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Reducing Perineum Injuries and Trauma During Vaginal Delivery

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REDUCING PERINEUM INJURIES AND TRAUMA DURING VAGINAL DELIVERY

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Abstract

Background: Perineal trauma and injury is extremely common during vaginal birth. Nurse-midwives and other obstetric providers should explore the most current literature for possible ways that perineal trauma and injury during vaginal birth can be avoided in patients.

Purpose: To determine if hands-on perineum care, given by healthcare providers during labor and delivery, decreases perineal trauma and injury in women giving birth vaginally, compared with as opposed to women delivering vaginally who do not receive any hands-on perineum care.

Results: Some hands-on techniques may improve perineal outcomes, but the hands-on techniques vary in effectiveness. The majority of providers currently prefer/use a hands-on technique in at least some situations, and many factors and variables influence perineal outcomes.

Conclusions: There is not adequate evidence to support that the majority of hands-on techniques are superior, but there is some evidence that certain hands-on support the techniques can influence perineal integrity outcomes and are potentially superior to allowing an undisturbed physiological birth. The heterogeneity of available studies along with the lack of accounting for other variable factors make it impossible to conclude any significant statistical difference in outcomes between the overall categories of hands-on vs. hands-off perineum support

Implications for Research and Practice: Implications include the need to collect more data related to factors that influence perineal outcomes and perineal integrity, as well as to continue to increase obstetric provider awareness.

Keywords: Preventing perineum trauma, hands-on vs. hands-off, reducing incident of perineum trauma with vaginal birth, and best practice for prevention of perineum injury during vaginal birth.

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Chapter I: Introduction

Obstetric related professions, including nurse-midwifery, are obligated to constantly re-examine their current practices in light of the latest available research evidence, and to make practice changes as appropriate. The core of midwifery profession is empowerment of women, avoidance of unnecessary interventions, and promotion of birth as a normal life process (ACNM, 2012, Core competencies), nurse-midwives, in particular, must be knowledgeable regarding the latest evidence relating to the care of their patients, and to the promotion of these objectives. Continuing traditional practices, or utilizing techniques that were originally advocated during our professional education may be wise in some contexts, but to truly empower women and help them achieve the best possible birthing experiences, nurse-midwives must continually and thoroughly study the current evidence and recommendations. Each birthing experience is unique, and it is a privilege and a responsibility to enter that sacred zone and support/assist the birthing process. Therefore, nurse-midwives must constantly evaluate practices (in particular, interventions and deviations from the normal physiological that are purported to improve birth outcomes) to determine if they are truly evidence-based and beneficial to the women we serve.

Statement of Purpose

The pain, suffering, and complications related to perineal trauma during vaginal birth is of high priority and interest, not only to obstetric providers, but also to the women they serve. Obstetric perineal injuries can affect future sexual activity and self-image/confidence, as well as create fear and anxiety during future births (Andrews, Thakar, Sultan, & Jones, 2008; Fodstad, Staff, & Laine, 2016; Rathfisch et al., 2010). Williams, Herron-Marx, & Carolyn (2007) discussed several enduring complications associated with perineal outcomes, such as urinary incontinence, fecal incontinence, and dyspareunia after 12 months postpartum. Even the smallest

injury has the potential to impact a woman's perception of her birth experience. Therefore, the PICO question for this integrative review of the literature was as follows—*Does hands-on perineum care, given by healthcare providers during labor and delivery, decrease perineal trauma and injury in women giving birth vaginally, as opposed to women delivering vaginally, who do not receive any hands-on perineum care?*

Evidence Demonstrating the Need for Critical Review

An estimated 90% of women currently experience some sort of perineum trauma while giving birth vaginally (Richmond, 2014). Women who tear during their first delivery are five times more likely to experience tearing/perineum injury during a succeeding birth (Richmond, 2014). The severity of the trauma varies widely, and may include only the skin and mucosa (first degree), may extend into the tissue but not involve the anal sphincter (second degree), or may actually breach the anal sphincter (third degree and fourth degree - also referred to as Obstetrical Anal Sphincter Injuries (OASIS), due to the nature of the injury). To clarify, third degree tears only involve part of the anal sphincter, while fourth degree tears are complete anal sphincter tears and beyond. Reducing OASIS are of particular interest to obstetric providers and women, due to the potential long term complications, such as incontinence, dyspareunia, and psychological implications that are associated with these injuries (McCandlish, et al., 1998; Priddis, Schmied, & Dahlen, 2014).

McCandlish, et al. (1998) was one of the first randomized controlled studies on the subject (carried out by midwives in the UK) providing evidence that the utilization of hands-on manual perineum support techniques could potentially affect perineal tear severity, and impact the after effects significantly. For example, 31.4% of women (n = 823) in the hands-on group reported pain at 10 days postpartum versus 34.5% of the hands-poised group (n = 910, p = 0.02)

($p < 0.05$) (McCandlish et al, 1998). This study inspired many of the later studies carried out on the subject of hands-on vs. hands-off, or hands-poised, manual perineal support techniques. Particularly because episiotomies (an earlier rather invasive form of surgical intervention that was purported to improve healing and decrease severe obstetric sphincter injuries) had already started to be highly scrutinized at this time, and manual perineum support techniques—whether or not they had the potential to decrease episiotomy rates and/or improve perineum integrity rates— had begun to be considered in more earnest (McCandlish et al., 1998).

Significance to Nurse-Midwifery

The use of various hands-on perineum techniques in midwifery to help decrease pain and preserve perineal integrity goes back to at least the second century AD, when Sorunas mentioned it in *Gynaecology* (Dahlen, Homer, Leap, & Tracy, 2011). Warm compresses, warm oil, and manual support of the perineum by midwives were mentioned in his work prior to 138 A.D. Although avoiding unnecessary intervention and promoting physiological birth is at the heart of the midwifery profession, intervention may be acceptable if it empowers a woman and leads to better maternal and/or neonatal outcomes. In 2012, the American College of Nurse-Midwives (ACNM), and several other midwifery organizations, published a joint consensus position statement clearly defining the need to support and promote normal physiological childbirth; however, this position statement did not automatically eliminate the use of all interventions or mandate abandonment of any effective techniques by midwives that were legitimately helping maintain perineum integrity during the birthing process.

Rather, this position statement recommended "Comprehensive examination and dissemination of the evidence and care practices supportive of normal physiologic birth" by midwives (ACNM, 2012, p. 4). The elimination of harmful or unnecessary interventions

throughout the birthing process is an important part of midwifery's role in empowering women and helping society as a whole see birth, pregnancy, and women's unique life cycles changes as beautiful and normal. In particular, hands-off approaches to perineal care during the birthing process needs to be explored and studied alongside the more popular and widely used hands-on techniques (Moore & Moorhead, 2013; Petrocnik & Marshall, 2015).

For the purpose of this literature review, hands-on techniques are defined as those in which a delivery attendant's hands would be used for any sort of intervention designed to reduce perineum trauma during the actual labor and delivery process, including manual perineum support, oil application, and massage techniques. In contrast, hands-off techniques would be defined as those in which the delivery attendant does not manipulate, or otherwise deviate from the natural birth process, by using his or her hands to intervene for the purpose of attempting to preserve the integrity of the perineum, such as techniques that allow the baby to be born unassisted, either outside, or under water. Hands-poised techniques can evolve into either a hands-off or hands-on technique. Therefore, unless the exact outcome is known, hands-poised will be grouped with hands-on techniques because it frequently involves some degree of hands-on manipulation of the perineum during the birthing process. Although it is acknowledged that maternal position during birth potentially plays a significant role in perineum trauma and birth outcomes, this is not a hands-on or hands-off technique specifically, and therefore will be noted as a separate variable.

Theoretical Framework

Abdellah's Twenty-one Nursing Problem Theory will provide the theoretical framework to guide the explorations for this PICO question (McCarthy & Fritzpatrick, 2014; Petiprin, 2016). This theoretical framework is uniquely suited to this practice question because it consists

of two parts: (1) health care professionals (specifically nurses in the original theory) assess and identify the problem or problems (using the ten steps and twenty-one nursing problems), and (2) health care professionals use their skills to identify solutions, and design a plan to help improve patient outcomes (using the eleven nursing skills). Table 1 shows the basic elements of Abdellah's Theory.

