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Research Article

Efficacy of Stretch and Sweep at Term to Promote Spontaneous Labor: Narrative Review

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Abstract

Objective: *To evaluate the efficacy and safety of stretch and sweep procedures for promoting spontaneous labor at term pregnancy through a narrative review of the literature.*

Methods: *A narrative review was conducted by searching relevant studies from various databases to investigate the use of stretch and sweep for labor induction at term. Studies were included if they assessed the success rates of stretch and sweep in initiating spontaneous labor, compared outcomes with expectant management, and reported on maternal and neonatal safety data.*

Results: *Studies reported varying success rates of stretch and sweep in women experiencing spontaneous labor within 48 hours after the procedure compared to expectant management. The procedure may reduce the need for formal induction methods. Mild discomfort, cramping, and vaginal bleeding were found as potential side effects. No significant increase in maternal or fetal deaths was reported. Studies haven't shown a negative impact on neonatal outcomes.*

Conclusion: *Stretch and sweep appears as a moderately successful and non-pharmacological method for promoting spontaneous labor at term. While it can be a suitable option for some women, individual factors and potential risks should be considered by healthcare providers before recommending the procedure. Further, well-designed studies are warranted to confirm the long-term efficacy and safety of stretch and sweep, particularly regarding optimal timing, frequency, and suitability for specific patient populations.*

Keywords: *Stretch and Sweep; Membrane Sweep; Spontaneous Labor Induction; Cervical Ripening; Cervical Effacement.*

Introduction

A healthy pregnancy delivers into natural labor which results in joyful birth. Medical intervention becomes necessary to start labor when pregnancy exceeds 40 weeks since post-term conditions raise health risks for the baby (Galal et al., 2012; Isbir, 2013). The practice of "stretch and sweep" known by its other name membrane sweeping has become an effective non-medication method that benefits both mother and child in this situation (Finucane et al., 2021). The biological process of pregnancy leads pregnant women through transformation before they experience the mystical occurrence of childbirth. A natural labor process should begin at week 40 of pregnancy but extended post-term pregnancies pose risks to fetal health (Rydahl, Eriksen, & Juhl, 2019). Post-term pregnancies carry three main complications which include meconium aspiration risk, macrosomia, and an increased chance of fetal death (Caughey, Snegovskikh, Norwitz, & survey, 2008). The prevention of risks during labor induction requires multiple approaches such as medication and mechanical techniques to ensure timely delivery (Caughey et al., 2008). Stretch and sweep provides pregnant women with a non-invasive alternative to conventional labor induction methods (Caughey et al., 2008). The procedure requires healthcare personnel to apply gentle finger movements between the amniotic sac and lower uterine wall (cervix) (Finucane EM, 2020). The procedure causes prostaglandins to release which helps the cervix to soften and ripen before labor contractions start (NICE, 2008).

Stretch and sweep serves as an effective method due to its imitation of the natural labor activation mechanism. The descending baby creates cervical pressure during pregnancy which activates prostaglandin release to prepare the cervix for labor. Stretch and sweep applies pressure to the uterus similarly to how it occurs during natural pregnancy thus possibly speed up the natural labor process and trigger spontaneous labor (Boulvain, Stan, & Irion, 2005; Hassan, 2023).

Many research studies have studied the effectiveness of stretch and sweep as a labor initiation technique (Jayasundara, Jayawardane, Denuwara, Jayasingha, & Obstetrics, 2024). The outcomes show promising results according to accumulating research data. Multiple clinical research has shown stretch and sweep leads to earlier spontaneous labor within two days of application when compared to waiting without intervention. Using stretch and sweep as a procedure may help eliminate the requirement for formal inductions thus providing advantages for mothers and their babies. Stretch and sweep procedures present multiple benefits to mothers and their newborn babies (Roberts J, 2020; Spiby et al.). The procedure helps initiate natural birth which in turn minimizes post-term risks for newborns while eliminating unwanted

effects from medicine-based labor initiation methods used on mothers. The procedure enables mothers to regain control over their birth choices in line with contemporary preferences for natural childbirth (Gynecol, 2014; Salau et al., 2022).

