Original Article

Labor Pain: Effect of Maternal Position on Front and Back Pain

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Abstract
The purpose of this study was to determine whether women in labor report less pain when they are in a vertical (sitting or standing) position than in a horizontal (side-lying or supine) position. Pain scores were obtained from 60 women in early labor (dilation: 2–5 cm) who alternated between the two positions. The results show that about 35% of women feel less front pain and 50% feel less back pain when they are in a vertical position than in a horizontal position. The decrease in continuous back pain (83%) was particularly impressive, but the front and back pains associated with contractions were significantly diminished as well. These results, taken together with those of earlier studies, indicate that many women in early labor have less pain and are generally more comfortable in a vertical than in a horizontal position. Since early labor comprises a substantial proportion of the entire process of labor and delivery, any simple procedure which alleviates pain without danger to mother or child, such as shifting from a horizontal to a vertical position, should be promoted and employed. J Pain Symptom Manage 1991;6:476–480.

Key Words
Labor pain, low back pain, maternal position, McGill Pain Questionnaire

Introduction
The optimal maternal position for the most comfortable, efficient delivery has long been a source of contention. Some investigators have argued that a vertical (sitting or standing) position is the most comfortable and effective while others have maintained that a horizontal (side-lying or supine) position is the most desirable. Despite the zeal of the proponents of each view, the data do not allow a strong conclusion for one view or the other. Rather, both seem correct, depending on the stage of labor.

Roberts and colleagues, in the best designed studies to date, report that women in the early stage of labor (less than 6 cm dilation) prefer to sit up but in late labor (more than 6 cm dilation) prefer to lie on their side. Maternal ratings of comfort, however, do not correlate with uterine efficiency. Roberts and colleagues found that, in early labor, uterine efficiency was significantly less in the sitting position than lying on the side. However, in late labor, neither position produced significant differences in the efficiency of uterine contractions to dilate the cervix. Thus, the mothers reported greater comfort while sitting even though contractions were less efficient in early labor, and greater...
comfort while side-lying in late labor despite the absence of differences in uterine efficiency between the two positions. Roberts and colleagues obtained two measures of comfort: 1) a report by the parturient that one position, compared to the other, was “more comfortable,” “less comfortable,” or “the same” as they alternated positions and 2) a 5-point descriptive scale which ranged from “none” to “unbearable.” However, a rating of comfort is not the same as a rating of pain; thus the important question of the effect of position on labor pain remains unanswered.

The purpose of the present study, therefore, was to obtain pain scores from women in early labor (2–5 cm dilation) during vertical (sitting or standing) and horizontal (side-lying or supine) positions. Furthermore, we obtained separate pain scores for the three major components of labor pain: 1) contraction pain in the abdomen and back and continuous low back pain. Our hypotheses were that the women would report less pain in the vertical than in the horizontal position, and that continuous low back pain would be the most diminished of all.

Methods

Subjects

The study comprised a convenience sample of 60 women (40 primiparas, 20 multiparas), ranging in age from 18 to 39 (mean 29.1 years) in the obstetric unit of a large general hospital in Montreal. The experimenter interviewed women in early labor who met the study criterion of cervical dilation between 2–5 cm (mean 2.3 cm). After the procedure was described in detail, the women were assured that, if they consented to take part, they could withdraw from the study at any time without affecting their subsequent treatment.

Procedure

After consent was given, the women were assigned, on the basis of computer-generated random numbers, to one of two groups in which the horizontal (H) or vertical (V) position was first adopted and then alternated with the other. Group 1 began with 20 min in the horizontal position (lying on the side or supine) followed by 20 min in the vertical position (sitting at the bedside or standing next to it). Group 2 received the alternated positions beginning with the vertical. Each group was asked to undergo three sets of alternations.

At the end of each 20-min period the women were asked to rate their labor pain using two scores: the Present Pain Intensity (PPI) index of the McGill Pain Questionnaire, in which pain is rated as 0, none; 1, mild; 2, discomforting; 3, distressing; 4, horrible; and 5, excruciating, and the Visual Analogue Scale (VAS) in which pain intensity is indicated by the patient making a mark along a 10-cm line with “no pain” written at the left end and “worst possible pain” at the right. These scores were obtained with English or French versions depending on the mother tongue of the woman.

In order to obtain a pain rating for each major component of labor pain, the women were told that they would provide two separate pain ratings after each 20-min period: one to describe abdominal (front) pain and a second one to describe back pain if they had any. The women were asked if they felt pain in the abdominal area (all of them did) and whether the pain occurred only during contractions or was continuous. If they replied that they had both kinds of pain they were asked which of the two kinds felt worse. They were then asked to provide pain ratings only for the pain that was the worst. They were then provided with the pain rating scales and were instructed to describe only the pain that was the worst of the two. All women were able to discriminate between the continuous pain background and the contraction pain. During this process the subjects were evaluated before they received any anesthetic or analgesic agents. Subsequently, some of the women received oxytocin and/or an epidural block.

Results

All 60 women reported that they had abdominal (“front”) pain during labor; 52 said that the front contraction pain was the worst and 8 said the front continuous pain was the worst. Because of the small number of women in the latter group, these data were not analyzed. Of the 60 women, 47 reported that they had back pain; the contraction back pain was rated as the worst in 26 and the continuous back pain was the
worst in 21. The mean pain scores in the PPI were 2.5 for both front and back pain associated with contractions and 2.3 for continuous back pain. These levels of pain fell between discomfirting (rated as 2) and distressing (rated as 3) and are comparable to previous work using the same scale.13 Of the women, 32 volunteered to carry on with a second set of alternating positions, and only 13 volunteered for a third set. Because the number of women was so small in the third set, data analyses were carried out only for sets 1 and 2.

