

# Evaluating the Role of Measuring the Perineal Length as a Predictor of Progress of Labor and Obstetrical Trauma

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## Abstract

**Objective:** Evaluating the effect of perineal length on the duration of the second stage of labor, the mode of delivery, the need for episiotomy and the possibility of perineal and vaginal tears needing repair. **Participants and Methods:** It is a prospective hospital-based observational study done on 483 parturient women in a university hospital. Personal, medical and obstetric data together with the measurement of perineal length were recorded in the first stage of labor. We followed up the progress of labor until delivery. Regression models were used to consider possible risk factors of episiotomy or tears needed repair. **Results:** The mean duration of the second stage of labor was significantly longer among women with a perineum of  $\geq 4$  cm length when compared with those with a perineal length of  $< 4$  cm ( $36.7 \pm 13.05$  vs.  $26.9 \pm 10.4$  minutes; respectively). Regression analysis of possible risk factors showed that circumcised primigravida with long perineum ( $\geq 4$  cm) are more liable to have episiotomy (OR (95%CI) 1.96 (1.1 - 3.5); 20.9 (11.1 - 39.5); 4.8 (2.5 - 9.2); respectively). Tears needed to repair are however, more common in circumcised women with short perineum ( $< 4$  cm) who delivered without episiotomy (OR (95%CI) 14.16 (8.1 - 24.9); 4.54 (1.5 - 14) respectively). **Conclusion:** Longer perineum is associated with increase in the duration of the second stage of labor. Obstetricians should expect the need of episiotomy when confronted with circumcised primigravida with long perineum. However, if the perineum is short they should not be deceived, short perineum is more probably torn.

## Keywords

Perineal Length, Second Stage of Labor, Obstetric Trauma

## 1. Introduction

Trauma to the genital tract does occur in about two thirds of women during the first and subsequent deliveries and the majority of these traumas require suturing [1]. There is a continuous inverse relationship between the rate of episiotomy and the rate of spontaneous trauma [2].

Perineal trauma is associated with a high prevalence of certain health problems. Perineal pain is the most significant with its impact on daily activities. Additional health issues, like blood loss, bowel and urinary dysfunction, sexual problems, fatigue and depression have been also reported [3] [4]. The severity of postnatal perineal pain is directly related to the degree and complexity of the genital tract injury sustained [5]. Episiotomy is usually performed for the sake of protection against these complications. Nevertheless, it is not allowed to do this protection. Episiotomy by itself represents a trauma and its suturing may convey more pain to the new mothers [6]. Meta-analysis of data from six randomized controlled trials recommended that episiotomy should not be a routine practice and its use should be restricted to certain specific fetal and maternal indications [1] [7]. However, these indications have not yet been clearly specified.

Perineum is the fibro-muscular structures which are situated between the vaginal orifice and the anus. The functional importance of the perineum has been largely neglected by the clinicians; however its importance in the diagnosis and classification of pelvic organ prolapse has been appreciated near the end of the 20<sup>th</sup> century [8]. Objective measurements of the perineum have been included by the International Continence Society (ICS) in its new standardized terminology of pelvic organ prolapse and pelvic floor dysfunction [9].

The length of the perineum, however, was first cited in the literature as a cause of traumatic vaginal delivery by Nichols and Randall in (1989) [10]. Rizk & Thomas (2000) were the first to study the effect of perineal length and anal position on vaginal delivery in 212 primigravidae with singleton term pregnancy [11]. They reported that the incidence of episiotomy, perineal tears and instrumental delivery were increased in patients with a perineal length of <4 cm. The above authors suggested that this measurement can identify primigravidae who are at risk of perineal injury during vaginal delivery and in whom elective episiotomy is beneficial. The same finding was supported by two other observational studies [12] [13].

Female circumcision or female genital cutting (FGC) is the collective name given to traditional practices that involve partial or total cutting away of the female external genitalia whether for cultural or other non-therapeutic reasons [14]. It is estimated that between 100 and 130 million girls and women now alive in at least 28 African countries and the Middle East have been subjected to FGC [15]. It is still frequently practiced in Egypt in spite of governmental and non-governmental efforts that have been made to control this traditional habit. The current estimated overall prevalence of FGC in Egypt is around 97% (type I, II, III) among adult women [15]. However, such prevalence is much dropped to almost half when we come to young age groups such as school girls [16]. To

what extent having scared lesions of FGC does affect the process of labor which is not much studied. WHO Study Group on Female Genital Mutilation and Obstetric Outcome had demonstrated increased incidences of caesarean section, postpartum hemorrhage, perineal tearing and recourse to episiotomies in circumcised females [15].