The assessment of potential restrictions and worries takes priority at this point. Stretch and sweep procedures create modest discomfort and cramping symptoms for many women yet remain secure for most patients. The procedure fails to lead to spontaneous labor in all instances so additional research is necessary to determine how the intervention should be applied to optimize results (Zamzami, Al Senani, & Obstetrics, 2014). The medical professional needs to weigh individual circumstances when deciding to perform stretch and sweep after carefully obtaining patient consent. The evidence supports potential advantages yet people must carefully consider their personal risk components and preferences. The process of making this decision requires essential communication between health care providers and pregnant women along with their collaborative approach. The accumulating research about stretch and sweep shows positive findings. However, there is a need to investigate the most effective period for conducting stretch and sweep procedures to determine which factors lead to successful results and how often the procedure should be performed. Also, how stretch and sweep affect both maternal health and fetal health in the long run.

This narrative analysis studies stretch and sweep procedures to determine their effectiveness in initiating term labor as well as their safety concerns. The review examines the basis and available evidence and essential considerations about stretch and sweep procedure while presenting its possible advantages and constraints. The advancement of research through acknowledgment of existing knowledge gaps will enable us to build an improved narrative with the aim of achieving ideal delivery outcomes for mothers and their babies. The review mainly focuses on modern evidence which demonstrates effectiveness combined with safety measures and possible advantageous aspects of stretch and sweep procedures.

Objectives

- This study conducts the literature review on the utilization of stretch and sweep procedures to induce labor in term pregnancies.
- This analysis consolidates essential results from the studies about stretch and sweep intervention success rates together with maternal health outcomes and neonatal findings.

- This systematic research assesses the gaps and inconsistencies between current studies regarding stretch and sweep procedures that initiate spontaneous labor in term pregnancies.
- The research will deliver evidence-based guidelines for clinical applications and future study trajectories based on the assessment of the narrative review findings.

Methodology

Search strategy

This narrative review adopted a comprehensive search strategy through electronic databases comprising PubMed along with Cochrane Library, Google Scholar, and Embase using the specific keywords "stretch and sweep" combined with "induction of labor" and "term pregnancy."

Inclusion and Exclusion Criteria

Articles published in English during the last twenty years were included in this research to maintain contemporary clinical relevance. Studies that analyzed stretch and sweep procedure effectiveness in helping term pregnancies start labor naturally were selected for the review. The review only included randomized controlled trials along with cohort studies and systematic reviews.

The review excluded studies using methods different from stretch and sweep for labor induction and those involving preterm pregnant women.

Statistical Analysis

No statistical analysis was performed statistical analysis since its main task involved descriptive synthesis of research findings from the selected studies.

Results

Success Rates of Stretch and Sweep Procedures

The success rates of stretch and sweep procedures varied among the studies included in this narrative review. As explained in Table 1, a randomized controlled trial by Zamzami et al. found that the majority of women who underwent membrane sweeping went into spontaneous labor (90% vs. 75%), and the mean gestational age differed significantly (39.5 ± 0.9 vs. 40.0 ± 1.2, P = 0.004). At 41 weeks' gestation, 10% of pregnant women had membrane sweeping compared to 25% of controls (OR 3.0, 95% CI 1.2–7.3, P = 0.01). In their study, the induction rate was lower in the intervention group than in the control group (10% vs. 25%; P = 0.01). Between the two groups, there were no differences in the incidence of caesarean delivery or in the morbidity of the mother or fetus.

Outcome	Membrane sweeping	Control
Spontaneous labor	90%	75%
Gestational age (mean ± SD)	39.5 ± 0.9	40.0 ± 1.2
Membrane sweeping at 41 weeks	10%	25%
Induction rate	10%	25%
Caesarean delivery rate	No difference	No difference
Maternal/fetal morbidity	No difference	No difference

Table 1: Efficacy and Safety of Membrane Sweeping in Reducing Induction Rates at Term (Zamzami et al., 2014)

Another interesting retrospective study by Li et al. (2023) examined whether transvaginal sonographic measurement of cervical length before labor induction could predict the success of induction in women undergoing labor induction at 37–41 weeks of gestation (Li, Tsui, Ding, & health, 2023). As summarized in Table 2, the study found that a shorter cervical length (≤3.415 cm) was associated with a higher likelihood of successful labor induction (76.8%). Multiparity was also associated with successful induction, while a higher BMI was associated with failed induction. Other factors such as age, gestational age (GA), Bishop score, and fetal birth weight did not show significant associations with successful induction. The study suggests that using cervical length measurement as a predictive factor could aid clinicians in counselling pregnant women about the likelihood of successful labor induction, facilitating informed decision-making (Li et al., 2023).