Table 1

Abdellah's Nursing Theory and Twenty-one Nursing Problems

Twenty-One Nursing Problems*		Ten Nursing Steps*	Nursing Skills*
1. To maintain good hygiene and physical comfort.	12. To identify and accept positive and negative expressions, feelings, and reactions.	1. Learn to know the patient.	1. observation of health status
2. To promote optimal activity: exercise, rest, and sleep.	13. To identify and accept the interrelatedness of emotions and organic illness.	2. Sort out relevant and significant data.	2. skills of communication
3. To promote safety through the prevention of accidents, injury, or other trauma and through the prevention of the spread of infection.	14. To facilitate the maintenance of effective verbal and nonverbal communication.	3. Make generalizations about available data in relation to similar nursing problems presented by other patients.	3. application of knowledge
4. To maintain good body mechanics and prevent and correct deformities.	15. To promote the development of productive interpersonal relationships.	4. Identify the therapeutic plan.	4. teaching of patients and families
5. To facilitate the maintenance of a supply of oxygen to all body cells.	16. To facilitate progress toward achievement of personal spiritual goals.	5. Test generalizations with the patient and make additional generalizations.	5. planning and organization of work
6. To facilitate the maintenance of nutrition of all body cells.	17. To create and/or maintain a therapeutic environment.	6. Validate the patient's conclusions about his nursing problems.	6. use of resource materials
7. To facilitate the maintenance of elimination.	18. To facilitate awareness of self as an individual with varying physical, emotional, and developmental needs.	7. Continue to observe and evaluate the patient over a period of time to identify any attitudes and clues affecting this behavior.	7. use of personnel resources
8. To facilitate the maintenance of fluid and electrolyte balance.	19. To accept the optimum possible goals in the light of limitations, physical and emotional.	8. Explore the patient's and family's reaction to the therapeutic plan and involve them in the plan.	8. problem-solving
9. To recognize the physiological responses of the body to disease conditions – pathological, physiological, and compensatory.	20. To use community resources as an aid in resolving problems arising from illness.	9. Identify how the nurse feels about the patient's nursing problems.	9. direction of work of others
10. To facilitate the maintenance of regulatory mechanisms and functions.	21. To understand the role of social problems as influencing factors in the case of illness.	10. Discuss and develop a comprehensive nursing care plan.	10. therapeutic uses of the self
11. To facilitate the maintenance of sensory functions.			11. nursing procedure

* McCarthy & Fritzpatrick, 2014; Petiprin, 2016.

The nursing problem has been defined as perineal trauma and its related complications according to the PICO question. This is not only an overt problem as defined by Abdellah's theory (Gonzalo, 2011) because it can be physically seen and diagnosed, but also a covert one because of the associated mental anguish and suffering that is internally experienced by the patient as a result of the injury.

Abdellah's Theory starts with the identification of the problem by getting to know the patient, and sort out the relevant and significant data (Petiprin, 2016). These elements must be addressed on an individual level for each patient, and the theory promotes the healthcare provider learning about the unique patient they are working with, in addition to using generalized data and information gained from reviewing the research (which is also included in the theory as the third step in problem solving; looking at data from similar patients). According to Abdellah (Gonzalo, 2011), there are 21 nursing problems that should be explored for each patient. Problem one would be applicable to perineal trauma, as the problem addresses physical comfort, Problem three is applicable because of its focus on safety and the prevention of trauma. Problems seven and eleven are also applicable because they are involved in maintaining elimination and sensory function. Further exploration of the particular problem solving steps that would be applicable to the main PICO question revealed that problem nine is also very applicable because it addresses how the healthcare provider (or nurse) feels about the patient's problem, which is important because it affects what they are willing to do about the problem, and how in tune they are to the patient's wishes, goals, and perspectives. Perineal tearing/trauma results in the potential for increased pain, increased risk of infection, and decreased body image confidence as a result of something that may be preventable with changes to healthcare providers' practices. As

Abdellah's Theory further promotes, it is important that nurses (or in this case, all obstetric providers) use their skills and knowledge to examine current practices and data, with the aim of designing superior and individually-centered care plans that can produce better outcomes for patients. Not only is this an element of Abdellah's Theory, but it also relates back to midwifery hallmarks and the responsibilities and duties of all obstetric providers (ACNM, 2012, Core competencies).

Summary

This research project and theoretical framework support the hallmarks of nurse-midwifery as presented by the ACNM (2012, p. 2), particularly in the "incorporation of scientific evidence into clinical practice," "health promotion, disease prevention, and health education," "advocacy for informed choice," and "advocacy of non-intervention in normal processes in the absence of complications." The discovery and collection of applicable data, and the summarization of that data, bringing forward potentially meaningful conclusions, and making practical applications should be the goal of every healthcare literature review. The first step is identifying the problem, but the second step is finding and collecting information that may assist in the examination and remediation of the problem.

In conclusion, Chapter 1 discussed the chosen research question, the need for such a question to be explored, and the significance that such a question has not only to nurse-midwives but also to the women they serve. In addition, Abdellah's Theoretical framework has been introduced and shown to be an applicable theoretical framework to provide structure and direction to the researching and examination of the evidence for this particular research issue. Chapter 2 will introduce the methods utilized to collect, sort, organize, and determine the applicability of the available research to the chosen nursing problem.

Chapter II: Methods

Identifying and evaluating applicable research studies is vital to the success of any healthcare related research study, and is the foundation upon which evidence based practice recommendations and conclusions are made. The internet and online search databases have greatly increased student and researcher access to a wide variety of high quality research study sources, and provide an excellent basis from which to explore practice based questions. Two online university databases were used to identify applicable studies for this project, and the John Hopkins nursing evidence-based practice model and guidelines (Dearholt & Dang, 2012) were used to evaluate the quality of the identified research studies.

Search Strategies Used to Identify Research Studies

Applicable peer-reviewed research articles were identified by searching the online libraries of Bethel University and the University of Phoenix. All duplicate articles were removed. Search terms included ‘manual perineum support techniques in labor’ (399 articles), ‘hands-on versus hands-off perineum’ (89 articles), and combinations of terms such as ‘perineum support techniques’, ‘water birth lacerations’, ‘lacerations in vaginal birth’, and ‘provider perineum support in second stage labor’. The goal was to use various search terms to find as many of the possible articles available on the subject, within the chosen research time period (2011-present). As the first articles were found, the terminology within the articles prompted the use of further search terms to discover more articles on the subject. One Cochrane review article and three literature reviews on the subject and related subjects were also reviewed to help identify applicable search terms and themes. These reviews were particularly helpful in establishing the inclusion and exclusion criteria.

Inclusion and Exclusion Criteria

The initial inclusion criteria included several different factors. Firstly, all studies specifically had to contain data on perineal trauma or injury outcomes following a vaginal delivery. Therefore, all caesarean deliveries, or converted vaginal-to-caesarean delivery studies, that did not have specifically have data on actual vaginal birth outcome were excluded. Secondly, it was deemed important to focus on various types of "hands-on" perineum support methods, and establish various categories of hands-on perineum support techniques that might be used. Therefore, only studies that addressed the incidents of trauma and tears AND also addressed a specific type of hands-on or hands-off provider approach to vaginal delivery were included. All studies that did not focus on hands-on or hands-off provider interventions during vaginal delivery were excluded from the research matrix. Specifically, "hands-on" perineal support was defined as: any direct physical support, or contact of healthcare providers' hands with the laboring woman's perineum during the labor and delivery process. All pre-labor/delivery massages, oilings, or other assorted interventions purposed to decrease perineum tearing (because these occurred prior to the actual labor and birth process) were excluded. However, physical support of the perineum and emerging fetus by a healthcare provider's hands during labor and delivery were included, as well as any in-labor massages or applications of oils, etc. that would involve direct "hands-on" contact between the provider's hands and the laboring patient's perineum during labor. "Hands-off" approaches would include any absence or intentional avoidance of healthcare provider manipulation, or direct physical contact with the laboring patient's perineum during labor and delivery. This would include some forms of water birth, as well as birthing styles that focus on allowing the laboring patient to deliver without any physical intervention on the part of the birthing attendant. Episiotomies were not included as a

hands-on intervention because although this surgical intervention could potentially be considered a hands-on intervention for perineum support/protection, it actually intentionally disrupts the integrity of the perineum, and therefore is not truly a support technique aimed at perineum integrity. Episiotomies are counted as an outcome variable in some studies and will be reported as such in the findings.

The final inclusion criterion was studies published in 2011 or later. Research prior to this point has been summarized in major literature reviews, and in order to have the most current and applicable research available on the subject, the decision was made to only include articles from the most current time period. In addition, only actual research studies were included in the matrix; however, literature reviews on the subject were consulted and reviewed to help identify themes, potential search words, and gain more overall knowledge on the subject being researched.

