: When applying the results of this trial to the clinical practice question of: do women who have active management of the second stage of labor, such as perineal massage or superficial heat have less perineal trauma than women who receive standard care, it can be concluded that this intervention, perineal massage with sterile lubricant, during the second stage of labor does not reduce the rate of episiotomy or laceration and therefore is not effective in reducing perineal trauma.</p>			