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ASSESSMENT OF PELVIC FLOOR STRENGTH AND LEVEL OF PHYSICAL ACTIVITY IN HEALTHY MEN OVER 45 YEARS OF AGE

Hypothesis / aims of study

The pelvic floor dysfunction has direct involvement in the pathophysiology of stress urinary incontinence in women. Meanwhile, in men the importance of the pelvic floor in post-prostatectomy incontinence is not yet fully understood. After radical prostatectomy in men, physiotherapy for the rehabilitation of the pelvic floor has provided positive results in the recovery of continence especially with an early beginning. More recently, the state of the pelvic floor before surgery was also described as an important factor. It was shown a direct association between thickness of the muscles of the pelvic floor and the time of recovery of urinary continence after radical prostatectomy, where patients had thicker muscles recovered faster. (1) Our hypothesis is that the pelvic floor strength differs among men and that some factors may contribute to its variability. Thus, it is essential to study the pelvic floor in normal male patients to characterize the differences between individuals and search for possible difference factors. In addition, there is a lack of studies on the normal function or dysfunction of the male pelvic floor as well as the best method for their evaluation.

The aims of this study is to do a pilot-study to indirectly assess the strength of the pelvic floor through manometry of the external anal sphincter and to evaluate the association with physical activity level, body mass index (BMI) and rectal pressure in healthy men with over 45 years of age.

Study design, materials and methods

We prospectively evaluated 31 volunteers men with a mean age of 51.8 ± 4.9 years (45 to 61 years) and no history of chronic disease other than controlled hypertension or diseases that affect the function or anatomy of the pelvic floor. In all patients, age, body mass index (BMI) and physical activity level were characterized. The patients were subjected to indirect assessment of the strength of the pelvic floor through anorectal manometry to assess the external anal sphincter. For the evaluation of the level of physical activity the International Physical Activity Questionnaire (IPAQ), version 8 format long, validated for the Portuguese language was used. In the manometry a probe with balloon and a single pressure channel was used to measure rectal pressure and external anal sphincter pressure at rest and maximum contraction. For the bivariate analysis was conducted calculating the Pearson correlation coefficient for continuous variables with analysis of statistical significance of coefficients. In the case of analysis between continuous and categorical variables, we used the analysis of variance (ANOVA). To evaluate the normality of continuous variables the Kolmogorov-Smirnov test was used. The significance level was considered $p < 0.05$.

Results

In the manometry (Figure 1), the values of rectal pressure had a mean of 44.4 ± 13.8 cm/H2O (21 to 87cm/H2O), the values of pressure at rest had a mean of 103.3 ± 28, 4 cm/H2O (64 to 171cm/H2O) and the values of maximum contraction had mean of 164.9 ± 32.4 cm/H2O (130 to 238cm/H2O). Variables of rectal pressure and maximum contraction pressure had normal distribution. When evaluating the association between the level of physical activity and the values of manometry we found that the pressures at rest and maximum contraction decreases with increasing physical activity, however there were only statistical difference in maximum contraction between patients with low level of physical activity compared with those with high level. Patients with high levels of physical activity had a lower maximum contraction pressure (155.4 ± 26.6) compared with patients with low physical activity (193 ± 40.2) ($p = 0039$). There were no statistical differences in BMI and rectal pressure in relation to the level of physical activity measured by IPAQ. In assessing the association between the studied variables, we observed a positive association between pressure at rest and rectal pressure ($p = 0018$) and a trend toward positive association between the maximum contraction pressure with rectal pressure ($p = 0098$). There was also a trend toward positive association between BMI and rectal pressure ($p = 0.08$), positive trend in the association between BMI and the pressure of the pelvic floor at rest ($p = 0093$).

