Early pushing urge before full dilation: a scoping review

by

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Abstract

This scoping review attempts to collect and catalog the relevant studies and literatures on the incidence, risks, and management methods of the early pushing urge before full dilation. Literatures relevant to the early pushing urge were electronically searched in 15 online databases and hand-searched with citation searches. A total of 26 eligible literatures were identified. The only peer-reviewed research studies identified included one randomized controlled trial, one prospective observational study, and four case reports. Evidence on the early pushing urge was generally lacking. The best-estimated incidence rate of the early pushing urge was 7.6%. Pushing with the early urge before full dilation did not seem to increase the risk of cervical edema or any other adverse maternal or neonatal outcomes. Evidence on the optimum management of the early pushing urge was limited. Most experts recommended an individualized management plan, which would allow a woman to push with the early urge as long as certain maternal and fetal conditions are satisfied. Some evidence suggested the early pushing urge may resolve spontaneously without interventions. Further investigations on the optimum management methods, effectiveness of various active management options, women's experience of the early pushing urge and its management are recommended.

Introduction

When the fetal presenting part descends and exerts pressure on the nerve receptors in the pelvic floor, the Ferguson's reflex triggers an involuntary strong maternal urge to push, which may occur before or after the cervix is fully dilated.(1,2) When a labouring women experiences the involuntary urge to push before her cervix is fully dilated, the phenomenon is called the early pushing urge.(3)

Traditionally, a labouring woman is discouraged to push with the early pushing urge due to the belief that pushing before full cervical dilation may cause cervical edema, cervical lacerations or maternal exhaustion.(1,4,5) Various techniques have been utilized by care providers to minimize a woman's early pushing urge, such as position changes to lateral or hands-and-knees; the "pant-and-blow" breathing method; and the use of nitrous oxide, narcotics, or epidural anesthesia for pain relief.(3,6) In addition, if the cervix is almost fully dilated and only a small anterior portion of the cervix is left, the so-called cervical lip can be manually reduced over the fetal presenting part by the care provider during a contraction with active maternal pushing effort.(4)

Recently, some experts argue since the involuntary urge to push is overwhelming and difficult to resist and there is a lack of evidence of harms for pushing with the early urge, women should be supported to follow her body's instinct to push, especially if the cervix is at least 8 cm, soft and stretchy.(1,5)

In practice, majority of care providers seem to advise labouring women not to push before full cervical dilation.(3,6) In a 1994-1995 survey of 1,519 US labour and delivery nurses, 80.6% of the nurses reported to coach women to use breathing techniques to resist the early pushing urge; and 45.5% advised women not to push until

they were instructed to do so.(6) A similar survey in UK found 43% of midwives would prevent a woman from pushing before full dilation under any circumstances.(3)

Evidence on early pushing urge is limited and even the incidence rate of the phenomenon is unclear and ranging from 7.6%(7) to 90%(8) depending on the studies. Despite the large discrepancy between the reported incidence rates of early pushing urge, there is a rather significant portion of labouring women experiencing the phenomenon. Thus, this scoping review will attempt to collect the relevant studies and literatures on the incidence, risks, management methods, and expert opinions of the early pushing urge in order to help enhance our understanding of and direct future research effort on the subject.

Method

Both electronic database searches and citation searches were conducted by the author to identify eligible literatures. Fifteen electronic databases were searched for relevant clinical trials; observational studies; surveys; clinical guidelines; literature reviews; expert opinions; obstetric or midwifery textbooks; Master's theses or dissertations; current unpublished trials; and grey literatures.

Search strings were constructed with medical subject headings (MeSH), Boolean operators and wildcards where applicable. The key search terms included the terms: "urge", "involuntary", "bear down", "push", "early", "premature", "second stage", and "labour". Search results were restricted to English language and the time period of 1946 to October 2014. The fifteen electronic databases searched and the corresponding search strings used for each database are listed in Table 1.

The electronic database searches yielded 276 records. After duplicate removals, 169 unique records were identified. The initial screening with the abstracts of the 169 records yielded 23 relevant literatures. The secondary screening with the full contents of the 23 literatures resulted in 18 eligible literatures. Citation searches were conducted on the 18 eligible literatures and yielded seven additional literatures. Thus, a total of 26 eligible literatures were included in this review. The data selection progress is depicted in Figure 1.

The 26 eligible literatures were categorized and charted with the following fields where applicable: title, authors, year of publication, type of material, publication, study location, type of study, objectives, method, population, intervention, comparator, sample size, outcomes, and result. The Appendix includes those charts for the 26 literatures.

Results

Types and Quality of the Literatures

The 26 eligible literatures on early pushing urge include one randomized controlled pilot study,(8) one prospective observational study,(7) four case studies,(2,9-11) three non-peer-reviewed surveys,(6,12) two guidelines,(13,14) ten literature reviews,(5,15-23) and five textbook articles.(1,4,24-26)

There is a major lack of evidence and recent interest in the early pushing urge. Most of the experimental studies and case reports on the subject were published before the year 2000. The only randomized controlled pilot trial by Yeates and Roberts,(8) which compared the expectant management to active management, was conducted in

1984. The only recent study was the prospective observational study by Borrelli et al. published in 2013.(7) In addition, there is no mentioning of the early pushing urge in most major obstetrics or midwifery guidelines.

