



Pocket Guide
to
Labor Induction

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Pocket Guide to Labor Induction

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What is Labor Induction?

Definitions

- Spontaneous labor is the onset of uterine contractions resulting in cervical change; it starts on its own, not with medical intervention.
- Sometimes care providers use medicine or other methods to start regular labor contractions before they've started on their own. This is called a medical induction of labor.
- Augmentation uses medicine or artificial rupture of membranes to increase the frequency or strength of contractions after spontaneous labor.

History of Labor Induction

- People have been trying to start labor for thousands of years!
- The ancient Greek physician Hippocrates described using nipple stimulation and mechanically dilating (opening) the cervix by inserting tree branches into the vagina [don't try that at home!]
- Acupuncture and acupressure have been used for labor induction for more than 2,000 years as part of Traditional Chinese Medicine.
- The use of castor oil to induce labor dates back to ancient Egypt.

Why Induce Labor?

- Medically indicated induction is when an induction is carried out for an accepted, evidence-based medical indication, or reason.
- Inductions are usually considered medically indicated when there are accepted medical problems or complications that make it less safe to continue the pregnancy.
- New evidence is constantly emerging on the risks and benefits of labor induction for different clinical indications.
- Elective induction is an induction that is not medically indicated (e.g., an induction that is done for convenience or comfort).
- Some providers consider induction for late and post-term pregnancy to be medically indicated because of the increased risks of complications that come with longer pregnancies.

How Common is Induction?



How Often do Care Providers Induce Labor?

- Labor inductions have increased in past decades, but the rate varies widely between countries and between birth settings.
- In the United States (U.S.), the Centers for Disease Control (CDC) reported that 27% of pregnant people were induced in 2018. But that number is probably low. It's likely that induction of labor is underreported in these statistics.
- According to the 2013 Listening to Mothers III survey, 41% of mothers in the U.S. said their care provider tried to induce labor.
- In the more recent Listening to Mothers in California survey, 40% of participants reported their care provider tried to induce labor. Among the people who experienced attempted labor inductions, 70% said it actually started labor, 20% said it did not start labor, and 10% were not sure.

Top Reasons for Medical Labor Induction

- In the Listening to Mothers in California survey, researchers asked the nearly 1,000 people whose care providers tried to induce labor about the reason for the attempted labor induction. The top five reasons for having an attempted medical induction were:
 1. Baby was full term and it was close to my due date
 2. Baby needed to be born soon due to a health problem (for one or both of us)
 3. They were worried that I was "overdue"
 4. Water had broken and they worried about infection
 5. Baby was getting too big
- Over the next few pages, we will look at the evidence on induction for these reasons.



Reaching Full Term

What Does it Mean to be Full Term?

- A pregnancy is considered to be full term when you are between 39 weeks 0 days and 40 weeks 6 days. Early term is 37 weeks 0 days through 38 weeks 6 days.
- Elective inductions before 39 weeks are widely discouraged because of evidence showing worse birth outcomes than with a continued pregnancy.
- Pre-term inductions for medical problems are managed with interventions to improve newborn outcomes (e.g., steroids).
- Inducing because you are full term in the absence of a clear medical indication is technically an elective induction.
- Whether elective induction at 39 weeks is a reasonable option is a topic that has been debated for decades.

What is the Evidence on Inducing at 39 Weeks?

- The 2018 ARRIVE study (A Randomized Trial of Induction Versus Expectant Management) took place at 41 hospitals in the U.S.
- The researchers randomly assigned (like flipping a coin) 3,062 people to be induced at 39 weeks, and 3,044 people to expectant management. This was the largest trial ever on this topic.
- Expectant management meant one of three things: 1) you could wait for labor to begin on its own as long as birth occurred by 42 weeks and 2 days, or 2) be induced for medical reasons at any time, or 3) be induced electively after 40 weeks and 5 days.
- They found that inducing labor at 39 weeks did not improve the primary outcome of death or serious complications for babies.
- Since stillbirths and newborn deaths are very rare at 39 and 40 weeks, the ARRIVE study (with 6,000 participants) was too small to tell if elective induction has an effect on this outcome.
- The main finding was that induction at 39 weeks was linked to a slightly lower rate of Cesareans compared to those assigned to expectant management (19% Cesarean rate versus 22%).

The ARRIVE Study, continued

- There was also a lower chance of developing high blood pressure among the 39-week induction group (9% versus 14%).
- Pregnant people in the 39-week induction group spent more time in the hospital in labor (+6 hours), and less time in the hospital postpartum (likely because of the lower Cesarean rate).

Should Everyone be Induced at 39 Weeks?

- No! It's always important for individuals to weigh the potential benefits versus the potential downsides of induction.
- Especially with elective induction, since there are fewer benefits than with a medically indicated induction, the downsides become even more important to consider.
- For example, there is the potential for medicalization of birth with induction (e.g., continuous fetal monitoring) and there is a risk of side effects from the various induction methods.
- In addition, cognitive benefits for babies may increase until 40-41 weeks of pregnancy, so elective induction at 39 weeks would miss this potential benefit of continuing the pregnancy.
- Also, there are plenty of alternatives for people who want to lower their risk of Cesarean but don't want an elective induction.
- Practice guidelines from the American College of Obstetricians and Gynecologists conclude that it is reasonable to offer elective induction to low-risk, first-time mothers at 39 weeks of pregnancy. However, they urge care providers to consider 3 important factors: 1) the values and preferences of the pregnant person, 2) the staffing and facility resources available (to assist longer labors), and 3) the protocol to prevent "failed" inductions.
- If your provider is pressuring you into an elective induction at 39 weeks, they are not following guidelines. At the same time, you should not be denied an induction at 39 weeks if you want one.



Health Problems

Hypertension and/or Preeclampsia

- Randomized trials have found better maternal outcomes with induction for preeclampsia starting at 34 weeks of pregnancy.
- However, induction for preeclampsia is linked to worse outcomes for the baby when the induction occurs before 37 weeks.
- The optimal timing for induction with chronic hypertension or gestational hypertension at term is not clear, but evidence suggests that induction near 38 to 39 weeks may lead to the best outcomes for pregnant people and their newborns.

Conflicting Findings

- There are conflicting findings or a lack of evidence for the following reasons for induction:
 - o Gestational or pre-existing diabetes
 - o Twin pregnancy
 - o Intrahepatic cholestasis of pregnancy (a liver disorder)
 - o Body mass index (BMI) >30 kg/m²
 - o Maternal age greater than 35 years
 - o Maternal heart disease

Practice Guidelines on Induction for Health Problems

- Practice guidelines are mostly consistent in recommending induction when preeclampsia is diagnosed after 37 weeks, when the mother notes decreased fetal movements, and for suspected fetal growth restriction (depending on the severity).
- Guidelines are conflicting on induction for preterm preeclampsia, chronic hypertension, gestational hypertension, gestational diabetes, suspected big baby, twin pregnancy, and high BMI.
- ACOG states high BMI alone is not an indication for induction.

Low Fluid (Oligohydramnios)

- Induction for low fluid alone at term (before 42 weeks, and without underlying fetal or maternal medical problems) is supported in guidelines but based on little evidence.
- Low fluid is defined as amniotic fluid index (AFI) ≤ 5 cm or, preferably, the largest vertical pocket measuring ≤ 2 cm. Both these ultrasound methods are poor predictors of the true amount of amniotic fluid.
- Abnormal test results should be considered in the overall clinical context. Consider repeating the test after rest and hydration.
- Early research found a link between low fluid and poor outcomes, but these reports included people with medical conditions.
- Observational studies have found high rates of induction, Cesarean, and NICU admissions among people with low fluid. It's uncertain whether the NICU admissions are due to low fluid, or due to the inductions and Cesareans for low fluid.

Summary about Induction for Health Problems

- Most indications for induction because of health problems at the end of pregnancy are not supported by strong evidence. This is mainly because few randomized trials have evaluated the various indications for induction—not necessarily because they are invalid.
- When care providers recommend induction because of health problems at the end of pregnancy (with the exception of hypertension/preeclampsia), these recommendations are based primarily on expert medical opinion rather than research.
- Medical opinion is a type of evidence; however, it is the type of evidence that is most likely to be biased. Care providers should base their recommendations on the best available evidence, and acknowledge when there are conflicting findings or that their recommendation is based on medical opinion alone, and not on research. They should avoid using pressure and coercion.

What does it mean to be Late-Term or Post-Term?