Factor	Association with Successful Induction	Odds Ratio (OR)	95% CI
Cervical Length (≤3.415 cm)	Yes	6.22	1.75–22.15
Multiparity	Yes	17.69	2.94–106.51
Higher BMI	No (Failed Induction)	0.87	0.75–0.99
Age	No	-	-
Gestational Age (GA)	No	-	-
Bishop Score	No	-	-
Fetal Birth Weight	No	-	-

Table 2: Factors Associated with Labor Induction Outcomes (Li et al., 2023)

Maternal Outcomes Following Stretch and Sweep Interventions

The impact of stretch and sweep procedures on maternal outcomes was assessed in several studies. Hassan et al. (2023) reported a higher incidence of post-procedure discomfort, cramping, and mild vaginal bleeding among participants who underwent stretch and sweep compared to those who received standard care. As shown in Figure 1, Hassan et al. reported a low rate of complications for both the mother and the fetus, and membrane sweeping has been shown to be a highly successful method of inducing labor. There have also been no reports of maternal or fetal deaths (Hassan, 2023).

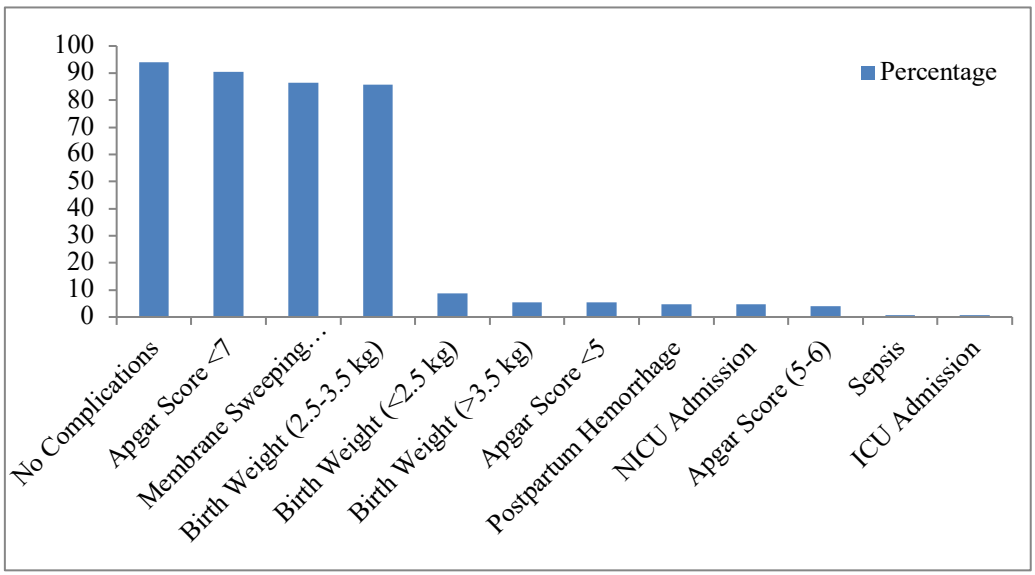

Figure 1: Maternal & Neonatal Outcomes after Membrane Sweeping in Postdate Pregnancy

