Mini-CAT Project

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Clinical Scenario

You are doing your OB/Gyn rotation and you notice that most of the women are giving birth in the lithotomy position at the encouragement of the physicians. You recall that one of the nurse midwives commented that other positions are **less likely to lead to deliveries with forceps or a vacuum**.

What is the evidence on this question?

Clinical Question

Do non-lithotomy birthing positions lead to fewer forceps or vacuum-assisted deliveries?

PICO Search Terms

Patient/problem	Intervention	Comparison	Outcome
Women in labor	Vertical birthing positions	Lithotomy birthing position	Non-assisted births
	Alternative birthing positions	Traditional birthing position	Decreased birthing time
	Non-lithotomy birthing positions		Decreased complications

Search Strategy Summary

Terms Used:
- Birthing positions
- Lithotomy position
- Alternative Positions
- Birthing Complications

Databases Searched:
-ScienceDirect
-PubMed
-Search criteria gave a total of **29** results

-ScienceDirect
-Search criteria gave **12** results, which were narrowed down to **4** after filters - two of which were selected.

-PubMed
-Search criteria gave **17** results, which were narrowed down to **5** after filters - three of which were selected.

Articles Used:
-Based on most recent research, sample size, and systematic review used to measure effects and outcomes measured by the studies.
- 3 articles from PubMed, 2 articles from ScienceDirect

Appraised Articles

1. Alternative model of birth to reduce the risk of assisted vaginal delivery and perineal trauma. A Randomized Control Trial [Walker et al., 2012]
2. Alternative Birthing Positions Compared to the Conventional Position in the Second Stage of Labor. A Systematic Review [Satone et al., 2023]
3. Effect Of Maternal Birth positions on duration second stage of labor: Systematic Review and Meta-Analysis [Berta et al., 2019]
4. Maternal position during the second stage of labor and maternal-neonatal outcomes in nulliparous women: A Retrospective Cohort Study [Elvira et al., 2023]
5. Evaluating the effects of maternal positions in childbirth: An overview of Cochrane Systematic Reviews. A Systematic Review [Kibuka et al., 2021]

Alternative model of birth to reduce the risk of assisted vaginal delivery and perineal trauma: A Randomized Control Trial

Criteria:
- Nulliparous and multiparous women (gestational age > 36 or < 42 weeks)
- Single fetus in cephalic presentation
- Spontaneous or induced labor
- Effective epidural anesthesia w/ standardized continuous-infusion technique

Methods:
- 199 women w/ epidural anesthesia were randomized to traditional model of birth (TMB) (n=96) or alternative model of birth (AMB) (n=103).

Procedures:
- Women in TMB pushed immediately after complete dilation and delivered in lithotomy position.
- In AMB, women followed a postural changes protocol while they delayed pushing and used a specific lateral position for delivery.

Alternative model of birth to reduce the risk of assisted vaginal delivery and perineal trauma: A Randomized Control Trial

Results

- AMB was associated with a significant reduction in AVD compared with TMB.

- TMB was strongly associated with AVD.

- AMB significantly increased the intact perineum rate

- Episiotomy rate was significantly reduced in AMB.

Limitations

Trial participants had:

- Uncomplicated pregnancies
- A normal fetal status at study enrollment
- An effective epidural anesthesia at full dilatation

Results may only apply under these conditions.

Alternative Birthing Positions Compared to the Conventional Position in the Second Stage of Labor: A Systematic Review.

Criteria:

- Women giving birth in different positions in the second stage of labor, and the impact it had on their overall delivery.

Methods & Procedures:

- Searches were performed through PubMed, Google Scholar and Cochrane Library looking for keywords including “alternative birthing positions”, “patient positioning”, “second labor stage”, “parturition” along with many other combinations.
- Initially, 560 articles were found which were then brought down to 42 of the most relevant articles.
- The authors found that more than 90% of women gave birth in the supine or the lithotomy positions, while less than 10% of women gave birth in a standing or squatting position or they laid on their sides.

