

# Evidenced Based Management of Pushing in Second Stage of Labour

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**Abstract:** *Recognition that the available evidence does not support arbitrary time limits for the second stage of labor has led to reconsideration of the influence of maternal bearing down efforts on fetal/newborn status as well as on maternal pelvic structural integrity. The evidence that the duration of 'active' pushing is associated with fetal acidosis and denervation injury to maternal perineal musculature has contributed to the delineation of at least two phases during second stage, an early phase of continued fetal descent, and a phase of "active" pushing. The basis for the recommendation that the early phase of passive descent be prolonged and the phase of active pushing shortened by strategies to achieve effective, but non-detrimental pushing efforts is reviewed. The rationale includes an emphasis on the obstetric factors that are optimal for birth and conducive to efficient maternal bearing down. Explicit assessment of these obstetric factors and observation of maternal behavior, particularly evidence of an involuntary urge to push, should be coupled with the use of maternal positions that will promote fetal descent as well as reduce maternal pain.*

**Keywords:** duration of active second-stage labor, maternal and neonatal outcome

## 1. Introduction

The second stage of labor is both a profound physiologic process and personal experience for the laboring woman. It is also a challenging phase of labor for the birth attendant who must consider the objective aspects of labor progression as well as help the woman cope with the pronounced sensations and pain that accompany fetal descent and birth. It can also be a challenge to provide appropriate care to a woman during the second stage where there are conflicting opinions about the various aspects of care and strategies for achieving "the best" birth outcomes for the mother as well as the newborn. For some, the management of second stage implies total avoidance of this stage of labor and all of its associated "risks" through elective cesarean section (1). For others, it denotes lesser invasive operative interventions that can be achieved through forceps assisted birth subsequent to epidural analgesia; to still others, it means spontaneous birth involving dialogue, support, and selective direction to the woman. The dissonance between operative intervention and spontaneous birth may be characterized as the extremes of medical and midwifery models of care. Most of the care women receive during the second stage of labor falls somewhere between these extremes, with both physician and other care providers wanting to help women achieve a timely and satisfactory birth. However, in many U.S. maternity settings, the second stage of labor is characterized by urgency, admonitions to the woman to push, and haste, on the premise that the shorter the second stage of labor, the better (2). Recognizing that operative assistance is sometimes necessary, the midwife in the contemporary social context of birth care must learn not only how to interpret the physical and behavioral indicators of progress in labor, but s/he must also know how to transact the achievement of a "good birth;" that is, one accompanied by the healthiest possible newborn outcomes and, from the woman's perspective, a positive birth experience, ideally one of joy and sense of accomplishment. One issue in addressing care practices in the second stage of labor is that much of what gets

transacted between a midwife and the laboring woman is interrelational and not procedural. The actions or lack of interventions on the part of the midwife reflect a philosophy of care that is oriented to the enhancement of the woman's capabilities to give birth. The midwifery philosophy includes a commitment to not only preserve, but also to promote the normalcy of labor and delivery and the woman's active participation in her birth, to the extent that is possible or, from the woman's perspective, desirable. Some of the midwife's decisions that are reflected in supportive care extend from a respect of the woman's ability to participate in the birth in an effective way that requires support but not "management." The use of a particular position may extend from a dialogue with the woman about her pain and the ways she can most effectively "work" with or cope with her contractions and the bearing down efforts that accompany advancing second stage (3). Until the incorporation of scientific principles into midwifery practice, the supportive behaviors of the midwife and the use of various positions may not have been viewed as interventions. In the minds of many, second stage "interventions" have become synonymous with medical procedures, such as episiotomy and forceps assistance, that are costly and associated with both positive and negative health outcomes (4).

## 2. Material and Method

This paper focuses on the caregiver actions that are not procedural, but rather have more to do with the way in which the caregiver-nurse, midwife, or physician-provides care to the laboring woman and helps her with the unique aspects of second stage as they relate to the accomplishment of the birth. These actions involve personal interaction with the woman, interpretation of the progress of labor including fetal well-being, and the diagnosis of second stage. The information, or evidence, related to midwifery "interventions" includes communications to the woman regarding bearing down with contractions, ways to push effectively, and how to position herself. Some of the evidence about the

