

01



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The Discontinuation of Oxytocin During the Active Phase of Labor;

A Viable Option for Induction of Labor



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Introductions:

Tara (she/her)

Enrolled in the DNP Certified-Nurse Midwifery program at Seattle University. Completed a Doula Certification in 2013 and has over five years of experience supporting families as a birth doula. In addition, Tara has over twelve years of experience as a massage therapist. She holds a BA in Psychology and a BS in Human Development from UC Davis, as well as a BS in Nursing from Seattle University. Tara's midwifery clinical rotations include Swedish Issaquah and currently Kaiser Permanente Capitol Hill.

Victoria (she/her)

Holds a BA in Communications from Cal State Fullerton, as well as a BS in Nursing from Seattle University. She moved to Seattle in 2019 to pursue her DNP with a specialization in Midwifery through Seattle University. She worked as a RN for Poma Fertility in Kirkland. Her midwifery rotations include a homebirth experience in Port Townsend, Providence Portland, and currently EvergreenHealth in Kirkland and Monroe.



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Terms:

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- IOL - induction of labor
- OD - **oxytocin discontinuation**
- OC - **oxytocin continuation**
- FHT - fetal heart tones
- PPH - post partum hemorrhage
- ROM - rupture of membranes
 - SRM - spontaneous rupture of membranes
 - AROM - artificial rupture of membranes



Photo credit: Jonathan Borba

Acronyms used throughout this presentation.



Learning Objectives:

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- Understand the risks associated with exogenous oxytocin use in IOL
- Understand the risks and benefits of OD in IOL
- Understand when it would be appropriate to advocate for OD in IOL
- Understand how to manage a failed intervention of OD in IOL
- Support shared decision making between patient and healthcare provider

Question:

06

How many labors are currently induced in the U.S.?

15%

22%

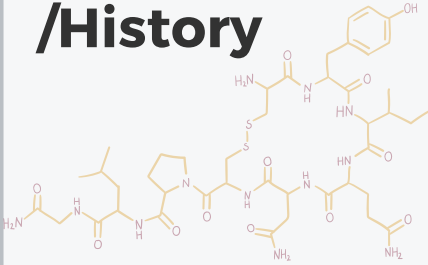
32%

38%

Osterman et al., 2023

Question: Zoom poll

Correct answer: 32%



- Some fun background and history about oxytocin!



Photo credit: Stephen Andrews

Phenomenon of Interest

IOL has been used to manage:

(Boie et al., 2018; Chopra et al., 2015)

- Post-dates pregnancy
- Prolonged rupture of membranes
- Fetal compromise
- Maternal medical conditions

IOL is often initiated with prostaglandin drugs, mechanical cervical ripening, oxytocin, or AROM or any combination thereof

(Boie et al., 2018).

Phenomenon of Interest:

Oxytocin Considerations

- Oxytocin is a high alert medication:
(Institute for Safe Medication Practices [ISMP], 2018)

 - Increased risk of harm if used incorrectly
- Risks associated with incorrect use:
(American College of Obstetricians and Gynecologists [ACOG], 2009; Bakker et al., 2007; Gilstrap & Sciscione, 2015; Simpson, 2020; Simpson & James, 2008)

 - Uterine tachysystole and abnormal FHTs
 - Less frequent: uterine rupture, abruption placentae, cesarean section, PPH, fetal acidemia, and fetal hypoxemia
- IOL may increase feelings of fear and anxiety in the laboring person
(Coates et al., 2021b; Coates et al., 2019; Jay et al., 2018a; Keulen et al., 2021; Lou et al., 2019).

Phenomenon of Interest:

Oxytocin Discontinuation in IOL

- ▶ Discontinuing oxytocin specifically during the active phase of labor (defined as ≥ 6 cm dilation), may facilitate:
(Boie et al. 2021; Boie et al., 2018)
 - Childbirth with lesser interventions
 - Endogenous release of birthing person's own oxytocin
- ▶ Discontinuing oxytocin during the active phase of labor may also reduce total oxytocin dose administered to the patient
(Boie et al., 2018).
 - Can lead to reduced side effects and improve health outcomes
- ▶ Due to the common use of oxytocin in the hospital setting, staff may be hesitant to implement OD.