Number and Type of Studies

The search results originally included hundreds of studies with a wide-range of topics related to perineum trauma and provider techniques. However, after the inclusion/exclusion criteria were applied, twenty applicable studies were left for consideration. Eight of these were random controlled trials, five were surveys/questionnaires/panels involving expert opinions from obstetric providers, three were quantitative stress/tension measurement studies involving an actual perineum or biomechanical model of the perineum during vaginal birth, three were observational studies focused on perineum outcomes, and one was a pre/post obstetric provider educational program intervention study that focused on perineum integrity outcomes after the intervention of the educational program. All of these studies produced quantitative data of

various kinds and of differing quality. Some also included a degree of qualitative data that might be useful for guiding future studies and research on the subject.

Criteria for Evaluating Research Studies

Studies were evaluated using the John Hopkins' Model and Guidelines for research categories and quality (Dearholt, 2012). Final evaluation resulted in three Level I A studies, five Level I B studies, two Level II A, one Level II B, two Level III A, two Level III B, one Level V A, and four Level V B studies. Table 2 shows a summary of the level and quality of evidence.

Table 2

Summary of Level and Quality of Evidence

Level/Quality of Evidence	Number of Studies
Level I A	3
Level I B	5
Level II A	2
Level II B	1
Level III A	2
Level III B	2
Level V A	1
Level V B	4

No studies of quality C or lower were included after the inclusion/exclusion criteria had been applied to the search results. Studies with an A quality level are sometimes more limited in scope and number of participants compared with B quality level studies, however, level A studies are more reliable and controlled in terms of data collection and rigor than level B studies. Therefore, knowing the quality as well as the level of a research study is very important in terms of evaluating the usefulness and strengths of the research data.

Summary

In conclusion, the number of current studies available was very limited after the inclusion/exclusion criteria were applied, but the studies selected did include a wide range of

types and quality of evidence. Only true research articles that were viewable as full text articles, were peer-reviewed, and published within the last five years (2011-present) were included in the final matrix. To summarize, Chapter 2 discussed the methods used to find research articles, the criteria used to determine applicable research articles, the methods used to critic and evaluate the strength of the available research, and the type and amount of research evidence available. Chapter 3 will present the actual research evidence and findings related to the research question.

Chapter III: Literature Review and Analysis

The purpose of a literature review is not only to find data, but also to analyze that data for useful information that can be applied to real-life practice situations. The current literature review focused specifically on finding and analyzing data related to hands-on versus hands-off techniques used to reduce perineal trauma during vaginal birth. A brief summary of the reviewed literature is presented below in Table 3, with a full version of the literature matrix available in Appendix A.

Table 3

Research Matrix (brief form)

First Author, Year of Article	Major Findings	Strengths	Weaknesses
Level I Evidence			
1. Harlev, 2013 2. Geranmayeh, 2012 3. Colacioppo, 2011 4. Foroughipour, 2011 5. Shirvani, 2014 6. Karaçam, 2012 7. Demirel, 2015 8. Rezaei, 2014	Hands-on techniques are sometimes superior to hands-off techniques, but the degree of benefit varies greatly from insignificant in some studies to clearly significant in others.	All studies were random controlled trials with good statistical analysis of data. All studies attempted to provide data on whether certain techniques were superior to others.	Not all known influencing variables were considered or documented as part of the studies. Hands-on techniques were too broadly or generally defined in the studies, other than Harlev (2013), Geranmayeh (2012), Colacioppo (2011), and Shirvani (2014).
Level II Evidence			
9. Jansova, 2013 10. Jansova, 2014	Hands-on techniques can change tension levels and stress areas of the perineum from the forchette to other areas.	Quantitative measurements.	Use of Biomechanical model rather than actual perineum. Relatively small, limited data studies.
11. Laine, 2012	Hands-on technique education was associated with less perineal trauma.	Large number of participants.	Did not document whether hands-on or hands-off techniques were actually used.

Table 2 cont.

Research Matrix (brief form)

First Author, Year of Article	Major Findings	Strengths	Weaknesses
Level III Evidence 12. Frost, 2015	Hands-on technique training improved perineal outcomes	Large number of participants and data	No actual correlation of data between used provider technique and outcomes
13. Ott, 2015	Overall perineal trauma rates vary between providers	Significant statistical data on differences in rates between providers	Exact technique used not defined or correlated to the perineal trauma data.
14. Henderson, 2014	Birth pools decreased pain perception but seemed to increase second degree tears	Large study including multiple sites and a lot of data collected	Data was not sorted specifically enough to determine the exact benefit of hands-on versus hands-off techniques
15. Zemčík, 2012	Forchette is the area of greatest tension/strain during a vaginal delivery	Used measurements from actual vaginal births and human perineums	Small study. Did not determine if tension would be less if hands-on support was used.
Level V Evidence 16. Ismail, 2015 17. Trochez, 2011 18. East, 2015	Majority of obstetric providers prefer a hands-on/hands-poised technique. Some feel hands-off popularity may be contributing to higher tear rates.	Obtained a lot of data related to current provider practice and viewpoints.	Did not correlate opinion to actual techniques used, or outcomes obtained.
19. Osborne, 2012	Coached or directed pushing techniques increased perineum trauma	Showed perineal trauma rates increased with directed pushing. The normal physiological birth process was associated with less trauma.	Failed to directly correlate/separate out factors, including potential increased utilization of hands-on perineum support techniques associated with directed pushing.
20. Ampt, 2015	Majority of midwives prefer techniques learned originally, and hands-on techniques	Showed current midwifery perspectives and opinions	No correlation between actual perineal outcomes and opinion or techniques used.

	in difficult birth situations.

Major Finding 1: Some hands-on techniques may improve outcomes

Two out of the eight randomized controlled trials (RCT's) reviewed, Harlev et al. (2013) and Colacioppo, Gonzalez Riesco, and Koiffman (2011) did not produce any statistically significant data ($p < 0.05$). However, Geranmayeh et al. (2012) showed a reduction from 96% (n = 43) to 73% (n = 33) ($p = 0.004$) of women experiencing perineal trauma when perineal massage was used during delivery ($p < 0.05$). Demirel & Golbasi (2015) did not find a statistically significant difference ($p < 0.05$) in perineal laceration rates, but did find that episiotomy rates were reduced to 31% (n = 44) in the massage group vs. 69.7% (n = 99) in the control group ($p = 0.001$). Although this data was limited and cannot be applied to all situations, nurse-midwives should be aware of the existence of such statistically significant data, and should consider the possibility that perineal massage during delivery may decrease perineal trauma in certain situations.

Educating providers on perineal trauma prevention, and teaching hands-on perineal support techniques to providers may also decrease perineal trauma rates. Laine et al. (2012) found that the rate of obstetric anal sphincter injuries (OASIS) decreased from 4% (n = 591) to 1.9% (n = 316) after an interventional education program that was designed to teach obstetric providers hands-on perineum support techniques. However, the study did not collect data on which perineum support techniques providers used, nor did they correlate the actual perineal support techniques used to the OASIS or perineal trauma rates. A similar problem was noted with Frost, Gundry, Young, and Naguib (2015), which again had a statistically significant reduction ($p < 0.05$) in the rate of obstetric anal sphincter injuries (from 4.8% to 3.1% (N =

4920) ($p = 0.008$)) following the implementation of an educational program designed to teach providers hands-on manual support of the perineum during vaginal birth.

One difficulty in analyzing and applying the data available regarding hands-on techniques, is the fact that studies do not properly define terms such as "hands-on perineum support" (only 9 out of 19 applicable studies that were reviewed had specific hands-on techniques defined). Many studies continue to use general categories such as "hands-on," "hands-off," or "hands-poised," even though studies such as those by Jansova et al. (2013) and (2014) provide data that support the idea that the exact placement of hands and fingers in a "hands-on" technique matters, and can greatly influence the areas of highest tension and overall strain placed on the perineum (based on their findings with biomechanical model simulations of vaginal births). Zemčík et al. (2012) who took measurements of the actual tension/strain areas of the perineum during vaginal birth in 19 women found that the forchette is the area of greatest pressure/tension/strain during the actual birthing process. Such data supports the idea that distributing the pressure more evenly, or applying counter pressure (particularly to the forchette area), may be beneficial, but does not necessarily establish the benefit of any particular hands-on technique. This is because the point of these studies was to measure pressure and tension variations, rather than identify a particular technique to improve perineal outcomes.