interpretation of second stage, the maternal bearing down reflex, types of pushing, and maternal positions for birth has been derived from clinical trials that provide the best guidance for “what works” in achieving positive outcomes. Other evidence comes from descriptive and qualitative studies based on record reviews, observations, and the analysis of narrative data. These reports have provided a basis for interpreting the nature of normal second stage labor and the behaviors that are characteristics of advanced labor. The results of descriptive studies have provided information about what is “normal” and have sensitized clinicians to aspects of care that had not been clearly addressed in experimental studies. Descriptive studies have also provided information about behavior and practices within the context of care settings and the perspectives of women giving birth. Thus, the results of prospective randomized clinical trials, meta-analyses of clinical trials from the Cochrane Perinatal Database (5), and other experimental studies give us a better understanding about physical and behavioral changes during labor, about what is “going on,” and what helps women during labor and birth. Knowledge of the evidence about physical and behavioral changes that characterize second stage can support the interventions that achieve desirable birth outcomes for the mother and for the newborn. This knowledge is essential for caregivers in birth settings in order for them to provide care that is safe as well as humane. This article reviews that evidence along with presenting a reconceptualization of second stage of labor as having “phases,” as opposed to being a single, final, stage of labor. Such a reconceptualization is necessary for interpreting “progress,” for interpreting the woman’s behavior, and for offering the most helpful direction or intervention.

### Issues in the Second Stage

The anatomic and physiologic features of labor and birth are described in well-known obstetric and midwifery textbooks. There are several issues in the interpretation of the progression of second stage and in the care given to women during this stage of labor. These include the diagnosis of second stage, interpretation of its progression and duration, strategies to assist women with bearing down, the relief of pain, the merit of various positions during second stage and for birth, and strategies to minimize perineal trauma.

### Diagnosis of Second Stage

The current and traditional definition of second stage is when the cervix is fully dilated. Spontaneous maternal bearing down efforts may precede or follow complete cervical dilatation and will progress in their forcefulness (6). The duration of second stage relies on the identification of the time at which complete dilatation is noted by the appropriate clinician (nurse, midwife, or physician, student, or recognized “expert”) based on their decision to do a digital assessment of the cervix (7). As such, there is the potential for a great deal of variation in the time at which the “diagnosis” of complete dilatation is made, depending on when the clinician decides to perform a vaginal examination. The determination that the cervix

is completely dilated, or not, has traditionally influenced direction to the woman to “push” or “not to push.” In conjunction with the diagnostic vaginal examination, there are some traditional “rules” that are often enforced. One rule is “not to push prior to complete cervical dilatation;” another is “to push when the cervix is complete” (8). There are adverse clinical consequences suggested for imposing these arbitrary rules.

**The ‘no pushing’ rule.** In the first instance, the woman with an urge to push prior to complete dilatation is told “not to push” to prevent cervical lacerations or edema that are thought to prolong labor (4, 11, 15, 16). The evidence for these potential problems is only anecdotal.

Nevertheless, the woman is coached in “panting” that helps her to resist this involuntary urge. In following the caregiver’s instructions, the woman gets into a pattern of trying to overcome the sensations to bear down that accompany contractions. When this woman does reach complete dilatation, she often finds it difficult to “push with the urge” and continues to need direction from the caregiver to push “correctly” and at the right time when a contraction starts. There are clinical reports (7) of labors where the fetal head is deeply engaged and in an occiput posterior position and the woman experiences a strong urge to bear down, but the cervix is tight (not soft and retracting) and less than 8 cm dilated. In these circumstances, strategies to help the woman resist this urge to push are necessary (9). The purpose is to avoid a protracted period of pushing, maternal fatigue, and possibly a swollen or torn cervix. It is possibly this kind of situation that has resulted in the generalized direction to women to “not push prior to complete dilatation,” without assessment of other obstetric factors.

### The “push at 10 cm” rule.

When a woman is directed to “push” upon complete dilatation, even if she does not feel an urge to push, she usually tries to follow the directions to push as long and as hard as she can with the start of a contraction. This may result in a very prolonged period of bearing down, because if the fetal head is not situated in the pelvis in a manner that is conducive to descent, progress may not occur. In both situations where these rules are imposed, the woman becomes dependent on direction and retains a pattern of following those directions that are often out-of-phase with her own sensations. and fortitude of all have been dissipated” (10). One of the earliest reports of the adverse consequences of directing women to push upon complete dilatation is a descriptive, comparative study by Beynon. She reported the need for forceps assistance and the incidence of perineal trauma (episiotomy or lacerations) were greater for women who were directed to push upon complete dilatation than for 100 women for whom those directions were delayed until they had an involuntary urge to bear down. She concluded that admonitions to push early in the second stage led to other interventions, as well as maternal fatigue. These directions also disrupted the progression of labor, with a sense of urgency and force dominating the environment of the birth as opposed to one of calm support. Thus, directions to a

woman not to push when she feels the urge, but is not yet completely dilated can be disruptive to the establishment of a pattern of effective bearing down with contractions; and directions to push arbitrarily upon complete dilatation of the cervix can also lead to an ineffective pattern of pushing, maternal exhaustion, practitioner frustration, and other interventions.