Question:

- During IOL, once oxytocin infusion is initiated, do you typically continue or discontinue oxytocin during active labor?

Continue

Discontinue

Advocate for continuation

Advocate for discontinuation

Question: Zoom poll

Risks

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- Most common risk with exogenous oxytocin:
(ACOG, 2009; Bakker et al., 2007; Gilstrap & Sciscione, 2015; Simpson, 2020; Simpson & James, 2008)
 - Uterine tachysytole
 - Abnormal fetal heart tones
- Exogenous oxytocin is structurally similar to Vasopressin:
(Vallera et al., 2017)
 - High dose of oxytocin can cause hyponatremia, water intoxication, and seizures
- The prolonged use of exogenous oxytocin can desensitize receptors, thereby producing less effective uterine contractions
(Simpson, 2020).



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Proposal

The discontinuation of exogenous oxytocin in the active phase of labor would reduce the total dose of oxytocin administered to the birthing person, which may reduce cesarean delivery, abnormal fetal heart tones, tachysytote, and potentially medical liability

Boie et al., 2018; Simpson & Knox, 2003



Photo credit: Frank Alarcon

Review of Literature Quantitative

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A total of 15 quantitative articles were relevant and selected for review:

- Five level I systematic reviews
- Seven level II randomized control trials (RCT)
- One level II RCT in the trial phase
- One level III comparative cross-sectional study
- One level V meta-synthesis

Systematic Reviews: Boie et al., 2018; Hernández-Martínez et al., 2019; Jiang et al., 2022; Saccone et al., 2017; Vlachos et al., 2015

RCTs: Boie et al., 2021 (CONDISOX Study); Bor et al., 2016; Chookijkul et al., 2016; Chopra et al., 2015; Eissa et al., 2019; Morad Abd El-Hakem et al., 2021; Öztürk et al., 2015; Girault et al., 2020 (STOPOXY) in trial phase

Comparative Cross sectional Study: Anjum et al., 2021

Meta-synthesis: Merriam et al., 2021

The sample sizes in the systematic reviews range from 1,232 to 3,374 participants

Sample sizes in the RCTs range from 90 to 1,198 participants

The comparative cross sectional study had 79 participants

The meta-synthesis had 1,888 participants

Systematic Reviews:

Boie et al., 2018; Hernández-Martínez et al., 2019; Jiang et al., 2022; Saccone et al., 2017; Vlachos et al., 2015

*RCTs:

Boie et al., 2021 (CONDISOX Study); Bor et al., 2016; Chookijkul et al., 2016; Chopra et al., 2015; Eissa et al., 2019; Morad Abd El-Hakem et al., 2021; Öztürk et al., 2015

Girault et al., 2020 (STOPOXY) in trial phase

*Many of the RTCs are reviewed in the systematic reviews selected in this quantitative literature review

Comparative Cross sectional Study:

Anjum et al., 2021

Meta-synthesis:
Merriam et al., 2021



Photo credit: Charles Eugene

Review of Literature

Quantitative




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- When comparing the intervention of OD to the control of OC at the active phase of labor, four primary outcome measures emerged:
- Mode of delivery
 - Non-reassuring/abnormal fetal heart tones
 - Uterine hyperstimulation or tachysystole
 - Duration of the active phase of labor

Review of Literature

Quantitative: Mode of Delivery

Consensus: Conflicting evidence, however, the majority of the quantitative studies found a reduced risk of cesarean delivery with OD.

-  All five of the level 1 systematic reviews found that the discontinuation of oxytocin during the active phase of labor reduced the risk of cesarean delivery. (Boie et al., 2018; Hernández-Martínez et al., 2019; Jiang et al., 2022; Saccone et al., 2017; Vlachos et al., 2015). Hernández-Martínez et al. (2019), Saccone et al. (2017), and Vlachos et al. (2015) found these results to be statistically significant.
-  Of the seven RCTs reviewed, Morad Abd El-Hakem et al. (2021) found a statistically significant reduction in cesarean delivery in the OD groups. Three RCTs determined there to be a lower rate of cesarean delivery in the OD group but results were not statistically significant (Bor et al., 2016; Chopra et al., 2015; Eissa et al., 2019).
-  The level II RCTs from Boie et al. (2021) and Chookijkul et al. (2016) found no statistical difference in cesarean delivery overall. In Boie et al. (2021) RCT, when results were stratified between nulliparous birthing persons and multiparous birthing persons, there was an increased risk of cesarean delivery among multiparous birthing persons with OD.