Most research studies had small sample sizes and, thus, low statistical power to provide high-quality evidence. The randomized controlled pilot trial by Yeates and Roberts(8) had an extremely small sample size of 10 labouring women, while the four case studies were reporting between three to 31 observations. The only research study with a large sample size was Borrelli et al.'s observational study in 2003,(7) which included 789 labouring women, 60 of which experienced the early pushing urge. There were also two surveys(6,12) conducted on care providers' management preferences on the early pushing urge with a large number of participants. Unfortunately, neither survey was published on a peer-reviewed journal.

Among all the studies, Borrelli et al.'s observational study(7) appears to be the most robust, well-designed and high-quality study. However, due to the nature of the study, Borrelli et al. only observed the management methods of the early pushing urge chosen by the midwives without being able to compare and report the risks and benefits of different management methods.

Incidence Rate

A wide range of incidence rate of the early pushing urge was reported in the various studies. Yeates and Roberts' randomized controlled trial(8) reported nine of the ten participating women (90%) experienced the urge to push before full dilation, whereas Roberts et al.(9) observed 20 out of the 31 laboring women (64%) with the

early pushing urge. The non-peer-reviewed survey conducted by the Trent Midwives Research Group(12) indicated an incidence rate of 40%, with 153 out of 383 labouring women had the early pushing urge. Lastly, in Borrelli et al.'s observational study,(7) 60 of the 789 labouring women (7.6%) felt an urge to push before full dilation. Due to the large number of participants and high-quality design, Borrelli et al.(7) likely have provided the best estimate for the incidence of the early pushing urge as 7.6%.

Adverse Outcomes

Although some experts such as Roberts(5) and Frye(4) suggested pushing with the early urge may cause harms, such as cervical trauma, prolonged second stage and maternal fatigue, evidence from the research studies did not show any association between the early pushing urge and an increase in adverse maternal or neonatal outcomes. No cervical lacerations or an increase in other adverse outcomes was reported in neither the large-scaled observational study by Borrelli et al.(7) nor the randomized controlled pilot trial by Yeates and Roberts.(8) Conversely, in Roberts et al.'s case report(9) of 31 labouring women, one woman with the early pushing urge and two without the early urge had cervical lacerations. Aderhold and Roberts(10) reported one woman who pushed for one and half hour before full dilation had cervical edema and eventually a cervical laceration after delivery. It is not possible to draw any associations between the early pushing urge and cervical lacerations based on the available data.

The literature reviews by McKeon et al.,(17) Chalk,(20) and Davis,(23) and the textbook by Chapman and Charles(26) agreed there was no evidence that showed

pushing before full dilation might cause cervical edema or trauma. In addition, no adverse neonatal outcomes were reported with the early pushing urge in any of the research studies and case reports.(2,7-11)

Management

Very limited evidence existed on the optimum management of the early pushing urge. Yeates and Roberts' randomized controlled pilot study(8) compared the expectant management of allowing women to push with the early urge vs the active management of discouraging women from pushing before full dilation. Due to the small sample size of ten participants,(8) no recommendations on the management method of early pushing urge could be inferred from the trial.

The observational study by Borrelli et al.(7) and the four case studies by Roberts et al.,(9) McKay et al.,(2) Aderhold and Roberts,(10) and Bergstrom et al.(11) though did not compare different management methods directly but provided some evidence that pushing with the early urge before full dilation did not increase risks of cervical lacerations or any adverse outcomes comparing to resisting pushing before full dilation.

The guidelines, literatures reviews, and expert opinions on the management of the early pushing urge differed considerably with each other. The literature review by Perez-Botella and Downe(21) and Myles' Textbook for Midwives(1) explicitly stated the optimum method in managing the early pushing urge was yet to be established.

The two guidelines found from the database searches recommended active management of the early pushing urge and asserted women should be discouraged from pushing before full dilation to prevent cervical edema and lacerations.(13,14) In

contrast, expectant management of the early pushing urge was supported in Davis's literature review(23) and Chapman and Charles's midwifery textbook.(26) Both suggested the early pushing urge may be physiological and only the expectant management was necessary.

Most literature reviews(5,15,16,19,20,22) and textbooks,(1,4,24,25) however, recommended an individualized management plan for the early pushing urge and suggested if a woman is greater than 8 cm dilated; her cervix is soft and stretchy; the fetal position is occiput anterior; and the fetal station is greater than 1; then the woman should be allowed to push with her nature urges. However, if those conditions are not satisfied, then active management with controlled breathing, position changes, bath, narcotics or epidural anesthesia to prevent the woman from pushing should be utilized. Further studies to evaluate the various recommended management methods are essential in establishing the optimum management for the early pushing urge.