- Late-term pregnancy is when you are between 41 weeks 0 days and 41 weeks 6 days.
- Post-term pregnancy is 42 weeks and 0 days and beyond.
- In the LTM California study, mothers who were induced because they were “overdue” were about 40 weeks, 3 days, on average.
- But these mothers were not late-term or post-term!
- Only about half of all pregnant people go into labor on their own by 40 weeks and 5 days (for first-time mothers) or 40 weeks and 3 days (for mothers who have given birth before).
- There is no such thing as an exact “due date,” and a due date of 40 weeks does not mean you will go into labor by that point.
- For more information visit evidencebasedbirth.com/duedates.

Evidence on Late-Term vs. Post-Term Induction

- There is high quality evidence that induction at 41 weeks of pregnancy reduces the risk of stillbirth and early newborn death compared to continuing to wait for labor until 42 weeks.
- The optimal timing for late- and post-term labor induction is still unclear, but a recent trial found that inducing labor at 41 weeks and 0-2 days resulted in fewer stillbirths and newborn deaths compared to continuing to wait for labor until 42 weeks.
- Randomized trials have also found fewer NICU admissions and a lower Cesarean rate among people assigned to induction at 41 weeks compared to those assigned to continue to wait for labor.
- The overall risk of stillbirth rises gradually after 39 weeks and then increases more rapidly starting at 41 weeks.
- So, people with late-term and post-term pregnancies who choose to wait for labor might benefit from regular fetal monitoring.

What is the Risk of Stillbirth when you're Past Due?

- Large studies have found these overall rates of stillbirth:
 - 39 weeks = 4 per 10,000
 - 40 weeks = 7 per 10,000
 - 41 weeks = 17 per 10,000
 - 42 weeks = 32 per 10,000
- The risk of stillbirth is lower for pregnancies with a single baby, no congenital abnormalities, and no maternal medical conditions. Stillbirth rates are higher for those giving birth to their first baby, and those who are older, plus size, have health problems, or for babies with growth restriction. Racism (including prejudice and institutional racism) also increases the risk of stillbirth.
- Visit ebbirth.com/duedates for more info about stillbirth, and ebbirth.com/inducingduedates for details on induction.

Practice Guidelines

- Practice guidelines are mostly consistent in recommending induction between 41 and 42 weeks of pregnancy, rather than waiting until 42 weeks or later. For example, ACOG in the U.S., NICE in the United Kingdom (UK), SOGC in Canada, and the World Health Organization all recommend offering induction at 41 weeks.

Summary about Late-Term Induction

- The available evidence supports having the option of inducing labor at 41 weeks (one week past your due date) to reduce the risk of stillbirth and early newborn death.
- Discussions about late-term and post-term induction should take into account the family's preferences, personal birth history, risk factors for stillbirth, chances of a successful induction, cervical ripeness (discussed in the following pages), the facility's Cesarean rate with inductions, and alternatives. Parents should not be pressured or coerced, but instead given facts and options.

Prelabor Rupture of Membranes

- Prelabor rupture of membranes (PROM) happens when your water breaks before the start of contractions.
- Term PROM is when this happens at ≥ 37 weeks. Preterm PROM, or PPRM, occurs before 37 weeks of pregnancy.
- About 1 in 13 people have term PROM. About 79% of these go into labor on their own within 12 hours, and 95% within 24 hours.
- It may take longer for first-time birthing people to go into labor with PROM. The concern is, the longer your waters are broken, the greater the risk of maternal and newborn infection.

Evidence on Inducing for PROM

- There is high-quality evidence supporting waiting for labor to start on its own with preterm PROM, unless the baby needs to be born early for a specific medical reason. With preterm PROM, induction increases the risk of Cesarean, newborn death, and NICU stays.
- A Cochrane review with 23 randomized trials found low-quality evidence supporting induction over waiting for term PROM.
- People who were immediately induced after term PROM were less likely to develop chorioamnionitis (also known as chorio), an inflammation of the maternal membranes due to infection.
- There were no differences between groups in the risk of Cesarean or serious maternal illness/death.
- With induction, babies were less likely to have “definite or probable” infections, need antibiotics, or be admitted to NICU when compared to babies whose mothers had expectant management.
- There were no differences between groups in definite newborn infection or perinatal mortality (a combined measure of stillbirth or newborn death).
- Importantly, avoiding vaginal exams as much as possible appears to lower the risk of infection with PROM.

Evidence, continued

- Most of the data in this Cochrane review came from the large “Term PROM” study by Hannah et al. (published in 1996).
- The Hannah et al. study is limited because it took place during a time period when mothers were not regularly screened and treated for Group B Strep—a major cause of maternal infection.

Practice Guidelines

- Practice guidelines are mostly consistent in recommending expectant management (waiting for labor) for preterm PROM; however, they are mixed on recommendations for term PROM.
- ACOG in the U.S. recommends labor induction for term PROM; however, they say that waiting for labor for 12-24 hours is an acceptable option so long as the clinical status is “reassuring”, and counseling is provided about the risks of waiting for labor and the limitations of available data.
- The Association of Ontario Midwives (2019) states that in the absence of Group B Strep, complications, or signs of infection, expectant management for up to 96 hours is a reasonable option. The AOM also provides guidelines for monitoring should the birthing person choose expectant management.

Summary

- With term PROM, both induction and waiting are reasonable options. Waiting for a few days for labor to start on its own is only a good option if there are no signs of infection and the pregnant person is Group B Strep negative. Vaginal exams should be limited.
- People who experience term PROM should be counseled about the potential benefits and harms of both induction and waiting for labor, so they can make the best choice for their unique situation, taking into account their values, preferences, and GBS status.
- Visit evidencebasedbirth.com/prom for more information.



Big Babies

Suspected Big Babies

- The medical term for big baby is macrosomia, which literally means “big body.” Some researchers consider a baby to be big if:
 - It weighs 4,000 grams (8 lbs, 13 oz) or more at birth, or
 - It weighs 4,500 grams (9 lbs, 15 oz) or more at birth
 - Babies are called “extremely large” if they are born weighing more than 5,000 grams (11 lbs).
- The only way to diagnose a big baby is to weigh the newborn after birth, because it is very difficult to predict newborn birth weight during pregnancy! Ultrasound predictions can be unreliable.
- Although less than 1 in 10 babies is born large, researchers in the LTM III study found that 1 out of 3 U.S. mothers were told that their babies were too big. In the end, the average birth weight of these suspected “big babies” was only 7 lbs, 13 oz.
- For every ten babies that an ultrasound predicts will weigh more than 8 lbs, 13 oz, five babies will weigh more than that and the other five will weigh less. Care providers have similar error rates when they try to estimate the baby’s size with their hands.

Health Concerns related to Shoulder Dystocia

- Health care providers’ main concern with suspected big babies is potential difficulty with the birth of shoulders, called shoulder dystocia. Shoulder dystocia happens to 7-15% of big babies.
- Most cases of shoulder dystocia are handled successfully by the care provider with no harmful consequences to the baby.
- Permanent nerve injuries due to stuck shoulders happen to:
 - 1 of 555 babies who weigh 8 lbs, 13 oz - 9 lbs, 15 oz.
 - 1 of 175 babies who weigh 9 lbs, 15 oz or greater.
- Newborn death is extremely rare, but cases have been reported.
- Shoulder dystocia can happen at any birth. When health care providers do interprofessional drills to practice managing shoulder dystocia, they can reduce or eliminate nerve injuries.

Evidence on Induction for “Big Baby”

- Four randomized trials included in a Cochrane review found little difference in birth outcomes between induction for suspected big baby versus waiting for labor to start on its own.
- The evidence indicated that induction may lower the chance of shoulder dystocia from 7% to 4% and the chance of birth fractures (such as collar bone fractures) from 2% to 0.4%, but may not have an impact on nerve injuries or NICU admissions.
- Induction for suspected big baby may increase the risk that the birthing person will have a severe tear, and it may also increase the risk of the baby needing treatment for jaundice.
- The best timing for induction is not clear—most of the evidence comes from very early induction at around 37-38 weeks.

Practice Guidelines

- ACOG in the U.S. state that induction for a suspected big baby is not recommended before 39 weeks of pregnancy because there is a lack of evidence showing that the benefits of reducing the risk of shoulder dystocia would outweigh the harms of early birth.
- Additionally, they say that it is not clear from the available evidence if a reduction in shoulder dystocia would be seen with induction after 39 weeks of pregnancy.

Summary

- More research is required before suspected big baby can be considered a medically indicated reason for induction.
- Although a policy of very early induction (37 to 38 weeks) can prevent some shoulder dystocia cases, researchers have not found that induction decreases the risk of nerve injury, and very early induction may carry other risks to the mother or baby.
- For more information check out evidencebasedbirth.com/bigbaby

Medical Induction Usually Involves Two Steps

1. First, cervical ripening is done to soften and eventually thin and dilate the cervix in preparation for labor and vaginal birth.
2. Then, when the cervix is favorable, labor induction stimulates uterine contractions artificially to promote the start of labor.