Review of Literature

Quantitative: Non-Reassuring/Abnormal FHT

Consensus: Currently, data on this topic favors OD in reducing the risk of abnormal FHTs.

Four of the level I systematic reviews found that OD during the active phase of labor reduced the risk of abnormal FHTs

(Boie et al., 2018; Hernández-Martínez et al., 2019; Jiang et al., 2022; Vlachos et al., 2015).

One level I systematic review found no difference in abnormal FHTs between the groups

(Saccone et al., 2017).

The level III cross-sectional study, three of the level II RCTs, and the level V metasynthesis found a statistically significant reduced risk for abnormal fetal heart tones in the OD group.

(Anjum et al., 2021; Boie et al., 2021; Bor et al., 2016; Eissa et al., 2019; Merriam et al., 2021).

Two of the level II RCTs found a reduction in abnormal FHTs in the OD group, but the results were not statistically significant

(Chookijkul et al., 2016; Morad Abd El-Hakem et al., 2021).

OD and its effects on neonatal morbidity has not been thoroughly examined in previous studies.

However, a level II RCT known as the STOPOXY trial, is still currently in trial phases. This study will focus on fetal outcomes with OD or OC in IOL, particularly neonatal morbidity

(Girault et al., 2020).

Review of Literature

Quantitative: Uterine Hyperstimulation/Tachysystole

Consensus: Currently, data on this topic favors OD in reducing the risk of uterine hyperstimulation or tachysystole.

Four of the level I systematic reviews found that OD during the active phase of labor reduced the risk uterine hyperstimulation (Hernández-Martínez et al., 2019; Juang et al., 2022; Saccone et al., 2017; Vlachos et al., 2015).

Four of the seven RCTs found the OD group to have a statistically significant reduced risk for uterine hyperstimulation Boie at al., 2021; Bor et al., 2016; Eissa et al., 2019; Merriam et al., 2021).

Boie et al. (2018), a level I systematic review, and Morad Abd El-Hakem et al. (2021), a level II RCT, both found OD may reduce uterine hyperstimulation, but the results were not statistically significant.

Review of Literature

Quantitative: Duration of Active Labor/Total Labor

Consensus: Conflicting evidence, however, the majority of the quantitative studies found an increased duration of the active phase of labor with OD.

■ Saccone et al. (2017), level I systematic review, found OD during the active phase of labor increased the duration from randomization to delivery by a mean difference of 28 minutes. The majority of quantitative studies found an increase in the duration of the active phase of labor with OD Boie et al., 2021; Boie et al., 2018; Bor et al., 2016; Hernandez-Martinez et al., 2019; Jiang et al., 2022; Morad Abd El-Hakem et al., 2021; Öztürk et al., 2015).

■ Chopra et al. (2015) and Eissa et al. (2029), level II RCTs, found there to be a statistically significant decrease in the length of active labor in the OD group. Chopra et al. (2015) found this decrease to be a mean of 30 minutes.

■ Jiang et al. (2022) and Vlachos et al. (2015), level I systematic reviews, found the total duration of labor did not differ between the OD and OC groups. Chookijkul et al. (2016), level II RTC, found no difference in the length of any stage of labor between groups.



Photo credit: Christian Bowen

Review of Literature

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Quantitative: Secondary Outcomes

Duration of oxytocin infusion

- OD decreases (Bor et al., 2016; Chookijkul et al., 2016; Chopra et al., 2015; Morad Abd El-Hakem et al., 2021).

PPH

- OD may reduce rates (Jiang et al., 2022; Eissa et al., 2019).

NICU admits

- OD may reduce (Eissa et al., 2019).