Management Preferences by Care Providers

Surveys conducted on care providers' management preferences on the early pushing urge indicated that despite of a lack of evidence on the optimum management, the majority of care providers would actively prevent women from pushing before full dilation.(6,12) In a 1994 UK study,(12) 43% of the midwives stated they would instruct women not to push with the early urge under all circumstances. Similarly, in a 1997 US survey,(6) 45.5% of the labour and delivery nurses reported to coach women not to push until full dilation. Interestingly, care providers' preferences seemed to have been changing over time. In a 2001 survey,(12) only 15% of the midwives would instruct

women not to push before full dilation under all circumstances and majority of the midwives reported their management of the early pushing urge would vary according to the woman's parity and labour progress. Thus, the care providers' management preferences on early pushing urge had changed to align more with the current recommendations from expert opinions and literature reviews.

Discussion

Delayed Investigations

Borrelli et al.(7) proposed the varying incidence rate from the individual midwives and various studies might be resulted from care providers' management preferences. Depending on the studies, the incidence rate of early pushing urge was reported ranging from 7.6%,(7) 64,(9) to 90%.(8) In Borrelli et al.'s observational study,(7) the incidence of the early pushing urge also varied widely between individual midwives, spanning from 2.3% to 20%. In addition, Borrelli et al.(7) found a delay between the onset of the early pushing urge and the investigation with a vaginal examination by the care provider was associated with a lower diagnosis rate of the early pushing urge. In Borrelli et al.'s study,(7) 60% of the early pushing urge cases were diagnosed when the onset of the pushing urge and the investigation with a vaginal examination was within 30 minutes of each other, whereas only 7% of the cases were identified 90 minutes after the pushing urge was observed. Thus, the incidence rate of the early pushing urge appeared to depend closely on the promptness of the follow-up investigation.

Furthermore, a delay in the investigation might allow the cervix time to dilate and the early pushing urge to resolve spontaneously.

Since evidence did not show an increased risks of cervical lacerations or any other adverse maternal or neonatal outcomes from the early pushing urge,(7,8,17,20,23,26) Borrelli et al.'s(7) observation of the delayed investigations may infer that managing the early pushing urge expectantly by allowing the woman to push with her own urge may be appropriate.

Implications

The early pushing urge, with a best-estimated incidence rate of 7.6%,(7) affect a large number of laboring women; however, there are only a small number of peer-reviewed research studies on the topic. Due to the lack of evidence and the discrepant recommendations from the literature reviews, textbooks, and guidelines on the management of the early pushing urge, care providers are compelled to manage this frequent-occurring phenomenon without guidance and based on personal preferences.(3) In addition, some evidence showed that care providers' management preferences strongly influenced the diagnosis rate of the early pushing urge.(7) Thus, it is essential to conduct more studies on the optimum management of the phenomenon, including researches on comparing expectant to active management methods, or a combination of both management methods. Furthermore, the effectiveness, risks and benefits of different active management methods, such as breathing, bath, position changes, narcotics or epidural anesthesia, should be examined to identify the optimum methods when active management needs to be considered.

Knowledge on women's experiences of the early pushing urge and their attitudes towards its management is also limited. In qualitative studies,(2,11) women often described the early pushing urge as overwhelming, compulsive and irresistible and it was extremely difficult to stop the involuntary pushing urge regardless of the coping techniques suggested by the care provider. Roberts and Woolley(16) also suggested that resisting the urge to push before full dilation might cause a woman to disassociate from her bodily instincts and resulted in having difficulty to coordinate pushing at full dilation. However, no well-designed researches have investigated women's experiences on the early pushing urge. Further qualitative studies on women's attitudes and responses towards the early pushing urge and the various management methods is required to help guide care providers' management of the phenomenon.

Conclusion

This scoping review has attempted to collect all the relevant studies on the subject of early pushing urge before full dilation. Although the early pushing urge seemed to be a common phenomenon and happened to at least 7.6% of labouring women,(7) only a small number of trials and literatures and limited evidence were identified through the database and hand searches.

Traditionally, the early pushing urge was believed to cause cervical edema and lacerations(1,4,5); hence, the active management of preventing women from pushing with the early urge have been recommended.(1,4,5) However, the evidence from the randomized controlled trial,(8) observational study(7) and case reports(2,9-11) did not show any evidence that the early pushing urge would increase risks of cervical trauma

or any other adverse maternal or fetal outcomes. Some evidence even suggested the early pushing urge might resolve spontaneously and could be managed expectantly.(7) In contrast, most experts recommended an individualized management plan which would allow a woman to push if certain maternal and fetal conditions are satisfied.(5,15,16,19,20,22)

Further and more robust studies on the optimum management methods of the early pushing urge, the effectiveness of various active management options and women's experiences and attitudes towards the management methods should be conducted to enhance our understanding of the early pushing urge and help care providers better serve the birthing women.

