1056

Zanetti M R D[1], Resende A P M[1], Petricelli C D[1], Nakamura M U[1], Pereira S[2], Pereira L C[2], Riccetto C L Z[2]
1. *Unifesp- Brasil,* ***2.*** *Unicamp- Brasil*

ELECTROMYOGRAPHY ACTIVITY OF PELVIC FLOOR MUSCLES: IS THERE ANY DIFFERENCE BETWEEN NULIPAROUS AND PRIMIGRAVIDAE?

Hypothesis / aims of study

The pelvic floor is responsible for support of abdominal and pelvic organs and the mechanisms of urinary and fecal continence; to sexual intercourse and childbirth. Thus, their physiological functions depend on an efficient muscle activity. During pregnancy, there are hormonal and biomechanical changes with repercussions on the abdomino-pelvic area. The evaluation of the pelvic floor muscle plays a decisive role in the prevention and treatment of its disorders at any stage of women´s life. This study aims to compare the muscle contractility of the pelvic floor in nulliparous and primigravidae by surface electromyography.

Study design, materials and methods

Multicenter observational and comparative study conducted in Brazil in 2008 and 2009. The sample constituted of 129 women consecutively enrolled and consisted in two groups: (a) 54 nulliparous, (b) 75 primigravidae on the third trimester.
The inclusion criteria for the group of nulliparous was the ability to do a correct pelvic floor muscle contraction and didn´t complaint of any pelvic floor dysfunction. For group of pregnancy women, the inclusion criteria were first and healthy pregnancy, without obstetrics pathologies.
For electromyographic evaluating, it was used the equipment EMG System of Brazil® model 400C with eight-channels. The patient was positioned supine, with flexed knee and hip. The vaginal probe with two opponents parts of metal (Chatanooga Group ®), responsible for obtaining the myoelectrical signal, was introduced by the physiotherapist in the middle third of the vaginal canal with KY lubricating gel (Johnson's & Johnson's). After the probe was positioned with metal parts placed in contact with the side walls of the vagina (lateral-laterally position), subjects were instructed to do three maximal voluntary contractions (MVC) with ten seconds of rest between contractions. Was selected the best maximal voluntary contraction (MVC) for data analysis. After the selection of the best contraction, were evaluated 5 seconds of that contraction using the software EMGLab, with subsequent analysis of Root-mean-square (RMS). For statistical analysis the SPSS (Statistical Package for Social Sciences) version 17® was used, and to analyse the possible differences in MVC between the two groups the Mann- Whitney test was used with a significance level of 5% (0.05).

Results

The mean value of age of nulliparous group was 26.6 (±5.4) years and primigravidae 23.9 (±6.1) years old. With regard to body mass index, we found 23.7 (±2.7) Kg/m^2 for nulliparous and 27 (±3.9) Kg/m^2 for primigravidae which were at 32.9 (±4.0) gestational age. Regarding to the resting tone and maximal voluntary contraction for both groups, the results are showed in table 1.

Table 1 - Comparison of electrical activity while resting and during maximum voluntary contraction between the groups studied

Variables	Nuliparous	Primigravidaes	P Values
Resting (µV)	17.6 (±11.2)	15.9 (±9.8)	p = 0.5
MVC (µV)	77.1 (±37.2)	39.1 (±20.1)	p < 0.001*

* Mann-Whitney Test

Interpretation of results

The physiological alterations present at gestational period affect the entire female musculoskeletal system, including the pelvic floor [1]. This was demonstrated by this study, which maximal voluntary contraction was significantly greater in nuliparous than in primigravidae. It is important to consider that there is a strain on, and consequently a weakening of the abdominal muscles during pregnancy to allow uterine growth [2]. As a result of chronic tension, the gradually stretched and weakened endopelvic fascia can trigger pelvic floor dysfunctions; or even due to collagen dispersion, which provokes alterations to the conjunctive tissue added to postural alterations and uterine weight gain, which can lead to PFM weakness in the gestational period [2]. Sapsford and Hodges (2001) report that the electromyographic activity of the pelvic floor muscles decreases when the abdominal wall is relaxed or loosened, with a consequent reduction in the pelvic floor's sustention function [3]. Our data allows us to point out impairment to the pelvic floor muscle function of first pregnancy compared to nulliparous women and we believe that this finding can contribute to clinical practice in the care of pregnant women. Physiotherapists, as professionals trained in biomechanics and kinesiology, are able to prevent damage to, or rehabilitate a muscle, should create an exercise program which aims to strengthen the pelvic floor throughout pregnancy. This approach would prevent pelvic floor dysfunctions that, not just in pregnancy, often considered to be transitory and physiological, can persist long-term, severely damaging women's quality of life.

Concluding message

The muscular function of primigravidaes pelvic floor when compared to nulliparous women is impaired during pregnancy, as evident in electrical activity.

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Was the Declaration of Helsinki followed?	**Yes**
Was informed consent obtained from the patients?	**Yes**