Neonatal Outcomes Associated with Stretch and Sweep Procedures

While the exact causes of some pregnancies extending beyond term are unknown, nulliparity, a high BMI, and older maternal age are known risk factors. The infant is more vulnerable to complications after 42 weeks of pregnancy, such as low Apgar scores, meconium aspiration, neonatal acidemia, macrosomia, and neonatal death (Roos, Sahlin, Ekman-Ordeberg, Kieler, & Stephansson, 2010). Heimstad and colleagues evaluated every singleton birth recorded in the Norwegian Medical Birth Registry between 1999 and 2005 that lasted longer than 41 weeks, assessing them daily for intrauterine growth defects (IUFGD) and perinatal mortality. They also estimated the number of births required to prevent one death. They found that on day 287 and day 302+, the number needed to treat (NNT) for perinatal death was 527 and 195, respectively (P = 0.02) (Heimstad, Romundstad, & Salvesen, 2008). Over 14,000 inductions occurred annually as a result of routine labor induction at 41 weeks. The number needed to prevent one fetal or neonatal death was considerable (671–195), but steadily decreased after a gestational age of 41 weeks (Malacrida & Boulton, 2014).

Adverse Events and Complications

Boulvain et al., in their systematic review, concluded that sweeping of the membranes does not seem to offer much benefit for women who are approaching term (37 to 40 weeks' gestation) in an uncomplicated pregnancy. Sweeping the membranes does not appear to increase the risk of infection in mothers or newborns or of premature membrane rupture. Still, it is important to weigh these adverse effects against women's discomfort during the procedure (Boulvain et al., 2005).

Subgroup Analysis of Stretch and Sweep Effectiveness and Key Outcomes

Boulvain et al. identified five main outcomes that best reflected the clinically significant indicators of effectiveness and complications. Only the following primary outcomes were included in subgroup analyses:

1. Inability to deliver the baby vaginally within 24 hours
2. Uterine hyperstimulation resulting in changes to the fetal heart rate (FHR)
3. Caesarean section
4. Serious neonatal morbidity or perinatal death (e.g., seizures, birth asphyxia as defined by trialists,

neonatal encephalopathy, childhood disability)

5. Serious maternal morbidity or death (e.g., uterine rupture, admission to the intensive care unit, septicaemia) (Boulvain et al., 2005).

Nomogram to Forecast Effective Membrane Sweeping

Hassan et al. constructed a nomogram to forecast the effectiveness of membrane sweeping. Within twenty-four hours post-procedure, the likelihood of birth can be precisely predicted with a basic calculator that considers the mother's age, parity, gestational age, cervical dilatation, effacement, and station. This tool could help doctors provide women with more accurate advice regarding their chances of a successful membrane sweeping procedure (Hassan, 2023).

Discussion

This narrative review aimed to evaluate the efficacy of stretch and sweep procedures at term to promote spontaneous labor. The research studies demonstrate the clinical outcomes along with maternal results and newborn outcomes and adverse effects and treatment effectiveness of stretch and sweep procedures.

Various studies utilized stretch and sweep procedures observed different success outcomes. According to Hassan (2023), the success rate was 86.4% (Hassan, 2023), yet Zamzami et al. (2014) found significant differences in mean gestational age showed that most women who received membrane sweeping achieved spontaneous labor (90% vs. 75%) (Zamzami et al., 2014). In their study population at 41 weeks gestation, the overall incidence of pregnant women was 10% among those who had membrane sweeping and 25% among the controls.

A work by Boulvain et al. showed that stretch and sweep procedures affect maternal outcomes through their effects on post-procedure discomfort. Women assigned to sweeping procedures developed more discomfort during vaginal exams and other adverse effects such as bleeding and irregular contractions. Researches that contrast prostaglandin treatment with sweeping have small sample sizes and don't show any advantages (Boulvain et al., 2005).

A study by Hassan et al. demonstrated that membrane sweeping presents itself as an effective and secure method to start labor in cases of post-term pregnancies. Vaginal birth continues to be the most preferred

childbirth method in clinical settings particularly in low-resource areas because it produces high success rates together with low rates of maternal and fetal complications. The procedure maintains its safety status because it produces neither maternal nor fetal mortality. Additional research needs to determine the best timing along with frequency of membrane sweeping for post-term pregnancies and how well it works in high-risk patient groups (Finucane et al., 2021; Hassan, 2023). Finucane et al. performed randomized and quasi-randomized controlled trials to study newborn mortality and severe neonatal perinatal morbidity through eighteen published research studies. They concluded that the incidence of major neonatal perinatal morbidity or newborn death may be mostly unaffected by membrane sweeping compared to control or sham interventions (Finucane et al., 2021).