The Bishop Score

- The Bishop score helps determine if cervical ripening is needed.
- The Bishop score is based on a vaginal exam that uses five measurements of the “ripeness” of the cervix for labor.
 1. Cervical Dilation: how dilated (or open) the cervix is in centimeters.
 2. Cervical Effacement: % of how effaced (or thin) the cervix is. Zero percent effaced means the cervix is normal (pre-labor) and 100% effaced means the cervix is paper thin.
 3. Fetal Station: how far the fetal head has descended. Negative numbers mean the baby is “floating” above the pelvis, 0 station means the baby is fully engaged in the pelvis, and + numbers mean the baby is beginning to emerge from the birth canal.
 4. Cervical Position: when ripe, the cervical position changes from posterior (toward the back) to anterior (toward the front).
 5. Cervical Consistency: how the cervix feels; a firm cervix feels like the tip of the nose and a soft cervix feels more like the lips.

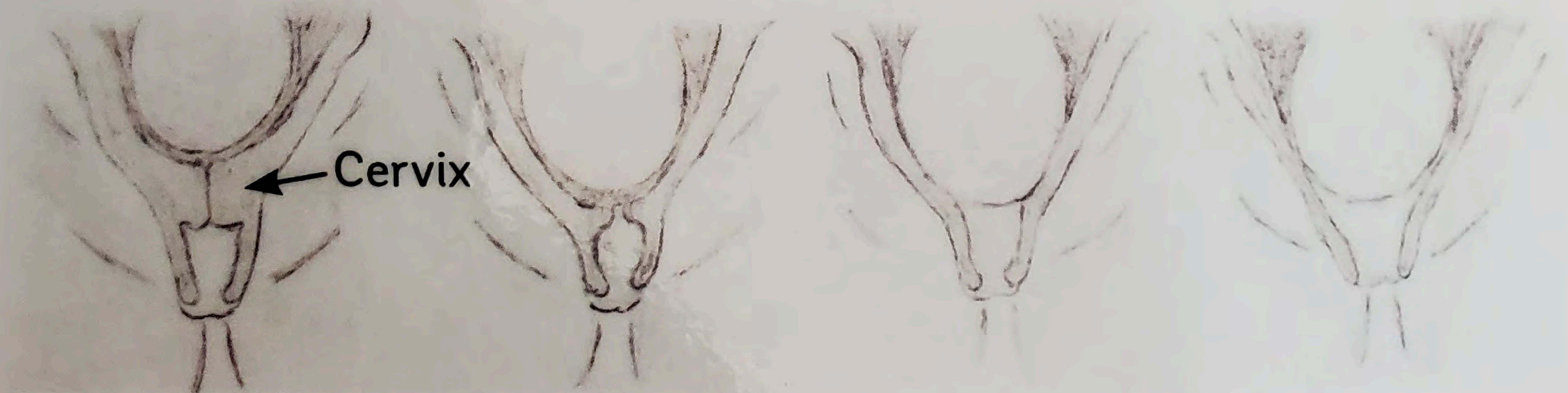


Figure 1: In the image on the left, the cervix is 0 cm dilated and 0% effaced (thick from top to bottom, like a thick bottleneck). The cervix gradually gets thinner and more open, until in the right image where it is completely dilated and 100% effaced (the birth canal is now thin and open, like the opening rim of a peanut butter jar).

Bishop Score



Calculating the Bishop Score

Vaginal Exam	Points				Calculate Subscore
	0	1	2	3	
Dilation (cm)	Closed	1-2 cm	3-4 cm	5 cm or greater	___ / 3
Effacement (%)	0-30%	40-50%	60-70%	80% or greater	___ / 3
Station	-3	-2	-1,0	+1 or greater	___ / 3
Consistency	Firm	Medium	Soft	N/A	___ / 2
Position	Posterior	Mid position	Anterior	N/A	___ / 2
Total Bishop Score =					

Interpreting the Bishop Score

- If the total score is ≥ 8 , then the chance of having a vaginal birth with induction is very good—similar to the chance of having a vaginal birth after a labor that starts on its own.
- A score of ≤ 6 means that the cervix is unfavorable for induction, and cervical ripening methods should be used. A Bishop score of 7 is not clearly favorable or unfavorable for induction.
- Many studies have found that higher Bishop scores are linked to higher chance of vaginal birth with induction and lower scores are linked to higher chance of Cesarean with induction.
- However, the Bishop score is still not considered a strong predictor of vaginal birth with induction, especially with scores of 4, 5, or 6.
- A major limitation of most Bishop score calculators is that they do not consider whether someone has given birth before, and having a prior vaginal birth has been found to be a very important factor—perhaps the most important factor—in predicting successful induction. Some providers add 2 points to the Bishop score for people who have already had at least one vaginal birth.
- Despite its limitations, the Bishop score is still useful in helping to decide whether cervical ripening is needed before induction.

Mechanical Methods vs. Pharmacologic Methods

- Mechanical and pharmacologic (drug) methods can be used alone or in combination for cervical ripening and labor induction.
- Mechanical methods are drug-free methods that involve the use of hands or medical devices. They have less risk of hyperstimulation, a broad term that includes uterine tachysystole (>5 contractions in 10 min averaged over over 30 min), which can lead to fetal distress.
- For the rest of the pocket guide, we will indicate Mechanical methods with an [M] and Pharmacologic methods with a [P]

Membrane Sweeping [M]

- Also known as “stripping” or “stretch and sweep;” involves inserting gloved fingers in the vagina and through the partially open cervix.
- The provider then uses a circular sweeping motion to separate the bag of waters from the lower part of the uterus. If the cervix is not open, the provider may massage the cervix instead.
- Membrane sweeping enhances the release of prostaglandin hormones and may trigger cervical ripening and labor onset.
- This procedure is common (1 in 3 pregnancies) and requires verbal informed consent. Here at EBB, we often hear reports of membrane sweeping being done without permission during vaginal exams.

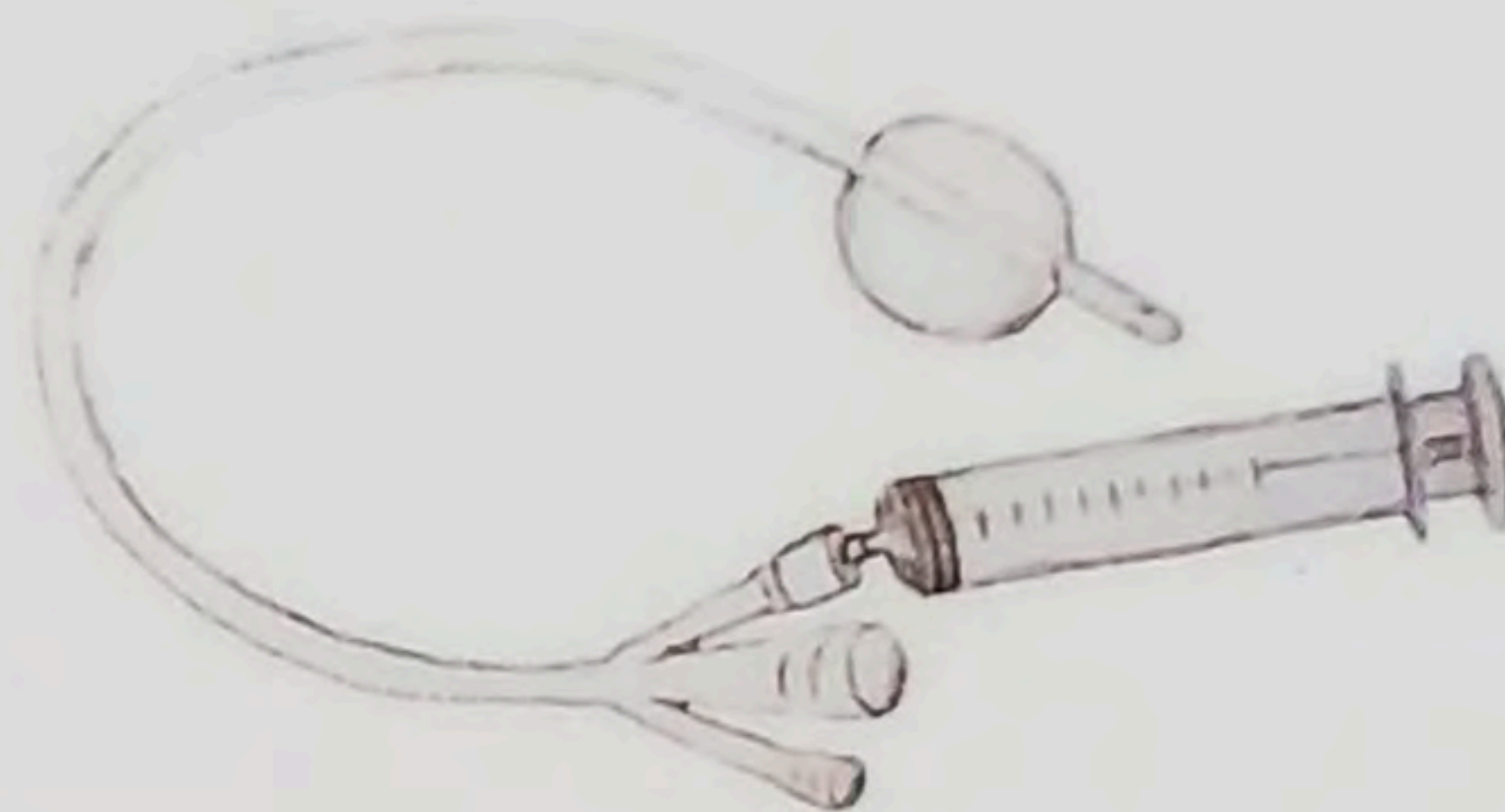
Cervical Osmotic Dilators [M]

