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ASSESSMENT OF PELVIC FLOOR MUSCLE FUNCTION IN NULLIPAROUS FEMALE ATHLETES USING TRANSLABIAL ULTRASOUND, MANUAL MUSCLE TESTING AND VAGINAL SQUEEZE PRESSURE MEASUREMENTS.

Hypothesis / aims of study

Female athletes who participate in high-impact, frequent intense training (HIFIT) sports represent a group who may be at higher risk of urinary incontinence due to damage of the pelvic floor[1]. Vaginal palpation, perineometry and ultrasound measure different aspects of pelvic floor function. Recent work has shown HIFIT athletes have greater bladder neck descent and a larger hiatal area on Valsalva maneuver measured by translabial ultrasound[2]. The aim of this study was to assess pelvic floor function in nulliparous female athletes using translabial ultrasound, manual muscle testing, and perineometry.

Study design, materials and methods

In a cross-sectional study, 20 nulliparous HIFIT female athletes (aged 20-23 years) were assessed by translabial ultrasonography, vaginal palpation and perineometry. Sports which were considered appropriate included: running, handball and gymnastics. All procedures were performed in the supine position and after voiding. A 'best-of-three' assessment of pelvic floor contraction was carried out during bimanual examination using the Oxford Scale. Vaginal pressure was then measured using a silicone sensor perineometer (Peritron®). Imaging was performed using GE Kretz Voluson 730/730 Expert systems (GE Kretztechnik GmbH, Zipf, Austria) with 8–4-MHz transducers. Imaging was acquired in the mid-sagittal plane with the angle of acquisition set at 85◦. Volume datasets were measured at rest, on pelvic floor muscle contraction and on Valsalva maneuver according to previous reports[3].

Results

The mean vaginal squeeze pressure was 70.2 ± 23.8 cmH2O (21-104). Figure 1 shows a scatter plot with the values for pelvic floor muscle squeeze pressure using the Peritron® manometer and correlation with the categories of the Oxford Grading Scale. The results of Pearson's correlation test were r = 0.7 (95% CI −0.28 to 0.85).

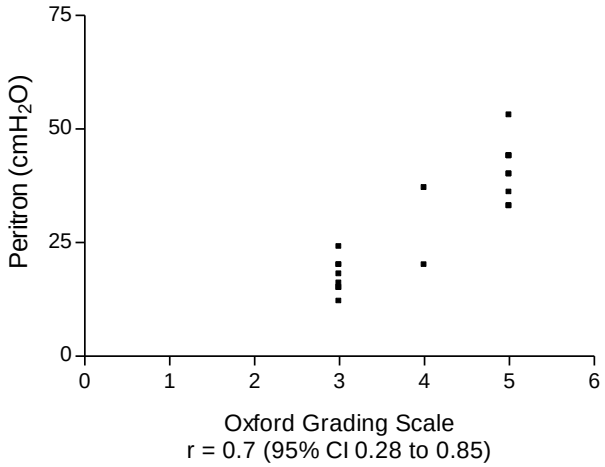

Figure 1: Values estimated for the categories of the modified Oxford Grading Scale, and correlation with the values obtained for pelvic floor muscle strength with the Peritron manometer (cmH_2O).

Table 1 shows the results of translabial ultrasound. The mean value of levator hiatal area at rest was 11.6 ± 1.7 cm^2 and the area increasing to 17.2 cm^2 on Valsalva maneuver (p = 0.002) and decreasing to 8.6 cm^2 on pelvic floor muscle contraction (p<0.001). The mean value of the bladder neck descent was 20.4 ± 4.8 mm (10.2 to 30.8 mm). There were moderate correlations between perineometer and hiatus area on pelvic contraction (r=0.35) (Figure 2).

Table 1: Biometric indices of the levator hiatus, bladder descent and perineometry.

	Mean	Min	Max
Levator hiatal area at rest	11.6 ± 1.7	9.2	14.1
Levator hiatal area on PFMC (cm^2)	8.6 ± 2.1	6.3	14.1
Levator hiatal area on Valsalva (cm^2)	17.2 ± 4.5	11.5	26.6
Bladder descent on Valsalva (mm)	20.4 ± 4.8	10.2	30.8
Vaginal pressure at maximal contraction (cmH2O)	70.2 ± 23.8	21.1	104.2

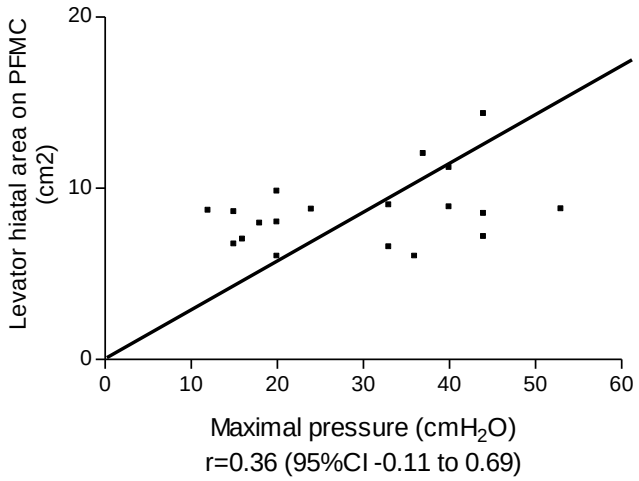

Figure 2: Correlation of levator hiatal area on PFMC and vaginal pressure at maximal contraction.

Interpretation of results

Although the HIFIT female athletes showed a moderate to strong contraction of the pelvic floor muscles, significant bladder neck descent during a voluntary Valsalva maneuver were measured by translabial ultrasound. There was moderate agreement between digital assessment of pelvic floor contraction strength and vaginal perineometry.

Concluding message

The use of a combination of assessment tools is necessary to evaluate the different aspects of PFM function. In HIFIT athletes, translabial ultrasound can be used to study the dynamics of bladder neck and levator ani and to teach pelvic floor exercises to prevent urinary incontinence.

References

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Disclosures

Funding: not aplly **Clinical Trial:** No **Subjects:** HUMAN **Ethics Committee:** Comitê de Ética do Hospital São João, Porto, Portugal **Helsinki:** Yes **Informed Consent:** Yes