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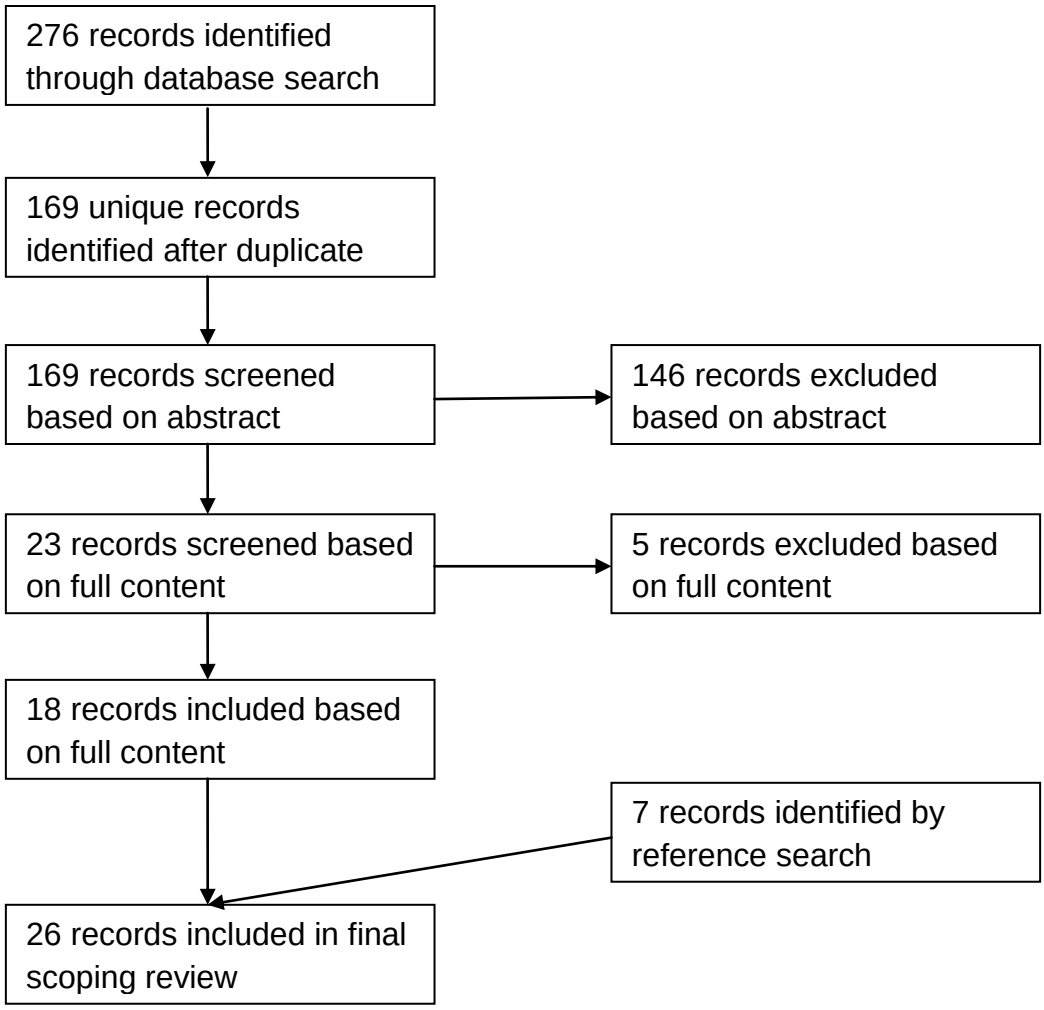
Table 1: Search String Used for Electronic Database Searches

Database	Date Range	Search String
PubMed	1946 to Oct 11, 2014	((involuntar* or urge or urges) and (“bear* down” or push*) and (“Labor, Obstetric”[Majr]) not (“Analgesia, Obstetrical”[Majr] or “Anesthesia, Obstetrical”[Majr])) OR ((involuntar* or urge or urges) and ("bear* down" or push*) and (labo?r or childbirth or parturition or obstetric) not (epidural or anesthesia or analgesia) and ("last 3 years"[PDat])) and (English[lang])
MEDLINE (OvidSP)	1946 to Oct 11, 2014	1. (((involuntar$ or urge?) and ("bear$ down" or push$)).mp. and exp *Labor, Obstetric/) not (exp *Anesthesia, Obstetric/ or exp *Analgesia, Obstetric/) 2. ((involuntar$ or urge?) and ("bear$ down" or push$) and (labo?r or childbirth or parturition or obstetric)).mp. not (epidural, anesthesia or analgesia).kw. 3. limit 2 to last 3 years 4. 1 or 3 5. limit 4 to english language
CiNAHL	1960 to Oct 11, 2014	TX ((involuntar* or urge?) and ("bear* down" or push*)) AND MW (second and stage) NOT MJ (anesthesia or analgesia or epidural) Limiters - English Language