Chorioamnionitis

- OD may increase, but results were not statistically significant (Bor et al., 2016; Jiang et al., 2022).

Consensus:

- Bor et al. (2016), Chookijkul et al. (2016), Chopra et al. (2015), and Morad Abd El-Hakem et al. (2021), level II RCTs, found a statistically significant decrease in the duration of oxytocin infusion in the OD group. The research demonstrates that the discontinuation of oxytocin reduces the total dose of oxytocin and duration of oxytocin infusion.

- Boie et al. (2018), Saccone et al. (2017), and Vlachos et al. (2015), level I systematic reviews, found no statistical difference in the rates of (PPH) between groups. Jiang et al. (2022), level I systematic review, found OD to significantly reduce the rates of PPH. Bor et al. (2016) and Morad Abd El-Hakem et al. (2021), level II RCTs, found there to be a lower rate of PPH in the OD group but the results were not statistically significant. Eissa et al. (2019), level II RCT, found there to be statistically lower rates of PPH in the OD group. The evidence suggests that a reduction in the rates of PPH favors the discontinuation of oxytocin.

- Jiang et al. (2022), Saccone et al. (2017), and Vlachos et al. (2015), level I systematic reviews, and Chookijkul et al. (2016), a level II RCT, did not find a difference in the rates of NICU admission between groups. However, Eissa et al. (2019), found that NICU admission was statistically lower in the OD group. These results favor the OD group.

- Hernández-Martínez et al. (2019), and Saccone et al. (2017), level I systematic reviews, found there to be no difference. Jiang et al. (2022), level I systematic review, found that OD may increase the rates of chorioamnionitis, but the results were not significant. In one RCT found no cases of chorioamnionitis in either group (Chookijkul et al., 2016). Bor et al. (2016) found only one

case of chorioamnionitis in the OD group. This was not statistically significant. Mirriam et al. (2021), level V meta-synthesis, found there to be no difference between the groups.

Summary of Quantitative: Discussion



- Do any of these results surprise you?

Review of Literature

Qualitative:

- Seven qualitative articles were reviewed exploring the laboring person's experience of IOL. Three themes emerged:
 - Setting patient expectations
 - Shared decision making (SDM)
 - Adequate Preparation

Coates et al., 2021a; Coates et al., 2021b; Coates et al., 2019; Jay et al., 2018a; Jay et al., 2018b; Keulen et al., 2021; Lou et al., 2019



Qualitative studies were also selected for the literature review to help determine guidelines for recommendations and goals of oxytocin algorithm and competency training.

Qualitative Articles Reviewed:

Coates et al., 2021a; Coates et al., 2021b; Coates et al., 2019; Jay et al., 2018a; Jay et al., 2018b; Keulen et al., 2021; Lou et al., 2019



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Setting patient expectations:

- Most would like to give birth without the use of chemical interventions (Coates et al., 2021a; Keulen et al., 2021).
- Length of stay from admission-to-delivery as well as the total length of hospital stay tends to be longer for those with IOL (Lou et al., 2019).

Shared decision making (SDM):

- SDM incorporates patient values and preferences (Coates et al., 2021b).
- Improving SDM between the provider and patient can improve the birthing person's experience of IOL (Coates et al., 2021a).

Adequate Preparation:

- Providing information to the patient regarding what to expect in the IOL is essential to informed consent (Jay et al., 2018b).



Photo credit: Huynh Van

Review of Management Strategies from Literature:

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- Adverse outcomes are not increased by the discontinuation of oxytocin in active labor for the neonate or the birthing person

(Boie et al., 2018; Chopra et al., 2015; Hernández-Martínez et al., 2019; Saccone et al., 2017).

- OD in the active phase of labor may reduce the risk of cesarean section, uterine tachysystole, and abnormal FHTs

(Hernández-Martínez et al., 2019; Morad Abd El-Hakem et al., 2021; Saccone et al., 2017).



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Review of Management Strategies from Literature:

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- OD in the active phase of labor is a viable option for those who require an IOL
(Boie et al., 2018; Chopra et al., 2015; Hernández-Martínez et al., 2019; Jiang et al., 2022; Merriam et al., 2021; Saccone et al., 2017; Vlachos et al., 2015).
- OD in the active phase of labor reduces the need for intensive monitoring and may also reduce the cost of labor management
(Chopra et al., 2015).