The current study has aimed to test whether the length of the perineum can be a predicting factor for progress of labor specifically, the duration of the second stage of labor, the mode of delivery, the need for episiotomy and the possibility of perineal/vaginal tears.

## 2. Material and Methods

The study was a prospective hospital-based observational study conducted in the period between July 2010 and December 2014 in the Obstetric Service of Women's Health Centre, Department of Obstetrics and Gynecology, Assiut University, Egypt. The study was approved by the Assiut Medical School Ethical Review Board.

All parturient women admitted to the above obstetric service during the study period have been counseled for participation and assessed for eligibility criteria. Inclusion criteria were being a low risk parturient women (no maternal or fetal risk-factors) women admitted in the first stage of labor and accepted to participate. All parturient women with malposition (ocipitoposterior), malpresentations, preterm labor, multiple pregnancies, and previous vaginal surgery or with any other pre-decided indication of CS, those who opted to have epidural analgesia during labor and finally those who were already in the second stage of labor at the time of admission were excluded from participation.

The perineum was measured as the distance from the fourchette (the midpoint of the posterior edge of the vaginal introitus at the muco-cutaneous junction) to the centre of the anal orifice. Measurements were performed by trained research nurses using standard tape in dorsal lithotomy position. Moreover, the presence of circumcisions (type II or more) was also reported. The degree of female circumcisions was categorized according to WHO categorization [15].

Personal, medical and obstetric data together with the above measurement were recorded in a special data collection sheet. Labor was managed according to the hospital guidelines and the progress was guided by the partograph. These data successfully recorded comprised; the duration of the second stage of labor, the need for episiotomy; the occurrence of perineal/vaginal tears which needed to be repaired, and the method of delivery.

The data collected, entered on Microsoft access data base and analyzed using the Statistical Package for Social Science (SPSS Inc., Chicago, version 13). Comparisons between the groups were done using Student's t-test and ANOVA to compare the mean values between groups in scale variables. However,  $\chi^2$  test was used to compare the dichotomous and ordinal variables in the groups. Multivariate logistic regression models were designed to consider the possible contributing factor. For analysis,  $P < 0.05$  was considered significant.

### 3. Results

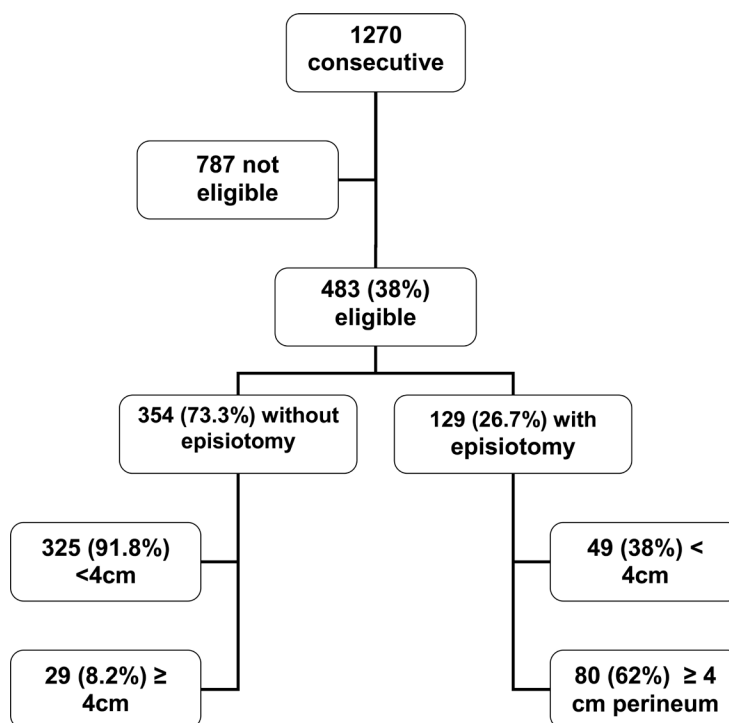
One thousands two hundreds and seventy parturient women admitted to the above obstetric service during the study period. Four hundreds and eighty three (38%) eligible parturient women have been included. All excluded cases were not fitting the above described eligibility criteria (**Figure 1**).

The mean age of the study participants was  $24.06 \pm 4.96$  SD years with a mean parity  $1.68 \pm 1.74$  SD deliveries. About 30% of the study participants were primiparae.

