

Medicine by the Numbers

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➤ Membrane Sweeping at Term to Induce Labor

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Details for This Review

Study Population: Patients who are pregnant with a live fetus at or near term (36 weeks or greater estimated gestational age) without indication for induction or urgent delivery

Efficacy End Points: Primary: spontaneous onset of labor, need for induction of labor, need for cesarean delivery, spontaneous vaginal delivery; secondary: instrument-assisted vaginal birth, epidural analgesia

Harm End Points: Primary: maternal death or serious morbidity, uterine hyperstimulation with or without fetal heart rate deceleration, neonatal death, serious perinatal morbidity; secondary: postpartum hemorrhage, uterine rupture, augmentation of labor

Narrative: Approximately 20% to 25% of deliveries occur after labor induction in middle- to high-income countries.¹ Membrane sweeping is a common outpatient intervention associated with cervical dilatation assessment. Membrane sweeping is the advancement of one or two fingers through the internal cervical os to the lower uterine segment, followed by a circular sweeping movement between the amniotic membrane and the lower uterine segment. Successful performance of this procedure can decrease the need for formal induction with pharmacologic or mechanical methods or the need for hospitalization or advanced monitoring. The process of membrane sweeping leads to the release of phospholipase A₂ and prostaglandin F_{2α}, which directly contribute to cervical ripening through an inflammatory cascade.²

A 2020 Cochrane review included 44 studies and 6,940 patients in 19 countries (14 from the United States).² The trials compared membrane sweeping with expectant management, sham membrane sweeps, and several induction methods, including vaginal and intracervical prostaglandins and intravenous oxytocin (Pitocin). Seventeen randomized controlled trials (RCTs) with 3,170 patients compared membrane sweeping with expectant

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Benefits

1 in 8 patients was helped (spontaneous onset of labor) compared with expectant management
1 in 12 patients was helped (avoided further induction techniques) compared with expectant management

Harms

No one was harmed (no change in the rate of unassisted vaginal delivery)

management, demonstrating a relative risk of 1.21 (95% CI, 1.08 to 1.34), an absolute risk difference of 12.5%, and a number needed to treat of 8 for spontaneous onset of labor. Sixteen RCTs with 3,224 patients demonstrated a relative risk of 0.73 (95% CI, 0.56 to 0.94) for requiring labor induction. This corresponds to an absolute risk reduction of 8.5% and a number needed to treat of 12 to prevent the need for further mechanical or pharmacologic induction of labor. Other primary outcomes, including the likelihood of spontaneous vaginal delivery, were not significantly different.

Evidence certainty was low to moderate for all primary outcomes. Patient perception of membrane sweeping was positive. In one study in the Netherlands (n = 742), 88% of patients noted they would opt for membrane sweeping in subsequent pregnancies if it were offered; 31% characterized the procedure as not painful, 51% as somewhat painful, and 17% as painful or very painful. Even among those who had pain, 88% indicated they would opt for the procedure again.³

Caveats: Despite the good numbers needed to treat and large sample sizes, the studies included in the Cochrane review had low certainty of evidence as assessed using the GRADE approach. The authors performed sensitivity analyses and excluded studies at high or unclear risk of bias for sequence generation or allocation concealment and studies with high or unclear risk of attrition. When sensitivity analyses were performed, including 12 of the

The NNT Group Rating System

Green	Benefits greater than harms
Yellow	Unclear benefits
Red	No benefits
Black	Harms greater than benefits

40 identified trials with low risk of bias, the result for spontaneous onset of labor was no longer statistically significant. Moderate heterogeneity was present in these included trials ($Tau^2 = 0.00$; $I^2 = 37\%$; $P = .16$).

This Cochrane review predates the ARRIVE trial, which examined the safety of induction vs. expectant management at 39 weeks' estimated gestational age. The results of ARRIVE are expected to increase the overall percentage of induced deliveries.⁴⁻⁷ Therefore, a safe, evidence-based modality such as membrane sweeping, which minimizes the need for formal induction, could have strong clinical utility.

The Cochrane review included data from 19 countries, a breadth of resource settings, and urban and rural locations. There was significant procedural heterogeneity across studies in the number of revolutions and standard depth of digital advancement in the membrane sweeping procedure. Sweeps can also be associated with bleeding from undiagnosed placenta previa or a low-lying placenta, which were not reported in this review because they were exclusion criteria.

There are concerns about the safety of membrane sweeping in carriers of group B streptococci. A prospective trial of 542 patients who underwent membrane sweeping demonstrated a nonsignificant difference in all study outcomes between those who were positive for group B streptococci and those who were negative.⁸

This Cochrane review did not address the possibility of artificial rupture of membranes after membrane sweeping. In one RCT of 300 patients, there was no significant difference in rates of prelabor rupture of membranes when directly comparing those who underwent membrane sweeping with those who did not. In subgroup analyses, patients with cervical dilatation of 1 cm or greater had a relative risk of 1.10 (95% CI, 1.03 to 1.18), with a number needed to harm of 378 for prelabor rupture of membranes.⁹ Studies comparing membrane sweeping with amniotomy and oxytocin demonstrated no statistically significant differences in outcomes or safety across the study groups. The same was true of one-time membrane sweeping vs. recurrent membrane sweeping.²

Conclusion: The American College of Obstetricians and Gynecologists mentions membrane sweeping in their practice bulletin on induction of labor without an overt endorsement.¹⁰ The 2021 guidelines from the National Institute for Health and Care Excellence state that membrane sweeping should be offered at 39 weeks' gestation and during subsequent antenatal visits if labor does not spontaneously commence.¹¹ The Society of Obstetricians and Gynaecologists of Canada mentions membrane sweeping in its guidelines but does not include it as part of the evidence-based recommendations.¹² The World Health Organization recommendations on labor induction at or beyond term detail most

induction modalities but do not explicitly mention membrane sweeping.¹

A lack of trial data precludes the development of a clear consensus on the ideal timing and frequency of membrane sweeping. A color recommendation of yellow (unclear benefits) was assigned to this intervention because of uncertainties and the low quality of evidence generated by the trials included in the systematic review.

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