Review of Management Strategies from Literature:

Success rate for OD

Success rate of OD varies across studies:

- Eissa et al. (2019): 97.9% success rate of OD
- Chookijkul et al. (2016): 87.2% success rate of OD
- Saccone et al. (2017): 92.3% to 100% success rate of OD in six of the seven studies reviewed in which active labor was defined as 5 centimeters or more

Oxytocin restarted after 2 hour waiting period fluctuated:

- Saccone et al. (2017): 0 - 46.4% restarted oxytocin due to arrest in labor in the nine studies reviewed
- Higher success rates when active labor defined as 5 cm or more

Only one RCT recommended against OD:

- Öztürk et al. (2015), recommended against OD during the active phase of labor due to the increased duration of active labor

Systematic Review: Saccone et al., 2017 - Sample size of 1,538 participants

RTCs: Eissa et al., 2019; Chookijkul et al., 2017; Öztürk et al., 2015 - Sample size of 90 participants, 340 participants, and 140 participants respectively

Oxytocin was restarted due to an arrest in labor after a 2 hour waiting period.

Discussion: Inclusion Criteria

What about
augmentation?

OD may be an option
during augmentation as
well as during IOL

✓ Inclusion criteria for participants in several studies included the augmentation of labor with oxytocin (Anjum et al., 2021; Bor et al., 2016; Chookijkul et al., 2016; Öztürk et al., 2015; Saccone et al., 2017).

✓ In Chookijkul et al. (2016), 75% of the cases studied had a spontaneous onset of labor, meaning oxytocin was used for the augmentation of labor.

✓ Boie et al. (2021) included SROM as an indication for IOL.

✓ Vlachos et al. (2015) elaborated on the indications for IOL:

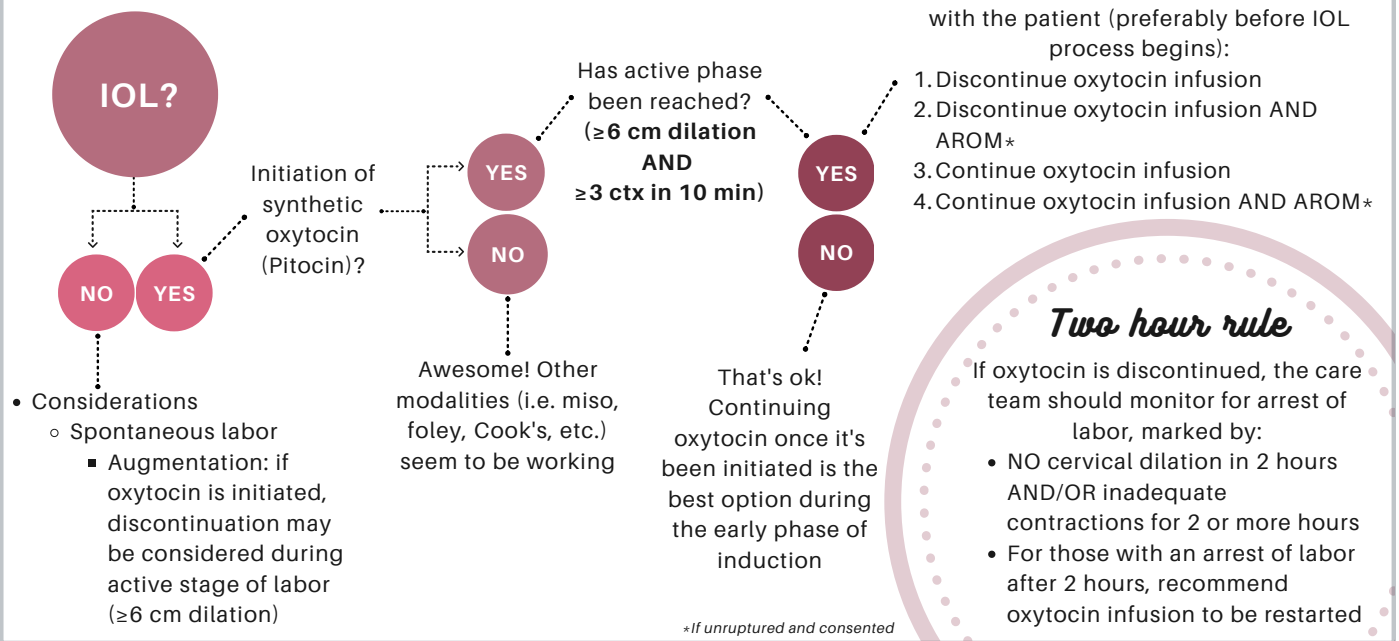
- Postdates
- ROM
- Oligohydramnios
- HTN
- or Non-Reassuring FHTs

