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Title: IS THERE A RELATIONSHIP BETWEEN URETHRAL STRUCTURE AND FUNCTION BEFORE AND AFTER DELIVERY?

Aim of Study.

Three-dimensional ultrasound offers an opportunity to image and assess the anatomy of the urethral sphincter (1). A decrease in sphincter volume has been associated with stress incontinence (2). Urethral pressure profilometry (UPP) is used to measure urethral sphincter function although it cannot diagnose stress incontinence. The aim of this study was to determine whether three-dimensional sphincter volume could be correlated with the area under the UPP curve thus comparing structural and functional anatomy before and after delivery.

Methods.

Primiparous women were recruited antenatally between 32 and 42 weeks gestation. Three-dimensional transvaginal ultrasound scans of the urethra were performed in modified lithotomy with a comfortably full bladder using a Kretz Combison 530 machine and a 7.5 MHz mechanical sector probe. These images were then computer regenerated into a three dimensional picture with the urethral endothelium and submucosal vascular plexus represented by a hyperechogenic core and the rhabdosphincter a surrounding incomplete hypoechoic band (Fig.1). Length and cross-sectional area were measured allowing the rhabdosphincter volume to be calculated. UPP measurements were performed with a Gaeltec solid-state catheter with two pressure transducers using a standard technique and the area under the curve was mapped out and calculated. All scans and measurements were then repeated between 3 and 6 months postpartum. Total sphincter volume and area under the UPP curve were correlated using the Pearson method (SPSS, USA).

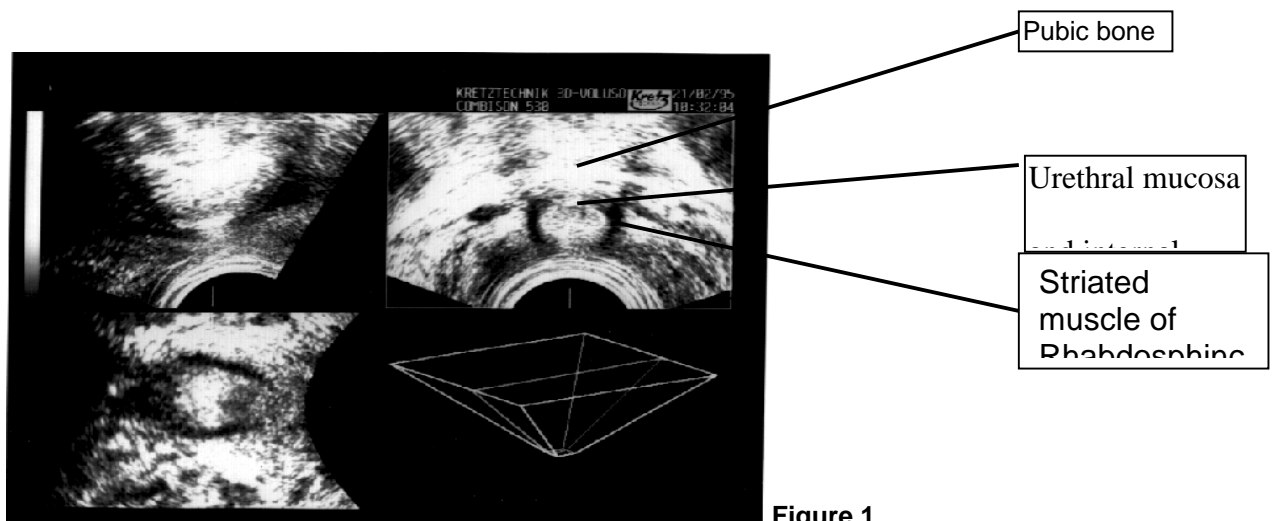


Figure 1.

Results.

19 women participated in the study. Antenatal and postnatal data were available in all cases. Antenatally there was a statistically significant correlation between antenatal sphincter volumes and area under the

UPP curve although this relationship was lost following delivery. The results are shown below:

	No.	Mean	Standard Deviation	Pearson Coefficient (r)
Antenatal UPP Area (cm ²)	19	1.01	0.44	r = 0.508
Antenatal Volume (cm ³)	19	2.22	0.48	p = 0.026
Postnatal UPP Area (cm ²)	19	0.85	0.33	r = 0.062
Postnatal Volume (cm ³)	19	2.01	0.37	p = NS.

Table 1: Correlation of Urethral Sphincter Volume and UPP Area.

Conclusion.

There appears to be a correlation between structural anatomy and functional anatomy in the antenatal period although following delivery this is lost. We hypothesise that this may be due to denervation injury to the urethral sphincter following delivery in addition to changes in the pelvic floor musculature.

References

1. Neurourol & Urodyn 2000; 19(4): 450-451.
2. Neurourol & Urodyn 1996; 15(4): 339-340.

There has been no external funding for this project. Urethral Sphincter Volume and UPP Area.