Therefore, although there is some data available in regards to a basic hands-on manual support of the perineum during a vaginal birth versus a hands-off approach, the current data does not clearly define the optimal methods and techniques that would significantly improve patient outcomes at this time. Although hands-on techniques may in theory improve perineal outcomes, the data is insufficient to support the universal application of a certain technique for all patients, by all obstetric providers. However, the evidence available currently is not strong enough to

initiate a change in practice for those providers who are currently seeing benefits with the utilization of a particular hands-on technique. For example, the randomized controlled study by Harlev et al. (2013) noted that lubrication during delivery helped to prevent perineal trauma (based on data from previous studies), but when two lubricants were compared in the actual study, there was no statistically significant difference in outcomes between the two lubricants being tested.

Major Finding 2: Hands-on techniques vary in effectiveness

An overall review of the studies containing data on the effectiveness of hands-on techniques showed that techniques and their effectiveness varied greatly. The biomechanical vaginal birth simulations by Jansova et al. (2014) showed that various hands-on manual support techniques produced greatly varying results on the artificial perineum, with some hands-on manual support techniques reducing stress to approximately 72% of the normal physiological stress (normal physiological stress was defined as the recorded stress/pressure on the biomechanical model during simulated vaginal birth when no hands-on technique was applied), while others increased it by up to 102%. The Jansova et al. (2013 and 2014) simulation data supported the idea that even small variations in provider technique can influence the outcome, and the retrospective study by Ott et al. (2015) further supported this finding by showing a significant difference in the overall rates of perineal trauma and tears between different midwives (although it should be noted that there were no statistically significant differences between the rates of severe tears among the various midwives studied).

The 2014 RCT by Rezaei et al., hypothesized that hands-on support of the perineum during vaginal birth was detrimental, and although they found that the hands-on manual support techniques used in their study resulted in more tears (49% of hands-on women (n = 300)

experienced perineal trauma) versus a physiological birth (47.7% of hands-off (n = 300)), the findings were statistically insignificant ($p = 0.74$). As Jansova et al. (2014) concluded, providers who are currently utilizing hands-on techniques (or who do not, because they have seen the failure, ineffectiveness, or potential harm of hands-on techniques) should be aware that differing outcomes and effectiveness may be due to variations in techniques. The RCT's by Colacioppo et al. (2011), which studied injections of hyaluronidase into the perineum versus no intervention, and Shirvani and Ganji (2014), which studied utilization of cold packs to the perineum to reduce pain, both showed no statistically significant association ($p < 0.05$) between the hands-on technique used, and any reduction or increase in perineum trauma outcomes. The Jansova et al. (2013 and 2014) studies both showed that variations in manual hands-on support techniques between providers have the potential to either decrease the stress/strain on the perineum or *increase* the strain/tension on the tissues during the birth (based on bio-simulated data, not actual perineums). The evidence supports the idea that hands-on techniques may provide benefits in certain circumstances, but there is the potential that certain techniques may also be potentially harmful and increase the risk of tearing, compared to an undisturbed physiological birth, depending on the technique used. For example, Foroughipour, Firuzeh, Ghahiri, Norbakhsh, and Heidari (2011) found that woman had higher rates of episiotomies and more pain with the use of a hands-on support technique (84%, n = 50) vs. hands-poised (40%, n = 50), ($p = 0.001$) for episiotomies, and 29% vs. 10% ($p < 0.001$) for moderate pain postpartum, respectively ($p < 0.05$). Therefore, even though the data showed that certain hands-on techniques may improve outcomes, it is important to note that hands-on manipulation and interventions designed to promote perineum integrity may actually lead to a decrease in perineal integrity, and worsen outcomes for women giving birth vaginally.

Major Finding 3: The majority of providers prefer/use a hands-on technique

The opinion studies reviewed, showed that there is a definite preference for the utilization of hands-on techniques by the majority of obstetric providers, in at least some situations (Ampt, 2015; East, Lau, & Biro, 2015; Trochez et al, 2011), particularly among more experienced providers (Trochez et al., 2011). One research survey carried out by Trochez et. al. (2011) in England, found that almost half of midwives (49.3%, n = 607) surveyed, said they preferred a "hands-off" method. In addition the less experienced midwives (72%, n = 168), were more likely to prefer the "hands off" approach compared to more-experienced midwives (41.4%, n = 423) ($p < 0.001$) ($p < 0.05$ significant). This finding was in keeping with the hypothesis that the hands-off technique has gained popularity in England among newly trained midwives, and that it might be contributing to the nationally rising OASIS rates. The Australian study by East et al. (2015) found that the majority of obstetric providers in their participation group preferred hands-on or hands-poised methods to the hands-off methods, in the majority of cases. Ampt, Vroome, and Ford (2015, also an Australian study) found 83.4% of midwives studied (n = 108), claimed that they would use a hands-on technique if they felt there was danger of an obstetric sphincter injury; however, this same study found that 63% of midwives (n = 108) preferred a hands-poised or hands-off approach, if it was a "low risk non-water birth." Ismail, Paschetta, Papoutsis, and Freeman (2015) found that the majority of providers (75%, n = 20) on the expert panel, which consisted of midwives and physicians, believed hands-on techniques should be recommended in the UK until sufficient evidence was available to warrant change. Unfortunately, in the opinion studies reviewed, a hands-on provider preference was not absolutely associated with actual perineum trauma rates. This is because data correlating perineum outcomes with the provider technique used was not gathered in connection with these opinion surveys. There was some

suggestion within the provider groups surveyed that the use of a hands-off technique may increase the risk of perineum trauma (particularly in certain situations (Trochez, 2011)), but the evidence to support such a suggestion was not available in the data reviewed for this project. This may simply be due to lack of data collection, analysis, and publication, or such an idea may be a fallacy, and there may be misconceptions within the obstetric community, who have a preexisting preference for hands-on support of the perineum during vaginal births. Although it is outside the scope of the research for this project, the opinion studies listed above also alluded to other studies and data that showed upper trends in perineum trauma rates when traditional hands-on manual support of the perineum during vaginal birth lost popularity, and a decrease in perineal trauma rates when hands-on perineum techniques were implemented.

Major Finding 4: Many factors and variables influence perineal outcomes

Although prenatal factors and maternal position during labor and delivery are known to have a tremendous impact on perineal and other birth outcomes, these factors are only beginning to be considered in conjunction with other factors, such as hands-on or hands-off provider techniques during labor and delivery (Henderson et al., 2014). There is evidence from some studies that seem to point to hands-on superiority while others produce data that in no way justifies the use of a seemingly similar hands-on technique. For example, Geranmayeh (2012) shows a 96% tear rate without massage (n = 43) and a 73% tear rate with massage (n = 33) (p = 0.004); however, the study by Karaçam, Ekmen, and Çalişir (2012) showed no statistically significant difference ($p < 0.05$) in the massage (3.5% intact, n = 198) versus the control group (3.5% intact, n = 198). One thing that must be considered is the variation in provider technique, and the multitude of pre-existing factors that influence the effectiveness of a particular intervention. For example, the study by Osborne et al. (2012) provided evidence that coached

pushing seems to increase perineal trauma and tears, yet this factor is unaccounted for in many studies involving hands-on or hands-off techniques to support perineum integrity.

Henderson et al. (2014) specifically studied the use of birthing pools as a variable in birth outcomes (looking at maternal and fetal outcomes with the use of a birthing pool during labor, as well as during actual birth). Interventions done prior to the actual birth can have a great effect on outcomes (such as laboring in the birthing pool), as well as interventions done or continued during the birth (such as actually giving birth in water versus out of water). Giving birth in water may be either a hands-on or hands-off provider technique (some providers do hands-off water births and some providers prefer hands-on manual perineum support while women give birth in water). However, the water itself is definitely an influencing factor, for example, Henderson et al. (2014) produced data showing that nulliparas who labored in the pools had a higher incidence of perineum tears, but this was counteracted by a lower incidence of episiotomies. To show another potential "hands-off" factor that may influence outcomes, Colacioppo (2011) produced data showing that with spontaneous pushing, 73.8% of women with perineal tears (n = 76) had a 1st degree tear or less, while with directed pushing (coached pushing) only 50.9% (n = 27) had a 1st degree tear or less (p-value not given because it was not the primary analytical data of the study, but it is still suggestive of being a possible influencing factor in perineal injury risk). Osborne and Hanson (2012) also looked at directed vs. spontaneous pushing, but surveyed midwifery opinions on it. Directed vs. spontaneous pushing is a potential hands-off intervention that may greatly influence perineal outcomes, particularly as spontaneous pushing may be more likely to be associated with a hands-off physiological birthing process.