In maternity care, consent and decision-making can sometimes be complicated (Van Der Hulst, Van Teijlingen, Bonsel, Eskes, & Bleker, 2004). According to Rydahl et al. (2019), nulliparous women who planned a home birth had a higher likelihood of receiving a membrane sweep from their midwife compared to those who planned a hospital delivery. "The most plausible explanation is that midwives' interventions are a last resort for women who are planning a home birth to initiate or hasten labor in order to allow the woman to give birth at home." In this context, consent is sometimes granted— albeit reluctantly —to safeguard others' choices regarding birth settings. (Rydahl et al., 2019).

Moreover, Obeidat et al. reported a substantial correlation between older maternal age and a higher vaginal delivery rate; however, this correlation disappeared when parity was considered. Maternal age was not found to be a reliable indicator of induction of labor (IOL) success in either nulliparous or multiparous groups, according to subgroup analysis. Furthermore, the authors also suggested that rupture of the membranes increases the likelihood of successful induction (Obeidat et al., 2021). However, in other studies, such as that conducted by Crane et al., the state of the membranes was not associated with a successful induction of labor. Crane et al. found that the success of induction was not linked to verified cases of ruptured membranes or to all cases of ruptured membranes (Crane & gynecology, 2006). Tan et al. also found that the percentage of women who go into spontaneous labor within 7 days or before 41 weeks of gestation has not changed significantly (Tan, Jacob, Omar, & Gynecology, 2006), despite the effectiveness of a single membrane sweeping treatment performed between 38 and 40 weeks of gestation. It is suggested that membrane sweeping carried out just prior to the onset of labor may improve effectiveness (Putnam et al., 2011).

A recent Cochrane review, evaluating the effects and safety of membrane sweeping for labor induction, included 44 studies with over 6,900 women. The review found generally low certainty in the evidence due to study design limitations and inconsistencies. However, it suggested that membrane sweeping may be more effective than expectant management (waiting for labor to start naturally) in promoting spontaneous labor at term. Notably, the studies did not report specific safety concerns such as uterine rupture or neonatal complications. The results from these studies support the advantages of membrane sweeping as a term labor induction technique without medication yet more extensive research needs to validate its safety and effectiveness. This narrative review investigates membrane sweeping as a method for spontaneous labor induction at term while the Cochrane review considered its use for labor induction purposes. The objectives differ slightly between labor induction and spontaneous labor promotion since the former seeks labor onset without waiting for spontaneous readiness while the latter helps the body progress toward natural labor initiation. New research should examine if membrane sweeping demonstrates different degrees of effectiveness and safety depending on its usage as an inducement agent or a labor promotion method (Finucane et al., 2021; Finucane EM, 2020).

Limitations and Future Directions

This review presented significant limitations that should be acknowledged. The inconsistent results stem from diverse research methodologies together with different sample sizes and study designs in the included studies. The experimental findings could have been influenced by procedural inconsistencies used by study participants during stretch and sweep procedures. Research must carry out well-designed randomized controlled trials with extensive participant numbers to create definitive proof regarding stretch and sweep procedure safety levels and effectiveness.

Conclusion

In conclusion, this narrative review provides valuable insights into the efficacy of stretch and sweep procedures at term to promote spontaneous labor. The procedure shows moderate success rates, with varying impacts on maternal discomfort, minimal adverse events, and reassuring neonatal outcomes. While it may not be suitable for all women, particularly those with certain risk factors, stretch and sweep procedures offer a non-pharmacological option for labor induction. Providers should consider individual factors such as

parity, cervical status, and gestational age when determining the appropriateness of this intervention. Further research is warranted to standardize protocols and better understand the optimal use of stretch and sweep procedures in clinical practice.

Statement and declaration

Conflict of interest

No potential conflict of interest was reported by the author(s).

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Data Availability statement

The data used in this study available with the manuscript.

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