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FACTORS INVOLVED IN THE DETERIORATION OF PELVIC FLOOR MUSCLE CONTRACTION STRENGTH SIX MONTHS AFTER FIRST VAGINAL DELIVERY

Hypothesis / aims of study

Vaginal delivery involves muscular distension, laceration, isquemia and neural trauma, all of them being possible mechanisms by which injury can occur. This damage can lead to anatomical and functional changes of the pelvic floor muscles (PFM) after childbirth.

The aim of the study was to evaluate pelvic floor contraction strength changes after vaginal delivery and also to analyse the risk factors involved in the deterioration of PFM function.

Constitutional, labor and delivery variables	Deterioration of PFM contraction strength six months postpartum	*P* value

Study design, materials and methods

A prospective cohort study was undertaken to evaluate the influence of first vaginal delivery on pelvic floor muscles function. The study group was selected from the primigravid women, who came to give birth at our Public Health Hospital from April to October, 2007. The exclusion criteria were: multiple pregnancy, gestational age of less than 37 weeks, previous urogynecological surgery, urogynecological malformations and neurological disorders. Women who were delivered by scheduled caesarean section were initially excluded and the ones who were delivered by intrapartum caesarean section were subsequently excluded.

PFM contraction strength was evaluated in pregnant women at term and six months after delivery. It was first carried out during a manual examination and a score from 0-5 was given according to the modified Oxford Grading System[1]. Examination was performed in the lithotomy position. Women unable to perform at least a moderate pelvic floor contraction after instruction (Oxford < 3) were excluded from the study. Vaginal pressure was then evaluated using a perineometer (Peritron®) measuring the strongest of three voluntary pelvic floor contractions as has been previously reported[2]. We defined a deterioration of pelvic floor contraction strength in the follow-up visit as a decrease equal or more than 10 cm H_2O between the value at inclusion and six months after delivery.

To investigate the risk factors associated with a decrease in PFM contraction strength, we analyzed the following variables: age; height; weight; use of oxytocin, epidural anaesthesia; second stage of labor and active pushing time; mode of delivery; episiotomy; 3rd and 4th degree perineal tears; birth weight and cephalic perimeter of the newborn; and pelvic floor muscle training up to at least 3 months postpartum. Information about labor and delivery was collected from the clinical charts.

Statistical analyses were used for mean comparison (Student's test, ANOVA) and proportion comparison (Chi-square and Fisher test). A multivariate logistic regression model was used to assess the relationship between the decrease of pelvic floor function strength and the variables described above.

Results

We enrolled 243 pregnant women at term who were able to perform an adequate pelvic floor muscle contraction and had a vaginal delivery. Of those, 215 (88.5%) attended the six months follow up visit, forming the study group. Mean age was 31.3 years (range:18-43) and mean BMI was 23.0 (range:15.9-44.2). Vaginal delivery was spontaneous in 149 (69.3%) women and instrumental in 66 (30.7%).

The manual testing score of PFM contraction strength at inclusion was 3 in 109 (50.7%) women, 4 in 82 (38.1%), and 5 in 24 (11.2%). Perineometry gave a mean value and a standard deviation (SD) of 35.3±10.2 in women with manual testing score 3; 49.3±12.6 in the ones with score 4; and 72.9±22.4 in those with score 5. Six months after delivery 70 (32.6%) women had a decrease of 10 cm H_2O or more in PFM contraction strength measured by perineometry.

We performed a univariant analysis to associate the deterioration of PFM contraction strength with different variables. Second stage of labor and active pushing were categorised in two groups. The results are shown in table 1. A multiple logistic regression model was performed with the variables near to statistical significance ($p \leq 0.2$). PFM training was included as a potential confounding factor. We observed that deterioration of PFM contraction strength six months after vaginal delivery was significantly increased among the older women (OR: 1.15; 95% CI:1.04-1.28) and those who had an instrumental vaginal delivery (OR: 5.27; 95% CI:2.47-11.26). We did not find any statistical association with the other variables.

Table 1 Results of the univariant analysis performed to associate the deterioration of PFM contraction strength six months after first vaginal delivery with different variables.

		No (n=145)	Yes (n=70)	
Age (years)	mean, SD	30.5 ± 3.8	32.8 ± 3.4	0.000
BMI	mean, SD	23.2 ± 4.0	22.6 ± 2.9	0.23
Use of oxytocin	n, %	109 (75.2)	61 (87.1)	0.04
Epidural anaesthesia	n, %	137 (94.5)	66 (94.3)	0.95
2nd stage of labor ≥ 2 hours	n, %	39 (26.9)	30 (42.9)	0.019
Active 2nd stage of labor ≥ 1 hour	n,%	6 (4.1)	10 (14.3)	0.008
Mode of delivery				
Spontaneous vaginal delivery	n, %	119 (79.9)	30 (20.1)	0.000
Instrumental vaginal delivery	n, %	26 (39.4)	40 (60.6)	
Episiotomy	n, %	108 (74.5)	59 (84.3)	0.10
3rd or 4th degree tears	n, %	1 (0.7)	3 (4.3)	0.10*
Birth weight (g)	mean, SD	3283 ± 423	3330 ± 478	0.49
Cephalic perimeter of the newborn (cm)	mean, SD	34.2 ± 1.3	34.6 ± 1.5	0.07

BMI: body mass index
(*) Fisher test

Interpretation of results

PFM contraction strength decreases after vaginal delivery in up to 32.6%. Older women and those delivered instrumentally are more at risk.

Concluding message

We have identified increasing age and instrumental vaginal delivery as independent risk factors associated with a deterioration of PFM contraction strength six months after first delivery. Tissue changes due to ageing and the increased perineal injury during instrumental vaginal delivery may be involved. Efforts should be directed at encouraging these women to exercise their pelvic floor.

References

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Is this a clinical trial?	**No**
What were the subjects in the study?	**HUMAN**
Was this study approved by an ethics committee?	**Yes**
Specify Name of Ethics Committee	**Medical Ethics and Investigation Committee of the Hospital Donostia.**
Was the Declaration of Helsinki followed?	**Yes**
Was informed consent obtained from the patients?	**Yes**