Parity is also a very well-known influencing factor in terms of perineal injury risk, with primiparous women being far more likely to experience perineal trauma while giving birth

vaginally, compared with multiparous women (studies present varying statistics on this, but every study seems to be in consensus with this idea as an established fact, based on study findings and previous research). All eight RCTs reviewed used only primiparous women, or controlled for this factor in the statistical analysis. By comparison, however, only three RCT studies (Colacioppo, Karaçam, and Rezaei) made note of the maternal position during birth. The authors/researchers of the observational water birth study done by Henderson et al. (2014) suggested that maternal position is definitely a potential influencing factor in perineal outcomes, but it is not known to what extent this variable effects the outcomes. Nutrition/diet, and the use of dietary supplements was not noted in any of the studies reviewed, but as diet is known to affect skin quality/elasticity, and the likelihood of injury in other settings, this may be a factor that should be noted in future studies. Maternal BMI and maternal/fetal size ratios are variables that were noted in some studies, which are also related to diet (although in a more limited sense). The Geranmayeh et al. (2012) study, in particular, attempted to control for birth-weight and maternal weight-gain during pregnancy. Difficulty in collecting and quantifying maternal diet and nutritional data may be one barrier preventing the proper control of this variable in future studies.

Strengths and Weaknesses

One of the strengths of the reviewed data was that a wide variety of data was available from multiple different types of studies. The Level I random controlled studies that were reviewed provided excellent data, but lacked comprehensiveness in data collection and the definition of hands-on techniques, in many instances. The Level II data from the 2013 and 2014 Jansova et al. studies provided more defined and exact data, however, these studies obtained data from a biomechanical model, which may vary somewhat from the actual physical perineum of a

woman during vaginal birth. The Level II study by Laine et al. (2012) had a very large sample size of births (N = 31,709), and included a vast amount of data, however, the study did not attempt to actually correlate specific provider techniques (hands-on or hands-off) to the perineum outcomes. Rather, it simply highlighted the improvement in outcomes after the implementation of an educational program aimed at educating providers on hands-on perineal support.

Synthesis of the Literature to Answer the Practice Question

In synthesizing the literature reviewed for this project, there is not adequate evidence to support that "hands-on" techniques, as a general category, are superior to allowing a natural physiological birth process with a hands-off perineum technique, in the majority of cases. However, there is some evidence that certain hands-on support techniques used by skilled providers can influence perineal integrity outcomes, and are potentially superior to allowing an undisturbed physiological birth. In the cases where the available research findings seem to conflict, it is important to remember that the data may be incomplete and may not account for all the potential variables. Therefore, where one study's conclusions seem to contradict another comparable study's conclusions, deeper analysis and consideration should take place. Every study is limited, and the data may be incomplete in its scope and comprehension.

Even the most currently available Cochrane review of "perineal techniques during the second stage of labor for reducing perineal trauma" (Aasheim, 2012, p.1) concluded that the "heterogeneity" of available studies, along with other factors, made it impossible to conclude any "significant" statistical difference in outcomes between hands-on and hands-off perineum support techniques. Of the techniques reviewed (hands-on, hands-off, warm compresses, and massage), only warm compresses had statistically significant evidence to support the merit of its use during labor. Independent literature reviews by Bulchandani et al. (2015), Moore and

Moorhead (2013), and Petrocnik and Marshall (2015) also analyzed and revisited the available data on the subject, but did not provide evidence to clearly recommend or rule out either hands-on or hands-off techniques. However, one of the most current and recent studies, done by Bovbjerg, Cheyney, and Everson (2016), showed that water births (which are typically more closely associated with hands-off perineum support techniques) had a slightly higher incidence of overall trauma, but a slightly decreased incidence of OASIS trauma.

In conclusion, Chapter 3 explored the actual research findings, the strengths and weaknesses of the available research, and how the current research findings could be applied to research question. Chapter 4 will build upon this foundation and further discuss the implications of the research findings. Recommendations for future research will be suggested as well, and Abdellah's framework will be used for the final application and examination of the available evidence to the research problem.

Chapter IV: Discussion, Implications and Conclusions

Implications for Nurse-Midwifery Practice

Implications for midwifery practice include the need for further evaluation of current practices, and the collection of more in-depth and comprehensive data to better show the true outcomes and associations of various techniques and influencing factors (Aasheim, 2012; McCandlish et al, 1998). Currently, many obstetric providers have a preference for the use of certain techniques, but these preferences are based on experience and education, rather than on evidenced-based research (Ampt et al., 2015; Ismail et al., 2015). Nurse-midwifery's core values promote non-intervention and normalcy whenever possible, but also promote the good of the patient and the empowerment of women, by giving them the information and resources to make the best healthcare decisions (ACNM, 2012). If nurse-midwifery is to offer women options and help them avoid complications and interventions, then it is imperative that evidence exist to either validate the use of an intervention, or discontinue it.

Because conclusive evidence does not currently exist that would mandate a specific procedure for perineum care for all patients, nurse-midwives must make recommendations based on their personal knowledge of the patient and the available research (Gonzalo, 2011). Rather than pursuing a paternalistic approach, nurse-midwives need to empower women in their decision-making by giving them all of the information available, and enabling them to make an informed decision about the perineum care options that are most appropriate for their situation (Hermansson & Martensson, 2011; Morrison, 2011; Specker Sullivan, 2016).

Recommendations for Future Research

Some research has been done on the topic of the best techniques to help increase the likelihood of perineum integrity and reduce perineal trauma, but there is a great need for more comprehensive research on the topic of hands-on versus hands-off perineum preservation techniques. As Aasheim (2012) concluded, there is a great need for further data that can be compared and analyzed to support specific results. To be more specific, research is needed that takes into consideration the many different factors that may influence perineum outcomes. As Osborne and Hanson (2012) showed, even factors such as how a mother is coached to push can greatly influence perineal outcomes. The contributing factors need to be solidly identified and noted whenever possible in order to adequately study their effects on perineum outcomes. In addition, the research data needs to be correlated, and extensively analyzed to compare various factors, and help further determine what associations are present between various factors and various outcomes. For example, although the Frost et al. (2015) study analyzed a large number of births (n = 4920) and the related perineal outcomes, before and after their hands-on educational intervention program, they did not collect any data on whether or not hands-on support techniques were actually used, or what correlation the used techniques had with outcomes. Ampt et al. (2015), East et al. (2015), Ismail et al. (2015), and Trochez et al. (2011), all had the same weaknesses, in that they obtained opinion data from obstetric providers, but did not study actual perineal outcomes that were associated with certain techniques.

Integration and Application of Selected Theoretical Framework

Abdellah's Framework initially helped to identify a problem that greatly affected patient experience and outcomes, and which nurses (particularly nurse-midwives) could potentially affect (McCarthy & Fritzpatrick, 2014; Petiprin, 2016). In this case, nurse-midwives in particular

are in a position to be able to influence outcomes related to perineum integrity in vaginal births. Ideally, the choice to bring an intervention into the birthing process would be evidence-based, and easily supported by available research (ACNM, 2012). However, the data obtained in this review did not strongly support the merit of the majority of hands-on or hands-off techniques in supporting perineal integrity during the birthing process. On the contrary, there was evidence that the introduction of certain techniques could actually result in harm, or worse perineal outcomes (Rezaei et al, 2014). Unfortunately, the current evidence would not support using the majority of hands-on techniques to improve perineum outcomes. However, midwives may have seen excellent results with the use of a hands-on technique in their own, or others' experiences, and may wish to incorporate this into their own practices, and allow patients the option to use various hands-on techniques. According to Abdellah's Framework, if a nursing practice produced better outcomes for a patient in a similar situation, then it is reasonable to offer such a technique to a current patient. The specific problems identified need to be addressed for the patient, and if it appears that a solution will address the identified problems, then it is reasonable to use the technique, and then evaluate it for success. Therefore, Abdullah's Framework would support the continued use of techniques that nurse-midwives have found to be effective previously, even if there is no conclusive evidence available from research studies. Initially, it might appear that Abdellah's Framework is in conflict with the midwifery goal of empowering the woman (because it focuses on the nursing perspective of the issue), but a woman cannot be empowered if the knowledge and resources offered to her are not complete. It is imperative that midwifery and other obstetric providers use frameworks like Abdellah's to guide their problem-solving processes, so that they in turn can share their knowledge, experiences, and perspectives, empowering patients to identify, address, and solve problems.