- These are thin rods that are inserted through a partially open cervix. The rods absorb water from surrounding tissue, which causes them to swell and gradually stretch the cervix.
- Laminaria is made from dried seaweed and has been used since the 1800s, but its use has largely been replaced by synthetic dilators such as Dilapan[®], which was developed in the 1980s. Dilapan-S[®] was FDA-approved in 2015 for cervical ripening.
- Dilapan-S[®] (“S”uper version) rods are sterile, have a soft and uniform shape, superior dilating properties, and avoid the risk of allergic reaction that can happen with Laminaria.

Overview of Methods

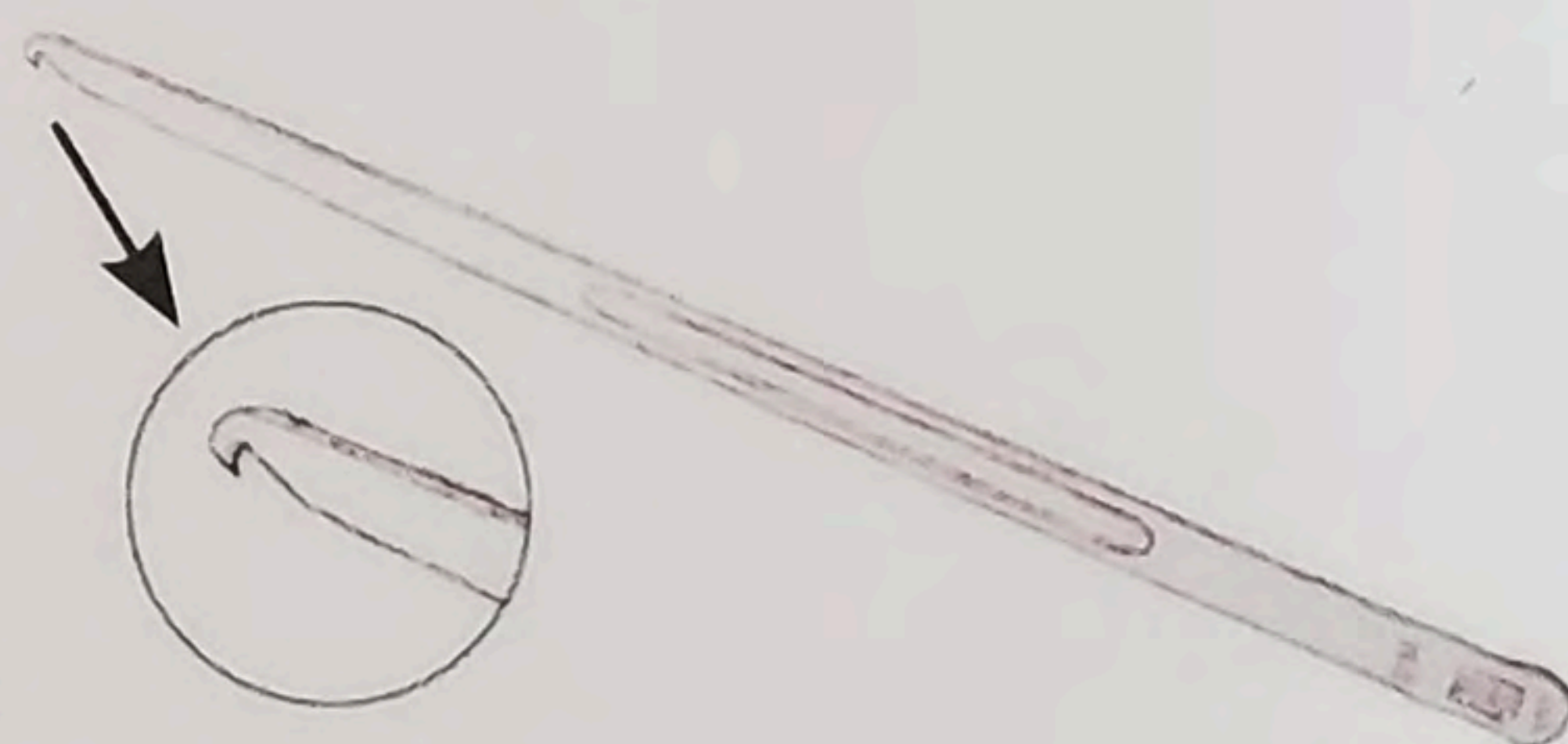
Balloon Catheters [M]

- The single balloon catheter (“Foley”) is thin, sterile tubing that is inserted into the vagina and through a partially open cervix.
- Once the tubing has reached the inside of the uterus, a small balloon at the tip is inflated with sterile fluid. This causes the balloon to press down gently on the cervix, stretching it and causing the release of natural hormones that ripen the cervix.
- The catheter is sometimes taped to the pregnant person’s leg so that it is kept under tension, placing continual pressure on the cervix.
- There is also a double balloon option (Cook or Atad) but it is no more effective than the single balloon, and it causes more discomfort. The double balloon is FDA-approved for labor induction, while the single balloon is used off-label in the U.S.



Amniotomy [M]

- Amniotomy is the artificial rupture of membranes (AROM), also called “breaking the water.” It is one of the most commonly performed procedures in obstetrics and midwifery.
- In the Listening to Mothers III study, amniotomy was performed with 39% of mothers who underwent medical inductions.
- The procedure involves using an amniotomy hook (a sterile rod with a small hook attached) or an amniotomy finger cot (a disposable finger glove with a small hook attached) to intentionally rupture the amniotic sac. The cervix must be at least partially open in order to perform an amniotomy.
- Breaking the water can help induce labor because it can release natural chemicals and hormones that stimulate contractions.



Prostaglandin E1 [P]

- The synthetic analog of prostaglandin E1 (PGE1), also known as misoprostol, and sold under the brand name Cytotec[®], is commonly used for cervical ripening and labor induction.
- The U.S. FDA originally approved its use for the prevention and treatment of stomach ulcers, but it is widely used off-label for termination of pregnancy and medical labor induction.
- Misoprostol has been extensively studied for labor induction despite lacking FDA approval. It comes in 100 microgram (mcg) or 200 mcg tablets, and can be broken to provide 25 mcg or 50 mcg doses to be given orally or vaginally.

Prostaglandin E2 [P]

- Synthetic prostaglandin E2 (PGE2), also known as the generic drug dinoprostone, is synthetic but thought to be identical to the body's own prostaglandin E2.
- It is the only prostaglandin that is FDA approved for cervical ripening in the U.S.
- It is often used as a thin, rectangular-shaped vaginal insert (Cervidil[®]) where dinoprostone is slowly released from a 10 mg reservoir (made of a synthetic gel material) at a controlled rate of 0.3 mg per hour. The insert can be easily removed by a string, and can be replaced after 12 hours.
- Dinoprostone can also be given as an intracervical gel (Prepidil[®]). The gel releases dinoprostone more rapidly and can be repeated (0.5 mg in 2.5 mL of gel) every 6 to 12 hours.

Synthetic Oxytocin [P]

- A synthetic form of the natural hormone oxytocin can be given as a generic drug (oxytocin) as well as under the brand names Pitocin[®] and Syntocinon[®].
- Synthetic oxytocin is commonly used to induce labor and speed up (augment) labor, as well as to help the uterus contract after birth in active management of the third stage.
- When given to induce or augment labor, it is infused intravenously at a controlled rate, in a diluted form.
- In the Listening to Mothers III survey, synthetic oxytocin was the most common method of induction, used by 63% of those who had an attempted medical induction.
- Synthetic oxytocin is not very helpful with cervical ripening because it acts on smooth muscle to cause contractions, and there is a lack of smooth muscle within the cervix itself.
- If the cervix is not favorable for induction, cervical ripening must be performed first using a different method.
- If the cervix is already favorable for induction, synthetic oxytocin can be given without a cervical ripening agent.