Alternative Birthing Positions Compared to the Conventional Position in the Second Stage of Labor: A Systematic Review.

Results

- Women who gave birth in the supine position had greater fetal heart rate abnormalities and fewer spontaneous vaginal deliveries than women in the upright or side-lying positions.
- Complications like using forceps, having an episiotomy, or getting a caesarean section were increased in the supine and lithotomy birthing positions.
- Women who gave birth upright had a much shorter second stage of labor because the pelvic outlet was increased and the fetal heart was less compressed leading to a lower rates of cardiac problems. Less pain was also reported by women, as well as providers needing to use fewer instruments to facilitate the delivery.

Limitations

- As was previously mentioned, most of the women who give birth do so in the lithotomy or supine positions. Physicians and health care providers have easier access to the baby in these positions, so the authors found that studying other positions and their advantages or disadvantages were more difficult to do so than not.

Effect Of Maternal Birth positions on duration second stage of labor: systematic review and meta-analysis

Criteria: Women in labor, focusing on birthing positions (flexible sacrum positions vs. lithotomy).

Methods:

-Used PUBMED, SCOPUS, Google Scholar, and Google.

-Had a mix of qualitative and quantitative studies.

-8 included studies with a total of 1985 laboring women (933 for supine position and 938 for flexible sacral position).

-Screening based on predefined criteria, including primary data analysis and maternal birth position relation to the duration of the second stage.

Procedures:

-All papers selected for inclusion were subjected to a rigorous, independent appraisal by the investigators using standardized critical appraisal instruments adopted

Effect Of Maternal Birth positions on duration second stage of labor: systematic review and meta-analysis

Results :

- The review showed that using a flexible sacrum position can reduce the duration of the second stage of labor by **21.12min**. The reduction was contributed mainly by a large reduction in the three studies of the **birthing ball, flexible sacrum and squatting positions** reduce **25.9, 29.7 and 34.38 min respectively**
- The reduction in second stage duration have **greater advantages** for both the mother and her infant by decreasing unnecessary intervention for the mother and reduced fetal heart rate abnormality, neonatal hypoxia and acidosis.
- In another way, reduction in second stage of labor **may cause both maternal and neonatal trauma** due to fast expulsion of the fetal head.
- To conclude, the flexible sacrum birthing position had effect on reduction in duration of the second stage of labor with a considerable variation reported.

Limitations:

- Use was limited to 2 main databases (PUBMED & SCOPUS) even though extensive research was done using these two databases.
- Could not access other databases because the sites were not accessible.
- There was a high variation in sample size, setting, and time between studies that may affected the quality of the review.

Table 1 Presentation of the summary results of the included studies

Author, year and country	Study design	Total sample size	Positions in comparison	Results			Bias/ Limitation
				Mean (minutes) for Upright/lateral	Mean (minutes) for Supine	Length of time shortened by upright position	
Simaro M., 2017 (Spain)	RCT	155	All upright/lateral Vs supine	94.6	124.3	29.7	Low risk
Denakpo J., 2012 (Benrin)	CS	980	Standing, sitting and squatting Vs supine	159.5	179.3	19.8	Low risk
Gupta JK, 1989 (U.K)	RCT	114	Squatting Vs supine	36	40	4	Low risk
Mathew A., 2012(India)	RCT	60	Birthing ball & ambulation Vs supine	23.9	49.8	25.9	Low risk
Mraloglu O., 2017 (Turky)	RCT	100	Squatting Vs supine	21.02	55.4	34.38	Low risk
Dabral A., 2018 (India)	RCT	300	Kneeling Vs supine	23.9	39.38	15.48	Low risk
Marittila M., 1983 (Finland)	RCT	100	Sitting Vs supinr	21.8	25	3.2	Low risk
Thilagavathy G.,2012 India)	RCT	200	Half sitting Vs supine	56	67	11	Low risk

Maternal position during the second stage of labor and maternal-neonatal outcomes in nulliparous women: a retrospective cohort study

Criteria:

- Nulliparous women ages 18 - 40 gave birth at gestational age >37 weeks

Methods:

- Total of 2240 nulliparous women were included and 76.9% gave birth in a supine position and 23.1% gave birth in alternative positions.
- Considered perineal damage as primary outcome.
- Secondary outcomes were the incidence of operative vaginal births, duration of fetal descent, intrapartum blood loss, and 1-minute and 5-minutes Apgar scores.

