

Analysis of the electromyography of the pelvic floor muscles in response to the impact caused by the vertical jump

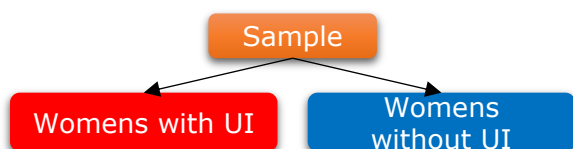
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Hypothesis/ aims of study

High impact exercises, such as jumping, are strongly associated with high prevalence of urinary incontinence (UI) in women and young athletes. This study has the objective of test the hypothesis that women with UI have lower activation of the pelvic floor muscles (PFM) when compared to women without UI in response to vertical jump.

Materials and methods

The cross-sectional study with a functional kinetic based on data from 35 adult women. The women were divided into two groups, with and without UI, according to the International Consultation on Incontinence Questionnaire - Short Form (ICIQ-SF).

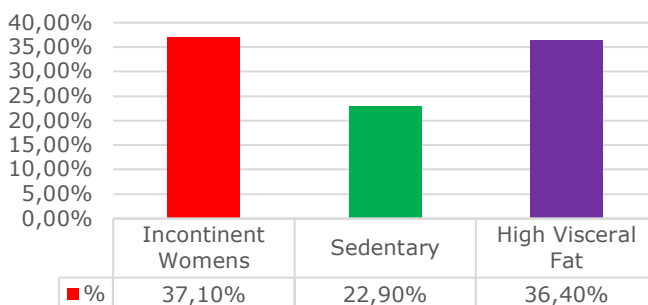


Surface Electromyography (EMG) acquisition of the PFM was obtained during the vertical jumping countermovement exercise at the time when the women touched the ground with their feet. For the analysis of the signals, the software Miotec Suite Version 1.0 was used and the fourth-order Butterworth analog filters (20 Hz High Pass Filter, 500 Hz Low Pass Filter) and 60 Hz Filter (notch) slot for the extrinsic interference of the collection and its harmonics. Comparisons between volunteers with and without UI were made.

The chi-square test was used to evaluate the categorical variables, while the test-t student for independent samples or the Mann-Whitney U test was used to test the differences between the means of the groups. The Student's t-test for paired samples or the Wilcoxon test was used to analyze the differences between group means at two different moments.

Results

Thirty-five women selected by eligibility criteria were categorized into two groups: women without UI (n = 22) and women with UI (n = 13). The descriptive statistics of the participants categorized in continence and urinary incontinence with general homogeneous characteristics, the median (IQR) of the participants' age was 27 (21-36) years, 37.1% were incontinent, 22.9% were sedentary and 36.4% had high visceral fat (Graphic 01).



Graphic 01: General sample's characteristics

The difference between the maximum voluntary contraction (MVC) found in the continents was an average of 71.8 (\pm 29.8) and in the incontinent participants, 48.4 (\pm 34.1), $p = 0.042$. The normalized analysis of the PFM's EMG data of the continents and incontinent women when analyzed in pre-activity and post-jump presented strong statistical differences ($p < 0.001$) and ($p = 0.0002$) respectively. However, when comparing the data between the groups, no statistically significant differences were found ($p > 0.05$).

Concluding message

This study contributed to the knowledge about the activity of the PFM during the vertical jump while body movement translates impact. We observed that in spite of the high activation of the PFM that occurs in the pre-activity and the post-jump, when in comparison between the EMG behavior and the continents and incontinent groups, there are no differences.

Figure 01: Measure of PFM activity during the jump



This may indicate that other mechanisms may be involved in urinary incontinence during impact activities. Future studies are needed to identify the participation of accessory muscles in vertical jump activity as they play an important role in maintaining continence during impact activities.

References

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