Interpretation of results

Among our patients, there was a variation in the values of maximum contraction pressure that showed a normal distribution (164.9 ± 32.4 cm/H2O) characterizing what happens in biological variables. This variability of the force of contraction of the pelvic floor between healthy patients may thus have relevance as a risk factor for the development of urinary incontinence after radical prostatectomy as verified in the association between anatomical characteristics of the pelvic floor (muscle thickness of the resonance) and risk of incontinence. We found that the pressures at rest and maximum contraction had a negative association with the level of physical activity. The decrease in the strength of the pelvic floor may be related to the vigorous and intense physical activity, which would increase intra-abdominal pressure transmission with this pressure on the pelvic floor causing stretch with consequent weakening of the muscles and fatigue. The chronic increase of intra-abdominal pressure seems to be associated with the pelvic floor dysfunction in women athletes, especially in activities that encourage the increase of intra-abdominal pressure, such as sports of impact, jumping, running, sports played with balls and weight lifting. (2,3) The practice of physical activity and muscle strengthening seems to not generally cause a corresponding increase in strength of the pelvic floor, favoring the muscular imbalance between abdominal and pelvic floor. In this study, the values of rectal pressure also showed normal distribution (44.4 ± 13.8 cm/H2O, range: 21 and 87cm/H2O). There was a positive association between rectal pressure and the pressure at rest ($p = 0018$) and a trend toward positive association with the pressure of maximum contraction of pelvic floor ($p = 0098$). Thus, the higher the rectal pressure, the greater the strength of the pelvic floor, raising the possibility of an adaptive mechanism. The concept that the balance between rectal pressure and strength of pelvic floor is the most important in the pathophysiology of stress urinary incontinence can be inferred by this work. However, the small number of evaluated volunteers does not allow us to generalize the present results. It only highlights the need of further studies about the pelvic floor in healthy men and its possible relation to post-prostatectomy incontinence risk,

Concluding message

The present study indicates that the higher the level of physical activity the lower the force of contraction of the pelvic floor. This seems to be a compensatory increase with increasing rectal pressure, which tends to be higher in patients with higher BMI. This study raises new questions about the understanding of the interaction between intra-abdominal pressure and pelvic floor strength in the physiology of continence. However, due to our small sample size further studies are necessary to better elucidate our findings.

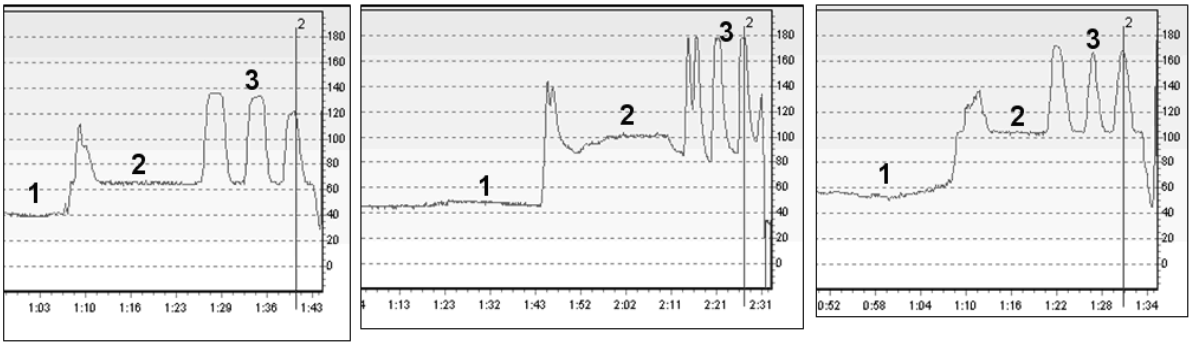

Figure 1: Manometry evaluation in three patients: 1 rectal pressure; 2 pressure at rest; 3 maximum contraction (3 attempts).

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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	**Comitê de Ética em Pesquisas da Universidade Federal de Juiz de Fora (protocolo CEP-UFJF: 997.043.2007).**
Was the Declaration of Helsinki followed?	**Yes**
Was informed consent obtained from the patients?	**Yes**