A deeper dive into inclusion criteria.

Chookijkul et al., 2017; - Sample size 340 participants.

Any other Q&A?

OUR RECOMMENDATION: OD ALGORITHM



Oxytocin Discontinuation Algorithm

Note: The articles selected for the quantitative literature review most commonly defined active labor as 5cm or more. Active labor is now widely considered 6cm or more. The authors of this DNP project recognize this as a subjective measurement and recommend the algorithm to define active labor by industry standards of 6cm or more (or >5cm).

Two Hour Rule:

This allows the body time to acclimate without pitocin and time to produce endogenous oxytocin.

Our Recommendations: Litigation consideration



- Common allegations related to IOL, the use of oxytocin, and uterine hyperstimulation include:
- "the failure to fully inform the woman [sic] of the risks and benefits of elective induction"
 - "excessive doses of oxytocin resulting in hyperstimulation of uterine activity (with or without the presence of a non-reassuring FHT pattern)"
 - "failure to appropriately identify and treat uterine hyperstimulation (with or without the presence of a non-reassuring FHT pattern)"
 - and "failure to decrease or discontinue the oxytocin infusion..." (Simpson & Knox, 2003, pp. 113-115).

Our Recommendations: Litigation consideration



- To reduce the risk of liability exposure, Simpson & Knox (2003) recommend that nurses, midwives and physicians agree to, "use applicable evidence and/or published standards and guidelines as the foundation for care and whenever a clinical choice is presented, choose patient safety rather than production" (p.110)

Our goals:

- Increase options for patients
- Increase satisfaction
- Increase safety



Goal of OD intervention:

- Offer another management option for IOL and create additional collaborative shared-decision making between patients and healthcare providers.
- Currently, the literature seems to support BOTH OC and OD. The purpose of this training is to give you and your patients more options for IOL.

True or False:

32

For those with a failed intervention of OD with a stalled labor of more than 2 hours (NO cervical dilation in 2 hours AND/OR inadequate contractions for 2 or more hours), it is appropriate to restart oxytocin infusion:

True

False

Quiz: Zoom Poll

Correct answer: True

Summary and Conclusions

- In the past 3 decades, IOL has tripled in the U.S.
(Osterman et al., 2023)
 - Approximately 1/3 of births induced in 2021
- Oxytocin is a high alert medication
(ISMP, 2018)
 - Increased risk of harm if used incorrectly
- OD during active phase of an induced labor is an additional evidence-based management option for providers to offer their patients
- Adverse outcomes are not increased by the discontinuation of oxytocin in active labor for the neonate or the birthing person
(Boie et al., 2018; Chopra et al., 2015; Hernández-Martínez et al., 2019; Saccone et al., 2017).

Summary and Conclusions

Recommendation:

- The OD algorithm may be a guideline for provider decision making during IOL
- Providers may offer OD as a safe management option for patients.

Goal:

- Offer OD during active phase of induced labor as an additional management option for patients to facilitate SDM

Our Proposal:

- The discontinuation of exogenous oxytocin in the active phase of labor would reduce the total dose of oxytocin administered to the birthing person, which may reduce cesarean delivery, abnormal fetal heart tones, tachysytote, and potentially medical liability (Boie et al., 2018; Simpson & Knox, 2003).

Q/A:

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Provider concerns/discussions



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Anecdotal Stories

Anecdotal stories with time permitting.

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