EBM Reviews (OvidSP)	till Oct 11, 2014	((involuntar$ or urge?) and ("bear$ down" or push$) and (labo?r or childbirth or parturition or obstetric)).mp. not (epidural or anesthesia or analgesia).kw. not (epidural or anesthesia or analgesia).ti.
EMBASE (OvidSP)	till Oct 11, 2014	(((involuntar$ or urge?) and ("bear$ down" or push$)).mp. and exp *Labor/) not exp *Epidural/ limit 1 to English language
Cochrane (Cochrane Central Register of Controlled Trials) (OVID)	till Oct 11, 2014	(((involuntar$ or urge?) and ("bear$ down" or push$)).mp. and exp Labor, Obstetric) not (exp Anesthesia, Epidural/ or exp Analgesia, Epidural/)
Web of Science	1900 to Oct 11, 2014	TS= ((involuntar* or urge$) and (bear* or push*)) and SU=Obstetrics & Gynecology
Trip Database	till Oct 11, 2014	(premature or early)("urge to push" or "bear down") (labor or labour or childbirth or obstetrics)
ProQuest	till Oct 11, 2014	(involuntar* OR urge OR urges) near/10 (push* or "bear* down") and SU((obstetrics or midwifery or birth or childbirth) and (labour or labor))
ClinicalTrials.gov	till Oct 11, 2014	"urge to push" OR "involuntary bearing down"
Current	till Oct 11,	second stage AND labour

Controlled Trials	2014	
Academic Search Complete	till Oct 11, 2014	TX (premature OR early) AND TX (involuntary OR involuntarily OR urge) AND TX (push OR "bear down" OR "bearing down") AND SU (obstetrics OR midwifery) NOT SU (epidural OR analgesia OR anesthesia)
Allied Health Evidence	till Oct 11, 2014	Two separate searches with the following search strings: "second stage" labour "second stage" labor
Google Scholar	till Oct 11, 2014	"premature urge to push" OR "early urge to push"
National Guideline Clearinghouse	till Oct 11, 2014	'second stage' and 'childbirth’

Figure 1: Flow diagram for the paper selection process



Appendix – List of Literatures by Categories

Table A1: Randomized Controlled Study

Title	Authors	Year of Publication	Publication	Location	Design	Objectives	Method	Population	Sample	Intervention	Comparator	Outcome Measured	Results
A comparison of two bearing-down techniques during the second stage of labor	Yeates, D.A.; Roberts, J.E.	1984	Journal of Nurse-Midwifery	United States	Randomized controlled study	To compare the active vs expectant management methods for the early urge to push during the second stage of labour	Labouring women were randomized into control and experimental groups. Women in control group were encouraged to blow through contractions if an urge to push was felt before full dilation. Women in the experimental group were encouraged to push with the natural urge without adding extra pushing effort.	Low-risk labouring women	10 labouring women	To allow a labouring woman to push with her body's natural urge regardless of the status of her cervical dilation	To prevent a labouring woman from pushing by blowing through contractions until the cervix was fully dilated	- Duration of the second stage - Perineal integrity - Neonatal Apgar scores	- 9 of the 10 women felt the urge to push before full dilatation. - In 5 of the women (3 in the control group and 2 in the experimental group), the urge to push became compelling, causing them to bear-down spontaneously before full dilatation. - No overall differences were found in Apgar scores. - There were no cervical, periurethral or fourth degree lacerations in either group.

Table A2: Prospective Observational Study

Title	Authors	Year of Publication	Publication	Location	Objectives	Method	Population	Sample	Results
Early pushing urge in labour and midwifery practice: a prospective observational study at an Italian maternity hospital	Borrelli, S.E.; Locatelli, A.; Nespoli, A.	2013	Midwifery	Italy	To investigate the early pushing urge incidence and management methods by midwives. Some obstetric outcomes were observed but not	22 midwives, who provided care to low-to-moderate risk labouring women following local protocols in an Italian maternity hospital, collected data on labouring women who experienced irresistible early urge to push,	Women above 18 years of age, with a singleton pregnancy and the cephalic presentation labouring at term and experiencing irresistible early urge to push	789 women	- Incidence of early urge to push was 7.6% (60 cases out of 789 births). - Single midwife incidence ranged from 2.3% to 20%. - The number of diagnoses decreased as the length of time

					analyzed.	which was confirmed by vaginal examination.			between the first urge to push and the investigation with a vaginal examine increased. - Early urge to push was associated with posterior position (41%), deflected head (30%) or both (27%). - 52 cases (87%) were managed actively with techniques, such as position change (75%), blowing breath (48%), vocalization (27%), bath (15%), epidural (15%), reduction of anterior lip (10%), amniotomy (3%) and oxytocin augmentation (2%). - 8 cases (13%) were managed expectantly. - No increased maternal or neonatal adverse outcomes - No third or fourth degree tear - No cervical laceration - No postpartum hemorrhages

