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Cervical Ripening and Induction of Labour Options: A patient education tool

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Clinical Education Tool
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Abstract:

Cervical ripening and induction of labour are common topics of discussion in both family medicine and obstetric offices. Patients requiring counselling on induction are faced with new concepts and terms that can be overwhelming. In addition, delivering a significant amount of information in a short period of time proves to be challenging for healthcare practitioners. An understanding of the indications for induction of labour are important for patient education and understanding. Cervical ripening methods include both mechanical (foley catheter) and hormonal (PGE1/PGE2 analogs), whereas labour contractions can be induced with a variety of strategies including prostaglandins, amniotomy and oxytocin. Clinical education tools exist in both paper and online formats to help supplement the counselling provided by care practitioners. The goal of this project is to create a brief, easily digestible 2-page patient education tool to help supplement the discussions that occur in office settings. The target audience is pregnant patients and their chosen supports. Canva design tool was used to make a visually appealing and straight forward document for education. Patient understanding and comfort is top priority in obstetrical care, and having quick access to evidence based information will decrease anxiety around the induction process.

Key Words: Induction of Labour (IOL), Cervical Ripening, Prostaglandins, Oxytocin

Introduction:

The processes of cervical ripening and induction of labour for pregnant patients are complex topics that continue to evolve as research develops to guide best practice. With the ever-evolving evidence, it can be a significant time burden for practitioners to keep up with the most up to date recommendations. Family medicine and obstetric offices are busy environments.

Although practitioners strive to educate patients thoroughly and appropriately about recommendations and reasoning around cervical ripening and induction of labour, it can be an overwhelming amount of information. There are complex layers of information relayed, including determination of cervical favorability, risk factors, cervical ripening options, and indications for induction. Many patients would benefit from a straight-forward, evidence-based tool to review following a visit with their healthcare provider. With such easy access to information via the internet, it is important to provide patients with guideline-supported information that they can trust and easily digest.

Educating patients about their options when an induction of labour is recommended is crucial in promoting informed decision-making and a sense of empowerment during a time where patients frequently report feeling a lack of control. When patients understand the reasons for induction, the methods available, and the potential benefits and risks, they are better able to participate actively in their care. Clear education can help reduce fear and anxiety, foster trust between patients and healthcare providers, and improve overall satisfaction with the birth experience. Providing this information supports patient autonomy, reinforces the importance of consent, and can contribute to safer outcomes for both parent and baby.

The purpose of this project is to create a clear, concise, and easily comprehensible educational tool for pregnant patients and their support people that empowers them to make informed shared decisions about induction of labor, as well as better-understand their provider's recommendations. Designed as a two-page document at a grade seven reading level, it will lay out common indications for induction of labour, cervical ripening methods, and induction techniques in simple language, supported by visual aids. By promoting understanding, fostering open communication with healthcare providers, and encouraging shared decision-making, the

tool aims to enhance patient autonomy, reduce anxiety, and contribute to a safer and more positive birthing experience. The tool will be available by QR code, and can also be printed for handing out at clinic appointments.

There are several existing tools designed to educate patients about induction of labor. These share the goal of aiming to simplify complex medical information and support informed decision-making. For example, the American College of Obstetricians and Gynecologists (ACOG) provides online patient education materials, including pamphlets and videos, that cover the basics of induction of labor.[1] Some hospitals have developed their own customized handouts, often featuring charts or step-by-step guides to explain cervical ripening and induction methods. These are often hospital-specific, attending to local preferences and guidelines (My Health Alberta, BC Women's Hospital, Champlain Maternal Newborn Regional Program).[2,3,4] The IWK Women and Children's Hospital in Halifax, Nova Scotia developed a patient education tool in 2024 called the "BORN Decision-Making Tool".[5] This is a 12-page document which reviews the benefits, options and risks of induction of labour. Additionally, apps like "My Birth Matters" offer digital resources to engage patients with tailored information on labor and delivery options. Specifically, the Toronto Video Atlas of Surgery has an interactive website with clear videos explaining anatomy, procedures, and expectations surrounding induction of labour. These tools provide valuable insights, and should be recommended to our patients to help supplement the education we provide. However, many of these tools often vary in readability, accessibility, and visual design, leaving room for improvement. This project seeks to address these gaps by creating a user-friendly resource that is concise, visually appealing, and adaptable for use in diverse clinical settings.