Conclusion

In conclusion, the use of hands-on or hands-off techniques for women giving birth vaginally is a very complex and multifaceted decision that must be made based on the best knowledge of the nurse-midwifes and their patients. It would be unfair and inaccurate to state that the available evidence shows that either hands-on or hands-off techniques are clearly superior to one another in all obstetric situations. Therefore, nurse-midwives should base current practice on the preferences of their patients, their own comfort with various techniques based on previous experiences, and their own best knowledge of the most current literature. However, in the future, it is important that information be available to help support various perineum support techniques or to help remove them from practice if they are ineffective or detrimental. Therefore, it is vital that nurse-midwives attempt to collect and publish data related to this important topic, and the data should ideally take into consideration exact techniques and the multitude of other factors that influence perineal outcomes.

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Appendix A: Matrix of the Literature

Citation	Purpose	Sample	Design	Measurement	Results/ Conclusion	Recommendations	Critique Level/Quality
1. Harlev, A., Pariente, G., Kessous, R., Aricha-Tamir, B., Weintraub, A. Y., Eshkoli, T., Dukler, D., Ben Ayun, S., & Sheiner, E. (2013). Can we find the perfect oil to protect the perineum? A randomized-controlled double-blind trial. *The Journal of Maternal-Fetal & Neonatal Medicine, 26*(13), 1328-1331. doi:10.3109/14767058.2013.784261	Evaluate whether or not one enriched oil lubricant applied during the second stage of labor was superior to purified wax lubricant.	164 women with vaginal deliveries	Prospective, randomized, double-blind study	Number of intact perineums versus number, and degree, of perineal lacerations in comparative groups.	Neither oil was superior to the other; however, the authors cited various other studies have shown the benefits of using lubricant, even if a superior lubricant cannot be determined at this time.	Recommend the use of lubricants during the second stage of labor based on previous literature review, but no determined superiority of any one oil for this purpose at this time.	Level I A This study was very well set up and executed in order to ensure that bias from the participants and researchers didn't enter the results. This only compared two lubricants, however, and was very limited in scope and application.

Citation	Purpose	Sample	Design	Measurement	Results/ Conclusion	Recommendations	Critique Level/Quality
2. Geranmayeh, M., Rezaei Habibabadi, Z., Fallahkish, B., Farahani, M. A., Khakbazan, Z., & Mehran, A. (2012). Reducing perineal trauma through perineal massage with vaseline in second stage of labor. *Archives of Gynecology and Obstetrics, 285*(1), 77-81. doi:10.1007/s00404-011-1919-5	To examine the effect of perineal massage with Vaseline on perineal trauma	90 primiparous women	Randomized clinical trial	Data analyzed using SPSS v.16. Chi-square and Fisher's exact tests for comparison analysis. Independent t test used for quantitative variables. A P value < 0.05 was significant.	Perineal massage using Vaseline during the second stage of labor appeared to significantly reduce perineal trauma (73% in massage compared to 96% in control p = 0.004).	Recommendations are that further studies be done, as previously reviewed study results had mixed results.	Level I A, nicely done RCT. This was a very limited study in numbers, and there are a great many potential extraneous variables that could easily affect the results.

Citation	Purpose	Sample	Design	Measurement	Results/ Conclusion	Recommendations	Critique Level/Quality
3. Colacioppo, P. M., Gonzalez Riesco, M. L., & Koiffman, M. D. (2011). Use of hyaluronidase to prevent perineal trauma during spontaneous births: A randomized, placebo-controlled, double-blind, clinical trial. *Journal of Midwifery and Women's Health, 56*(5), 436-445. doi:10.1111/j.1542-2011.2011.00056.x	To compare the frequency and severity of perineal trauma during spontaneous birth, with or without perineal injections of hyaluronidase	160 primiparous women	Randomized, placebo-controlled, double-blind clinical trial	Peri-rule and standard laceration degree categorization used for obtaining data on perineal trauma. 1-tailed Fisher exact test used for analysis, P value of <0.025 considered significant.	The use of hyaluronidase did not result in a significant increase in perineal integrity	Further study recommended, but the use of injectable hyaluronidase to increase perineal integrity is not recommended based on this study result.	Level I A This study was a well set-up RCT, but did have limited numbers, and only studied a very limited technique. It was appropriate for the topic studied, but many variables can influence outcomes in terms of perineal integrity.

Citation	Purpose	Sample	Design	Measurement	Results/ Conclusion	Recommendations	Critique Level/Quality
4. Foroughipour, A., Firuzeh, F., Ghahiri, A., Norbakhsh, V., & Heidari, T. (2011). The effect of perineal control with hands-on and hand-poised methods on perineal trauma and delivery outcome. *Journal of Research in Medical Sciences, 16*(8), 1040-1046.	To evaluate the effect of "hands-on" vs. "hands poised", on perineal trauma and delivery outcome in primiparous women	100 primiparous women	Randomized controlled trial	Statistical analysis of data for a significance of $p < 0.0001$. Pain ratings and episiotomy rates were measured.	The rate of episiotomy was higher in the hands-on group (84% vs. 40%, $p = 0.001$). The rate of mild and moderate postpartum pain in the hands-on group was higher than the hands-off group (70% vs. 58% and 29% vs. 10%, $p < 0.001$).	Further study needed, but the hands poised technique did seem to have some benefit for the woman in the study. (Ritgen's maneveur was the hands-on technique in this study).	Level I B This was a good random control trial with a relative small sample size. The tendency of providers to use episiotomy more in the hands-on group may have affected the results, or the hands-on technique may have affected the need for episiotomies.

Citation	Purpose	Sample	Design	Measurement	Results/ Conclusion	Recommendations	Critique Level/Quality
5. Shirvani, M. A., & Ganji, Z. (2014). The influence of cold pack on labour pain relief and birth outcomes: A randomised controlled trial. *Journal of Clinical Nursing, 23*(17-18), 2473-2480. doi:10.1111/jocn.12413	To evaluate the influence of local cold on severity of labor pain and to identify the effect of local cold on maternal and neonatal outcomes	64 women giving birth vaginally	Randomized controlled trial	Pain severity was assessed by visual analogue scale and 5-point Likert scale. Incidence of perineal trauma/tears were evaluated for comparative purposes between the control and experimental group. Chi squared, t tests, and $p < 0.05$ were used for analysis	There was no significant difference between the cold pack and control group in terms of perineal trauma (this was a side issue in the study, not the main focus).	Cold packs appear to have some benefit in decreasing pain for women in labor without causing any increased risk of perineal trauma and other complications.	Level I B Fairly good RCT. It wasn't possible to have the participants blinded in this trial because of the nature of the intervention. Perineal trauma wasn't the main focus of this study, but this information was included.

Citation	Purpose	Sample	Design	Measurement	Results/ Conclusion	Recommendations	Critique Level/Quality
6. Karaçam, Z., Ekmen, H., & Çalişir, H. (2012). The use of perineal massage in the second stage of labor and follow-up of postpartum perineal outcomes. *Health Care for Women International, 33*(8), 697-718. doi:10.1080/07399332.2012.655385	To evaluate the use of perineal massage in the second stage of labor in decreasing perineal trauma	396 women who gave birth vaginally	Randomized controlled study	Data collection by designated researchers using standardized forms. Data analyzed with Statistical Package for the Social Sciences, version 11.5 (SPSS Inc., Chicago, IL, USA).	Perineal massage had no significant beneficial effects (study followed participants up to 1 year after giving birth to evaluate for possible benefit/detriment)	Further study needed, but perineal massage did not demonstrate any significant benefit or harm.	Level I B This was a fairly good RCT with a good sample size, but more potential variables could have been considered. There was probably more potential for error than was considered.

Citation	Purpose	Sample	Design	Measurement	Results/ Conclusion	Recommendations	Critique Level/Quality
7. Demirel, G., & Golbasi, Z. (2015). Effect of perineal massage on the rate of episiotomy and perineal tearing. *International Journal of Gynaecology and Obstetrics: The Official Organ of the International Federation of Gynaecology and Obstetrics, 131*(2), 183-186. doi:10.1016/j.ijgo.2015.04.048	To evaluate the effect of perineal massage on the rate of episiotomies and perineal tearing/trauma.	284 women	Randomized controlled study	Degree and incidence of perineal trauma and associated symptoms.	Massage decreased the incidence of episiotomies, but did not show significant decrease in the number/incidence of lacerations.	Further study needed. Limited number of participants, difficult to generalize results. Appears that perineal massage during second stage of labor has some benefit.	Level I B Fairly good RCT with a fair number of participants. This study focused on the episiotomy effect, but did provide some data on overall perineum outcomes.

