

# Maternal Position and Other Variables: Effects on Perineal Outcomes in 557 Births

Inge Meyvis, MSc, BaM, Bart Van Rompaey, PhD, MS, BN,  
Karine Goormans, MScN, BaM, Steven Truijen, PhD, MSc, Sabine Lambers, PT,  
Eveline Mestdagh, MScN, BaM, and Wilhelm Mistiaen, PhD, ScD, MD

**ABSTRACT: Background:** Damage to the perineum is common after vaginal delivery, and it can be caused by laceration, episiotomy, or both. This study investigated the effects of maternal position (lateral vs lithotomy) and other variables on the occurrence of perineal damage. **Methods:** A retrospective study included the examination of hospital records from 557 women. The effects of demographic characteristics, gravidity, parity, duration of pregnancy, reason for admission, and mode of labor on perineal outcomes were investigated through univariate (independent sample t test, chi-square test) and multivariate analysis (logistic regression analysis). **Results:** Considering episiotomy as perineal damage, univariate analysis showed a protective effect of the lateral position (45.9% vs 27.9%,  $p > 0.001$ ), and fewer episiotomies were performed (6.7% vs 38.2%) with this position. This protective effect for perineal damage disappeared on excluding women undergoing episiotomy from analysis. Multivariate analysis including all participants showed an increase of 47 percent in the likelihood of an intact perineum for the lateral position when compared with the lithotomy position (OR: 0.53; 95% CI: 0.36–0.78). Parity was associated with a reduction of 44 percent in perineal damage (OR: 0.56; 95% CI: 0.47–0.78,  $p < 0.001$ ). Moreover, the lithotomy position was associated with significantly more episiotomies than the lateral position (7% vs 38%,  $p < 0.001$ ). The odds of perineal damage increased in deliveries performed by physicians (OR: 2.92; 95% CI: 1.79–4.78). **Conclusions:** Childbirth in the lateral position resulted in less perineal trauma when compared with childbirth in the lithotomy position, even after correcting for parity and birth attendant. The probability of an intact perineum increased in deliveries performed by midwives. (BIRTH 39:2 June 2012)

**Key words:** episiotomy, lateral position, lithotomy position, maternal position, perineal trauma

The position of women during birth is determined by several factors, including cultural background. Two major positions can be distinguished (1): horizontal (i.e., an angle of less than 45° between the horizontal

and the birth canal) and vertical (i.e., the same angle is greater than 45°). Examples of the vertical position include squatting, sitting, and standing. The lithotomy and left lateral positions are examples of the horizontal

*Inge Meyvis is a Lecturer of Midwifery and Bart Van Rompaey is a Professor of Nursing and Midwifery at Department of Health Care, Artesis University College, and the Division of Nursing Science and Midwifery, University of Antwerp; Karine Goormans, Sabine Lambers, and Eveline Mestdagh are Lecturers of Midwifery; Wilhelm Mistiaen is a Professor of Medicine; and Steven Truijen is a Professor of Statistics at Artesis University College, Antwerp, Belgium.*

*Address correspondence to Wilhelm P. Mistiaen, MD, ScD, PhD, Artesis University College of Antwerp, J De Boeckstr 10, 2170 Antwerp, Belgium.*

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position (1). From the year 1668 onward, a half-supine position with the woman's legs on a support has been used by maternity practitioners as standard (1). This position allows a view of the perineum during delivery and facilitates maneuvers. For this reason, a more horizontal maternal position during delivery has been commonly adopted by birth attendants as standard medical practice. The physiological consequences, however, were not taken into consideration (1). Currently the horizontal position seems to be a prerequisite for proper continuous fetal monitoring. This position restricts the movement of the mother (2,3). A return to the more "old-fashioned" vertical delivery has been advocated recently as a result of a supposed increase in maternal comfort and other advantages (4).