Relevance to Family Medicine:

As many family practitioners provide obstetrical care to pregnant patients, induction of labour conversations are commonplace in many family practices. Many clinics have their own patient education documents around other prenatal topics such as kick-counting, investigation schedules, and preparing for breast-feeding. This tool will help add to the variety of resources available to patients in these settings. This project highlights the family medicine principle of "The patient-physician relationship is central to the role of the family physician." In particular, the provision of patient education in an easily digestible way will strengthen patient understanding and trust.

Background:

Cervical ripening and Induction of labour for pregnant patients are common processes in obstetrical care. Induction of labour is defined as the initiation of labour (IOL) (contractions that make cervical change) before it occurs spontaneously (independent of external factors).[6] It is distinct from cervical ripening, which often precedes induction of labour. [6] IOL aims to optimize maternal and fetal safety, however the tools used for induction have significant risks that need to be balanced with expectant management.

It is essential to review when and to whom induction of labour should be offered. Indications for induction can be broken down into maternal and fetal factors. Some maternal factors include advanced maternal age (AMA), obesity, in-vitro fertilization (IVF) pregnancy, pre-eclampsia, and gestational diabetes mellitus (GDM).[6] Fetal factors include chorioamnionitis, term premature rupture of membranes (TPROM) with maternal GBS colonization, large for gestational age (LGA) fetus, fetal growth restriction, post-dates pregnancy, and previous IUFD.[7]

AMA is defined as ≥ 40 years of age at time of delivery.[6] Patients that are AMA are at increased risk of antepartum and intrapartum stillbirth.[6] The Society of Obstetricians and Gynaecologists of Canada (SOGC) describes that the risk of antepartum and intrapartum stillbirth in an AMA patient at 39 weeks gestational age (GA) is equivalent to the risk of the same in a 24-29 year old at 41 weeks GA.[6] The risk of cesarean delivery (CD) is more than 3x likely than average for AMA primiparous patients. [6] Therefore, delivery planning for induction should be offered to pregnant AMA patients at 39 weeks GA.[6] Pregnant patients with obesity (pre-pregnancy BMI ≥ 30) are also at increased risk of antepartum stillbirth.[6] At 40 weeks GA, there is a 3-8x increased risk of stillbirth in patients with BMI >30.[6] A 2018 study by Gill et al. described that routine IOL at 39 weeks GA decreased risk of stillbirth, cesarean delivery, and delivery-related healthcare costs. [8] They extrapolated said information to a hypothetical population of 100,000, in which IOL at 39 weeks vs 41 weeks GA avoided 9234 cesarean deliveries.[8] Evidence does not suggest a specific BMI at which to induce labour, however recommends considering delivery at 39 weeks GA in patients with a pre-pregnancy BMI ≥ 40.[6] When induction is initiated for obese pregnant patients, they are found to have greater need for repeated doses of cervical ripening agents, longer labours, higher rates of oxytocin use, and an overall increased need for cesarean delivery.[6]

In-vitro fertilization (IVF) pregnancies are known to have higher associations with adverse outcomes in pregnancy.[6] These include gestational hypertension (GHTN), GDM, placental abruption, stillbirth, preterm birth, and NICU admissions, and are often associated with AMA. It is recommended to consider IOL on an individual basis for assisted reproductive technology pregnancies until further evidence becomes available.[6]