Table A3: Case Studies

Title	Authors	Year of Publication	Publication	Location	Objectives	Method	Sample	Results
A descriptive analysis of involuntary bearing-down efforts during the expulsive phase of labor	Roberts, J.E.; Goldstein, S.A.; Gruener, J.S.; Maggio, M.; Mendez-Bauer, C.	1987	Journal of Obstetric, Gynecologic and Neonatal Nursing	United States	To learn more about the nature and characteristics of spontaneous bearing-down efforts in the second stage	Healthy term nulliparous women who received no formal childbirth education and were bearing down spontaneously in the second stage of labour were observed and audio-recorded while their intrauterine pressure and fetal heart rate were being monitored.	31 nulliparas (28 black women and 3 Hispanic women)	- 20 out of 31 (64%) women experienced urge to push before full cervical dilatation. - There was no statistically significant association between occiput posterior position and urge to push before full dilatation. - There was a significant association between fetal station and the onset of urge to push. 29 out of 31 women first experienced the urge to push when fetal station is at +1 or lower. - Cervical lacerations happened to 2 of the 11 women who did not had the urge to push until full dilatation and 1 of the 20 women who had the urge to push before full dilatation.
I gotta push. Please let me push! Social	Bergstrom, L.; Seidel, J.; Skillman-Hull,	1997	Birth	Colorado, United States	To examine the social events and communications that occur during the change of	Videotapes of women in the second stage of labor and their caregivers were analyzed using	3 labouring women with low to moderate risks experiencing	Social and interactive features observed in the transition from the first stage to the second stage of

interactions during the change from first to second stage labor	L.; Roberts, J.				first and second stage of labour when a laboring woman has a strong involuntary urge to push before being examined as having complete cervical dilatation.	the methods derived from conversational analysis.	urges to push before full cervical dilatation	labour included (1) the health care provider insisted the woman to suppress her involuntary urges to push; (2) both the health care provider and labouring woman looked forward to the certification of the full cervical dilation by a designated authority (usually, a physician), regardless of the woman's involuntary urges to push; and (3) the certification process marked a ritual transition to “official” second stage labor; in which the woman’s involuntary urges were considered appropriate. 1 of the 3 women in the study had the urge to push before full dilation and was discouraged from pushing with the breathing technique and was managed with the manual reduction of the anterior lip.
Phases of second stage labor: Four descriptive case studies.	Aderhold, K.J.; Roberts, J.E.	1991	Journal of Nurse-Midwifery	United States	To study the progression and phases of spontaneous second stage	Women in spontaneous labour were videotaped from the onset of second stage, defined as maternal involuntary urge to push or full cervical dilatation, to spontaneous delivery. The external uterine contraction monitoring records, written transcripts, audiotapes of conversation and videotapes were analyzed for verbal and nonverbal behaviours in the birthing room.	4 white nulliparous women with low to moderate risk term pregnancy in spontaneous labour and delivery	Two out of four women had the urge to push with an anterior lip of cervix remaining. One who had the urge to push before full dilatation had a swollen anterior lip about 1.5 hour after the start of pushing and a cervical laceration after delivery.
Women's views of second-stage labor as assessed by interviews and videotapes	McKay, S.; Barrows, T.; Roberts, J.	1990	Birth	United States	To explore from birthing women what second-stage of labour felt like and what advice from childbirth educators or care providers helped or hindered them	Postpartum women were interviewed about their experiences in the second stage of labour while viewing the videotapes of their second stage. The videotapes started with either the maternal urges to push or full cervical dilatation assessed by the care providers until the birth of the infant. The interviews were analyzed and the major themes were identified.	20 birthing women with low-to-moderate obstetric risk (13 primiparas and 7 multiparas; 16 caucasian women, 3 Hispanic women, and 1 black woman)	- 9 women (45%) felt relief, pressure, stretching or straining at second stage and 7 women (35%) felt negative sensations, such as feeling miserable, terrible, or painful. - 13 women had the urge to push; some had the urge before full dilatation (number not specified in the study); 1 woman had an intermittent urge and 5 women did not have the urge to push. - Pushing instructions from the care providers were considered as confusing and not helpful.

								- 7 women found grunting or vocalizing were helpful for pushing. - 1 out of 7 women found squatting helpful; most of them did not like squatting and 2 women prefers side-lying - Generally, women were not prepared for the length, intensity, and pain of the second stage.

Table A4: Surveys

Title	Authors	Year of Publication	Publication	Location	Objectives	Method	Population	Sample	Results	Note
Exploring midwives' practices in relation to the early pushing urge	Downe, S.	2008	"The early pushing urge: practice and discourse" by Downe, S.; Young, C.; Moran, V.	UK	To explore midwives' practices with the early pushing urge and changes with practices with experiences	Two surveys were conducted in 1994 and 2001 with semi-structured scenario-based questionnaires with free-format responses given to midwives at study days organized by Midwives' Information and Resource Service	Midwives in UK	129 midwives	1994 Survey - 43% (56/129) midwives would prevent pushing before full dilation under all circumstances - 53% (68/129) midwives would manage the early urge to push depending on the woman's parity and cervical dilation - 4% (5/129) midwives would manage the early urge to push by following maternal instinct 2001 Survey - 15% midwives would prevent pushing before full dilation under all circumstances - 15% midwives would manage the early urge to push by following maternal instinct pushing before full dilation	Not published as a peer-reviewed study
Pushing techniques during labor: issues and controversies	Petersen, L.; Besuner, P.	1997	Journal of Obstetric, Gynecologic, and Neonatal Nursing	United States	To identify common beliefs and practices among labour and delivery nurses	Questionnaire on common beliefs and practices of second stage of labour were distributed to labour and delivery nurses.	Labor and delivery nurses	1519 nurses	- 92.7% of nurses had attended labouring women with early urge to push before full dilation. - 80.6% of nurses managed early urge to push actively with a pant-and-blow technique. - 45.5% of nurses would instruct women not to push until they were told. - Other frequently used	Not published as a peer-reviewed study