**Table 1** shows the relationship between the perineal length and the participants' age, parity and fetal birth weight. The mean age was higher in participants with a perineum of  $<4$  cm than with a perineum of  $\geq 4$  cm ( $24.7 \pm 5.0$  vs.  $21.7 \pm 3.8$  years  $p = 0.0009$ ). The primigravidae tended to have longer perineum; the mean perineal length was significantly longer in primigravidae relative to multiparae [ $3.91 \pm 0.42$  SD/ $3.16 \pm 0.44$  SD cm; respectively ( $P = 0.0008$ )].

Out of 483 parturient women, 129 (26.7%) of women did have episiotomy and most of them are primipare. In the current study, 77.2% of primipare have undergone episiotomy. Moreover, 30% other participants developed vaginal or perineal tears that needed repair. Operative vaginal delivery was performed in only 14 cases (2.9%) and cesarean sections in 19 cases (3.9%)

**Table 2** shows a multivariate logistic regression analysis for possible risk factors of episiotomy among study participants. The risk factors that proved significant were being a primigravida OR 20.9 (11.1 - 39.5), and being circumcised OR 1.96 (1.1 - 3.05). Moreover, having a perineal length of more than 4 cm was associated with more probability of having episiotomy OR 4.8 (2.5 - 9.2).



**Figure 1.** Study profile.

**Table 1.** Characteristics of study participants in relation to the perineal length (PL).

Patient characteristics	PL $\geq$ 4 cm n = 109	PL < 4 cm n = 374	Total n = 483	P-value
<b>Age mean <math>\pm</math> SD</b>	21.7 $\pm$ 3.8	24.75 $\pm$ 5.0	24.06 $\pm$ 4.9	0.0009†
<b>Range (in years)</b>	17-42	16-40	16-42	
<b>Parity</b>				
0	88 (80.7%)	59 (15.8%)	147 (30.4%)	0.0001‡
1 - 2	17 (15.6%)	194 (51.9%)	211 (43.7%)	
3 - 4	3 (2.8%)	94 (25.1%)	97 (20.1%)	
$\geq 5$	1 (0.9%)	27 (7.2%)	28 (5.8%)	
<b>Residency</b>				
Rural	79 (72.5%)	251 (67.1%)	330 (68.3%)	NS†
Semiurban	20 (18.3%)	59 (15.8%)	79 (16.4%)	
Urban	10 (9.2%)	64 (17.1%)	74 (15.3%)	
<b>Birth weight mean (Range)</b>	3.52 $\pm$ 0.2 2.35 - 4.11	3.48 $\pm$ 0.2 2.95 - 4.10	3.48 $\pm$ 0.2 2.35 - 4.11	NS†
<b>Circumcision</b>	65 (50.5%)	156 (41.7%)	211 (43.7%)	NS†

Figures between brackets are the percentages of the total in the columns; † = Independent sample t-test. ‡ =  $\chi^2$  test.

**Table 2.** Multivariate logistic regression analysis for possible risk factors of episiotomy.

	Episiotomy (done)	
	p-Value	OR (95% CI)
<b>Age</b>		
<35 years	Reference	
> 35 years	0.145	2.7 (0.71 - 10.4)
<b>Parity</b>		
Primigravida	0.0006	20.9 (11.1 - 39.5)
mulipara	Reference	
<b>Birth weight</b>		
<4 kg	Reference	
$\geq 4$ Kg	0.238	3.1 (0.47 - 20.3)
<b>Perineal length</b>		
<4 cm	Reference	
$\geq 4$ cm	0.0003	4.8 (2.5 - 9.2)
<b>Circumcision</b>		
No	Reference	
yes	0.026	1.96 (1.1 - 3.5)
<b>Duration of second stage of labor</b>		
<1 hour	Reference	
$\geq 1$ hour	0.922	1.1 (0.21 - 5.6)

Another logistic regression analysis was done for those who delivered without episiotomy to assess the probability of occurrence of TNR (**Table 3**). Having a perineal length of less than 4 cm and being circumcised are the two variables

**Table 3.** Multivariate logistic regression analysis for possible risk factors of TNR in women delivered without episiotomy.