LGA fetuses are defined as having an estimated fetal weight (EFW) > 90th percentile.[9] It is understood that accurate assessment of fetal weight by ultrasound is difficult, and that ultrasound has a tendency to overestimate fetal weight.[9] LGA fetuses are known to have higher rates of shoulder dystocia, a complication of vaginal delivery where the anterior fetal shoulder gets stuck behind the maternal pubic bone, impeding delivery of the fetus.[9] Suspected fetal macrosomia is not an indication for IOL before 39 weeks GA as there is insufficient evidence that the benefits of reducing a shoulder dystocia would outweigh harms of early delivery.[9] A 2015 randomized control trial compared IOL at 37-39 weeks GA vs expectant management to 41 weeks GA in pregnancies with EFW > 95%ile.[10] Boulvain et al. found that in the induction group, there was a significant reduction in shoulder dystocia and subsequent neonatal fractures.[10] Currently, there is insufficient data to recommend IOL at a specific GA in a suspected LGA fetus, however local practice at the IWK hospital in 2023 is to recommend IOL at 39 weeks GA for EFW ≥95%ile.[11]

A post dates pregnancy is defined as a pregnancy at ≥41 weeks GA.[6] Delivery past 42 weeks GA is known to have increased risk of meconium aspiration syndrome, fetal macrosomia, postpartum bleeding, and stillbirth.[6] Therefore, it is strongly recommended that induction of labour and delivery happens between 41 and 42 weeks GA to reduce risks of morbidity and mortality.[6]

The five leading predictors of successful IOL as per the SOGC include patient age, BMI, parity, GA and cervical status.[6] Cervical ripening is typically the first step towards induction of labour if the cervix is found to be unfavourable. Cervical ripening is defined as using mechanical or pharmacologic means to prepare, optimize, or “ripen” the cervix before induction of labour contractions.[12] Cervical favourability is assessed objectively using the modified Bishop score.[12]

The modified Bishop's score assesses features of the pregnant patient's cervix to assign a score, which then represents the cervical "readiness" for contractions.[12] The Bishop score is composed of the following features: cervical position, consistency, length (previously effacement), dilation, and station (Fig 1 SOGC).[12] A Bishop score ≥7 denotes a cervix that is associated with successful induction of labour.[12] Therefore, cervical ripening methods are recommended and offered when the modified Bishop score is <7.[12] Amniotomy and oxytocin are ineffective cervical ripening agents, and have been shown to increase the risk of cesarean delivery when the Bishop score is <7.[12]

Table. Modified Bishop Score

	0	1	2
Position	Posterior	Mid	Anterior
Consistency	Firm	Medium	Soft
Cervical length, cm (previously effacement)	≥4 (0%–30%)	2–3 (31%–50%)	1–2 (51%–80%)
Dilatation, cm	0	1–2	3–4
Fetal station	–3	–2	–1/0

Note: A score of 7 or greater is associated with successful induction of labour.

Cervical ripening methods can be divided into mechanical and pharmacologic options. The only mechanical option currently used and approved for cervical ripening is the balloon catheter (foley catheter). When the cervix is between 1-3 cm dilated, a balloon catheter can be placed through the cervix to act as a mechanical method of further dilating the cervix.[12] The pressure of the balloon also promotes the release of natural cervical prostaglandins which help to soften and thin the cervix.[12] The catheter can be left in place for up to 24 hours.[12] Of all cervical ripening methods, the balloon catheter has the lowest risk of uterine rupture in a previously scarred uterus, and therefore is the only safe option for cervical ripening in a trial of labour after cesarean section (TOLAC) setting.[12] The balloon catheter method when compared to prostaglandins, has shown fewer episodes of tachysystole, equal risk of cesarean section, no increased risk of infection, and less maternal discomfort.[13] This method has been found to be

equally effective as PGE2 agents (dinoprostone) in achieving delivery within 24 hrs, and slightly less effective as PGE1 agents (misoprostol) for achieving delivery within 24 hrs.[12] The SOGC recommends that health care providers consider balloon catheters as first-line agents when possible, as they are safe, effective, and can be used in an outpatient setting.[12]