Effectiveness

- 40 randomized trials have compared membrane sweeping to either no treatment or sham (fake) membrane sweeping.
- On average, people in the membrane sweeping group were more likely to have labor start on its own instead of with a formal induction. These findings appear to apply equally to first-time parents and those who have given birth before.
- However, the authors state these findings should be interpreted with caution because the evidence is “low-certainty.”
- There were no differences between the groups in the rate of Cesareans, the use of forceps/vacuum, or serious illness or death for the mother or baby.

Advantages

- May shorten the length of pregnancy by about 4 days on average, and reduce the risk of having a more formal induction later on.
- Relatively simple and low cost; can be done in the clinic.
- Can be repeated multiple times, although there is no evidence that this provides benefits. Can also be combined with other methods.

Disadvantages

- Sometimes done routinely during a vaginal exam without an informed consent discussion.
- Potential pain/discomfort with the procedure, and potential bleeding and cramping after the procedure (both discomfort and bleeding can also happen with a regular cervical exam).
- One randomized trial found a 9% risk of the water breaking before labor began (with membrane sweeping, not cervical massage).
- May trigger irregular contractions that can interfere with sleep.

Effectiveness

- A randomized trial with 419 U.S. participants compared the Dilapan-S® to the Foley balloon for cervical ripening:
 - There were similar rates of vaginal birth, maternal infection, and newborn outcomes in both groups. Zero cases of tachysystole.
 - People randomly assigned to Dilapan-S® were more likely to report satisfaction related to sleep, relaxation, and activities.
- In an observational study, researchers looked at data from 444 people who used Dilapan-S® for cervical ripening in 7 countries:
 - The average Bishop score increased from 2.9 to 6.5 after use.
 - Overall, the vaginal birth rate was 70%.
 - Most people required other methods for induction; Dilapan-S® was effective for cervical ripening but not causing contractions.

Advantages

- Drug-free method that is at least as effective as the Foley balloon, but has higher ratings of patient satisfaction than the Foley.
- FDA-approved; does not cause systemic side effects.
- Use permitted among people with a prior Cesarean.
- Can be done in the outpatient setting but does require some in-person monitoring before and after the device is placed.
- Possible to toilet, shower, walk around, sleep, and perform activities as normal while the device is in place.
- Can be removed (reversible) and no need to tape to your thigh.

Disadvantages

- Uncommon in some birth settings (lack of provider familiarity).
- May require pharmacologic cervical ripening first if the cervix is <1 cm dilated.
- Potential pain or cramping (0.2%).
- Potential bleeding from inserting or extracting rods (2.7%).
- Has not been well studied among people with ruptured membranes.

Effectiveness

- There are many randomized trials on the Foley for cervical ripening.
- Compared with placebo, the Foley increases the chance of vaginal birth within 24 hours and decreases the risk of Cesarean.
- Compared with dinoprostone, the Foley has similar rates of vaginal birth, higher satisfaction, fewer side effects, and safer for the baby.
- Compared with misoprostol, the Foley is slightly less effective at obtaining a vaginal birth, but it is safer for the baby and reduces side effects. Satisfaction was higher with misoprostol.
- Pooled randomized trials have found a shorter time to birth by ~2 hours with increased inflation volume (60 mL versus 30 mL).

Advantages

- Drug-free method that has effectiveness similar to dinoprostone.
- Does not cause systemic side effects.
- Lower risk of hyperstimulation of the uterus compared with synthetic prostaglandins.
- Compared to dinoprostone, the Foley is less likely to cause Cesareans for fetal distress or serious newborn complications.
- Use permitted in people with a prior Cesarean.
- Cheap, simple, widely available, can be used in outpatient settings.
- Possible to stay mobile, although a tube will be coming out of the vagina; the tube is usually taped to the thigh for tension.

Disadvantages

- May be less effective than misoprostol at obtaining a vaginal birth.
- Requires in-person monitoring before and after placement.
- Cannot be used if cervix is closed; may require drugs to ripen cervix.
- Potential pain during insertion; discomfort and bleeding.
- Lower ratings of patient satisfaction compared to Dilapan-S®
- May have an increased risk of maternal infection if used after membranes are ruptured.

Amniotomy

Effectiveness

- Amniotomy is not usually used alone for labor induction, and there is a lack of evidence to support its use as a standalone method.
- However, with a favorable cervix, there is evidence of shorter time to birth when amniotomy is used in combination with synthetic oxytocin.
- In fact, a meta-analysis of randomized trials on labor induction methods found that oxytocin plus amniotomy was the best method at achieving a vaginal birth in 24 hours.
- See **page 30** for more info on combination methods.

Advantages

- A drug-free method that is simple to perform.
- It is not usually painful and does not require pain medication.
- Amniotomy may shorten the time to birth when used in combination with other methods.

Disadvantages

- There is an increased risk of infection after prolonged rupture of membranes.
- A potentially severe (but rare) complication is cord prolapse, where the umbilical cord passes through the open cervix ahead of the baby. The overall risk of cord prolapse with amniotomy is 0.2%. However, it's more common with earlier gestations, dilation <6 cm with any fetal station, and active labor when the fetal head is not yet engaged in the pelvis (station less than or equal to -3).
- If baby has vasa previa (an extremely rare condition where the fetal vessels are exposed in the membranes), the vessels could be ruptured and cause fetal bleeding.

Effectiveness

- It is controversial whether misoprostol should be given orally or vaginally. When given at the same dose, vaginal misoprostol is more effective than oral misoprostol; however vaginal misoprostol is linked to more abnormal fetal heart rate patterns and tachysystole.
- In a Cochrane review on randomized trials comparing oral versus vaginal misoprostol, oral misoprostol was linked to fewer low Apgar scores and less postpartum hemorrhage. Oral misoprostol was linked to more meconium-stained fluid compared to vaginal misoprostol, but this was not linked to poor birth outcomes.
- Studies comparing the two routes have found increased maternal satisfaction with the oral route.
- Doses > 25 mcg increase the risk of fetal heart rate abnormalities.

Advantages

- As effective or more effective than dinoprostone and the Foley.
- Repeated doses may be given, with vaginal doses commonly given every 4-6 hours and oral doses commonly given every 2-4 hours.
- On average, has a shorter time to birth than dinoprostone.
- Low cost, can be kept at room temperature.
- Vaginal misoprostol is one of the most effective induction methods but it is also the most likely to cause uterine hyperstimulation.

Disadvantages

- Off-label use of a tablet not designed to be split makes it difficult to give exact doses (not FDA-approved for induction).
- Increases the risk of uterine tachysystole even at the lowest doses; people induced with a high dose (50+ mcg) are at highest risk.
- Any prostaglandin (but especially misoprostol) can cause a rare uterine rupture, but the risk is very high (1 in 40) with a prior Cesarean. Requires continuous in-person monitoring.
- Other side effects include fever, chills, vomiting, diarrhea.

Dinoprostone Medications

Effectiveness

- The vaginal insert (Cervidil®) has been linked to a higher rate of vaginal birth in 24 hours compared to the intracervical gel (Prepidil®) with no difference in Cesareans or hyperstimulation.
- Compared to placebo or no treatment, dinoprostone medications increase cervical ripening, reduce the Cesarean rate, reduce the use of synthetic oxytocin, and shorten the time to birth.
- Compared to misoprostol, dinoprostone medications take longer from administration to birth and are more expensive. However, dinoprostone may lower the risk for complications compared to misoprostol, including tachysystole with fetal heart rate changes, meconium-stained fluid, and uterine rupture.

Advantages

- Cervidil® and Prepidil® are the only FDA-approved prostaglandins for cervical ripening. Cervidil® is more convenient because it is easily removed, less invasive, and leads to fewer vaginal exams. Drug effects go away within 15 minutes of removal.
- Repeated doses of Prepidil® can be given every 6-12 hours.
- Lower risk of uterine hyperstimulation compared to misoprostol.

Disadvantages

- Similar effectiveness to the Foley balloon but with a worse safety profile than the Foley.
- Similar or less effective than misoprostol; however, dinoprostone medications take longer than misoprostol to ripen the cervix.
- Much more expensive than misoprostol; requires refrigeration.
- All prostaglandins increase the risk of uterine rupture, which is a rare side effect among people without a prior Cesarean, but the risk is high (1 in 40) if you've had a prior Cesarean.
- Other side effects include fever, chills, vomiting, diarrhea.
- Requires continuous in-person monitoring.