Procedures:

- All patients had the option to choose what position they felt most comfortable in delivering in 2nd stage of labour.
- Documented the position the patient chose for pushing, and if more than 1 position was chosen, the last position chosen during delivery, namely the 1 which the child was born, was the one analyzed.

Maternal position during the second stage of labor and maternal-neonatal outcomes in nulliparous women: a retrospective cohort study

Results

- Regardless of epidural analgesia, non-supine positions are associated with having intact perineum and lower risk of perineal trauma or episiotomy.
- A free birthing position was significantly associated with an intact perineum and, in general, with a less severe degree of vaginal tearing.

Limitations

- Lack of randomization represents a strong limitation, but the study is appropriate because it allows for patients to choose the position they felt more comfortable in.

Evaluating the effects of maternal positions in childbirth: An overview of Cochrane Systematic Reviews

Criteria:

- Pregnant women of any parity who had experienced spontaneous or induced labor at full-term of their pregnancies (>37 weeks gestational age)
- Position or positions assumed by women in the first and second stages of labor (upright or recumbent)

Methods:

- An electronic search was conducted in the Cochrane database. Three SRs were included (65 trials with 18,697 women).
- Evaluating the effects of maternal positions during childbirth on outcomes, including the duration of labor and birth, as well as the likelihood of operative or assisted vaginal births.

Evaluating the effects of maternal positions in childbirth: An overview of Cochrane Systematic Reviews

Results

- Women in the upright position with no epidural analgesia were more likely to experience a significantly shorter duration of the first and second stages of labor.
- During the second stage of labor without epidural analgesia, women in an upright position showed significant reduction in rates of assisted vaginal births.

Limitations

- There is a lack of sufficient detail on the procedure and description of maternal position to make the findings applicable for replication in research and clinical practice.
- Of the 65 trials in the SR, only 19 used adequate methods of randomization. The quality of evidence within the reviews was very low to moderate.

Summary of Mini-CAT Grid

Key Findings

1. Walker et al., 2012
    a. AMB was associated with a significant reduction in AVD compared with TMB.
    b. TMB was strongly associated with AVD.
2. Santone et al., 2023
    a. Positions that didn't include lying on one's back had less interventions like using forceps or having an episiotomy than did when a patient was lying on their back.
3. Berta et al., 2019
    a. Flexible sacrum birthing positions reduced the duration of the second stage of labor.
    b. Potential benefits for maternal comfort and reduced intervention during childbirth.
4. Elvira et al., 2023
    a. Regardless of epidural analgesia, non-supine positions are associated with having intact perineum and lower risk of perineal trauma or episiotomy
5. Kibuka et al., 2021
    a. The results of the SRs identified some benefits when women adopted upright positions during labor and birth.

Clinical Bottom Line: Do non-lithotomy birthing positions lead to fewer forceps or vacuum-assisted deliveries?

- The evidence from all the articles we have collected suggests that **non-lithotomy birthing positions are associated with a decreased likelihood of using forceps or having vacuum-assisted deliveries.**
- Encouraging alternative birthing positions during labor may be a beneficial approach to reduce the need for these interventions.
- However, it's important to consider individual patient factors and preferences when making recommendations for birthing positions.
- Ultimately, some alternative positions may have more supporting evidence for improved outcomes than others. More research is needed to better assess which non-lithotomy positions are best at preventing assisted deliveries.

References

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5. Kibuka, M., Price, A., Onakpoya, I., Tierney, S., & Clarke, M. (2021). Evaluating the effects of maternal positions in childbirth: An overview of Cochrane Systematic Reviews. European journal of midwifery, 5, 57. https://doi.org/10.18332/ejm/142781