### The expulsive phase of labor

Another perspective about the second stage is the identification of an “expulsive phase” of labor. This has been defined as the onset of involuntary, spontaneous, bearing down efforts. These may occur either prior to or after complete cervical dilatation (11). This phase includes the traditional definition of second stage, but acknowledges the bearing down component that is related to the reflex urge ‘to push’ when the fetal presenting part distends the pelvic floor. Rather than considering this spontaneous urge ‘premature’ prior to complete dilatation, the clinician should assess the woman’s labor status, that is, fetal position and station along with cervical dilatation, and then offer appropriate assistance.

### Progression and Duration of the Second Stage

The identification/diagnosis of complete cervical dilatation often “starts the clock” for determining the duration of second stage. However, one investigator has noted that “it is difficult to determine objectively how long the second stage should be allowed to last since very little is known about the true distribution of the duration of second stage”. Multiple reviews of the association between the total duration of second stage and perinatal outcomes have concluded that arbitrary time limits for the duration of second stage are “not warranted” (12). The guidelines published by the American College of Obstetricians and Gynecologists (ACOG) regarding “Operative Vaginal Delivery” indicate that, “The length of second stage is not in itself an absolute indication for operative termination of labor” because of the means available today for “more intensive fetal surveillance” than when the 2-hour rule was established. However, the guidelines recommend operative delivery be “considered” when 3 hours have elapsed for a nullipara with a regional anesthetic or 2 hours for one without, and when 2 hours have elapsed for a parous parturient with a regional anesthetic or 1 hour without. An analysis of 4, 745 births from the hospital records of nine midwifery services by Albers et al has identified the limits of labor (mean plus 2 standard deviations that represents 95% of a population) in a population of U.S. women of mixed ethnicity. The means for the second stage were 2.5 hours for nulliparas and 1 hour for multiparas. It should be noted that these values are similar to the well-known values published earlier by Friedman. Investigators have emphasized the importance of continued progress in fetal descent and reassuring fetal heart tones to justify second stages that exceed the statistical “norms” for that population. In addition, Kadar et al (13) caution that although the findings no longer justify arbitrary limits being placed on the duration of second stage, they do *not* support “an open-ended approach to management that entails an ill

defined period of additional labor for all women, especially when the long-term consequences of such a policy are unknown, and quite possibly detrimental.” In their study of 410 primigravida with epidural analgesia, the probability of spontaneous delivery occurring after 3 hours was reduced for women older than 33 years and with a fetus of greater than 3000 gr. There is increasing evidence that the exact timing of the duration of second stage is not as important as its progression, and the appreciation that there are phases to this progression that have significant biologic and behavioral indicators.

### Phases of second stage

The recognition of at least two subdivisions of the second stage of labor, an initial and a later phase, is evident in the writings of European investigators and obstetric care providers (5). In the United States, Simkin (14) originally described three phases within the second stage, an initial latent phase characterized by a “lull in uterine activity,” an active expulsive phase of forceful bearing down efforts, and a final transition phase as the fetal head emerges. Although continuous electronic monitoring of uterine activity has shown that uterine contractions do not cease (11, 14), some observers describe a change in the “character of the contractions” (15). This change may be inferred from the behavior of the women who seem to experience less pain and distress with contractions after complete cervical dilatation is achieved. Less pain and behavior reflecting less distress may be because the completely dilated cervix has retracted back around the fetal head, allowing the woman to have a time of rest before further fetal descent evokes an involuntary urge to bear-down. Additional evidence for this progressive change in behavior was observed by Aderhold and Roberts (16) in the analysis of video recordings and uterine monitor tracings of four nulliparous women whose labors were not altered by analgesia or directions from care providers. Thus, if women are not arbitrarily directed to push upon complete cervical dilatation, their involuntary behavior will reflect their progress throughout the second stage of labor from a more passive descent phase to the phase of active pushing. This pattern of progression in second stage from an early portion of ‘small’ or no bearing down efforts and fetal descent into the lower pelvis, past the ischial spines, to more pronounced pushing efforts and expulsion of the fetus is analogous to the well-known Friedman pattern of cervical dilatation during the first stage of labor, with its latent phase of cervical softening and then more rapid dilatation. This recognition of the pattern of cervical dilatation has important implications for the interpretation of labor progress and care, in that interventions (administration of analgesia or amniotomy) during the latent phase are discouraged until further progress is evident. A reconceptualization of second stage as also having a pattern of progression might enable care providers to decide how to best help women during the second stage, as well as to recognize progress in fetal descent. An approach to care based on such a reconceptualization would include *delay* in encouraging a woman to ‘push’ until the obstetric conditions for fetal descent are ‘optimal’ and reserving *directions* to the woman regarding

