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PUBORECTALIS MUSCLE AND ANORECTAL ANGLE MOVEMENT DURING PELVIC FLOOR CONTRACTION IN CONTRAST TO BLADDER NECK ELEVATION ON PERINEAL ULTRASOUND

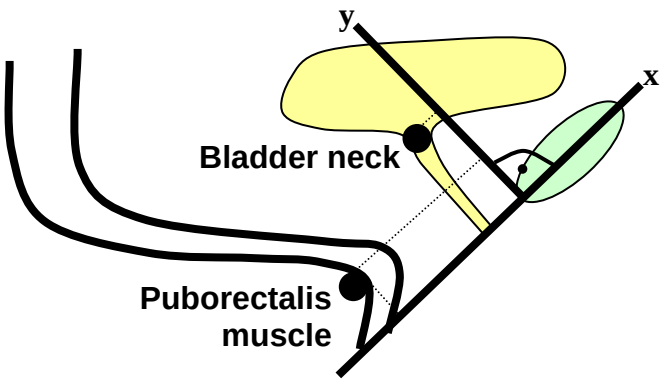
Hypothesis / aims of study

Bladder neck position at rest and during coughing as well as bladder neck elevation during pelvic floor contraction can be imaged with perineal ultrasound and have been used to describe pelvic floor muscle function. The aim of this study is to compare the puborectalis sling displacement behind the anorectal angle with bladder neck elevation during pelvic floor contraction on perineal ultrasound. Loss of pelvic organ support is taken into account and the reproducibility of the method is tested.

Study design, materials and methods

Perineal ultrasound was performed in 80 consecutive women attending a urogynaecological clinic. A curved linear array probe was used. The bladder neck and puborectalis muscle position was measured at rest and during pelvic floor contraction according to the method described by Schaer et al. (Fig. 1). The puborectalis sling position was measured at its most ventral point behind the easily identifiable smooth muscle layer of the rectum at the level of the anorectal angle. The pubic symphysis served as a reference structure for both measurements. Vectors of the displacement were calculated from the x and y measurements. Intra- and inter-examiner reliability was tested in 15 women applying Bland & Altman's method. Loss of pelvic organ support was staged according to the ICS quantification system. Women with pelvic organ prolapse beyond the hymen were excluded. Paravaginal and midline defects were noted on speculum examination. Pelvic floor muscle strength was assessed with the modified Oxford-scale.

Figure 1



Results

The mean age was 53 ±13 years. The median parity was 2 (range 0-6). The method of perineal ultrasound measurements was reproducible with a maximum difference of 3 mm between evaluations and examiners which was considered acceptable.

The mean bladder neck displacement (calculated vectors) during pelvic floor contraction was significantly smaller at 9 ±6 mm than the puborectalis muscle movement at 15 ±8mm ($p<0.001$, t-test). There was a significant difference in bladder neck (4 vs. 11mm) but not

puborectalis displacement (12 vs. 15mm) between women who had an obvious midline defect (n=20) and those who had a paravaginal support defect (n=30). The extent of anterior (Aa, Ba) or posterior vaginal wall prolapse (Ap, Bp) was not associated with bladder neck or puborectalis displacement. The digital pelvic floor contraction assessment (Oxford grading) correlated significantly with both bladder neck and puborectalis movements (Spearman's rho).

Interpretation of results

In contrast to bladder neck elevation, the ventro-cranial movement of the puborectalis musle at the level of the anorectal angle is a direct measurement of a pelvic floor contraction which is reflected in the significantly greater displacement. Bladder neck elevation seems impaired in women with midline cystoceles whereas puborectalis muscle/anorectal angle displacement remains unchanged in these women. The measurement of puborectalis sling movement or anorectal angle displacement is reproducible and might add information on pelvic floor function.

Concluding message

Measurement of puborectalis muscle behaviour behind the anorectal angle during pelvic floor contraction and straining could be considered in research involving ultrasound and pelvic floor re-education. It is easily performed and might be helpful as a biofeedback instrument.