Oxytocin (Pitocin®)

Effectiveness

- Many studies have shown that inducing labor with synthetic oxytocin alone leads to a lower rate of vaginal birth compared to first using cervical ripening agents including mechanical and/or pharmacologic methods. So, it is not evidence-based to use synthetic oxytocin alone in someone with an unfavorable cervix (usually defined as having a Bishop score of 6 or less).
- In someone with a favorable cervix, oxytocin plus amniotomy is the induction method most likely to achieve vaginal birth in 24 hours.
- When cervical ripening is used, synthetic oxytocin can be started:
 - At least 6-12 hours after the final dose of Prepidil®
 - At least 30-60 minutes after removal of Cervidil®
 - At least 4 hours after the last dose of vaginal misoprostol
 - At least 2-4 hours after the last dose of oral misoprostol
- The optimal dosing for Pitocin® is controversial (see next page).

Advantages

- Widely available and the most common medication for induction.
- When the cervix is favorable, combining oxytocin with amniotomy is the most effective induction method.

Disadvantages

- Oxytocin is a designated “high alert” medication, meaning it carries a high risk of causing harm if a drug error occurs. It is also the drug most often linked to preventable complications during birth.
- The most frequent side effect is tachysystole (more common at high doses). Rarely, oxytocin use can result in uterine rupture. The risk is much higher (1 in 100) if you’ve had a prior Cesarean.
- Other side effects include low blood sodium and low blood pressure.
- Strong/frequent contractions from IV oxytocin may increase the use of pain medication (and side effects from pain medication).
- Prolonged use can increase the risk of bleeding after birth.
- Requires continuous in-person monitoring and 1:1 nursing care.

Low vs. High Dose Pitocin[®]

- The optimal dosing regimen for giving Pitocin[®] in practice is controversial (see practice guidelines below).
- A potential “low dose” regimen starts with 0.5-2 milliunits (mU)/min and gradually increases by 1-2 mU/min every 30 to 40 minutes until labor is established and/or contractions are every 2 to 3 minutes.
- “High-dose” regimens start at 4-6 mU/min and increase by 4-6 mU/min every 15 to 40 min, with a maximum dose of 40 mU/min.
- Pitocin[®] in doses up to 9 mU per minute leads to similar levels in the blood as seen with spontaneous labor, while doses between 10-16 mU per minute raise levels to double those of spontaneous labor.

Guidelines for Dosing

- In the U.S., the American College of Obstetricians and Gynecologists (ACOG) recommends that low or high-dose Pitocin[®] regimens are appropriate when induction is indicated.
- The Association for Women’s Health, Obstetric, and Neonatal Nurses (AWHONN) recommends starting with a low-dose regimen.
- According to the AWHONN:
 - o Synthetic oxytocin should be started at 1-2 mU/min and gradually increased by 1-2 mU/min every 30 to 40 minutes until labor is progressing and/or contractions are occurring every 2 to 3 minutes (i.e. start “low and slow”).
 - o The infusion may be increased to 20 mU/min as needed, but should not be increased beyond 20 mU/min except in rare cases and only after a bedside evaluation by the provider. If uterine activity is abnormal, the rate should be decreased or stopped until uterine activity returns to normal.
 - o Once active labor is progressing (there is an increase in cervical effacement and cervical dilation of about 0.5 to 1 cm/hr), oxytocin should be decreased to the lowest rate necessary for progress to continue (including stopping the medication, if possible). When oxytocin is stopped by 5 cm dilation, the risks of uterine tachysystole and Cesarean are reduced.

Combination Methods

- A meta-analysis of induction methods found that if the cervix is favorable, then IV oxytocin plus amniotomy is the most effective method at achieving vaginal birth within 24 hours. The use of this method is permitted in people with a prior Cesarean.
- A Cochrane review on mechanical methods of labor induction did not find a benefit from combining mechanical methods plus dinoprostone compared to using dinoprostone alone.
- However, there is evidence supporting the use of a mechanical method combined with misoprostol:
 - A meta-analysis compared misoprostol + Foley vs. misoprostol alone. Most of the studies used vaginal misoprostol at a dose of 25 mcg every 3 to 4 hours.
 - They found a 3 to 4 hour shorter time to birth, as well as lower NICU admissions, meconium, and tachysystole with fetal heart rate changes with the combination method.
 - The combination method lowered the risk of tachysystole because lower doses of misoprostol are required for the same effect when used in combination with mechanical ripening.
 - There was no difference in Cesareans or maternal infection.
 - This study was called “practice-changing” because of the new evidence showing benefits plus fewer harms from using a “double-agent” (Foley + misoprostol) for cervical ripening.
- Another meta-analysis found that, for first-time birthing people, using a Foley plus IV oxytocin increased the rate of birth within 24 hours without increasing the Cesarean rate:
 - This was in comparison to cervical ripening with a Foley followed by use of IV oxytocin.
 - So, using the Foley at the same time as IV oxytocin was more effective than using the Foley first and following it up afterwards with IV oxytocin.
 - The benefit of combining the Foley + IV oxytocin was only seen with first-time parents, not those who had given birth before.

"Failed Induction"

Controversy

- There is no standard definition for "failed induction of labor," although there are practice guidelines from different organizations that list various interventions and time frames that should occur before diagnosing a failed induction.
- Importantly, the term "failed induction" only applies to pregnant people who never reach the active phase of labor (6 cm). In other words, a failed induction means that the induction methods failed to get someone into active labor, not that the person's body "failed" or that a Cesarean had to be performed (although a failed induction commonly leads to a Cesarean).
- Technically, as long as your membranes are intact, you could return home after a failed induction and wait for spontaneous labor, or try a medical induction again on another date.
- If someone says an induction "failed," but the client is 6+ cm dilated and meets criteria for labor arrest, the more appropriate diagnostic phrase would be "labor arrest in the 1st or 2nd stage."
- The Cesarean rate for people who are induced varies greatly from hospital to hospital, and provider to provider. This means where and with whom you are giving birth has a huge impact on whether your induction leads to a vaginal birth or Cesarean.

Guidelines

- Strong recommendations from ACOG and the Society for Maternal Fetal Medicine (SMFM) in the U.S. state that Cesareans for failed induction can be avoided by giving more time in early labor (up to 24 hours or more with regular contractions) and requiring that synthetic oxytocin be given for at least 12-18 hours after breaking the waters before diagnosing failed induction.
- If maternal and fetal status is reassuring, it is premature to call an induction "failed" before breaking the waters (if possible) and giving synthetic oxytocin for at least 12-18 hours afterwards.
- For more information, visit ebbirth.com/failuretoprogress

Overview

- Acupuncture has been used for > 2,000 years in China and Japan.
- In Traditional Chinese Medicine, qi is energy that flows through the body's 14 meridians, or pathways. Very fine needles are inserted into specific acupuncture points to stimulate circulation of qi and blood.
- Acupuncture can only be administered by a licensed acupuncturist.
- Acupressure uses the same points but applies manual pressure.
- Shiatsu, an ancient Japanese practice, is similar but distinct from acupressure. There are differences in how pressure is applied.

Effectiveness

- A Cochrane review examined 22 randomized trials, with 18 examining acupuncture or electro-acupuncture, and 4 studying acupressure.
- Findings showed that acupressure and acupuncture did not reduce the risk of Cesarean or shorten the time from intervention to birth.
- Two trials examined cervical ripening and found that acupuncture or electro-acupuncture promoted cervical ripening within 24 hours.
- Electro-acupuncture had cervical ripening rates similar to misoprostol, but with a higher vaginal birth rate and no complications.
- One randomized trial found greater cervical ripening at 48 hours with acupressure using Spleen 6 compared to routine care (there was no placebo).
- One randomized trial found a higher rate of spontaneous labor when shiatsu was used in post-term pregnancy.

Advantages

- Acupressure & acupuncture may increase cervical ripening.
- Shiatsu may increase the chance of spontaneous labor.
- Pregnant people can use acupressure or shiatsu at home for free.

Disadvantages

- More high-quality research is needed on these techniques.
- There are minor adverse effects with acupuncture use during pregnancy. Studies are not large enough to determine rare side effects.

Nipple Stimulation

Overview

- Nipple stimulation causes the release of oxytocin from the pituitary gland, increasing uterine contractions.
- It has been historically used to induce and speed up labor in many different cultures; its use has been depicted as long ago as 700 BC.