'how to push' for occasions when they were really necessary. Such an approach based on the identification of phases of second stage needs to be addressed through further research. In addition to the maternal behavioral cues that can assist clinicians in recognizing progress during the second stage, there are anatomic and physiologic indicators that are associated with the early and later phases of second stage. Biologically, it has been recognized that fetal acidosis develops during the phase of second stage when the woman is actively bearing down (17). In a clinical study where women were not directed to bear down until they experienced an involuntary urge, the first part of second stage was identified as that period of time from "full cervical dilatation (until the) mother starts her first voluntary bearing down efforts" (36). The final phase was the period of active maternal bearing down. In this study, fetal acid base status did not change in the first part. However, higher levels of lactic acid and pCO<sub>2</sub> and lower pH levels did develop during the final part. In addition to increasing acidosis that develops during the active (perineal) phase, maternal pushing is also accompanied by a significant decrease in fetal cerebral oxygenation together with an increase in cerebral blood volume (18). Thus, the fetus is more adversely affected by a longer phase of forceful pushing than by the period of time between complete cervical dilatation and active pushing. There are also adverse consequences for the mother during the phase of active pushing. A prolongation of the phase of active pushing has been associated with neuromuscular injury to the maternal perineal structures, whereas a prolongation of the earlier, passive phase of descent has not (19). European investigators have called the later portion, or phase, of second stage the "press period," the "active phase," the "phase of 'active' pushing," and the "perineal phase" (20). In contrast, the earlier phase when bearing down efforts are absent or minimal is called the "pelvic phase" of "passive descent" (21). While Williams Obstetrics (22) makes reference to a "period of active bearing down," there is no description of a pattern of progress or change in the quality of bearing down efforts over second stage. Thus, an appreciation for the biologic significance of early and later phases of second stage is lacking among U.S. educated clinicians. However, there is an understanding of the obstetric factors that reflect progress in labor that can be used to interpret the clinical circumstances that are appropriate for encouraging the woman to push with her contractions.

### 3. Conclusions

The strategy of prolonging the passive phase of descent and shortening the phase of active pushing needs to be addressed in prospective research. The concepts of spontaneous versus directed pushing and allowing for a period of rest and descent, or "laboring down" require a reconceptualization of second stage as having at least two phases—an early stage of continued fetal descent, and a later phase of active pushing. The importance of allowing for adequate rotation and descent prior to adding maternal bearing down efforts to the force of the uterine contractions is based on the recognition that maternal bearing down is a physiologic stress and that fetal acidosis develops with sustained strenuous bearing down along

with injury to maternal perineal structures. An emerging recommendation, therefore, is for clinicians to primarily support women in involuntary bearing down, rather than caregiver directed, and that strategies be used to prolong the early phase of second stage in order to shorten the phase of active pushing. It is the duration of active pushing that is related to both maternal and fetal outcomes, not the total duration of second stage. It is not clear how long the phase of active pushing should continue prior to delivery, but durations that extend beyond 1 hour may be excessive. The type of maternal bearing down efforts as well as ongoing assessment of fetal condition should guide decisions about how/when to provide interventions. To clarify safe parameters for the second stage of labor, additional research is needed to clarify how to assist women during the early passive phase as well as to identify ways to assist women with effective bearing down when it is appropriate for them to push actively. The results of this research might not only increase the autonomy of nurses and midwives in their use of evidence-based care strategies, but also increase cooperation among medical, nursing, and midwifery disciplines as they seek to enable the parturient woman to "participate more autonomously as a birth giver". The end result would be more positive birth experiences for women as well as the care providers. In the AWHONN Second Stage Research Utilization Project, many nurses were energized by the opportunity to more deliberately empower women in giving birth. A physician also reports that when the doctor, nurse, or midwife "try [to] avoid telling the woman when to push and just let her push when she feels the urge, the birth will be entirely different—much calmer and more relaxed. It will be a good experience, not only for the woman and the baby, but also for the practitioner" (87). The application of evidence-based second stage care strategies is not easy, but potentially mutually beneficial within the interpersonal and interprofessional dynamic of its application.

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