The mean pain scores after each 20-min period, based on the PPI and VAS, were calculated for both groups after the two sets of alternating positions. No differences were found between the pain scores of the two alternating-order groups (HV versus VH) so they were combined to provide scores for H and V that counterbalanced the effect of order. Further analysis showed that the same results were obtained with the PPI and VAS. Since the PPI was used in most of the earlier studies in this series on labor pain,89 only the PPI scores are presented in Table 1. Table 1 shows the percentages of women who reported greater or lesser pain scores in the V position than in the H position. This was done for the three kinds of pain in both sets of observations. Using $\chi^2$ analyses, all measures showed that significantly more women had less pain in the vertical than in the horizontal position. Table 1 also shows the mean percentage differences in pain levels between V and H positions for the three kinds of pain. Among those women who had less back pain in the vertical position, the average decrease of 83% in continuous back pain was particularly impressive, but it was not significantly larger than the decreases in front or back pain due to contractions. The overall similarity of the percentage scores in the two sets of data indicates the reliability of the methods and results. The changes in pain scores for each woman tended to be in the same direction in both sets, and women whose pain was diminished by sitting upright or standing generally reported similar levels of relief in both.

**Discussion**

The results show that in early labor (2–5 cm dilation), women in a vertical (sitting or standing) position feel significantly less pain than when they are in a horizontal (side-lying or supine) position. Although the largest decrease was in continuous low back pain, the front and back pains associated with contractions were significantly diminished as well.

The implication of this finding is that low back continuous pain in labor cannot be attrib-

### Table 1

<table>
<thead>
<tr>
<th>Pain Scores During Labor</th>
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<tbody>
<tr>
<td>Number (and %) of Subjects Reporting Differences in Pain Scores</td>
</tr>
<tr>
<td>Front</td>
</tr>
<tr>
<td>Set 1</td>
</tr>
<tr>
<td>More (V &gt; H)</td>
</tr>
<tr>
<td>Same (V = H)</td>
</tr>
<tr>
<td>Less (V &lt; H)</td>
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<tr>
<td>P (less &gt; more, $\chi^2$ test)</td>
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<tr>
<td>Mean % Difference in pain scores V &lt; H</td>
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<tr>
<td>Set 2</td>
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<tr>
<td>More (V &gt; H)</td>
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<tr>
<td>Same (V = H)</td>
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<tr>
<td>Less (V &lt; H)</td>
</tr>
<tr>
<td>P (less &gt; more, $\chi^2$ test)</td>
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<tr>
<td>Mean % difference in pain scores V &lt; H</td>
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uted simply to the weight of the baby on the abdominal tissues against which the baby is pressing when the woman is in a horizontal position. If the hypotheses were correct we might have a further clue on the cause of continuous low back pain in labor. The results show that this is not the case.

So far, the results from an earlier study have shown that continuous low back pain in labor is not correlated with the mother's age, height, weight, or parity, or with the weight of the baby, the duration of labor, or the position of the baby. The latter findings are contrary to frequent statements (made in the absence of any data) that the baby's position in the uterus is the cause of "back labor."

We have previously shown that back pain, but not front pain, during menstruation is significantly correlated with all three types of labor pain. Again, even this variable is not associated exclusively or even predominantly with continuous low back pain. Nor is low back pain in labor correlated with the most obvious of possible causes, a history of low back pain.

Why some women—about a one-third—report intense continuous low back pain continues to remain unknown. It is not produced directly by contractions because it persists between contractions and contraction pains "ride on it." It is not caused by cervical dilation because it occurs in 10-30% of women yet every vaginal birth obviously involves a dilated cervix. The same reasoning precludes distention of the vagina or perineum as the cause of continuous low back pain. It is most likely to be the result of many other possible causes of pain listed by Bonica: 1) traction and pressure on the adnexa and parietal peritoneum and the structures they envelop; 2) pressure and stretch of the bladder, urethra, rectum, and other pain-sensitive structures in the pelvis; 3) pressure on one or more roots of the lumbosacral plexus; and 4) reflex skeletal muscle spasm and vasospasm in these structures supplied by the same spinal cord segments supplying the uterus. Indeed, all of these factors are capable of producing severe pain referred to the lower back. Stimulation of any of the structures in the pelvic cavity by stretch, distention, or pressure produces pain referred to the lower lumbar and sacral segments. Nevertheless, it is a fact that only about one-third of women have significant back pain during labor, and why pain is referred continuously to the back in these women and not in others remains a mystery.

The results confirm the observations by Roberts and colleagues that women in early labor are more comfortable in an upright than in a horizontal position. They show that one aspect of the phrase "more comfortable" is less pain. Roberts and colleagues also noted that, in late labor, women prefer the horizontal to the vertical position. Most women in the present study requested an epidural anesthetic so that we have no data on pain in late labor. However, Williams and colleagues observed that 87% of their ambulant patients asked to return to bed during the early active phase of labor, and all had returned to bed before the onset of the second stage. Similarly, Flynn and colleagues reported that the average ambulation time in their subjects was 54% of the first stage of labor and all returned to bed before the onset of second-stage labor. As Lupe and Gross observe, "... the clinician need not fear that the ambulant patient may deliver while ambulating."

The results indicate that 47.5% of women report substantial reductions in continuous low back pain when in a vertical position. Similarly, 37% and 46% report significant reductions in front and back contraction pain while in the vertical position. This prospective study therefore offers an empirical basis for providing a choice of positions to women with normal labor. Given the paucity of knowledge about the diverse causes of labor pain, it seems reasonable to allow women to regulate their own pain during labor. Moreover, early labor comprises a substantial proportion of the entire process of labor; thus any simple procedure that alleviates pain without danger to the mother or child should be employed and promoted.

Acknowledgment

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References