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IS THERE DIFFERENCE IN THE PELVIC FLOOR MUSCLES' PERCENTAGE OF CO-CONTRACTION BETWEEN CONTINENT AND INCONTINENT WOMEN? PRELIMINARY RESULTS

Hypothesis / aims of study

A coordinated and simultaneous activity between pelvic floor muscles (PFM) and transverse abdominal muscle (TrA) seems to favor the maintenance of urinary continence. According to the *International Continence Society* and *International Urogynecological Association*, the contraction of two or more muscles at the same time is denominated as 'co-contraction' and can result in an augmentation of motor activity when occur in a synergistic way (1).

The presence of co-contraction between PFM and TrA in young asymptomatic women has been reported in some studies. However, there is still no consensus in the literature about the presence of a synchronous muscle activity in women with stress urinary incontinence (SUI) (2). The authors also suggest that the presence of urinary symptoms is related to an uncoordinated action between these muscles, characterized by a lower PFM response compared to TrA response.

Thereby, the aim of this study was to analyze and compare the pelvic floor muscles' percentage of co-contraction from TrA contraction in continent and incontinent women.

Study design, materials and methods

A transversal clinical study was carried out after Research Ethics Committee approval and conduct in accordance with the Helsinki declaration.

Initially, 127 women were recruited and it was investigated if they fulfilled the study eligibility criteria. Eight of these women did not fulfill the inclusion criteria due to PFM strength grade 0 or 1 (n=3), presence of predominant urgency urinary incontinence (n=1), previous surgery for SUI (n=2) and pelvic organ prolapse grade III or greater (n=2). Thus, 119 women participated in the study.

The participants' urinary symptoms were evaluated using the *International Consultation on Incontinence Questionnaire Urinary Incontinence – Short Form (ICIQ UI-SF)* and they were divided into two groups: (1) continent women (n=88) (Mean age: 30.2±10 years old, mean BMI: 23.25±3.23 kg/m², mean number of pregnancies: 1.2±1.7, ICIQ UI-SF score: 0) and (2) incontinent women - women with predominant SUI (n=31) (Mean age: 51.6±8.3 years old; mean BMI: 24.1±5.1 kg/m²; mean number of pregnancies: 2.6±1.4; ICIQ UI –SF score: 15±3.8).

Afterward, they were submitted to PFM surface electromyography exam, being requested three PFM maximal voluntary contractions (obtaining the PFM electromyographic activity when it was requested) and more three TrA maximal voluntary contractions (obtaining the PFM electromyographic activity when it was co-contracted).

The mean *Root Mean Square (RMS)* was calculated from three contractions and was used for data analysis. The PFM percentage of co-contraction was calculated through this formula:

$$PFM \text{ percentage of co-contraction} = \frac{PFM \text{ electromyographic activity when it was co - contracted} \times 100}{PFM \text{ electromyographic activity when it was requested}}$$

The sample homogeneity and the comparison between PFM percentage of co-contraction in continent and incontinent women were analyzed using the Kolmogorov-Smirnov and Mann-Whitney tests, adopting a significance level of 5%.

Results

The groups were homogeneous only in terms of body mass index (p=0.6). There was significant difference between PFM electromyographic activity when it was requested and co-contracted, both in continent (p<0.0001) and incontinent (p<0.0001) women, demonstrating a greater PFM activation when it was requested.

Table 1 presents the PFM percentage of co-contraction between groups.

Table 1 – Analysis of PFM percentage of co-contraction between continent and incontinent women.

	Continent women M (SD)	Incontinent women M (SD)	Difference between groups (p-value) ¹
PFM percentage of co-contraction (%)	70.2 (40.9)	57.8 (27.7)	0.1

Data presented in mean (M) and standard deviation (SD). PFM = Pelvic floor muscles; % = percentage. ¹Mann-Whitney test.

Interpretation of results

Several authors discuss the relationship between PFM and TrA. There are indications that TrA thickness correlates directly with PFM electromyography activity (3). However, the preliminary results of our study demonstrated that PFM co-contraction from TrA contraction is significantly lower when compared to direct PFM contraction in both continent and incontinent women, corroborating with other studies.

In addition, we had verified that PFM percentage of co-contraction in continent women was 70.2% while in incontinent women was 57.8%. However, no statistically significant difference was found between groups, being necessary to continue the study to elucidate this question, since these findings will contribute to the conservative management of pelvic floor dysfunctions, allowing a clinical practice based on evidence.

Concluding message

In conclusion, the PFM electromyographic activity is statistically greater when this muscle is required than when it is co-contracted, in both continent and incontinent women. Besides, PFM co-contraction occurs more frequently in continent women, although no significant statistical difference was found between groups.

References

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Disclosures

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