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EVEN WEAK PELVIC FLOOR MUSCLES LIFT

Hypothesis / aims of study

The original Oxford scale for grading skeletal muscle combined strength with the effect of gravity into the one grade, a six-point scale, graded 0 – 5 (1). This scale has been modified to apply to the pelvic floor muscles (PFM) with measurement of the squeeze and lift components following the same grading system as the original Oxford scale, where muscle scores below grade 3 are defined as being unable to lift against gravity (2). The advent of more sophisticated imaging techniques has made it possible now to accurately measure the elevation component of a PFM contraction in any position. Transabdominal ultrasound (TA US) measures the elevation of the PFM via a surrogate marker (the posterior bladder wall fascia) in mm displacement (3). Both cranial and ventral movements are incorporated into the one value. However if only a ventral movement occurs on attempted contraction of the PFM, then no elevation is recorded. If PFM depression occurs, a negative elevation will be registered. The aim of the present study was to compare digital muscle testing using the modified Oxford grading scale and TA US in assessment of pelvic floor muscle elevation, in different body positions.

Study design, materials and methods

Twenty female physiotherapists were recruited for this study. The ability to correctly contract the PFM was established qualitatively by digital palpation in crook-lying. The PFM were digitally graded using the modified Oxford scale. A measure of the elevation of the PFM was calculated from the electronic callipers within the TA US machine. This was done suprapubically in the sagittal plane. The best of three repetitions of a 3-second PFM maximum voluntary contraction (MVC), tested in each of four positions – crook-lie, supine, sitting and standing – was recorded. Subjects commenced the test with a full bladder for TA US measurements, then voided prior to digital muscle testing. Order of testing position was randomized for each subject. The sitting surface varied between the two tools: the digital muscle test necessitated the subject to be seated on an over-toilet chair, whereas the TA US measures in sitting were taken on a firm-seated chair. Ethical approval for this study was obtained from the Institutional Human Research Ethics Committee.

Results

One subject was not able to correctly contract the PFM so the final data set represents nineteen subjects. Eight of the nineteen subjects received a grade 1 or 2 for PFM strength (no lift palpable) in at least one position. Despite their low Oxford grade, all of these subjects were able to elevate the PFM in sitting and standing, as measured by TA US. The range of scores for elevation measured by TA US for the upright positions were: sitting: 2.3 mm – 12 mm (mean = 6.3 mm) and standing: 6.6 mm – 24 mm (mean = 11.8 mm). Two of these eight subjects depressed the PFM in supine (-3.4 mm, -2.3 mm), even though they could elevate the PFM in the other three positions. However both of these subjects received the same Oxford grade in supine as in crook-lie, where TA US verified elevation of the PFM, suggesting that even a slight change of position, from crook-lie to supine, affects the ability of some subjects to elevate their PFM.

Interpretation of results

The results of the present study suggest that the modified Oxford scale of digital muscle testing, which combines two components of PFM function (squeeze and lift) in one grade, may be unable to detect the lifting component with sufficient accuracy. Perhaps a separate grading of the elevation component of the PFM is required for digital muscle testing. This could involve a qualitative scale of: lift (small, moderate, large amount); no lift; or depression. Improved agreement of PFM lift between digital muscle testing and US may be possible with greater understanding of the mechanism of PFM lift, what contributes to it and why it varies with change of position.

Concluding message

From the results of the present study, the current description of the modified Oxford scale for digital muscle testing does not appear to be accurate in the assessment of PFM lift, when compared against a more objective measure of PFM elevation, such as ultrasound.

References

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