There are two commonly used pharmacologic options for cervical ripening. They are both synthetic prostaglandins, which are lipid hormone-like compounds that naturally occur in the female body.[12] Prostaglandin E1 (PGE1), commonly known as Misoprostol, acts as a cervical ripening agent as well as an induction agent.[12] It causes contraction of smooth muscle fibers in the myometrium and relaxation of the cervix, facilitating cervical opening.[14] It can be administered orally, sublingually, or vaginally, and route of administration affects the pharmacokinetics and thus function of the agent.[12] When given as an oral dose (typical for cervical ripening), serum levels fall 1-2 hrs post dose due to first pass hepatic metabolism, which leads to a cessation of effects on uterine activity. [12] When given SL or vaginally, after 1-2 hours it causes increased resting uterine tone which changes to rhythmic contractions lasting 3 hrs post SL and 4 hours post vaginal administration.[12] Therefore, when given for cervical ripening, misoprostol is dosed every 4 hours, and evidence supports the use of the oral regimen because of greater safety.[12] Oral misoprostol is as effective as vaginal misoprostol and vaginal PGE2 (Cervidil) in achieving vaginal delivery.[12] Risks of misoprostol include tachysystole (>5 contractions in a 10 minute period averaged over 30 minutes), fever, nausea and stomach cramping.[12] The main contraindication to misoprostol use is history of a full thickness uterine scar (previous cesarean delivery), as it significantly increases the risk of uterine rupture.[14] Due to the frequency of dosing and need for fetal monitoring, misoprostol can only be administered in an inpatient setting, which is a disadvantage.[12]

Prostaglandin E2 (PGE2), known as dinoprostone or Cervidil, is another synthetic prostaglandin used for cervical ripening.[12] It is a 24 hr controlled-release mesh that is administered intravaginally, and is effective for cervical ripening.[12] Advantages include easy administration, the option for removal if intolerable side effects or adverse effects occur, and it's ability to be used in the outpatient setting so long as EFM is normal.[11] Risks of PGE2 include uterine tachysystole, and should not be used in patients with history of full-thickness uterine surgery.[12] Maternal adverse effects include nausea, vomiting, diarrhea and fever.[12]

The SOGC key message in the 2023 guideline for Cervical Ripening reports "For outpatient settings the preferred method of cervical ripening is the use of a cervical balloon. Where insertion of a cervical balloon is not possible, the use of prostaglandin E2 is recommended, which may also be used in an outpatient setting. For individuals requiring inpatient cervical ripening, the preferred options are balloon, oral misoprostol (PGE1), or both concurrently."[12]

When the Bishop score is $\geq$7 (ie. cervix is favourable), induction of labour can be initiated, as the cervix is determined to be favourable for contractions. Risks of induction of labour include failure to establish labour, tachysystole, chorioamnionitis, cord prolapse with artificial rupture of membranes, uterine rupture, assisted vaginal birth, cesarean delivery, postpartum hemorrhage (PPH), and adverse neonatal outcomes.[15] When amniotic membranes are intact and Bishop score is favourable, induction of labour can be attempted with several options: PGE1 (misoprostol), oxytocin and amniotomy.[15] Induction of labour with oral misoprostol is highly effective.[15] For IOL, misoprostol is dosed every 2 hours and is considered a safe and effective method of induction when compared with all alternatives.[15] It is recommended that if

labour has not been successfully achieved by 24 hours, an alternative plan such as oxytocin augmentation should be considered.[15]

Amniotomy is the process of artificially rupturing the amniotic membrane (AROM). It is performed to help induce contractions and help with cervical dilation.[15] When used alone as an IOL agent, it has been associated with higher rates of infection, longer time to birth, and higher rates of cesarean delivery.[15] Therefore, it is not supported alone as a method of IOL. However, it has been found to be successful in multiparous patients with favourable Bishop scores, followed by early PGE1 or oxytocin use.[15] Risks of AROM include chorioamnionitis as well as cord prolapse if the fetal head is not well applied to the cervix at time of amniotomy.[15]

