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CO-ACTIVATION OF THE PELVIC FLOOR MUSCLES DURING CONTRACTION OF THE HIP EXTERNAL ROTATORS

Hypothesis / aims of study

It has been suggested that contraction of the hip external rotators, particularly the gluteus maximus, can generate co-activation of the pelvic floor muscles (PFM) in nulliparous continent women [1]. The purpose of the study was to evaluate the presence and magnitude of the synergy between the PFM and hip external rotators in parous stress incontinent women using an instrumented speculum [2].

Study design, materials and methods

Twenty-six parous women were recruited from the obstetrics and gynecology clinic of Maisonneuve-Rosemont Hospital in Montreal. All subjects reported stress urinary incontinence (SUI) symptoms according to the ICS definition (the complaint of involuntary leakage on effort or exertion, or on sneezing or coughing) [3]. The women were evaluated in a supine position with hips and knees flexed and feet flat on a conventional gynecologist's table. Their ability to contract the PFM was verified by digital assessment. An experienced physiotherapist carried out the assessment using the instrumented speculum. This reliable instrument provides an accurate measure of the resulting PFM force, regardless of its site of application on the branch of the speculum [2]. The dynamometric assessment of the PFM was conducted at the minimum opening (5 mm between the two speculum branches). The subjects were instructed to relax their PFM in order to record a baseline value. They were then asked to contract maximally for a 10-second period. Three 10-second contractions separated by a 2-minute rest period were recorded. The maximum strength value was obtained by subtracting the maximum peak value from the baseline value. The mean of the three trials was used in the analyses. Thereafter, an elastic band was placed around the participants' thighs in order to resist external rotation of the hips. The women were asked to do an isometric contraction of the hip external rotators against the elastic band for 10 seconds. The synergistic force generated by the PFM during this maneuver was recorded and an increase of 0.05 N was considered significant. The mean of three trials was calculated. Finally, as a control measure, the associated force of PFM strength during three 10-second contractions of the shoulder external rotators was measured. All women gave written consent to participate in the study, which was approved by the Maisonneuve-Rosemont Hospital Ethics Committee. Unilateral one sample t tests were used to determine if the associated forces of the PFM were above 0.05 N.

Results

The subjects' mean age was 35.5 years (±6.0 SD) and they had a mean parity of 1.7 (±0.8 SD). The mean PFM strength was 3.62 N (±2.36 SD; range 0.36–10.35 N). No significant increase in PFM strength was observed during the shoulder muscle contractions ($p<0.001$). However, the majority of the subjects (19/26) demonstrated a significant associated force of PFM strength during contraction of the hip external rotators (mean 0.10 N; ±0.04 SD; range 0.05–0.19 N) ($p=0.0015$). The PFM strength increment during a contraction of the hip external rotators represents a mean percentage of 3.75% of the voluntary PFM maximum strength (±3.40 SD; range 1.23%–13.35%).

Interpretation of results

A synergy between the PFM and hip external rotators seems to be present in the majority of stress incontinent women. However, it should be noted that the strength of the PFM during a hip rotator contraction is much less than during a maximum voluntary PFM contraction.

Concluding message

The hip external rotator muscles can be used to facilitate recruitment of weak PFM contraction. Since PFM activation is less during hip external rotation than during a maximum

PFM voluntary contraction, use of the hip external rotators should be limited to facilitation of pelvic floor activation in the first phase of treatment.

References

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