

## PELVIC FLOOR EXTENSIBILITY IN PARTURIENTS: A QUANTITATIVE EVALUATION

### Hypothesis / aims of study

Check the possibility of measuring the parturients pelvic floor extensibility quantitatively and to investigate fetal and maternal variables that may influence perineal outcomes in vaginal delivery. Determine a cutoff value, in centimeters, of pelvic floor extensibility with *Epi-no*<sup>®</sup> that could be an intact perineum predictor.

### Study design, materials and methods

A transversal, observational study in a consecutive sample (227 parturients) was conducted throughout 2009 at a Public Hospital (Osasco- Brazil). Inclusion criteria were parturients at term with a single fetus in vertex presentation, with less than 9 cm dilatation, who presented alive fetus until the time of evaluation with the equipment, and who received (when necessary) local analgesia to perform the episiotomy or sutures. Exclusion criteria were excluded patients who underwent cesarean section, operative or taquiotocic delivery, also the parturients with latex allergy, or those who refused to participate.

Participants were submitted to the pelvic floor extensibility assessment, measured as the perimetry of inflated *Epi-no*<sup>®</sup> balloon in centimeters on admission to the delivery room. The test was performed in lying parturients with flexed and abducted lower limbs and feet supported on the bed.

After application of a gel lubricant, the balloon covered with a condom was introduced into the vagina. Subsequently, the balloon was gradually inflated until the tolerable limit determined by the patient pain/discomfort was reached. At this point, the balloon was slowly withdrawn while still fully inflated, and the broadest circumference/ perimeter of the balloon was measured using a metric measuring tape.

To identify the variables that influenced the perineal outcomes (intact perineum, episiotomy and laceration), were applied the Kruskal-Wallis, and Mann-Whitney test. The ROC (Receiver Operating Characteristic) was then constructed to determine the best cutoff point of *Epi-no*<sup>®</sup>, to identify parturients who remained with an intact perineum. It has been also determined the sensitivity and specificity. Finally, the *odds ratio* was calculated to determine the parturient chance to present intact perineum by reaching the best cutoff point in the *Epi-no*<sup>®</sup> perimetry. Significance was set at  $p < 0.05$ .

### Results

A total of 161 parturients with 24.2 ( $\pm 4.5$ ) years old, 2.2 ( $\pm 0.7$ ) gestations and 1.1 ( $\pm 0.4$ ) deliveries were included, after exclusion of 66 parturients that underwent cesarean section. The mean pelvic floor extensibility with the use of *Epi-no*<sup>®</sup> was 19.9 $\pm$ 2.7 cm, and among the multiparous (20.7 $\pm$ 2.4 cm) was significantly higher than the 19.3 $\pm$ 2.8 cm of primiparous ( $p < 0.001$ ). Among the parturients included in the study, 50.9% were submitted to episiotomy, 21.8% suffered lacerations, and 27.3% remained with an intact perineum. They gave birth newborns weighing 3.200 ( $\pm 412$ ) grams with cephalic perimeter measuring 34.2 ( $\pm 1.4$ ) cm. Older age (25.9 $\pm$ 4.9 years), higher number of pregnancies (3.4 $\pm$ 2.2), deliveries (2.2 $\pm$ 1.9) and greater perimeter by *Epi-no*<sup>®</sup> (21.4 $\pm$ 2.0 cm) were directly related to the intact perineum occurrence (Table 1). The area under the ROC curve was 0.71 when the found *Epi-no*<sup>®</sup> perimeter cutoff value were 20.8 cm. The calculated sensitivity, specificity and odds ratio to preserve an intact perineum were respectively, 70.5%, 66.7% and 4.8.

### Interpretation of results

Selective episiotomy seems to be more beneficent than its routine use (1). Natural birth without surgical procedure as always as possible, has been advocated by some entities such as anthroposophic medicine among others. For this reason, procedures that can reduce the use of episiotomy have been studied such as *Epi-no*<sup>®</sup> use during pregnancy (2). Evaluating quantitatively pelvic floor extensibility or elasticity could be useful in deciding to use or not an episiotomy. *Epi-no*<sup>®</sup> showed to be an efficient measurer of pelvic floor extensibility. Parturients with advanced age, more pregnancies, parities and with greater perimeter by *Epi-no*<sup>®</sup> maintained more intact perineum. Those who achieved approximately 22 cm of perimeter have almost five times more chance to an intact perineum in a vaginal delivery.

### Concluding message

Pelvic floor extensibility can be evaluated quantitatively and is directly related to an intact perineum in vaginal birth such as advanced maternal age, greater number of pregnancies and deliveries. When the perimeter achieved in the assessment of pelvic floor extensibility, using *Epi-no*<sup>®</sup>, is greater than 20.8 cm characterized a predictor of intact perineum in parturient who present a newborn with an average weight of 3.200 grams and mean head circumference of 34.2 cm.

Table 1- Presentation of quantitative variables and its relation with perineum outcomes in vaginal birth.

Variable	Perineum outcomes	n	Mea n	Standard Deviation	P-Value
Age (anos)	Episiotomy	82	22.2	4.5	< 0.001* episiotomy < intact perineum** episiotomy < laceration**
	Laceration	35	24.5	5.7	
	Intact perineum	44	25.9	4.9	
Pregnancies	Episiotomy	82	1.3	0.7	< 0.001* episiotomy < laceration < intact perineum**
	Laceration	35	2.1	1.1	
	Intact perineum	44	3.4	2.2	
Parity	Episiotomy	82	0.2	0.4	< 0.001*

	Laceration	35	0.9	1.0	episiotomy < laceration < intact perineum**
	Intact perineum	44	2.2	1.9	
Body mass index (kgm <sup>2</sup> )	Episiotomy	82	27.2	3.7	
	Laceration	35	29.1	5.2	0.1
	Intact perineum	44	26.8	4.0	
Epi-no® (cm)	Episiotomy	82	18.9	2.7	< 0.001*
	Laceration	35	20.2	2.7	episiotomy < laceration**
	Intact perineum	44	21.4	2.0	episiotomy < intact perineum**
Newborn weight (gramas)	Episiotomy	82	3181	379	
	Laceration	35	3183	438	0.4
	Intact perineum	44	3063	453	
Newborn cephalic perimeter (cm)	Episiotomy	82	33.9	1.5	
	Laceration	35	34.6	1.5	0.06
	Intact perineum	44	33.9	1.5	

\*Teste de Kruskal-Wallis; \*\*Mann-Whitney.

#### References

1. Carroli G, Belzan J. Episiotomy for vaginal birth (Cochrane Review). In: The Cochrane Library, Issue 2, 2008. Oxford: Update Software.
2. Ruckhaberle E, Jundt K, Bauerle M, Brisch KH, Ulm K, Dannecker C, et al. Prospective randomised multicentre trial with the birth trainer Epi-no® for the prevention of perineal trauma. Aust N Z J Obstet Gynaecol 2009;49(5):478-83

<b>Specify source of funding or grant</b>	<b>TECSANA donated Epi-no Equipments</b>
<b>Is this a clinical trial?</b>	<b>No</b>
<b>What were the subjects in the study?</b>	<b>HUMAN</b>
<b>Was this study approved by an ethics committee?</b>	<b>Yes</b>
<b>Specify Name of Ethics Committee</b>	<b>Ethics Committe of Federal University of São Paulo- number-1283/09 National Ethics Research Comission fo Brazil- number- 15368</b>
<b>Was the Declaration of Helsinki followed?</b>	<b>Yes</b>
<b>Was informed consent obtained from the patients?</b>	<b>Yes</b>