									techniques to discouraging push with early urge included position changes, moaning, grunting, light pushes, explaining the risk of cervical swelling and prolonged labour, use of epidural, use of nitrous oxide.	
The incidence of the early pushing urge in one UK regional health authority	Trent Midwives Research Group	2008	"The early pushing urge: practice and discourse" by Downe, S.; Young, C.; Moran, V.	UK	To establish the incidence of early pushing urge before full dilatation	Midwives attending births at four maternity units in UK in 1999 were asked to complete a questionnaire of five questions related to the incidence of early pushing urge after each birth.	Births in two tertiary and two secondary level consultant maternity units	383 survey results from 918 births	- 42% (383/918) response rate - 40% (153/ 383) women experienced early pushing urge - Half of those women had the early urge at 6-9cm dilation - Extrapolated incidence is 20% (153/765) - No association between early pushing urge and parity	Not published as a peer-reviewed study

Table A5: Clinical Guidelines

Title	Authors	Year of Publication	Recommendations
Preparation for Childbirth. A Health Workers Manual. Appropriate Technologies for Development. Peace Corps Information Collection & Exchange Reprint R-55.	Hansen, M.	1985	"A mother must refrain from pushing with a contraction before full cervical dilation. Premature pushing can cause swelling or tearing of the cervix. Blowing out forcibly can keep the woman's abdomen vibrating and stop her from pushing."
The Merck Manual Professional Edition: Management of normal labor	Brown, H.L.	2013	"Women may begin to feel the urge to bear down as the presenting part descends into the pelvis. However, they should be discouraged from bearing down until the cervix is fully dilated so that they do not tear the cervix or waste energy."

Table A6: Literature Reviews

Title	Authors	Year of Publication	Publication	Recommendations
A new understanding of the second stage of labor: Implications for nursing care	Roberts, J.	2003	Journal of Obstetric, Gynecologic, and Neonatal Nursing	To manage the early urge to push, if the fetal head is at station +1 or lower and rotation from occiput transverse to occiput anterior position, and there is only a soft cervical rim retracting with a contraction, the woman should be supported to push with the urge. If a woman experiences an urge to push prior to adequate fetal rotation and descent, she should use relaxation and slow breathing techniques and only push at the peak of a contraction when the urge is irresistible.
A second look at the second stage of labor	Roberts, J.; Woolley, D.	1996	Journal of Obstetric, Gynecologic, and Neonatal Nursing	Women may find resisting her body's reflex urges to push before full dilation tiring and frustrating and later have difficulties responding to her pushing urge at full dilation due to a disassociation from her bodily sensations resulted from the early resistance. If the cervix is 8-9cm dilated, soft and retracting; and the fetal head is at station +1 or lower and in the transverse or

				anterior position; then women should be allowed to bear down at the peak of the contractions for relief and breathe through towards the end of the contraction. The limited pushing in response to the involuntary urge helps the cervical dilation and labour progress. If the fetus is in a posterior position, side-lying or hands-and-knees positions may facilitate fetal rotation and lessen the urge to push.
Limits on second stage pushing and time	Chalk, A.	2004	British Journal of Midwifery	No evidence has demonstrated that pushing before full dilatation increases the risks of cervical edema or trauma. A woman should be allowed to push with her urges if her cervix is 8-9cm dilated or if the fetal head is low and there is only a 'rim' of cervix remains. If the fetal head is deeply engaged in an occiput posterior position and the cervix is not fully dilated, soft or effaced, pushing with the early urges might cause cervical trauma. The epidural analgesia may lessen the urges to push and allow the fetal head to rotate.
Nursing management of second stage labor	McKeon, V.A.; O'Reilly, M.	1997	Online Journal of Knowledge Synthesis for Nursing	Allowing women to push with the involuntary urges before complete dilation, may not cause cervical edema or cervical lacerations.
Physiologic second	Cosner, K.R.; de Jong, E.	1993	The American Journal of Maternal Child Nursing	Women should be allowed but not encouraged to bear down spontaneously when urges to push occur at 8 to 9 centimeters. Since maternal responses vary, individualized management is essential.
Second-stage labor care: challenges in spontaneous bearing down	Hanson, L.	2009	The Journal of Perinatal & Neonatal Nursing	The early urge to push is commonly caused by an occiput posterior fetus or asynclitism. Pushing at the peak of contraction should be allowed to provide relief. Postural interventions, such as side-lying, squatting, supported squat, and hands-and-knees, may help rotate the occiput posterior fetus. However, there is no evidence on the effectiveness of these positions. Interventions, such as abdominal lift, lunge, “duck walk” or stair climbing, may be used to correct asynclitism. Anterior lip of cervix may be reduced with the positions of hands-and-knees, exaggerated Sims, open knee-chest, or standing to redistribute or alleviate pressure on the cervix and, hence, diminish the urge to push. When an anterior lip persists or become edematous, the closed knee-chest or hands-and-knees position may reduce the force of gravity on the anterior portion of the cervix. In addition, therapeutic rest with narcotic analgesia or epidural should be considered.
Stories as evidence: the premature urge to push	Perez-Botella, M; Downe, S.	2006	British Journal of Midwifery	No strong evidence exists on the optimal approach to support women who experience the early urge to push.
Supportive care during labor: A guide for busy nurses	Simkin, P.	2002	Journal of Obstetric, Gynecologic, and Neonatal Nursing	To manage the early urge to push, if the cervix is mostly dilated and very stretchy, the woman should be allowed to bear down just enough to satisfy the urge. If the cervix is not close to complete dilation, the early urge to push may be due to a fetal malposition, and forceful bearing down should be prevented. Panting through contractions and position changes to side-lying, hands-and-knees or kneeling may help reduce the urge to push. If the urge to push is uncontrollable, excessive or distressing, epidural may be required.
The push for evidence: management of the second stage	Roberts, J.E.	2002	Journal of Midwifery & Women's Health	When the fetal head is deeply engaged and in an occiput posterior position and the cervix is less than 8 cm dilated, tight and not retracting, the woman may experience a strong urge to push. In these cases, resisting the urge to push is necessary to avoid a prolonged period of pushing, maternal fatigue and a swollen or torn cervix. If the cervix is 8-9cm dilated, soft and retracting during a contraction, the fetal station is +1 or lower, and the fetal position is occiput transfer to occiput anterior, pushing at the peak of the contraction with the urge to push will likely lead to further cervical dilatation.
To push... or not to push?	Davis, J.	2012	The Practising Midwife	The early urge to push may be physiological. When a baby is in the occiput posterior position, a woman's pushing with the early urge may help the fetal head rotate and flex and further dilate the cervix without causing cervical edema or trauma.