Oxytocin is the third and most common agent for IOL. Oxytocin is a hormone that binds to uterine receptors, and produces rhythmic uterine contractions.[15] It has no direct effects on the cervix, however indirectly leads to cervical dilation.[15] For IOL, oxytocin is delivered through an intravenous infusion. It is started at a low rate, and titrated up to target adequate contractions.[15] Due to the risk of uterine tachysystole with fetal heart rate changes, continuous external fetal monitoring is recommended when oxytocin is being used for IOL.[15] The SOGC strongly recommends using oxytocin alone for IOL when bishop score is ≥ 7 and the patient is term with no PROM.[15] It has been found that early amniotomy following oxytocin initiation is associated with a shorter duration of time between IOL and delivery.[16] Oxytocin has been determined as the safest method of IOL for patients with prior uterine surgery.[15]

A 2020 double-blind RCT showed that when misoprostol was compared to oxytocin for IOL, contractions were found to start sooner in the oxytocin group (69 minutes vs 262 minutes).[17] However, the misoprostol group demonstrated more deliveries within 12 hours.[17]

Overall, they found that maternal and fetal efficacy and safety were equivalent in both groups for the induction of labour with a favourable Bishop score.[17]

Study Design / Methods:

This clinical education tool was created on *Canva*, an online design platform used for creation of visual content. The target audience was identified as pregnant patients and their support people. The key concerns to be addressed in the tool included a brief explanation on induction, indications for induction, methods for cervical ripening and induction of labour contractions, and finally, possible complications. Headings and bullet points were used to enhance readability. Bulleted numbers were used to identify the steps of induction, with colour consistency to enhance ease of navigation. Throughout, consistent fonts and colours were used to optimize readability and flow throughout the tool. Many visual aids were incorporated into the tool, including cartoon-style images to illustrate procedures (Cervidil placement, foley placement, amniotomy), with appropriately labeled anatomy where necessary. *Lexile* text analyzer, a readability assessment tool, was used to ensure vocabulary was appropriate for grade seven reading level. A “key terms” section was included on page one in order to help define complicated terms and abbreviations. An education section was included on page two to disclaim that the presented information is meant for educational purposes only and the tool should be used in conjunction with advice from one’s healthcare provider. Secondly, the education section includes a link to the University of Toronto’s evidence based Induction of Labour education tool which includes videos and further information on the topic. The tool was designed to be available both as a print out for providers to give patients, as well as an online PDF version accessible via QR code. In today’s age, many individuals prefer having a resource on their smart device, and therefore in designing this tool it was important to have this option available.

Results and Discussion:

This patient education tool is practical and can be easily implemented in a family medicine or obstetrical setting. The up to date, evidence-based information lets practitioners be confident in sharing this resource with their patients. The tool allows for patients to revisit information that was introduced during their induction counselling appointment, which will help reinforce their understanding. By being able to review indications, methods, and risks of induction of labour in a simple way, patient autonomy is prioritized, and fear around the induction experience may be reduced. The availability of this type of tool also reduces the risks of patients accessing unreputable resources online which can lead to increased anxiety and misinformation. The tool is available in both print and digital formats (PDF via QR code). Therefore, the resource can be shared between practitioners, facilities, and patients with ease.

The main limitation of this study is the depth of information provided in the clinical tool. In order to meet the project's goal of creating a small and easily digestible resource, it's impossible to provide a comprehensive education on the cervical ripening and induction of labour options. The tool is therefore a brief layout of options available, but is not thorough nor exhaustive. There are other tools that have been able to capture a larger amount of information, however they lack concision and approachability.

A possible approach to assessment of the utility and effectiveness of the tool could include patient feedback, provider perspectives, and patient engagement. Patient feedback could be gathered via a short survey that assesses ease of understanding, reduction of anxiety, and whether it prompted follow up discussion with their practitioner. Provider feedback could similarly be gathered through a survey to assess provider satisfaction with the tool's information, improvement in efficiency of counselling, and enhanced communication / patient understanding.