Citation	Purpose	Sample	Design	Measurement	Results/ Conclusion	Recommendations	Critique Level/Quality
8. Rezaei, R., Saatsaz, S., Chan, Y. H., & Nia, H. S. (2014). A comparison of the "Hands-off" and "Hands-on" methods to reduce perineal lacerations: A randomised clinical trial. *The Journal of Obstetrics and Gynecology of India, 64*(6), 425-429. doi:10.1007/s13224-014-0535-2	To compare the "Hands-off" and "Hands-on" methods to reduce perineal lacerations.	600 nulliparous women	Randomized controlled trial	Rates of perineal tears	147 (49 %) women "Hands-on" and 143 women (47.7 %) "Hand -off" = perineal trauma ($p = 0.74$). 8 women (2.7 %) "Hands-on" = 3rd degree trauma and (0.3 %) "Hands-off" ($p = 0.1$). Episiotomy = 38 women (12.7 %) "Hands-on" and 17 (5.7 %) women "Hands-off" ($p = 0.003$). 28 women (9.3 %) "Hands-on" and 47 women (15.7 %) "Hands-off" = periurethral tears ($p = 0.01$) that did not need mending.	Further study needed.	Level I B This study seemed to show less perineal trauma with a hands-off technique versus the hands-on technique that was being used. The hands-on technique was not defined and is a variable in these results. A good overall RCT.

Citation	Purpose	Sample	Design	Measurement	Results/ Conclusion	Recommendations	Critique Level/Quality
9. Jansova, M., Kalis, V., Rusavy, Z., Zemcik, R., Lobovsky, L., & Laine, K. (2013). Modeling manual perineal protection during vaginal delivery. *International Urogynecology Journal, 25*(1), 65-71. doi:10.1007/s00192-013-2164-1	To compare manual hands-on perineum protection techniques versus hands-off delivery techniques	Biomechanical models simulating vaginal birth were tested using various manual and hands-off delivery techniques.	Quantitative stress measurement using a biomechanical model with various delivery provider hand techniques	Stress measurements of various areas of the simulated perineum were used.	Some hands-on techniques may be useful. The exact definitions and techniques used in hands-on techniques vary, and may produce very different perineum protecting results. A 30% and 39% decrease in value of highest stress was achieved with hands-on techniques versus hands-off.	Further study and definition/standardization of hands-on delivery provider techniques is needed.	Level II A Excellent study that gathered data on the actual physical stress points and tensions caused by various provider hand techniques. Problems included the fact that the manikin simulation may or may not reflect real life perineum tension/stress measurement.

Citation	Purpose	Sample	Design	Measurement	Results/ Conclusion	Recommendations	Critique Level/Quality
10. Jansova, M., Kalis, V., Lobovsky, L., Hyncik, L., Karbanova, J., & Rusavy, Z. (2014). The role of thumb and index finger placement in manual perineal protection. *International Urogynecology Journal, 25*(11), 1533-1540. doi:10.1007/s00192-014-2425-7	To assess the effect of various hand-placement techniques in reducing stress on the perineal tissue during vaginal birth.	Biomechanical model	Experimental biomechanical model.	Stress/tension measurement differences based on differing hand/finger positions.	The amount of stress/tension on the tissue varies greatly depending on how hands and fingers are positioned in supporting the perineum. Hands off (100%) was less tension or more tension than some of the hands-on techniques (which varied from 72.1% to 102.1%).	Further study needed to assess best hand placement techniques and evaluate these techniques in the real life setting.	Level II A Very good study in specifically looking at how the placement of provider's fingers and hands can influence the pressure/tension placed on a woman's perineum. This was a simulation, however, and may not reflect an actual perineum completely accurately.

Citation	Purpose	Sample	Design	Measurement	Results/ Conclusion	Recommendations	Critique Level/Quality
11. Laine, K., Skjeldestad, F. E., Sandvik, L., & Staff, A. C. (2012). Incidence of obstetric anal sphincter injuries after training to protect the perineum: Cohort study. *BMJ Open, 2*(5), e001649. doi:10.1136/bmjopen-2012-001649	To determine if a training program aimed at the implementation of hands-on perineum support techniques would decrease the incidence of severe perineal lacerations/injuries.	31,709 deliveries (907 severe obstetric anal sphincter injury).	Pre and post-intervention study (Population based cohort study).	Incidence of lacerations (particularly obstetric anal sphincter injuries) with comparison/analysis .	The rate of obstetric anal sphincter injuries (OASIS) decreased from 4% (591/14787) to 1.9% (316/16922). Lesser perineal injury rates also decreased post-education/ training implementation.	Further study needed. Also, recommended implementation of similar educational program and monitoring for such programs effectiveness.	Level II B Interestingly, the data from this study seemed to point toward a decrease in injuries with the implementation of an educational program that taught hands-on techniques. The sample size was large, and though there were a lot of other potential variables that could have influenced the results, the results were very thought-provoking.

Citation	Purpose	Sample	Design	Measurement	Results/ Conclusion	Recommendations	Critique Level/Quality
12. Frost, J., Gundry, R., Young, H., & Naguib, A. (2015). Multidisciplinary training in perineal care during labor and delivery for the reduction of anal sphincter injuries. *International Journal of Gynecology and Obstetrics,* doi:10.1016/j.ijgo.2015.12.011	To determine whether a multidisciplinary intrapartum perineal-care training program reduced the rate of obstetric anal sphincter injuries in vaginal deliveries	4920 vaginal deliveries in the UK .	A prospective observational cohort study (also conducted a retrospective data collect for comparative purposes).	Rates of severe anal sphincter injuries and risk factors compared using logistic regression analysis. P < 0.05 was considered statistically significant. SPSS version22 (IBM, Armonk, NY, USA) was used for data analyses.	The training program that increased awareness about anal sphincter injury risk factors and identification did help decrease the anal sphincter injury rate (decreased from 4.8% to 3.1% of vaginal deliveries (odds ratio 0.66; 95% confidence interval 0.493–0.899; *P* = 0.008).	More study needed.	Level III A This study did not adequately address which factors might be involved in changing the anal sphincter injury rate other than education. For example, it suggested that a hands-on technique when the patient is at higher risk for anal sphincter injury may be appropriate and decrease injuries, but this was not monitored in the study.

Citation	Purpose	Sample	Design	Measurement	Results/ Conclusion	Recommendations	Critique Level/Quality
13. Ott, J., Gritsch, E., Pils, S., Kratschmar, S., Promberger, R., Seemann, R., . . . Hauser-Auzinger, C. (2015). A retrospective study on perineal lacerations in vaginal delivery and the individual performance of experienced mifwives. *BMC Pregnancy and Childbirth, 15*(1), 270. doi:10.1186/s12884-015-0703-0	To determine if individual midwives differed significantly in the rate/incidence of perineal lacerations among their patients.	1937 women with singleton pregnancies and spontaneous vaginal deliveries (cephalic presentation).	Retrospective data collection study (chart review).	Chart review with statistical analysis of data collected.	Perineal laceration rates do vary significantly from midwife to midwife (ß-values ranging from −0.028 to 0.899 compared to the reference midwife), but the rate of *severe* perineal lacerations was not statistically significant based on individual midwife.	Further study needed, but individual midwife performance does not seem to have the same effect on severe laceration rates as it does on less severe perineal laceration rates.	Level III A This study was excellent in that it collected the data after the fact, eliminating the bias of the providers knowing they were being studied at the time of the data formation (also a limitation). This study showed that individual midwives do vary in their laceration rates even in similar practices and practice settings with seemingly similar techniques.

Citation	Purpose	Sample	Design	Measurement	Results/ Conclusion	Recommendations	Critique Level/Quality
14. Henderson, J., Burns, E. E., Regalia, A. L., Casarico, G., Boulton, M. G., & Smith, L. A. (2014). Labouring women who used a birthing pool in obstetic units in Italy: Prospective observational study. *BMC Pregnancy and Childbirth, 14*(1), 17-17. doi:10.1186/1471-2393-14-17	Describe and compare characteristics of women who used birth pools during labor (a control group was used in one center).	19 Italian birth centers (2505 women using birth pools in 19 centers; and a mixed group of non-birth pool and birth pool in another center).	Prospective Observational study.	Descriptive statistics, used chi square statistics for comparison of categorical data and t-tests for continuous data. Results were considered statistically significant if $p < 0.05$ in a two-tailed test. Analysis using SPSSX version 19.	There was an increase in second degree tears associated with use of a birthing pool during labor; however, there were less episiotomies used in the birth pool group.	Birth pools were associated with lower rates of intervention and did not show significant differences in outcomes.	Level III B There are many potential variables that could affect the results; however, this study did provide some useful data. Because birthing pool was used for labor and/or birth, however, it was difficult to really assess specific data about provider perineum support techniques and their effects. This data could be re-analyzed for further information.

