Perineal Trauma in a Low-risk Maternity with High Prevalence of Upright Position during the Second Stage of Labor

trauma perineal em uma maternidade de baixo risco com alta prevalência de parto vertical durante o período expulsivo

Abstract

Objective  Perineal trauma is a negative outcome during labor, and until now it is unclear if the maternal position during the second stage of labor may influence the risk of acquiring severe perineal trauma. We have aimed to determine the prevalence of perineal trauma and its risk factors in a low-risk maternity with a high incidence of upright position during the second stage of labor.

Methods  A retrospective cohort study of 264 singleton pregnancies during labor was performed at a low-risk pregnancy maternity during a 6-month period. Perineal trauma was classified according to the Royal College of Obstetricians and Gynecologists (RCOG), and perineal integrity was divided into three categories: no tears; first/second-degree tears + episiotomy; and third and fourth-degree tears. A multinomial analysis was performed to search for associated factors of perineal trauma.

Results  From a total of 264 women, there were 2 cases (0.75%) of severe perineal trauma, which occurred in nulliparous women younger than 25 years old. Approximately 46% (121) of the women had no tears, and 7.95% (21) performed mediolateral episiotomies. Perineal trauma was not associated with maternal position ($p = 0.285$), health professional (obstetricians or midwives; $p = 0.231$), newborns with 4 kilos or more ($p = 0.672$), and labor analgesia ($p = 0.319$). The multinomial analysis showed that white and nulliparous presented, respectively, 3.90 and 2.90 times more risk of presenting perineal tears.

Conclusion  The incidence of severe perineal trauma was low. The prevalence of upright position during the second stage of labor was 42%. White and nulliparous women were more prone to develop perineal tears.
The need to encourage women to decide in which position they want to give birth is essential for a humanized approach, especially in a country like Brazil, known for presenting high rates of cesarean section.\(^8\) Considering this, we have aimed to look for the prevalence of perineal trauma in a low-risk pregnancy facility that has a multidisciplinary team (midwife and obstetrician) assisting deliveries, as well as to search for risk factors.

### Methods

**Study Design, Inclusion/Exclusion Criteria**

A retrospective cohort study of 264 singleton pregnancies during labor was performed at Maternidade Cidinha Bonini, a low-risk pregnancy facility at the Universidade de Ribeirão Preto (Unaepr, in the Portuguese acronym), Brazil. This maternity cares for any pregnant woman who has received her prenatal care at any Brazilian Public Unified Health System (SUS, in the Portuguese acronym) outpatient clinic and is referred to this hospital for labor. The Institutional Review Board approved the study (under CAAE 61392616.0.0000.5498). The exclusion criteria were women with preterm birth, with comorbidities, and patient records in which more than 50% of data were absent. The study followed the strengthening the reporting of observational studies in epidemiology (STROBE) checklist for observational studies.
Variables
Perineal trauma (main outcome) was divided into three categories: no tears; first/second-degree tears with episiotomy; and third and fourth-degree tears. The classification of the Royal College of Obstetricians and Gynaecologists (RCOG) was also used, \( ^9 \) first and second degrees (mild perineal trauma), third and fourth degrees (severe perineal trauma). There was no standardized pattern about hands-on or hands-off at the second stage of labor. The independent variables were: age (divided into \( < 25 \) or \( \geq 25 \) years old), race, financial income, parity, marital status, intrapartum analgesia, birth weight, type of health professional (obstetrician or midwife), and birth position (lithotomy or upright). The upright or vertical position represents all possibilities of non-lithotomy, non-supine or non-lateral position (such as kneeling, all-fours, squatting and standing). Episiotomy was presented in two ways: it was categorized as a second-degree tear, and as a dummy variable (yes/no).

Statistical Analysis
Data were tabulated in Microsoft Excel for Windows (Microsoft Corporation, Redmond, WA, USA). The Chi-squared test was utilized for the binomial variables. A multinomial logistic regression was performed; all variables were inserted simultaneously into the model, and variable dropout occurred for each variable with the highest \( p \)-value. The procedure was repeated so that only statistically significant variables remained in the final model. The significance level was stipulated at 5%. The statistical analysis was performed using the Intercooled Stata version 13.0 (StataCorp, College Station, TX, USA) and R version 3.0.1 (R Foundation for Statistical Computing, Vienna, Austria) statistical packages.

Results
- **Table 1** displays the baseline characteristics of women who underwent labor according to the presence or absence of perineal trauma. The mean age of the sample was 25.34 ± 5.75 years (range: 13–40), with \( \sim 10\% \) of gestations during adolescence, and 68.18% of women self-reporting as white. From a total of 264 women, there were 2 cases (0.75%) of severe perineal trauma, which occurred in nulliparous women younger than 25 years old. Approximately 46% (121) of the women had no tears, and 7.95% (21) underwent episiotomies (all of them mediolateral). About the birth position, 42.8% (113) of women preferred the vertical birth position, while 57.2% (151) preferred the semi-recumbent position, with no statistical association with perineal trauma \( (p = 0.285) \). A total of 76% (200) of the deliveries were performed by obstetricians, and 23.44% (64) by midwives, with no statistical association with perineal trauma \( (p = 0.231) \). Similarly, newborns weighing 4 kilos or more \( (p = 0.672) \), the presence of a sexual partner \( (p = 0.319) \), labor analgesia \( (p = 0.319) \) and familiar income \( (p = 0.479) \) were not associated with perineal trauma.

