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EFFECT OF TEST POSITION, USING TWO DIFFERENT METHODS OF MEASUREMENT, ON RELIABILITY OF PELVIC FLOOR MUSCLE STRENGTH ASSESSMENT.

Hypothesis / aims of study

Digital palpation for manual muscle testing (MMT) and perineometry for vaginal squeeze pressure (VSP) are widely used in clinical practice, with variations in reported validity, reproducibility and sensitivity of tools, and in assessment positions (1-3). There have been no reported studies assessing reliability in sitting or standing positions, utilising MMT or VSP, and no reports on reliability of vaginal resting pressure (VRP) as a pelvic floor muscle (PFM) measure.

The aims of this study were to determine the intra-rater reliability for MMT, VRP and VSP on PFM assessment between sessions, and to establish how this varies with different testing positions.

The hypothesis was that intra-rater assessment of PFM function would be reliable (Kappa and ICC both > 0.80) across all positions, between test 1 and test 2.

Study design, materials and methods

Twenty female participants (pelvic floor physiotherapists) were recruited for the study in 2003. Subjects were accepted if they self-reported a correct technique of PFM contraction. Subjects included both nulliparous and parous women, age range 25 – 65 years. No account of pelvic floor dysfunction or symptom status was taken. Exclusion criteria included pregnancy and currently undertaking PFM training. Ethical approval for this study was obtained from the institutional Human Research Ethics Committee.

The ability to correctly contract the PFM, and the comfort with either single digit or 2 digit vaginal palpation was established in the crook-lie position, prior to MMT and VSP recordings. The sequence for muscle testing for each method was as follows: 3 repetitions of maximum voluntary contractions (MVCs), lasting 3 seconds each with a 3 second rest in between, followed by change of position. A standardised protocol for ensuring correct technique (squeeze and in-drawing) was used for all tests. All results were recorded verbally on a Dictaphone, and transcribed for later calculation. MMT scores were recorded according to the Oxford scale. If the MMT reflected a score of grade 1/5 or above, perineometry was performed. VRP and VSP readings were made using the Peritron perineometer (measurement unit: cm H_2O pressure), with a non-inflatable sensor and insertion cuff. Prior to PFM contraction, a resting (insertion) pressure reading was taken. Calculation of the between-test reliability was performed using the highest score of the 3 x MVCs. The same sequence of testing was performed in each of four positions in a random order: position 1: crook-lie (single pillow head support, hips and knees comfortably flexed and abducted); position 2: supine (legs extended and abducted); position 3: sitting (upright sitting on an over-toilet chair) and position 4: standing erect. These positions were chosen because they represent positions commonly used in PFM assessment and training regimens. Time intervals between tests ranged from 2 to 6 weeks.

Results

Results in Table 1 include data from 19 subjects (results from one subject were withdrawn due to incorrect PFM contraction technique).

Table 1: Between test reliability for MMT, VRP and VSP.

Test re-test reliability	Crook-lie	Supine	Sitting	Standing
MMT Kappa, (std error)	0.69, (0.14)	0.69, (0.14)	0.86, (0.10)	0.79, (0.33)
% complete agreement of MMT grade	79%	79%	89%	84%
VRP ICC, (95% CI)	0.74 (0.46 – 0.89)	0.77 (0.51 – 0.90)	0.47 (0.09 – 0.76)	0.29 (0.16 – 0.65)
VSP ICC, (95% CI)	0.95 (0.88 – 0.98)	0.91 (0.79 – 0.96)	0.96 (0.90 – 0.98)	0.92 (0.81 – 0.97)

Interpretation of results

MMT as a measure of test re-test reliability of PFM strength was moderately good across all positions for this study. A good percentage of complete agreement of scores for MMT between the two tests was obtained, across all positions. No score was more than one grade higher or lower on the second test, in any position. In this study, the highest reliability of MMT was found in the sitting position. However subjects reported they found this position the most difficult to "feel" their PFMs contracting. The investigator also found this position more awkward to use for assessment.

VRP was moderately reliable in recumbent positions only. Therefore VRP does not appear to be a reliable outcome measure for PFM assessment in sitting and standing positions, which may be more influenced by gravity, body weight and weight from pelvic organs than recumbent positions.

Reliability of PFM strength as measured by VSP was excellent for this study for all four positions.

Concluding message

VSP is a more reliable tool for measuring PFM strength than MMT. VSP can be used reliably in recumbent and upright positions.

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