Perineal trauma, which is defined as any possible damage to the perineum or the genitals, occurs frequently after vaginal delivery, and its impact is often underestimated by physicians and midwives (5). The trauma could be the consequence of laceration, episiotomy, or both. In one study, lacerations occurred in 43 percent of the vaginal deliveries (6). In 2004, episiotomies were performed in 23 percent of the deliveries in the United States (6). In Belgium, episiotomies were performed in 59 percent of all deliveries in 2006 (7).

Perineal trauma is influenced by various risk factors, some of which (e.g., nutritional status, maternal body mass index, ethnic origin, birthweight, fetal position) cannot be altered by obstetricians at the time of delivery. Other factors (e.g., maternal position) can be altered, thus possibly reducing perineal damage (8). In this study, delivery in the lateral position was compared with the lithotomy position, focusing on perineal damage.

### Methods

A study with a retrospective cross-sectional design investigated the effects of maternal position (lateral vs lithotomy) on perineal damage. This project was approved by the ethical committee of ZNA Middelheim, Antwerp, Belgium. Data collection (demographic, medical, and obstetric data obtained from files) in a regional general hospital started at the beginning of November 2008 and ended in November 2009. All women with gestations between 37 and 42 weeks who were delivering vaginally were included. Exclusion criteria were premature delivery and any kind of operative delivery, because these conditions could necessitate episiotomy.

The outcome was defined as perineal damage, graded according to Fernando (9). Grade 1 refers to a

tear limited to the skin or vaginal wall. Grade 2 involves the perineal musculature as well, and Grade 3 involves damage to the anal sphincter. Episiotomy is defined as a medio-lateral incision widening the birth canal. Lacerations occurring after an episiotomy were classified as episiotomy + laceration.

### Data Analysis

Statistical analysis was performed using SPSS version 16.0 for Windows (10). Both positions (lateral vs lithotomy) were compared using an independent sample *t* test for continuous variables (presented as mean/median and SD) and a chi-square test for categorical variables (presented as totals and percentages). To study the relationship between infant birthweight and perineal damage, the ratio of infant birthweight and infant length at birth was used as parameter. To study the effects of position during delivery on perineal outcomes, univariate analysis was performed using the tests mentioned before. As a second step, the significant variables from the univariate analysis were entered into a logistic regression analysis, to start with the most significant variable and include stepwise the other variables, until the model was complete. This step was performed by the SPSS program automatically. It allowed the identification of the independent predictors in one model. The effects of these predictors can be presented simultaneously. A *p* value less than 0.05 was considered significant, with a confidence interval of 95 percent.

### Results

Between November 2008 and November 2009, 1,016 women gave birth in the Antwerp hospital in Belgium where this study was conducted, 557 of which could be included. In 348 participants, delivery was performed in the lithotomy position, with the other 209 deliveries performed in the lateral position. Information on demographic characteristics, parity, gravidity, and other obstetric factors are presented in Table 1. Only two factors differed significantly: women in the lateral position were older and less likely to have epidural anesthesia than those who delivered in the lithotomy position. Table 2 presents information on perineal damage after birth for both positions as a percentage. The univariate effect of position on perineal outcome was studied with and without episiotomy.

Women delivering in the lateral position showed significantly more lacerations of the first and second

**Table 1. Demographic Data**

Characteristic	Total (n = 557)	Lithotomy (n = 348)	Lateral (n = 209)	p
Age (yr) (mean/range)	28.1 (15–45)	27.6 (15–45)	29.0 (15–41)	0.002
Marital status (%)				
Married	64.5	64.9	63.9	0.924
Cohabiting	32.5	32.2	33.0	
Living alone	3.1	2.9	3.3	
Origin (%)				
Belgium	57.7	54.3	62.7	0.151
Morocco	20.3	23.0	15.8	
Elsewhere	19.3	22.7	21.5	
Gravidity (median/range)	2 (1–12)	2 (1–8)	2 (1–12)	0.280
Parity (median/range)	2 (1–10)	2 (1–8)	2 (1–10)	0.410
Gestation (wk)	39 ± 1	39 ± 1	39 ± 1	0.440
Birthweight (g) (mean/range)	3,432 (1,995–5,270)	3,451 (1,995–4,830)	3,401 (2,390–5,270)	0.199
Duration of admission (days)	3.8 ± 1.4	3.9 ± 1.3	3.7 ± 1.6	0.080
Reason for admission (%)				
Spontaneous contractions	55.1	52.9	58.9	0.326
Induction	23.3	23.9	22.5	
Stimulation	21.5	23.3	18.7	
Medication				
Prostaglandin	1.3	1.1	1.4	0.131
Oxytocin	42.7	46.6	36.4	0.131
Both	5.9	5.7	6.2	
Birth attendant (%)				
Midwife	14.2	46.2	53.8	<0.001
Physician	85.8	70.9	29.1	
Epidural analgesia	44.5	50.0	35.4	<0.001

