

IMPACT OF PHYSICAL ACTIVITY ON URINARY SYMPTOMS AND ON PELVIC FLOOR MUSCLES CONTRACTILITY

Hypothesis / aims of study

The function of the pelvic floor muscles can be affected by physical activity, especially those that require large increases in intra-abdominal pressure. There are two opposing hypotheses about the pelvic floor in athletes: (i) female athletes have strong pelvic floor muscles, and (ii) female athletes may overload, stretch and weaken the pelvic floor [1]. According to some studies, high-impact activities are a risk for the athlete to present urinary incontinence. However few studies have been conducted using electromyography to compare specific modalities and their effect on the muscles the female pelvic floor. The objective of this study was to analyze the influence of the types of physical activity on urinary symptoms and on pelvic floor muscles contractility.

Study design, materials and methods

Exploratory clinical study. The sample consisted of 161 volunteers who were divided into two groups: (a) sedentary: n = 37, (b) physically active: n = 124. Among the physically active 19 were volleyball players, 29 practiced muscle strengthening exercises and 76 practiced walking. All participants were then assessed by interview about personal and demographic data, electromyography evaluation and application of validated versions of Questionnaires in order to evaluate the presence of urinary symptoms: the International Consultation on Incontinence Questionnaire - Urinary Incontinence Short Form (ICIQ -UI SF) and the International Consultation on Incontinence Overactive Bladder Questionnaire (ICIQ - OAB) . PFM (Pelvic Floor Muscle) contractility was registered using a surface electromyography equipment (EMG System of Brazil ®, model 400C). The vaginal probe was inserted and manually positioned, by the researcher, with the metallic sensors placed laterally in the vagina. EMG evaluation protocol consisted of three, maximal, voluntary PFM contractions. Each requested contraction, was performed with a period of twice the rest of the performed contraction, to avoid muscle fatigue. Each contraction was recorded for 5 seconds, in microvolts and analyzed by root - mean-square (RMS). The arithmetic mean of three RMSs was considered per analysis. For statistical analysis, the Fisher exact test (categorical variables) and the Kruskal -Wallis test (quantitative variables) test for comparison of modalities were used. The significance level was 5%.

Results

The average age of the volunteers was 55.43 years (± 12.87), being that 77% practiced regular physical activity on an average of 41.37 months and 23% was sedentary. Regarding the socio-demographic data most were married (69.57%), white (79.5%), with Elementary school (54.04%). As for the clinical variables, BMI was 27.20 kg/m² and most had symptoms of urinary incontinence (70.8%). The electromyography activity was higher among women who practiced volleyball, followed by those who practice walking, the sedentary muscle strengthening exercises (P = 0.01). Urinary symptoms were lower in the group who practice volleyball for both the ICIQ-UI SF scores (p = 0.0004) and ICIQ-OAB (p = 0:03). The results are shown in Table 1.

Table 1 - Presentation of mean values of EMG data and the scores of the ICIQ-SF questionnaire and ICIQ-OAB.

Physical Activity modalities and sedentary	Electromyography data (RMS mean)	Urinary Symptoms (Total score mean)	
		ICIQ-SF	ICIQ-OAB
Sedentary	20.95	8.81	5.05
Walking	26.48	8.49	5.74
Volleyball	28.99	3.84	3.74
Muscle Strengthening exercise	14.19	7.62	5.00
P-Value	0.0107	0.029	0.027

Total Score - ICIQ-SF: 0 to 21; ICIQ-OAB: 0 to 16. P-value<0,05

Interpretation of results

The effect of physical activity on the pelvic floor is still broadly discussed. High prevalence of urinary incontinence is reported in women who practice high-impact physical activity due to increased intra-abdominal pressure and the impact of the reaction forces on the pelvic floor [2]. In a recent study, it was demonstrated decreased pressure of the pelvic floor muscles in a group of athletes compared to non-athletes [3]. Contrarily to this study, we demonstrated that women who practiced volleyball showed higher EMG activity when compared to the other groups. It can be inferred that this type of activity may require greater activation of the pelvic floor muscles. Physical activity that increases abdominal pressure will lead to a simultaneous or pre-contraction of the PFM, and the muscles could be trained [1]. Consequently there is a lower incidence and severity of urinary symptoms in women who practice volleyball as verified by us. This group was not composed of elite athletes, so believe there was no excessive impact on the pelvic floor muscles. It is suggested that, differently of strenuous activities for high impact sports training, the practice of regular physical activity can help maintain the function of the pelvic floor muscles, encouraging mechanisms of urinary continence.

Concluding message

This study demonstrated that women who practice volleyball showed greater electromyography activity of pelvic floor muscles and lower incidence and severity of urinary symptoms.

References

1. Bo, K (2004) Urinary incontinence, pelvic floor dysfunction, exercise and sport. Sports Med 34(7):451-64.
2. Goldstick, O; Constantini, N (2013) Urinary incontinence in physical active women and female athletes. J Sports Med 1-5. doi:10.1136.
3. Borin LCMS, Nunes FR, Guirro ECO (2013) Assessment of pelvic floor muscle pressure in female athletes. Phys Med Reh 5: 189 -193.

Disclosures

Funding: Nothing to declare **Clinical Trial:** Yes **Registration Number:** University of Campinas - UNICAMP Brazil, Committee the Ethics and Research **RCT:** No **Subjects:** HUMAN **Ethics Committee:** University of Campinas - UNICAMP Brazil, Committee the Ethics and Research **Helsinki:** Yes **Informed Consent:** Yes