with the urethral cross-sectional area (R=.37;p=.03)and the urethral volume (R=.41;p=.02). There was also a positive correlation between the urethral closure pressure during a maximum pelvic muscle contraction (the kegel urethral closure pressure-KUCP) and the urethral cross-sectional area (R=.48;p=.004:Figure 1). The KUCP as correlated positively with the urethral volume (R=.52;p=.002). In addition the KUCP also correlated with the urethral sphincter muscle volume (R=.38;p=.03).

Conclusion: There is a positive correlation between measures of urethral function and structure in young nulliparous women. Comment: The Galenic doctrine of "final cause" states that descriptions of structure should agree with the observed function of a region. The above findings are supportive of this. Urethra dysfunction, quantified by functional measures, should also be viewed in terms of structural abnormalities. MR provides us with the opportunity to image parous women with urethral dysfunction to see if these structure function relationships continue to hold.

References:

1. Obstet Gynecol 1998;91:705-9.

# 63

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## QUANTIFICATION OF CIRCULAR AND LONGITUDINAL SMOOTH MUSCLE IN THE DORSAL WALL OF THE FEMALE URETHRA

AIMS OF STUDY:

Urethral pressure is important in maintaining urinary continence. Smooth muscle is an important contributor to urethral closure pressure. (Brading). This study was undertaken to analyze the variation in amount and distribution of smooth muscle within the muscular wall of the urethra previously studied and tc clarify the proportion of the smooth muscle region that is occupied by smooth muscle cells.

METHODS:

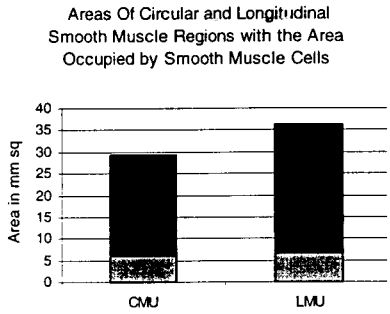
Midline-sagittal sections of 13 cadaveric urethras were stained with smooth muscle alpha actin antibody stain. The ventral urethral wall from the vesical neck to the caudal margin of the striated sphincter muscle was studied. The area of the region occupied by circular smooth muscle (CSM) and longitudinal smooth muscle (LSM) was determined by summing the areas of contiguous rectangular low power microscopic screens (0.42mm$^2$) occupied by each region of smooth muscle. The proportion of the region comprised of smooth muscle cells was assessed using actin stained sections. High power (400x) microscopic field images were captured and the proportion of the microscopic field stained by nonvascular smooth muscle was measured using digital imaging techniques. The total quantity of smooth muscle cells within the urethra was calculated by multiplying the regional area by the proportion of the region occupied by smooth muscle cells.

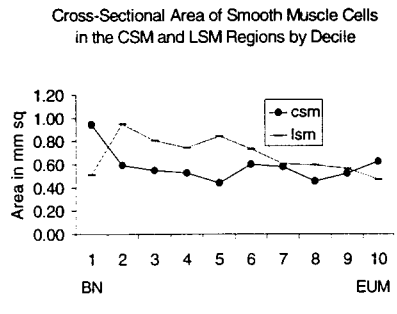
RESULTS:

The mean area of CSM region in the dorsal urethral wall was 29.8mm$^2$ (range 15.3 – 50.5 mm$^2$, SD $\pm$ 11.1mm$^2$) and the mean area of LSM region was 36.4 mm$^2$ (10 - 56 mm$^2$, $\pm$ 14.2 mm$^2$)(see left chart below). Smooth muscle cells occupied 20.9 % (15.3 – 23.6, $\pm$ 2.5) of the CSM region and 17.8 % (12.3 – 20.6, $\pm$ 2.6) of the LSM region. This means that there were 6mm$^2$ (2.9 – 11.3, $\pm$ 2.7) of smooth muscle cells in the CSM region and 6.7mm$^2$ (0.7 – 13.2, $\pm$ 3.7) in the LSM region.

Study of the variation in distribution of smooth muscle along the urethral wall shows that there is 16%

smooth muscle near the bladder neck, and it declines to 11% towards the external meatus showing relatively little change in smooth muscle from one decile to the next (see right graph below).




Conclusion:

Regions of smooth muscle occupy a significant portion of the muscular urethral wall. The longitudinal muscle in the urethra occupies as much area as circular smooth muscle. Smooth muscle cells, however, occupy little of this region, with the interstitial tissues comprising a majority of this area. It is interesting that for the urethra that has a sphincter responsible for maintaining continence, approximately half of the tissue is longitudinal muscle and within the muscle regions and up to 80% of the tissue is acontractile connective tissue and other elements. The layers do not have a thicker region in the mid-urethra similar to that found in the SUGS so the mid-urethral rise in MUCP is not likely created by smooth muscle action.

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## EXTRACTION OF CELLULAR GENETIC MATERIAL FROM HUMAN FASCIA LATA ALLOGRAFTS

**AIMS OF STUDY**: With the increasing use of the pubovaginal sling to treat stress urinary incontinence, human cadaver fascia lata has gain wide acceptance as a sling material option. Longevity of sling integrity and potential for disease transmission are important issues surrounding the use of this material. In light of the scarcity of data regarding the DNA / RNA content in commercially available allografts, molecular techniques for extraction of cellular genetic material was performed on allografts subjected to 4 different tissue processing techniques.

**METHODS**: 10 mg samples from 4 commercial sources of human allograft fascia all processed by 4 different techniques (patented and unpatented) underwent a standard extraction technique (proteinase K / SDS / RNase / phenol) for total DNA content. Appropriate positive (fresh human fascia) and negative controls were used to validate concerns regarding handling and processing of the samples. Spectophotometric detection was used to quantify DNA concentrations using A260 and A280.

**RESULTS**: All material tested from commercial sources of human allograft fascia contained DNA material; this was irrespective of the processing technique used to eradicate cellular genetic material. DNA concentrations ranged from 0.3 to 3.0 ug/mg tissue. A ratio of 1.5 or higher for OD 260 / 280 was obtained for all samples, indicating an optimal extraction method.

**CONCLUSION**: Contrary to reports from commercial sources and regardless of the processing method used to eradicate human