degrees when compared with those delivering in the lithotomy position. In the lateral position, episiotomy was performed significantly less frequently: this procedure was applied in 38.2 percent of the women delivering in lithotomy position and in less than 7 percent of the women delivering in lateral position. Including both laceration and episiotomy in the analysis, an intact perineum was significantly more likely in women delivering in lateral position (45.9% vs 27.8%). The difference in the effect of position on perineal outcome became insignificant on excluding participants with episiotomies.

The incidence of episiotomy also differed according to type of birth attendant: midwives performed the procedure in only 2 percent ( $n = 2$ ) of the cases. Physicians performed this procedure more often, varying from 10 percent ( $n = 5$ ) to 40 percent ( $n = 34$ ). The perineum was intact in 58 percent ( $n = 52$ ) of women after delivery by a midwife; for

physicians, an intact perineum varied from 21 percent ( $n = 21$ ) to 76 percent ( $n = 38$ ).

Of the primiparous women, 53 percent ( $n = 85$ ) had episiotomies and 19 percent ( $n = 30$ ) had an intact perineum after delivery. Nevertheless, 42 percent ( $n = 166$ ) of multiparous women experienced lacerations, whereas they occurred only in 28 percent ( $n = 45$ ) of primiparous women ( $p > 0.001$ ). Multiparas underwent significantly fewer episiotomies (17%;  $n = 68$ ), which apparently outweighed perineal laceration: more lacerations were observed with multiparas compared with primiparas. The latter underwent an episiotomy more frequently, however, as these women were more likely to have an intact perineum (41%,  $n = 163$ ). In women without perineal damage, parity was significantly higher ( $2.0 \pm 1.0$  vs  $2.8 \pm 1.4$ ,  $p < 0.001$ ). Differences in birthweight and in the weight/length ratio of the newborn had no significant effects on perineal outcomes.

The significant factors were included in a multivariate logistic regression analysis (Table 3). This analysis showed the protective effect of the lateral position and parity against perineal damage. Logistic regression showed that a one-child increase in parity decreased the likelihood of perineal damage by 44 percent. With the lateral position the decrease in perineal damage was 47 percent. In contrast, delivery by a physician (compared with a midwife) and the use of epidural analgesia resulted in a considerable increase in perineal damage.

### Discussion

Perineal damage decreased significantly for deliveries in the lateral position. Almost 50 percent of women delivering in the lateral position had an intact perineum, compared with one-third of those delivering in the lithotomy position. These results confirm earlier studies (2,11). In a previous series, intact perineum after a delivery was documented in up to 66 percent of cases (12). We observed a considerable difference in the application of episiotomy in both groups of women. For the lateral position, fewer episiotomies were performed, but perineal lacerations of grades 1 and 2 were significantly more common. In a recent

review, episiotomy has been related to more extensive trauma, prolonged wound healing and an increase in dyspareunia (13). In contrast to the lithotomy position, delivery in the lateral position is a “hands-off” technique, avoiding unnecessary manipulations (14), which could explain the low number of episiotomies.

In deliveries performed by midwives, almost 60 percent of the women had an intact perineum; in deliveries performed by physicians intact perineums decreased to 30 percent. The type of birth attendant also showed an effect in a previous series (15), in which the difference in perineal trauma was also because of the performance of an episiotomy. In the current group, midwives used this procedure for only 2 percent of the women. For physicians, over 30 percent used it, with one physician doing an episiotomy in 76 percent of all women. Results from several studies indicate that midwives perform fewer episiotomies than physicians (12).

