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EFFECT OF DIFFERENT TESTING POSITIONS USING THREE MEASUREMENT TOOLS ON PELVIC FLOOR MUSCLE CONTRACTION, AND SUBJECT ACCEPTANCE OF TESTING POSITION.

Hypothesis / aims of study

The aims of this study were:
1) to analyse the effect of different body positions on pelvic floor muscle (PFM) assessment, using manual muscle testing (MMT), vaginal resting pressure (VRP), vaginal squeeze pressure (VSP) and trans-abdominal ultrasound (US). Reliability of these assessment tools has been previously considered, however only a few studies have considered the influence of body test position on measurement (1,2).
2) to assess subject acceptance of each testing position.

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, aged 25 – 65 years. No account of pelvic floor dysfunction or symptom status was taken. Exclusion criteria included pregnancy. Ethical approval was obtained from the institutional Human Research Ethics Committee. MMT was performed using vaginal palpation, and the Oxford scale was used to record strength of contraction. The Peritron perineometer was used to record VRP and VSP. The US test used an Acoustic Imaging Performa ultrasound unit with a 3.5MHz curved linear array transducer placed suprapubically, with displacement of the bladder neck measured in millimetres. Testing protocol was 3 repetitions of maximum voluntary contractions, held for 3 seconds each. Positions used for the tests were as follows: crook-lie (single pillow head support, hips and knees comfortably flexed and abducted); supine (legs extended and abducted); sitting (upright sitting on an over-toilet chair) and standing erect.
Subjects commenced the US test with a full bladder, then voided prior to MMT and VSP recordings. Testing position sequence was randomised. All of the positions tested represent positions commonly used in PFM training programs. At the completion of the testing, subjects rated their acceptance of each procedure on a 10-point visual analogue scale, with zero being described as “worst acceptance” and 10 described as “maximal acceptance”.

Results

The scores for PFM assessment for each test position are summarised in Table1.

Table 1: PFM assessment scores.

	MMT (grade) median (range)	**VRP (cm H_2O)** mean (SD)	**VSP (cm H_2O)** mean (SD)	**US (mm)** mean (SD)
Crook-lie	3 (2-5)	24.5 (9.1)	36.5 (18.1)	10.3 (3.9)
Supine	3 (2-5)	25.8 (7.2)	29.9 (17.3)	7.5 (4.5)
Sitting	3 (2-5)	26.7 (8.5)	27.8 (17.1)	7.8 (3.4)
Standing	3 (1-4)	31.7 (7.0)	25.6 (15.4)	13.2 (6.2)

A significant effect of different body positions on MMT grading was found using Friedman’s test ($p<0.05$, mean ranks 3.0, 2.8, 2.3, 2.0 for crook-lie, supine, sitting, standing respectively). Using Wilcoxon’s signed rank test (with bonferroni correction), MMT grade was significantly lower in standing compared with crook-lie ($p=0.004$) and supine ($p=0.005$).
VRP, VSP and US results were anlaysed using repeated measures ANOVA.
VRP was significantly higher in standing than in crook-lie ($p<0.001$), supine ($p<0.001$) and sitting ($p=0.009$).
VSP was significantly higher in crook-lie than in supine ($p=0.001$), sitting ($p<0.001$) and standing ($p<0.001$).

US readings were significantly greater in standing than in supine ($p=0.003$) and sitting ($p=0.001$).
Results of subject acceptance are summarised in Table 2.

Table 2: Subject acceptance of test position.

	MMT mean (SD)	**VSP** mean (SD)	**US** Mean (SD)
Crook-lie	8.9 (1.0)	8.9 (1.0)	9.0 (1.9)
Supine	9.3 (0.9)	9.1 (1.1)	9.1 (1.9)
Sitting	7.7 (2.2)	7.8 (2.1)	8.6 (2.3)
Standing	8.2 (1.7)	8.0 (1.8)	8.9 (2.1)

Interpretation of results

From these data, significant differences between body test position and PFM scores using MMT, VRP, VSP and US, were found. Differences were observed most frequently between lying and standing positions. Therapists need to be aware that the magnitude of the response obtained in the PFM may vary according to which position is used for measurement and exercise.
Subject acceptance of MTT and VSP testing was significantly greater in lying compared to upright positions ($p>0.008$). However for US there was no difference in acceptance level between positions.

Concluding message

When interpreting the results of PFM assessment, consideration of the body position used in testing needs to be taken into account, along with reliability of the tool. While it is known that MMT, VSP and US all measure different aspects of PFM function, further research needs to be done to examine why differences occur according to body position. It is hypothesised that the higher US scores in standing reflect a greater amplitude of PFM movement due to effects of gravity and body weight acting on the elasticity in the tissues, contributing to a lower starting position, hence a greater excursion of movement with contraction. As scores of PFM contraction are different in lying compared to standing, it is recommended that more functional positions other than lying are used in assessment and training regimens, for PFM activity.

References

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