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REVIEW

Inviting Newton to Visit the Delivery Room. The Role of Gravity During Childbirth

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Abstract: Throughout history, the upright position was the norm for most deliveries. However, due to cultural reasons, this practice was changed in the 17th century, and since then, the majority of deliveries have been conducted with the parturient lying on her back. The aim of this review article is to challenge the nowadays recumbent birth position and to emphasize the added value of gravity to the childbirth. Physiologically there is a strong argument for delivering in an upright position due to the significant role of gravity. The baby's presenting part does not move back between contractions as happens in today's recumbent position when due to the anatomy of the pelvis, the presenting part moves uphill. In this position, the second stage is shorter, and the signal for active pushing occurs spontaneously. It is recommended that any parturient should be informed about the risks and benefits of each birthing option to decide the birthing position that suits her.

Keywords: labor position, birth, upright birth, delivery

Local traditions prevailed in surgery and all medical disciplines. In the twenties of the 20th century, it was stated that "the preservation of tradition in surgery has contributed to its succession no less than the published treatise or the written word. Tested method handed down from master to pupil is quite as valuable as, and doubtless more impressive than the studied statement recorded on the printed page", and also that "tradition is the tie that binds us. It is honorable, it is sacred, it is immortal. Hold fast to that which is good".[1]

These days, however, evidence-based medicine prevails in all medical disciplines, and obstetrics is not excepted.[2]

For thousands of years, women delivered their babies while squatting or kneeling. This can already be seen in temple reliefs from Egypt illustrating the birth of Cleopatra.[3]

One can find statues from deliveries in Africa or South America showing the delivering maize goddess in Mexico in upright positions (600 BCE). The Romans used special birthing chairs with a U-shaped hole.

So how comes that these days most deliveries are done in a recumbent position?

Delivering in this position was introduced in the 17th century.

The legend says that it started when King Louis XIV (1638–1715) wished to watch the delivery of his mistress.[4]

When the midwives who were not experienced to deliver in this position faced difficulties doctors were called in. The most famous obstetrician at that time was Mauriceau known for his breech delivery maneuver.[5]

While King Louis XIV reigned in France and Mauriceau practiced in Paris, Isaac Newton (1642–1727) did his original calculations on the other side of the English Channel at the Trinity College in Cambridge, and among others described the force of gravity.[6]

As in many other subjects, one can find different opinions concerning the benefits of different birthing positions. Kneeling, upright and squatting positions are using gravity to assist the baby when moving down in the pelvis.[7]

In the Cochrane database review, evidence was shown that walking and upright positions during the first stage of labor reduce the labor duration, as well as the risk for cesarean birth and the need for an epidural, with no negative effects

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on the newborn. The authors are calling for more studies, but recommend that the benefits of upright positions should be explained to the parturient in the low-risk group.[8]

Lamaze International states that "women opt for upright positioning and spontaneous rather than directed pushing efforts. In the intervening years, not a single study has refuted this approach to second-stage management. Changing the culture of birth has not been easy but appears inevitable as evidence-based care becomes the gold standard for safe, healthy birth".[9]

Meanwhile, there are midwives and obstetricians who believe that there are several benefits to squatting or kneeling during birth, including a reduction of the duration of the labor's second stage, lower episiotomy rate, and assisted deliveries, although with possible higher blood loss and increased risk of perineal tears,[10] at the time where fewer episiotomies are recommended, as these are recognized as a destructive tradition.[11]

The evaluation of thirty trials comprising over 9000 deliveries has concluded that the upright position during delivery (when no epidural anaesthesia was administered) offers various benefits. These include a shorter second stage of labor, a decreased incidence of episiotomy and assisted labours. However, this position carries an increased risk of blood loss and vaginal tears. More trials were recommended to ascertain the benefits and risks of the different birth positions.[10]

A study conducted in the Netherlands demonstrated that employing the Valsalva maneuver during the second stage of labor, particularly in an upright position, as opposed to other positions, resulted in a shorter delivery time. The authors recommend that women be given the freedom to choose their preferred way of pushing.[12]

However, in a randomized study concerning births in nulliparous women with epidural analgesia, fewer spontaneous births occurred in the upright group: 35.2% (548/1556) vs 41.1% (632/1537) in women lying on their backs, which might be the result of the regional anesthesia. No differences were found concerning instrumental deliveries, sphincter injury, or the outcome of the newborn. The authors concluded that the outcome of lying down during delivery results in a higher rate of spontaneous vaginal deliveries.[13]

The shown differences among the different studies might be the outcome of difficulties or lack of standardization of the examined groups, as standardized study groups are the condition sine qua non for any accepted conclusion.[14]

Certainly, standardization should have been applied also to studies that were in favor of the upright position. Therefore, we recommend continuing randomized studies comparing different birth positions which should carefully standardize the examined groups.

Each obstetrician or midwife experienced how the baby's head moves backward between contractions when the parturient lays on her back, as there is less pressure on the uterine lower segment, and the cervical dilatation takes longer. This is due to the anatomy of the pelvis, the presenting part of the baby moves uphills, instead of toward the center of the earth as happens with all other mammalians.

Conclusion

It seems that when the parturient delivers in the upright position, gravity is beneficial to the birth process, shortens the second stage, and dilates gradually the vaginal outlet. Pushing down while upright may be beneficial, also because the signal for active pushing occurs spontaneously at the right time.

Meanwhile, we recommend that any parturient should be well informed about the risks and benefits of each birthing option and make her decision according to the position that best suits her.

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