The experience of labour pain is a complex, subjective, multidimensional response to sensory stimuli generated during parturition. Many factors affect a woman’s perception of labour pain, including anxiety, and prior experience, making each woman’s experience unique. These cognitive and emotional factors interact with pain, affecting its intensity. During the dilatation phase of labour (first stage), visceral pain predominates, with nociceptive stimuli arising from mechanical distention of the lower uterine segment and cervical dilatation. High-threshold mechanoreceptors in the myometrium may also generate nociceptive stimuli in response to uterine contractions, particularly during protracted labour [1].

The increasing intensity of pain commonly observed with dilatation may be partially attributable to a lowered activation threshold in the mechanoreceptors, and to chemoreceptor stimulation produced by the uterine contractions [2]. These nociceptive stimuli of the dilatation phase are predominantly transmitted to the T10 to L1 posterior nerve root ganglia. As with other types of visceral pain, labour pain may be progressively referred to the abdominal wall, lumbosacral region, iliac crests, gluteal areas, and thighs. Although virtually all women experience lower abdominal pain during contractions, 15% to 74% may also experience contraction-related low back pain that for some continue between contractions [3].

As the pelvic or descent phase of labour advances (late first stage and second stage), somatic pain from distention and traction on pelvic structures, and from distention of the pelvic floor and perineum predominate. Sharp and generally well localized, these stimuli are transmitted via the pudendal nerve through the anterior rami of S2-S4. In the dorsal horn of the spinal cord, the nociceptive stimuli are processed and transmitted via the spinothalamic tract to the thalamus, brain stem, and cerebellum, where spatial and temporal analysis occurs, and to the hypothalamic and limbic systems, where emotional (affective) and autonomic responses originate.

The intensity of labour pain increases with greater cervical dilatation, and is positively correlated to the intensity, duration, and frequency of uterine contractions [4-6]. An almost threefold increase in minimum local analgesic concentration is required as labour progresses [7]. Cervical dilation and the stage of labour significantly influence the effective duration of intrathecal sufentanil/bupivacaine analgesia [8]. The combined influence of advancing cervical dilatation and increased frequency and intensity of uterine contractions explains the progressively intense pain many women experience during late first-stage labour.

A link between the occurrence of dysmenorrhea and increased pain during labour, regardless of parity, has also been reported [9,10]. Increased prostaglandin synthesis producing a greater intensity of contractions is suggested as the mechanism common to both dysmenorrhea and labour pain, and is supported by data indicating that it is the intensity of contractions rather than their duration that determines the intensity of labour pains [11]. Women undergoing prostaglandin induced-labour request more epidural sufentanil than those in spontaneous labour [12]. Similarly, intrathecal fentanyl is less efficacious in nulliparous parturients with labour induced by oxytocin [13].

In a study to determine the relationship between the objective properties of the physical stimulus of uterine contractions and sensations felt, 94% or more of the total variation in pain intensity was accounted for by uterine pressure during contractions [14].

The pattern of pain during labour differs between nulliparous and multiparous women. Consistent findings indicate that during early labour (before 5 cm), nulliparous women on average experience greater sensory pain than multiparous women [15-19]. As labour progresses, these differences are less pronounced, except for a possible increase in pain intensity during the pelvic phase of labour (deceleration and second stage) in multiparous women [6,20]. The affective component of pain seems to be greater throughout the first stage of labour for nulliparous parturients [6,18] but it tends to decrease in all women during the second stage [6]. In a study in which the sensory and affective components were each measured on a visual analogue scale, the affective component of labour pain was found to be significantly lower than the sensory component for 3 of 4 labour stages (active, transitional, and second stage) [21]. Physiological differences in the progression of
parturition between nulliparous and multiparous women may explain this [6]. Because the majority of nociceptive stimuli during the first stage of labour are attributed to the cervix and lower uterine segment, these areas may actually transmit fewer noxious stimuli in women who have previously given birth. As labour progresses into the pelvic phase (deceleration with descent and expulsion), these same tissue characteristics may lead to increased pain perception as a result of the speed and suddenness with which the fetus often descends through the pelvis. Fetal descent during first births is usually gradual, allowing for progressive distention of pelvic structures and perhaps the development of a level of natural pressure-induced analgesia. In contrast, the typically quicker fetal descent in multiparous births may produce more intense pain as a result of the sudden stimulation of nociceptors surrounding the vaginal vault, vulva, and perineum [22].

Although clinicians commonly attribute back pain during labour to a posterior fetal position, less than half of the women who experienced low back pain have such a position [23]. A significant positive relationship between menstruation-related back pain and back pain during labour has been reported, suggesting a common underlying mechanism that may be independent of fetal position [24].

The position of the parturient may also significantly affect pain perception. In a series of 20 unmedicated nulliparous labours with random assignment to 30 minutes of alternating supine and standing positions during labour, 19 of the women reported greater overall comfort when standing than supine, and 15 reported less pain during uterine contractions when standing [25]. Subsequent research has also found decreased pain in vertical as compared with horizontal positions before 6 cm of dilatation [26], whereas another study found no significant differences before 6 cm, with less pain during horizontal positions after 6 cm [27]. Although some data suggest positive relationships between greater fetal weight, greater maternal weight/height ratio, and increased pain [4], these findings have not been confirmed [9].

It is not clear if there is any relationship between intensity of labour pain and dystocia. Women who experience more intense pain in the latent phase of labour have longer labours and are more likely to undergo cesarean delivery [28]. Recently, Hess et al. [29] reported that women requiring supplemental epidural analgesic boluses were more likely to undergo cesarean or assisted vaginal delivery than were those who did not. Their study did not directly measure pain, but provides indirect evidence that more intense pain during labour is associated with dystocia. Another paper [30] did not establish cause or effect, but strongly suggested that the for analgesia was associated with intense pain related to dystocia. In addition, the minimum analgesic dose of bupivacaine in early labour was reported to be greater in parturients who eventually delivered by cesarean section for dystocia [31]. Thus an increased need for analgesia is associated with intense pain related to labour dystocia. This relationship should be considered when considering analgesic methods and their potential effects on the course of labour. The observation that more intense pain is associated with difficult labour, may also alert obstetricians to the possibility that such pain may be due not to a reduced pain threshold, but rather, it may herald difficult and ultimately obstructed labour.

**References**

31. Panni MK, Spiegel J, Segal S. Early labour is more painful in parturients who eventually deliver by cesarean section for dystocia. Anesthesiology 2002; 96: GM5