Table A7: Textbooks

Book Title	Section Title	Authors	Editors	Year of Publication	Edition	Publisher	Recommendation
A guide to effective care in pregnancy and childbirth	N/A	Enkin, M.;Keirse, M.;Neilson, J.;Crowther, C.;Duley, L.;Hodnett, E.;Hofmeyr, J.;	N/A	2000	3rd Ed	Oxford University Press	If a woman has the early urge to push before her cervix is 8 cm dilated, she should find a comfortable position and try to resist the urge with breathing techniques. Epidural analgesia may be considered. If there is only a rim of cervix left and the urge to push is irresistible, a woman may feel better to push with the urge. Pushing in this situation is unlikely to cause harm as long as she does not exhaust herself.
Holistic midwifery, a comprehensive textbook for midwives in homebirth practice: volume II: care of the mother and baby from the onset of labor through the first hours after birth	Cervical and other soft tissue problems during labor	Frye, A.	N/A	2004	N/A	Labrys Press	Active bearing down before complete dilation is the primary cause of cervical trauma and anterior lip formation. However, preventing a woman from pushing with the involuntary urge before full dilation is counterproductive and may cause maternal exhaustion. A woman should be encouraged to let her uterus push with the early urge without adding any voluntary efforts. A woman's body, left to its own devices, will usually not hurt itself. The uterus will frequently pull the cervix away and complete the dilation. If the early urge to push is uncontrollable or the cervix starts to swell, position changes to hands-and-knees or side-lying may lessen the urge. Cervical lips that do not resolve on their own can usually be reduced manually or with the supine position, exaggerated crawling, rolling from side-to-side, or hot bath.
Myles Textbook for Midwives	The transition and the second stage of labour: physiology and the role of the midwife	Downe,S.	Fraser, D. M.; Cooper, M. A.	2009	15th Ed.	Churchill Livingstone	Traditionally, the early pushing urge is managed actively to prevent bearing down before full cervical dilation with techniques such as position changes, controlled breathing, and use of nitrous oxide, narcotics or epidural analgesia. However, if both the mother and baby are well with good labour progress, some midwives would support the woman to push with the early urge without confirming full dilation. The optimum management method of the early urge to push has not yet be established.
The labor progress handbook: Early interventions to prevent and treat dystocia	N/A	Simkin, P.; Ancheta, R.	N/A	2011	3rd Ed	Wiley-Blackwell	Mild to moderate urges to push before complete dilation can be lessened with position changes or brief grunting with the urge. The uncontrollable and convulsive urge to push is usually associated with an occiput posterior fetus. Pushing with an occiput posterior fetus before full dilation may lead to a swollen cervix or torn cervix and prevent further progress. Position changes to hands-and-knees, semi-prone (exaggerated Sims) or open knee-chest positions may relieve the urge to push. Manually repositioning of the fetal head may also help. If the urge to push is sever and convulsive or if the cervix swells, epidural analgesia may be considered.
The midwife's labour and birth handbook	N/A	N/A	Chapman,V.; Charles, C.	2013	3rd Ed	Wiley-Blackwell	No evidence supports that pushing before full dilatation increases the risk of cervical edema or trauma. The premature pushing urge is common in occiput posterior fetuses and may be physiologically desirable to rotate the fetus into an optimum position prior to full

							dilation and descent.