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## Review article

# Position for labor and birth: State of knowledge and biomechanical perspectives

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## ABSTRACT

This review aims to examine how childbirth position during labour affects maternal, fetal and neonatal outcomes. Epidemiological data suggest that vertical birthing positions have many benefits. But when we consider the players and mechanisms of delivery, including the forces generated to move the fetus and obstacles to its progression, many questions remain about the advantage of one position over another.

Thus, childbirth could be considered in a way as an athletic feat that probably requires the choice of optimal positions. These should be individually suited to each woman at different stage of labour to improve its efficiency and effectiveness.

Tweetable abstract: Beyond epidemiological data, biomechanical investigations is necessary to assess birth's position.

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## Introduction

For several years, some postural approaches widely disseminated and marketed, have offered alternatives for women's positions at delivery [1]. Although these approaches appear to be improving women's satisfaction, their effects in optimizing spontaneous vaginal birth are still to be demonstrated.

We will begin by describing the different approaches to positions for giving birth and the literature about their obstetric impact. Then we will compare them with theories on obstetrical mechanics. We will conclude with propositions on the potential ways that research should be developed to answer the questions that remain about positions for giving birth and obstetrical mechanics.

### Positions for giving birth: a conflict between monitoring, efficiency, and comfort

#### Definition

The position for giving birth most widely used in maternity units is based on the work of the 18th-century obstetrician, François Mauriceau.<sup>1</sup> This position, still called the *semirecumbent* or the *French birthing position* was described in the 18th century and developed into the recumbent or lithotomy position [2]. All of these positions are considered horizontal, based on the position of the waist relative to the horizontal plane [3]. Nonetheless, other positions have been widely reported since early Antiquity, especially those referred to as upright. In a 1961 study, Naroll et al. reported that among 76 traditional cultures, only 14 spontaneously opt for a dorsal position for childbirth [4]. Engelmann and Jarcho observed that women, not influenced by Western conventions, do not adopt the dorsal position and change positions – mainly upright – during labor [5,6].

For midwives and other health care providers, Atwood's article remains the reference for the definition of these positions; it nonetheless lacks precision [7]. Upright or vertical positions are sometimes summarized as those where the woman's feet are on the ground, without any real consideration for the position of the spine. Thus, in a very schematic presentation, positions for giving birth are classified into two main groups (Table 1), depending on the angle made by the horizontal plane and the line linking the midpoints of the third and fifth lumbar vertebrae. When this line is greater than 45°, the position is considered upright or vertical. It is labeled horizontal when this angle is less than 45°. The squatting, seated, suspended or standing positions, with their variants, are therefore in the category of positions considered upright, while the dorsal decubitus, lithotomy, gynecological, and lateral positions and their variants are considered horizontal [7].

Unfortunately, this definition isn't always quite so strict. Some studies define upright positions by an angle greater than 30° [8].

## Epidemiology

Because women's positions in the delivery room are not routinely collected, their distribution is difficult to assess. Reviews of the literature on the subject, essentially include randomized trials, that seek to measure the obstetric consequences of specific positions [9–11]. Accordingly, they do not provide precise epidemiologic information about positions for giving birth. Studies on the subject are rare and we were able to find only two observational studies. An observational study of a large Swedish cohort (12,782 women) sought to estimate the impact of positions for giving birth on perineal tears and lacerations; it reported that 83.9% of births took place in a horizontal position [12]. Vertical birth for giving birth position, like squatting, is rarely used in countries with high medicalization of birth (less than 1% of women during labor), while this position is most commonly used in countries where childbirth occurs mainly at home (38.9% in Nepal) [13]. A Brazilian study observed the same results, with 82.3% of 1079 women in a horizontal position [14]. The latter study also offered a glimpse of the distribution of other positions for giving birth: 16% in a left lateral position, 0.8% squatting or crouching, 0.7% on all fours, and 0.2% standing.

### Horizontal position: a women's or obstetrician's choice?

The positions that women take in the delivery room are in fact largely influenced by constraints related to the monitoring and intervention during labor [15].

In a permanent effort to control residual risks as in aviation, obstetricians promote the routine use of continuous fetal heart rate monitoring, which is facilitated by the horizontal positions [16]. In upright positions, walking around requires telemetric fetal heart rate monitoring, which is available in very few maternity wards. Horizontal positions also facilitate obstetric intervention and monitoring of the progression of labor, by their easy access to the woman's perineum, particularly in the second phase of labor.

#### Obstetric outcomes

Although the lithotomy position still seems to optimize obstetric monitoring and intervention today, it does have an effect on the course of labor and on women's comfort. Many authors have suggested that upright positions have several obstetrical advantages compared with horizontal positions [8]. The principal data describing these advantages involve three types of outcomes: obstetrical (duration of labor, use of operative vaginal or cesarean delivery), fetal (fetal heart rate abnormalities), and maternal (perineal lacerations, episiotomy, postpartum hemorrhage, and pain).

#### Mode of delivery and duration of labor

A recent meta-analysis, which included 25 studies and 5218 women showed a reduction in the duration of the first stage of labor for women in the upright compared to horizontal positions. This study classified walking, use of a birth cushion, and seated, standing, and kneeling positions as upright, while supine, semi-recumbent, and lateral positions were treated as horizontal. The time gained with the upright positions for labor is thought to be an hour on average, but it may be significant only in multiparas (mean gain of 90 min).

<sup>1</sup> According to some authors, Mauriceau, who was also a Greek scholar, was inspired by Aristotle's description of this birthing position, despite its rarity during Antiquity

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