- **Table 2** investigates the multinomial regression with two possible dependent variables (episiotomy and perineal trauma). When the variable perineal trauma was converted to a binomial fashion (yes/no), there was a statistical association with women younger than 25 years old \( (p = 0.019) \), those who were white \( (p \leq 0.005) \), and nulliparous women \( (p < 0.005) \). A multinomial analysis showed that white and nulliparous women were, respectively, 3.89 (range: 1.52–2.96) and 2.89 (range: 1.69–4.95) times more prone to present perineal tears. When we considered episiotomy as a dependent and dummy variable, nulliparous women were 4.81 (range: 1.65–14.07) times more prone to undergo episiotomy.

Discussion
The present study has found that in a low-risk maternity with a high prevalence of upright position in the second stage of labor (42%), no differences were seen regarding the prevalence of severe perineal tears (one case in the lithotomy group versus one case in the upright position). Nulliparous women presented a risk factor for presenting OASIs or to undergo episiotomy, even though there was a low incidence of episiotomy in our facility. Younger women and white women were also factors that were associated with perineal trauma; age and birth weight \( > 4,000 \) g did not remain significant after the multinomial analysis. These results are similar to those in the available literature.\(^1\)\(^{10–12}\)

Risk factors are well documented in the literature. A retrospective hospital-based cohort study in Australia found a 5.4% incidence of severe perineal trauma for nulliparous women versus 1.7% for multipara in 10,408 singleton vaginal deliveries.\(^10\) A prospective observational study in Southeast England found a 6.6% incidence of OASIs in nulliparous versus 2.7% in multiparous women.\(^11\) Another Brazilian study has found a 2.5% incidence of severe perineal lacerations. The same study found that operative delivery, primiparity, epidural anesthesia and higher gestational ages were associated with OASIs.\(^12\) A study performed in another low-risk maternity from the same municipality as our study (Ribeirão Preto, Brazil) found a 0.9% incidence of severe perineal trauma.\(^1\)

The impact of the maternal position in perineal trauma is still controversial. In our sample, the upright position was not associated with severe perineal trauma. A recent pragmatic, multicenter randomized study with 3,093 nulliparous women comparing upright versus lying down position did not find differences in the prevalence of OASIs. However, women could modify their birth position during the second stage whenever they felt like doing so, and this could include some bias in the results.\(^13\) A recent meta-analysis of the effect of upright positions during the second stage of labor without analgesia did not find an association with third-degree perineal laceration incidence.\(^14\) It is known that women who give birth in the lithotomy position do not feel that this position is helpful, which differs from the opinion of the practitioners, and this may cause a false impression or correlation with negative intra/postpartum outcomes.\(^15\) Moreover, a mixed method study investigating how the maternal birth position could influence the experience of fathers during childbirth has found that they were more likely to have a positive experience, or to feel comfortable or powerful.\(^16\)
We do not have regional data about the prevalence of maternal position during the second stage of labor, but our Western culture has assumed the lithotomic position as the traditional one, and it is the most taught birth position to obstetricians.

We believe that the strengths of the present study are the sample taken from a Brazilian public hospital, which comprised pregnant women choosing the upright position to give birth, and the continuous fashion of data collection: no cases were excluded from this hospital cohort. Nevertheless, there are some limitations in the present study: its retrospective fashion, the lack of other variables that could be analyzed as risk factors (second stage duration, fetal head position, head circumference), and the selection bias of a low-risk maternity, which excludes some other risk factors (such as maternal obesity) that could be associated with OASIs. Furthermore, performing a retrospective post-hoc analysis and using our sample (n = 264) with a 13%...
significance level between birth position and perineal integrity, we have calculated a study power of 46%, with the minimum required sample of 442 women to notice a difference (possible type 2 error).

It is essential to prevent OASIs because their impact on subsequent pregnancy outcomes is high; the risk is increased five-fold in women who had a severe perineal trauma in their first delivery. To the best of our knowledge, the maternal position during labor does not have a significant role in preventing OASIs, but it may have positive effects in the childbirth experience itself. An online survey was mailed to postpartum women, and respondents who gave birth on the seat had answered that they were more likely to participate in the decision-making process during labor and to have the opportunity to choose their preferred birth position.9 There are several perineal techniques that can be offered to women (such as warm compresses during the intrapartum period or perineal massage during the antenatal period) in order to reduce third and fourth-degree tears, and this educational step may empower these patients.20 Finally, more prospective studies with different positions than the gynecological, with women spending most of the labor on their preferred position, avoiding the use of instrumental deliveries and with larger samples, will be necessary to answer this question.

**Conclusion**

The present study has found that the incidence of severe perineal trauma was low, similar to the incidence in the available literature. The prevalence of upright position during the second stage of labor was 42%, a high percentage when compared with most of the birth positions found in epidemiological studies. White and nulliparous women were more prone to develop perineal tears.

**Contributions**

All authors met the International Committee of Medical Journal Editors (ICJME) criteria: 1. substantial contributions to conception and design, data collection or analysis, and interpretation of data; 2. writing of the article or critical review of the intellectual content; and 3. final approval of the version to be published.

**Conflicts of Interest**

The authors have no conflicts of interest to declare.

**References**