	TNR	
	p-Value	OR (95% CI)
<b>Age</b>		
<35 years	Reference	
>35 years	0.78	0.39 (0.14 - 1.1)
<b>Parity</b>		
Primigravida	0.49	0.76 (0.35 - 1.6)
Multipara	Reference	
<b>Birth weight</b>		
<4 kg	Reference	
≥4 Kg	0.76	1.3 (0.25 - 6.65)
<b>Perineal length</b>		
<4 cm	0.009	4.54 (1.5 - 14.0)
≥4 cm	Reference	
<b>Circumcision</b>		
No	Reference	
Yes	0.0003	14.16 (8.1 - 24.9)
<b>Duration of 2<sup>nd</sup> stage of labor</b>		
<1 hour	Reference	
≥1 hour	0.999	0.0001

TNR= Tears needed repair.

that proved significant with odds ratio of 4.45 (1.5 - 14.0) and 14.16 (8.2 - 24.9); respectively.

#### 4. Discussion

Identification of women who are in need for episiotomy and those who are at increased risk of perineal/vaginal trauma has been long an important question to the obstetricians. This work demonstrates a significant impact of perineal length on the progress of labor specially. The population studied in this work is unique as 40% of them were circumcised. This may add more importance in this work. The methodology we have used in measuring obstetric perineum was similar to that previously specified by the ICS and previous studies [11] [17].

In the current study, perineum is shorter in older women compared with younger ones. This could be explained by the tendency of increased parity with age that traumatizes the perineum and shortens it. This difference in the perineal between primiparae and multiparae has been previously demonstrated [18] [19] [20]. The mean length of the perineum in this study is shorter than what have been previously measured by Rizk and colleagues (3.7 vs. 4.6 cm); respectively [11]. This difference could be attributed to the inclusion of only primiparae in the latter study who usually have long un-traumatized perineum compared with women of variable parities in our cohort.

All the current study participants were low risk deliveries and all of them were

delivered or supervised by an obstetrician in charge. Midwifery system is not applied in our and other public hospital in Egypt. The rate of episiotomies and perineal tears (about 30% each) is acceptable taking in consideration that a good number of the study participants were attempting their first vaginal delivery. Caesarean section rate in the current study is low and this could be because all deliveries with any fetal or maternal risks factors had been excluded from the study.

The duration of the second stage among our deliveries was longer in those with perineal length  $\geq 4$  cm. A previous study address this issue showed that there was no significant difference in the duration of second stage of labor between those with perineal length shorter and longer than 3.5 cm [12]. We hypothesize that this may be secondary to the extra time needed for the perineum to stretch to open the *one door posterior gate* of the obstetric outlet. Unfortunately, the current study did not measure the perineal stretchability previously suggested by Wolfish *et al.*, 2005 [13], a confounding factor that may affect the duration of the second stage of labor.

In the present cohort, the rate of episiotomy was higher among women with longer perineum ( $\geq 4$  cm). However, among those who did not have episiotomy, the incidence of obstetric trauma needed repair was higher among the group of women with short perineum ( $< 4$  cm). Previous studies did include episiotomy with perineal tears in one category and demonstrate an inverse relationship between perineal length and perineal/vaginal tears needing repair [11] [13]. The difference in the relation between episiotomy and perineal length between the current and previous studies may be attributed to the actual need of episiotomy with long perineum. Long perineum may be associated with shorter genital hiatus. A factor that was previously identified as one of the determinant of the need for episiotomy affects the possibility of obstetrical trauma [21]. However, malpractice of elective episiotomy in primiparas by young obstetricians may share in that difference. In the current study (77.2%) of primiparae have done episiotomy during their deliveries.

Previous studies suggested that observation of more trauma with short perineum may be attributed to that the short perineal body is indicative of either a smaller bony pelvis or a smaller vaginal opening [11] [13]. However, we do suggest that in addition to the above explanation this relation may be due to one or more of the following hypothesis. First is that the short perineum prevent the head from one of the natural supports during its passage in the birth canal (the strong perineum) that normally preventing its premature extension during delivery. Absence of this needed natural support does allow premature extension of the head, bringing longer anteroposterior diameter and increases the probability of obstetrical trauma. Second, this observation may be secondary to the shortness in the 2<sup>nd</sup> stage of labor demonstrated in the present study especially in multipara (most of those who did not have episiotomy). Short second stage may not allow enough time to put the patient in lithotomy position to have good perineal support. Thirdly, short perineum may cause shorter second stage of labor

giving less time for stretching of the perineum (a factor that had not been addressed in the current study). Rapidly stretched perineum is rigid and more liable for lacerations.

In conclusion, longer perineum is associated with increase in the duration of the second stage of labor. Obstetricians should expect the need of episiotomy when confronted with circumcised primigravida with long perineum. However, if the perineum is short they should not be deceived, short perineum is more probably torn.

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