Effectiveness

- A 2005 Cochrane review examined 6 randomized trials that looked at nipple stimulation for cervical ripening and labor induction vs. no intervention or synthetic oxytocin alone.
- In every study, participants in the intervention group performed self-breast and nipple stimulation, stimulating only one side at a time.
- In 2 trials, stimulation was done for 1 hour per day for 3 days, alternating sides every 15 minutes. In 3 trials, it was done for 3 hours per day (1 hour, 3x/day), alternating sides every 10-15 minutes. In 1 study, stimulation was done with a breast pump, alternating sides.
- Compared to no intervention, more people in the stimulation group went into labor over the next 3 days (37% vs. 6%). However, the results were not significant in people who had an unripe cervix. The stimulation group also had less bleeding after birth.
- A subsequent randomized trial found that 3x/day breast massage (15-20 minutes each side), starting at 38 weeks, had several benefits compared to no intervention: higher Bishop score, birthing 3 days earlier on average, and fewer Cesareans (8% vs. 20%).

Advantages

- Among people with a ripe cervix, nipple stimulation may increase the chance of going into labor in the next 3 days.
- May increase cervical ripening.
- Inexpensive; can be self-performed or done with a pump.

Disadvantages

- Safety has not been evaluated for use with high-risk pregnancies.
- There have been several case reports of uterine tachysystole; study protocols often require medical monitoring during stimulation.

Overview

- Castor oil is obtained from the seeds of the Castor Bean plant.
- Reports dating back to ancient Egypt have suggested the use of castor oil to stimulate labor. It is also a potent laxative.

Effectiveness

- A 2013 Cochrane review examined 3 randomized trials that looked at castor oil (single 60 mL dose) vs. placebo or no treatment.
- There were no differences in Cesareans, use of forceps/vacuum, meconium staining, or Apgar score <7 at 5 min.
- The Cochrane authors did not report time to onset of labor. However, if you look at the 3 trials individually, you can see evidence of effect:
 - In 1 trial, ~60% of people in the castor oil group had active labor within 24 hrs compared to <5% of those receiving no treatment.
 - Another trial found a significant increase in the start of labor in 24 hours with castor oil (54% versus 4%). The average Bishop score also increased in the castor oil group.
 - The 3rd study found a 3x higher odds of labor in 12 hours.
- A 2018 systematic review of 8 studies on castor oil for induction found that participants were more than 3x as likely to go into labor within 24 hours, with no differences in Cesareans, use of forceps/vacuum, episiotomy, hemorrhage, meconium staining, NICU admissions, maternal death, stillbirth, or uterine rupture.

Advantages

- More likely to go into spontaneous labor within 12-24 hours compared to placebo or no treatment; may also increase cervical ripening.
- A low-cost method that can be used at home.

Disadvantages

- Larger studies are needed to assess safety and effectiveness.
- It is less effective when used by first-time mothers.
- Side effects include nausea (can be reduced by blending into a cold smoothie) and diarrhea (although similar rates with placebo).

Overview

- Date fruit, or date palm fruit, is considered a sacred fruit in Islamic traditions and is consumed traditionally during pregnancy and postpartum in regions of Asia and Africa. It's also very nutritious.

Effectiveness

- A recent systematic review from Iran included 5 randomized, controlled trials evaluating the effect of date fruit.
- Two of the trials found that eating date fruit significantly improved the Bishop score. In one trial, people ate 7 dates every day starting at 38 weeks. In the other trial, people ate 70-75 grams (6-7 large dates) every day starting at 37-38 weeks.
- Drinking small amounts of honey date syrup during labor was shown to shorten the active phase of labor.
- Eating date fruit did not shorten the length of the 1st, 2nd, or 3rd stages of labor, nor did it lower the risk of Cesarean.
- All of the studies were rated at high risk of bias, since blinding was not used.

Advantages

- Eating 70-75 grams (6-7 large dates) starting at around 37-38 weeks of pregnancy may help with cervical ripening.
- Date fruit is tasty and nutritious. It contains carbohydrates, fats, 15 types of salts and minerals, protein, dietary fiber, and at least 6 vitamins.

Disadvantages

- More high-quality research is needed before we can be confident that eating date fruit improves cervical ripening.
- The studies do not apply to those with diabetes or gestational diabetes; effects of potential increases in blood sugar in these populations is concerning.
- Date fruit can be expensive and not accessible to people living in food deserts.

Overview

- EPO comes from the seeds of the evening primrose plant and contains gamma-linoleic acid, a precursor of prostaglandins E1 & E2.

Effectiveness

- Two trials evaluated vaginal use of EPO and found that it was useful for cervical ripening among first-time mothers compared to placebo.
 - In the first trial, the EPO group took 1,000 mg daily in a soft vaginal capsule starting at 38 weeks of pregnancy. There was a higher average Bishop score in the EPO group compared with placebo. The EPO group also had fewer inductions (29% vs. 62%), a shorter average length of early labor, and fewer Cesareans (21% vs. 47%). There were no differences in any other health outcomes.
 - The other study compared a 1 time dose of 1,000 mg vaginal EPO vs. placebo during an induction with synthetic oxytocin. Labor was shorter and the Bishop score was improved in the EPO group.
- Two trials evaluated the effects of oral EPO and found mixed results: One study found an improved Bishop score with 500 mg 3x/day for one week at term. The other study found that oral EPO (1,000 mg twice daily for 1 week, starting at 40 weeks of pregnancy) made no difference in cervical ripening, length of pregnancy, or length of labor.

Advantages

- EPO may have therapeutic potential for cervical ripening without evidence of adverse effects; vaginal use may be more effective.

Disadvantages

- There are differing opinions in the research about whether EPO should be used clinically for cervical ripening, or whether its use should be limited to clinical trials because more research is needed.
- Some people complain of nausea, headache, and diarrhea with EPO.
- EPO should be avoided in people who take the medicine phenothiazine, and it may raise the risk of bleeding in people who take antiplatelet and anticoagulant drugs.

Find a Qualified Herbalist

- If you're interested in using herbal supplements for induction, it's important to talk with your care provider and a qualified herbalist.
- The use of herbs during pregnancy has an ancient history, and most evidence is anecdotal or based on traditional wisdom.
- Very few herbal compounds have been tested for their active ingredient, their mechanism of action, and any adverse effects during pregnancy. Therefore, it is difficult to evaluate the safety of herbal treatments, especially during pregnancy.

Black and Blue Cohosh

- Some herbs, including *Caulophyllum thalictroides* (blue cohosh) and *Cimicifuga racemosa* (black cohosh), have a long history of use for labor induction but **are currently not recommended for use during pregnancy**. There are no clinical trials involving black and blue cohosh.
- The limited evidence focuses mainly on blue cohosh and consists of case reports, animal studies, and a cell-based study. While blue cohosh does appear to have oxytocic properties, it could also be teratogenic, fetotoxic and cardiotoxic.
- Due to their potentially toxic effects, a prudent approach at this time would be to avoid blue and black cohosh during pregnancy.

Other Herbs for Labor Induction

- At least two double-blind placebo controlled trials on herbs for labor induction have been conducted in Iran in the last five years.
- One study found that post-term mothers who took 1,000 mg of chamomile orally every 8 hours had a faster onset of labor.
- In the other study, participants with term pregnancies took 250 mg of saffron orally over 24 hours (once every 8 hours). The Bishop score was higher in the saffron group 20-24 hours after the intervention and again when measured just after the onset of labor.
- More research is needed on these herbal treatments.

Overview

- Pineapple fruit (ripe and unripe) has been used as a traditional abortion agent in many parts of the world. It is used traditionally for other female reproductive issues as well.

Effectiveness

- There is a lack of scientific evidence supporting the effects of pineapple for inducing uterine contractions.
- The research is limited to a few studies conducted on rats and on isolated human uterine tissue.
- In multiple studies, pineapple juice has induced contractions in isolated rat and human uterine tissue; these contractions are similar to those induced with artificial oxytocin.
- It's thought that this is the effect of bromelain and other components of the juice and that serotonin may contribute to the effects.
- However, no studies have been carried out on pregnant humans. So thus far, there is no evidence that eating pineapple or drinking pineapple juice will cause miscarriage or induce labor.

Advantages

- There is some evidence from studies on rat and human tissue samples that pineapple extract, when put directly on those tissues, can cause contractions.
- Pineapple is tasty and nutritious.

Disadvantages

- There is no scientific evidence backing the use of pineapple, but it's also not likely to be harmful (unless you eat too much and get a sore mouth!)
- Pineapple may raise blood sugar in people with diabetes or gestational diabetes; effects of potential increases in blood sugar in these populations is concerning.

Red Raspberry Leaf

Overview

- Red Raspberry Leaf (RRL) is native to Europe, North America, and Asia, and has been used medicinally since at least the 6th century.
- It can be taken as a tablet or tea, and is sometimes recommended during pregnancy to strengthen and tone the uterus for labor. Others believe it may stimulate contractions and shorten labor duration.