Citation	Purpose	Sample	Design	Measurement	Results/ Conclusion	Recommendations	Critique Level/Quality
15. Zemčík, R., Karbanova, J., Kalis, V., Lobovský, L., Jansová, M., & Rusavy, Z. (2012). Stereophotogramm etry of the perineum during vaginal delivery. *International Journal of Gynecology and Obstetrics, 119*(1), 76-80. doi:10.1016/j.ijgo. 2012.05.018	Analyze the perineum during normal vaginal delivery to help identify which provider perineal support techniques may be beneficial.	10 primiparous Czech women .	Quantitative study collecting perineal stress/tension measurement during normal vaginal delivery.	Stereophotogra mmetry data, analyzed for points of highest tissue stress/strain.	The fourchette area was found to be the area of highest strain during delivery. Hands-on techniques that support this area may be beneficial.	Recommend further study particularly into whether a specific technique that supports fourchette may be useful in preventing perineal injuries during vaginal delivery.	Level III B This study was awesome in that it actually obtained measurable quantitative data on the areas of greatest pressure/tensi on during vaginal delivery. The data from this study could be starting point for a better understanding of how to support the perineum in vaginal delivery.

Citation	Purpose	Sample	Design	Measurement	Results/ Conclusion	Recommendations	Critique Level/Quality
16. Ismail, K. M. K., Paschetta, E., Papoutsis, D., & Freeman, R. M. (2015). Perineal support and risk of obstetric anal sphincter injuries: A delphi survey. *Acta Obstetricia Et Gynecologica Scandinavica, 94*(2), 165-174. doi:10.1111/aogs.12547	To explore the views of a multidisciplinary group of experts and achieve consensus on the importance of perineal support in preventing obstetric anal sphincter injuries.	Panel of 20, consisting of obstetricians, midwives and urogynecologists recommended by UK professional bodies.	Three-generational Delphi survey (expert opinion multidisciplinary).	A 58-item web-based questionnaire that used a six-point Likert scale to assess expert opinion.	It appears that current UK practice is not evidence-based, and that the experts felt the use of hands-off/hands-poised technique might be contributing to higher rates of obstetric sphincter injuries. The majority believed hands-on techniques should be recommended until sufficient evidence was available to warrant change.	Recommended further study to provide evidence on which perineal support techniques would have the lowest risk of obstetric sphincter injuries.	Level V A This study focused on finding out what UK obstetric providers' thought about perineum support techniques and how it might be connected to obstetric sphincter injuries, but opinion is not reliable evidence for practice change.

Citation	Purpose	Sample	Design	Measurement	Results/ Conclusion	Recommendations	Critique Level/Quality
17. Trochez, R., Waterfield, M., & Freeman, R. M. (2011). Hands on or hands off the perineum: A survey of care of the perineum in labour (HOOPS). *International Urogynecology Journal, 22*(10), 1279-1285. doi:10.1007/s00192-011-1454-8	To obtain an estimate of English midwives using the hands-on or hands-off techniques during deliveries.	607 returned questionnaires from English midwives (1000 questionnaires sent out).	Observational postal questionnaire study .	Questionnaire data analyzed with SPSS version 15, comparisons using chi squared tests with contingency tables. Used STROBE statement for reporting results.	299 midwives (49.3%, 95% CI 45.2–53.3%) prefer the "hands-off" method. Less-experienced midwives were more likely to prefer the "hands off" (72% vs. 41.4%, $p < 0.001$). A higher proportion of midwives in the "handsoff" group would never do an episiotomy (37.1% vs. 24.4%, $p = 0.001$) for indications other than fetal distress.	Recommended further study as the researchers hypothesized the increased utilization of the hands-off technique may be contributing to the recent increased obstetric anal sphincter injury rates, but this may also be explained by lower incidence of episiotomies.	Level V B There are not clear definitions of hands-on and hands-off techniques which allows for great variances in these techniques in practice. Also, preference doesn't mean best practice. This study shows the status quo, but not whether or not the hands-on or hands-off techniques are superior.

Citation	Purpose	Sample	Design	Measurement	Results/ Conclusion	Recommendations	Critique Level/Quality
18. East, C. E., Lau, R., & Biro, M. A. (2015). Midwives′ and doctors′ perceptions of their preparation for and practice in managing the perineum in the second stage of labour: A cross-sectional survey. *Midwifery, 31*(1), 122-131. doi:10.1016/j.midw.2014.07.002	To identify the delivery providers' perceptions regarding their own education and practice of perineum management during 2nd stage of labor.	Midwives (69) and doctors (17) at three Monash Women′s maternity hospitals.	Anonymous cross-sectional semi-structured questionnaire based on expert opinion and peer-reviewed literature (Survey).	Number and percentage of each group expressing opinions in each area and category.	Many providers combine techniques and do not exclusively use one perineum management technique. The majority of providers surveyed preferred hands-on or hands-poised to the hands-off methods in the majority of cases. 90% of providers agreed that RCT was needed to determine the best perineum management techniques.	This data is a baseline to help give insight into current perceptions and practice. Recommendations are that further research be done and that further educational programs and opportunities may need to be developed.	Level V B The data was very limited and generalized. Also, it was from focused on perceptions and current practice rather than comparing outcomes and techniques.

Citation	Purpose	Sample	Design	Measurement	Results/ Conclusion	Recommendations	Critique Level/Quality
19. Osborne, K., & Hanson, L. (2012). Directive versus supportive approaches used by midwives when providing care during the second stage of labor. *Journal of Midwifery and Women's Health, 57*(1), 3-11. doi:10.1111/j.1542-2011.2011.00074.x	To describe CNM/CM practices in response to maternal-bearing down efforts during 2nd stage labor and to identify factors that are associated with the supportive approach.	512 returned questionnaires (705 random sample selected from the ACNM database for original mailout).	National survery/questionnare of US CNMs/CMs.	Data analyzed using SPSS 16.0; Chicago, IL. Described using univariate statistics. Comparisons using Wilcoxon signed rank tests, Mann-Whitney test, and Kruskal-Wallis analysis. Correlations assessed using Spearman correlation coefficients. A type I error of 0.01 was used for all tests of statistical significance.	The supportive approach to maternal bearing down effort is preferred unless potential complications are anticipated or present. Previous research has suggested that perineal trauma is reduced with the utilization of supportive rather than directive provider responses to maternal bearing down efforts.	Recommend supportive approaches to maternal bearing down effort when possible. Further research needed. (It was a side note/issue concerning perineal trauma and its association with directive vs. supportive approaches; however, directive approaches are potentially associated with situations that are more likely to result more direct manipulation of the birth process i.e. hands-on birth techniques as well as increased perineal trauma.)	Level V B Good study in that it encompassed many American ACNM midwives, but again, this study was expert opinion and consensus based. The analyses were of the opinion numbers rather than comparing outcomes to techniques directly.

Citation	Purpose	Sample	Design	Measurement	Results/ Conclusion	Recommendations	Critique Level/Quality
20. Ampt, A. J., Vroome, M., & Ford, J. B. (2015). Perineal management techniques among midwives at five hospitals in new south wales – A cross-sectional survey. *Australian and New Zealand Journal of Obstetrics and Gynaecology, 55*(3), 251-256. doi:10.1111/ajo.12330	To determine perineal protection techniques midwives prefer for low-risk non-water births; whether preference is associated with technique taught; and whether midwives change preference according to clinical scenario.	108 midwives	Survey (Questionnaire)	Questionnaire, data analyzed with chi square, McNemar's test, and Wilcoxon two sample test. Statistical analyses with SAS Version 9.3, SAS Institute, Cary NC, USA.	Midwives appear to prefer the techniques they were taught, and 63% preferred hands-off or hands-poised techniques in low-risk non-water births; however, many reported changing techniques to hands-on during higher risk scenarios or when they felt the situation warranted it (83.4% if they felt danger of obstetric sphincter injury).	More study needed. The authors in particular were concerned with the possible association of hands-off techniques with more severe obstetric perineal injuries.	Level V B This study was of opinions, but it did show the effect that training has on midwives in regards to which techniques they use. This study did not show how the various techniques influence outcomes, but the authors still were concerned about the possible ill effects of hands-off techniques.