Even with exclusion of episiotomy, however, a trend toward less perineal trauma was observed for the lateral position. Results from a randomized trial comparing the lateral position with the supported sitting position, the rate of instrumental delivery, episiotomy, and the need for perineal suturing (with all women having received epidural analgesia) showed that the lateral position was more beneficial than the

**Table 2. Effect of Maternal Position (Lithotomy vs Lateral) on Perineal Outcome**

Perineum	Episiotomy Included				Episiotomy Excluded			
	Total (%) (n = 557) p	Lithotomy (%) (n = 348)	Lateral (%) (n = 209)	p	Total (%) (n = 416)	Lithotomy (%) (n = 223)	Lateral (%) (n = 193)	p
Intact	34.6	27.9	45.9	<0.001	46.4	43.5	49.7	0.203
First degree	19.4	16.7	23.9	0.046	26.7	27.4	25.9	0.739
Second degree	16.2	13.8	20.1	0.005	23.3	24.7	21.8	0.485
Third degree	2.3	2.3	2.4	0.944	3.6	4.5	2.6	0.302
Episiotomy	26.4	38.1	6.7	<0.001	—	—	—	—
Episiotomy followed by laceration (%)	1.1	1.1	1.0	0.831				

*Degree = degree of perineal laceration.*

**Table 3. Independent Risk Factors for Perineal Damage**

Risk Factors	Univariate Analysis		Multivariate Analysis	
	OR (95% CI)	p	OR (95% CI)	p
Lateral position	0.46 (0.32–0.66)	<0.001	0.53 (0.36–0.78)	0.001
Primipara vs multipara	0.56 (0.47–0.66)	<0.001	0.56 (0.47–0.66)	<0.001
Physician	3.2 (2.0–5.0)	<0.001	2.92 (1.79–4.78)	<0.001
Epidural analgesia	1.9 (1.3–2.8)	<0.001		

lithotomy position (16). This report confirmed the current favorable results of a lateral position, although it includes other variables (e.g., pain level and position of the fetal head) and was limited to nulliparous women, making it difficult to compare results (16).

In contrast to other series (17–19), birthweight and the weight/length ratio of the newborn had no effect on perineal damage. Given that biparietal diameter is the largest to pass the birth canal, it would be useful to include the effect of this parameter on perineal damage in future studies.

This study has several limitations. Premature birth and assisted delivery were excluded, as they are indications that necessitate an episiotomy. Nonetheless, these two factors should be considered in the study of risk factors for perineal damage. This mono-centric study did not have a uniform policy with respect to episiotomy care; hence, randomization was not possible for either the position during labor or the use of an episiotomy. Moreover, such randomization has been considered unethical. The absence of a uniform policy had a major advantage: it revealed the differences between different birth attendants. The current results could have implications for practices used by birth attendants in perineal management. A multicenter study could mask these differences.

The results in our study indicated that the lateral position is a valuable alternative for the classic lithotomy position: the perineal damage is significantly less. When midwives perform the delivery, less perineal damage occurs when compared with physicians. Midwives prefer a laceration over an episiotomy, which is considered to be more damaging than a laceration of grade 1 or 2. When episiotomy is excluded from the analysis, the lateral and lithotomy positions do not differ with respect to perineal damage, but a trend in favor of the lateral position remains. Informing pregnant couples concerning health promotion is one of the tasks for midwives. Accurate and complete information enables the couple to make a desirable choice about maternal position during labor. Routinely advising of a certain position can be considered as an intervention in the natural course of delivery and should be avoided. Midwives, however, are in a position to inform couples and support them in their choice for the most comfortable position during birth.

### Conclusions

Childbirth in the lateral position offered some protection against perineal trauma when compared with childbirth in the lithotomy position, even after correcting for parity and birth attendant (midwife or

physician). The probability of an intact perineum increased for deliveries performed by midwives.

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