Effectiveness

- RRL is generally recognized as safe; however, very few participants have been included in studies on RRL in pregnancy.
- In the only double-blind randomized trial on RRL during labor, researchers assigned 192 low-risk, first-time mothers to raspberry leaf tablets or placebo tablets starting at 32 weeks until labor.
- The RRL group was not significantly different from the placebo group in any outcomes, including length of pregnancy, labor inductions, or duration of labor.
- Results from laboratory studies are mixed as to whether raspberry leaf causes contraction or relaxation of isolated uterine tissue.

Advantages

- RRL is caffeine-free, rich in vitamins/minerals, and pleasant tasting.
- It has a long history of traditional medicinal use for problems related to menstruation, childbirth, and the gastrointestinal tract.

Disadvantages

- There is very little research on human consumption of raspberry leaf during pregnancy, and the laboratory studies had conflicting results.
- In the only randomized trial on this subject, some pregnant people taking RRL reported diarrhea, constipation, nausea, vomiting, headache, heartburn, strong Braxton Hicks contractions, dizziness, and bloating. But these are common symptoms of pregnancy and were found in similar levels among the placebo group.
- One case report described a mother with diabetes who experienced a drop in glucose levels after taking RRL.

Overview

Sexual intercourse could influence labor through 3 mechanisms:

1. Human semen contains very high amounts of prostaglandins.
2. Sex sometimes includes nipple stimulation, which increases oxytocin levels and can help induce labor and ripen the cervix.
3. Sex and female orgasm have been linked to an increase in uterine contractions, possibly through mechanical effects from penetration.

Effectiveness

- A 2019 meta-analysis combined 3 randomized trials that evaluated the effects of encouraging patients to have sex vs. not encouraging patients to have sex for starting labor at term.
- There was no difference in rates of spontaneous labor between groups (about 82% of people went into spontaneous labor in both groups.)
- They did not find a difference in pregnancy duration or any other outcomes, including Cesareans and premature rupture of membranes.
- The research did not assess many of the features of sex (condom use, orgasm, nipple stimulation, etc.), and many of these factors could influence the success of using sex as an induction method.
- At least 4 observational studies have found benefits from sex in the third trimester. But this does not mean sex itself was the cause of better outcomes. It could be healthier people simply have more sex.

Advantages

- In theory, sex may help stimulate labor, especially if penetration involves mechanical action on the cervix and if there is nipple stimulation, female orgasm, or cervical exposure to semen.
- It is considered safe to attempt unprotected vaginal sex if the membranes are intact and the partner has tested negative for STIs.

Disadvantages

- Research has not yet shown that sex is an effective induction method.
- It is contraindicated after PROM or with high-risk pregnancies, such as having a low-lying placenta or increased risk of preterm labor.

Overview

- Walking is commonly recommended to naturally induce labor, but there is very little scientific evidence on this practice.
- It's hard to know if walking is really effective, or if people just link it with labor onset because walking is a common part of life.

Effectiveness

- The first study to assess the effect of walking to induce labor at term took place in 2020. They randomly assigned 131 low-risk people with a single, head-first baby and no prior Cesareans to walking or control.
- They only included pregnant people at 38 weeks who were not already regularly exercising during pregnancy.
- People in the walking group walked on a treadmill for 30 minutes 3x/week at a moderate intensity (4 km/hr or 2.5 mi/hr). On average, they completed 5 walking sessions in an observed hospital setting.
- The control group did not participate in an exercise routine.
- The hospital's protocol was to induce labor at 41 weeks of pregnancy, and in the year before the study, about 33% of patients were induced.
- The walking group had a lower rate of labor induction (18% vs. 33%) and fewer births with forceps/vacuum (21% vs. 38%). There were no differences in gestational age, length of active labor, or Cesareans.

Advantages

- Evidence from one small study found that walking at a moderate intensity for at least 30 minutes, 3x/week may increase the chance of spontaneous labor and reduce the risk of forceps or vacuum delivery.
- There are many health benefits of walking aside from labor induction.
- It's considered safe for most people to walk during pregnancy.

Disadvantages

- There is very little research on walking to induce labor, and it's impossible to carry out a blinded randomized trial.
- Exercise is contraindicated for people with some high-risk medical conditions.

The Most Important Thing to Know is that...

You have options! Many parents are told that they need to have an induction, and they just do as they're told. But you have the right to ask questions, and to have those questions answered with accurate information. You have the right to say yes, and you have the right to say no, without being pressured either way. And if you choose an induction, you have the right to help decide which methods will be used.

Avoiding Fear Tactics

- Fear tactics can be used on both sides, for and against inductions! If you hear fear tactics being used, recognize them as such.
- It's your right to have facts. Ask for them!
- Examples of fear tactics include:
 - An induction will be painful and you don't want a Cesarean, do you?
 - You have a 50% higher chance of stillbirth if you don't have an induction right now!
- Ask for "absolute risks" instead of "relative risks." If you're told there's a 50% chance higher risk of stillbirth without an induction, you could say, "That sounds like relative risk. Could you tell me what research says the absolute risk of a stillbirth is in studies on induction versus waiting for labor in medical situations like mine?"
- If your provider uses coercion or fear tactics, strongly consider switching to a provider who fully supports informed consent/refusal.

Questions to Ask:

- What's the medical reason for this induction? What do the professional guidelines say about induction for this specific reason?
- How ripe is my cervix? What is my Bishop score?
- What is the induction rate in your practice? Out of the last 10 births that you did, how many of them were inductions?
- What is your Cesarean rate with inductions? Out of the last 10 inductions that you did, how many ended in Cesareans?
- What are your preferred methods for cervical ripening?

Every Parent Should Know That...

Inductions can take a very long time. It's common for an induction for a first-time birthing person to take 24, 48, or even 72 hours. Because of this, it's important to be rested ahead of time, and to stay hydrated and well-nourished with drinks and food. You do have a human right to eat and drink during an induction, even if hospital policy "forbids" it.

If You Have a Medical Induction You Can:

- Ask about induction methods and choose the one that works for you.
- Create an "Induction birth plan" and go over it with your provider.
- Bring a doula to help lower your risk of Cesarean with an induction.
- Ask for a break during the induction, if you need one to sleep or rest (in other words, you can ask for the induction medicines to be stopped).
- Ask for any Pitocin® to be "started low and increased slowly."
- Know that you have the right to refuse dose increases.
- Shift positions as much as possible and use a peanut ball while in bed.
- Ask for a mobile monitor to move around as much as possible!
- Ask for privacy to get your oxytocin flowing—kissing and laughter help!
- Remember that you have the right to ask questions and decline anything along the way.
- Try some "natural labor induction" techniques to ripen your cervix before you attend the scheduled induction (i.e. eating dates, acupressure, acupuncture) or to do with the medical induction (i.e. walking, acupressure)
- Prioritize your comfort (EBB has a Comfort Measures Pocket Guide!)
- Keep the "Failure to Progress" handout from EBB with you (download at ebbirth.com/failuretoprogress)

Affirmations

- "I am intelligent, informed, and empowered with evidence."
- "I am strong and capable of giving birth in the way that I need to."
- "I am using my voice and advocating to have my needs met before and during my birthing time."



Resources

Evidence Based Birth[®] Signature Articles

- EBB has free, in-depth, peer-reviewed articles on a variety of topics about induction, including:
 - Due Dates: ebbirth.com/duedates
 - Inducing for Due Dates: ebbirth.com/inducingduedates
 - The ARRIVE study: ebbirth.com/ARRIVE
 - Induction for Big Baby: ebbirth.com/bigbaby
 - Induction for GDM: ebbirth.com/inducinggdm
 - Induction for Advanced Maternal Age: ebbirth.com/ama
 - Induction for PROM: ebbirth.com/PROM
- Most EBB articles have free, one-page handouts that you can print off and bring to appointments with your health care provider!
- A great conversation starter with your provider: “I really value your opinion! I was wondering if you could take a look at this research I’ve been reading on [insert topic here] and let me know your thoughts?”

Your Pocket Guide Resource Page!

- Check out our Pocket Guide resource page with links to references, professional guidelines, and a list of blog articles and podcasts: visit ebbirth.com/inductionpocketguide and use the password: POCKET
- If we make any major changes to this Pocket Guide in the future, we will post the changes on the Pocket Guide Resource page!
- The Resource page also has a Question and Answer section!

To Further Your Education...

- Subscribe to the Evidence Based Birth[®] Podcast to get regular updates on evidence based topics!
- We specialize in teaching about evidence based care and how to advocate for yourself through the Evidence Based Birth[®] Childbirth Class! Check out ebbirth.com/childbirthclass
- Professionals who are passionate about evidence based care are invited to join the EBB Professional Membership to get access to continuing education and an inter-professional community!