Finally, patient engagement could be assessed by tracking QR code “hits”, to track how often the resource is being viewed and therefore used.

In summary, this patient education tool strives to enhance maternal health care and patient empowerment, and overall, works to improve pregnant patient’s induction and birth experiences by reducing education gaps.

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Appendix:

Induction of Labour

What is an Induction of Labour?

Induction means helping to get your labour started before it happens naturally on it's own!

Induction is comprised of 2 possible phases:

1. Cervical ripening (softening, thinning & opening cervix)
2. Initiation of labour contractions (push baby down the birth canal)

Often, phase 1 can be skipped if the cervix is already partly open!

Who might need an induction?

Maternal reasons

- Advanced Age (>40)
- High Blood Pressure
- Diabetes in Pregnancy
- Obesity (BMI >40)
- IVF Pregnancy

Fetal reasons

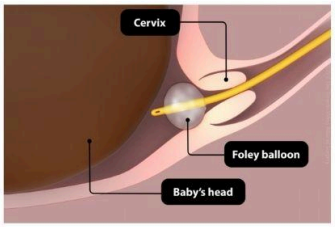
- Post-dates (>41 weeks GA)
- Ruptured membranes
- Large Fetus
- Small Fetus
- Concerns with fetal wellbeing

Cervical Ripening

1

A **Mechanical Option:**

- A soft, thin tube (foley catheter) with a small balloon tip is placed through the cervix (often placed using a speculum)
- The balloon is inflated with water, and sits between baby's head and the cervix
- It works to slowly open the cervix until it is 3-4 cm dilated, and the balloon falls out on it's own!



!

- Your cervix must be at least 1 cm dilated for this option
- You can go home after the ballon is placed

DAL Family Medicine

KEY TERMS

Dilated = how open the cervix is (from 1 - 10 cm)
GA = gestational age (how many weeks pregnant)
IVF = In Vitro Fertilization

Updated 2025

Induction of Labour

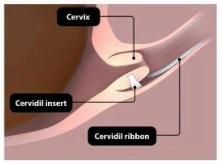
Cervical Ripening

B **Hormonal Options:** Prostaglandin hormones help to soften, thin and open your cervix. They are naturally produced in spontaneous labour

1

Cervidil

- Slow release vaginal insert
- Placed behind cervix, removed like a tampon
- Removed after 24 hrs
- You can go home after this is placed!



Misoprostol

- tablet taken by mouth
- taken every 4 hours until desired ripening is achieved
- must stay at hospital for administration!

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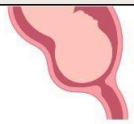
- Not offered to patients with previous cesarean sections
- Small number (1-2%) of people may get fever, nausea, and diarrhea
- These medications can cause labour contractions



Initiation of Labour Contractions

Interventions used once the cervix is soft, thin, and starting to dilate.

GOAL: start uterine contractions to bring baby down birth canal

2

A **Hormonal**

Misoprostol

- tablet taken by mouth every 2 hours
- makes uterus contract
- given in hospital

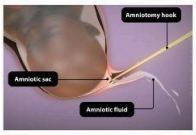
Oxytocin

- intravenous medication
- makes uterus contact
- further opens cervix
- dose adjusted to target goal # of contractions
- given on Birth Unit

!

- baby requires continuous heart rate monitoring
- can cause contractions that are too long/strong

B **Mechanical**



- used with **A**, not alone
- Amniotomy = rupture amniotic sac
- small hook gently opens amniotic sac
- will not harm you or baby
- amniotic fluid contains prostaglandins which causes contractions and opens cervix

!

- baby's head must be well applied to cervix
- you will feel continued leaking from vagina

Extra Information / Recommendations

SCAN FOR THIS TOOL

- Please discuss any questions or concerns with your care provider
- This information is for educational purposes only and is not advice
- Visit https://pie.med.utoronto.ca/TVASurg/PE/iol/ for more detailed information

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Questions about this tool? Please contact:
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