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**RANGE OF MOTION OF FEMALE PELVIC FLOOR EVALUATED USING 3-D MRI IMAGING.
INFLUENCE OF AGE ON DISPLACEMENT TO VOLUNTARY CONTRACTION.**

AIMS OF STUDY

Voluntary activation of the female pelvic floor (PF) compresses and/or displaces the bladder, urethra, vagina and levator ani, among other intra-abdominal organs. The effectiveness of such action depends on the physiological and anatomical integrity of the neuro-musculature structures and it has been postulated that age may also have a role to play in the effectiveness of such training. In the present study we report the results of a comparative functional evaluation in women.

METHODS

These comparisons were focused to examine whether there are age related influences of voluntary PF contractions on the anatomy of the PF of asymptomatic subjects. Two groups of female volunteers were evaluated. Group I was 34 and Group II 55 yr. old. Imaging was performed in the axial, sagittal and coronal plane with the subject in the supine position and position data reconstructed in 3-D. At each plane image storage was done with the pelvic floor relaxed and another image with the pelvic floor contracted over a period of 0.5-1.0 minutes. Image processing was subsequently performed to enhance the anatomical boundaries of the pelvic organs and measure the displacement produced by PF contraction. Displacements, measured from the Group I were compared with Group II, and the range of motion of the internal organs was computer coded as: dark red when compressed, light yellow when vacated. Range of motion was measured ($m \pm se$) in each group, and compared statistically using the students t-test.

RESULTS

The digitally processed image made possible the accurate comparison between relaxed and contracted PF and highlighted the differences between them. From these visualizations it found that the levator ani displace the vagina asymmetrically in 9 of the 11 older subjects. This is in comparison of 6 of the 17 in the younger subjects. The numerical values obtained from the imaging in the sagittal and coronal plane in the present study in comparison between Group I and II are: Levator ani displacement: 7.4 ± 1.1 to 1.4 ± 0.2 cm. ($p < 0.002$) Superior bladder wall: from: 4.2 ± 0.5 to 1.0 ± 0.1 cm ($p < 0.002$). Results also show that significant differences in the range of displacement produced by voluntary PF contraction in the internal structures, external outlines do not reflect these changes. Maximum displacement of the gluteal surface in the coronal plane shows a non significant change; Group I change was from 3.9 ± 1.8 to 2.9 ± 0.7 cm.

CONCLUSION

In conclusion, 3-D MRI evidence is provided suggesting that the range of motion over which voluntary PF contractions that displace the bladder and urethra is dependent on age; higher in the younger than the older subjects. It remains to be established whether range of movement is a limitation in due to neuronal factors, decrease in muscle strength/mass, or the substitution of spaces with fat restricting free movement or other factors.