Results: The mean age of the group was 28.7±7.5 years (range 20-49, median 25). A median of 24 (range 12-44) MUAPs were recorded in each LA, and median of 6 (range 2-13) MUAPs in each EAS. IP was measured in 12 epochs in the LA and 6 epochs in the EAS. Mean and standard deviations for parameters are presented below:

	MUAP Amplitude (μV)	MUAP Duration (msec)	Turns/sec	Amplitude/Area Ratio
LA	480 ± 200	10.5 ± 2.2	2.8 ± 0.8	1.44 ± 0.3
EAS	370 ± 130	8.3 ± 2.5	2.3 ± 0.4	0.91 ± 0.4
Biceps	364 ± 296	10.58 ± 5.1	2.14 ± 0.99	1.75 ± 0.7

	IP Amplitude (μV)	IP Activity	IP Env Amp (μV)	Turns/sec	# Small Segments
LA	308.6 ± 58.2	98.7 ± 50.5	879.4 ± 219.7	248 ± 82.8	109.4 ± 62.9
EAS	221.6 ± 42.4	60.8 ± 39.9	560 ± 192.9	181.9 ± 91.8	77.5 ± 52.7

Published values for MUAP of the biceps brachii muscle as a representative limb muscle are shown for comparison(Musc & Nerve,18:1155,1995). LA,EAS,and biceps parameters are similar. Conclusions: EMG of the LA and EAS is feasible and well tolerated. We have established normal ranges for important QEMG parameters for both the LA and EAS in a nulliparous group of subjects. Ongoing study involves comparison of these data to that of older normal subjects and that of patients with pelvic floor dysfunction.

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VARIATION IN QUANTITY AND DISTRIBUTION OF NEURAL TISSUE IN THE STRIATED UROGENITAL SPHINCTER MUSCLE

Aims of Study: A neurogenic hypothesis proposing that pudendal nerve injury causes stress urinary incontinence (SUI) is based on prolonged conduction times. These conduction delays, however, are not sufficient to plausibly affect continence. Nerve damage can cause muscle loss. If loss of neural tissue caused loss of sphincter muscle and sphincteric weakness, this could affect continence.

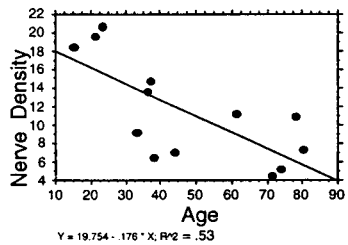
Previous work has shown decreased muscle cells in the striated urogenital sphincter of women (1). The present study was undertaken to analyze 1) the quantity and 2) the distribution of neural tissue within the striated urogenital aphincter muscle (SUGS) and to relate changes in neural tissue and number of muscle cells present.

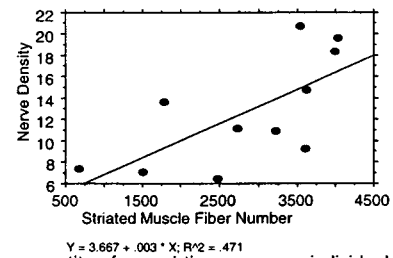
Methods: Thirteen cadaveric urethras (mean age 47 years, range 15-78,) from our earlier work had sufficient tissue remaining for further analysis and were selected for study. Five of these samples were from nulliparous women, seven from parous women and in one cadaver, parity was unknown. None of the patients had neuro-muscular disease that would affect the pelvic floor.

A sagittal histologic section was made from the paraffin blocks. An S100 stain was used to identify neural tissue. The upper end of the SUGS region began at the caudal end of the detrusor loop and the lower end, at the caudal extent of the striated muscle. This region was then divided into ten equal segments called "deciles". The number of times that a nerve section was seen within the SUGS ("*nerve number*") was counted under 400X magnification of a microscope (1). The axons within each nerve fascicle were similarly counted. The total number of nerves and axons seen in the section within the SUGS was obtained by adding the number of nerves and axons obtained at every 10% of urethral length. Regression analysis between nerve density and muscle cell number was performed using a statistical program (Statview®, Abacus Concepts, Berkeley, California). Comparative data was available for 11 urethras. Regression analysis between cadaver age and the nerve density was also carried out.

Results: Remarkable variation was seen in the quantity of neural tissue in the sampled region of the SUGS. There was a 7-fold variation in number of nerves present. Nerve counts ranged from 72 to 543 (mean 247.1 SD 123.24), and the range of number of axons was 431 to 3523 (mean 2201 SD 1152.6).

Reduced nerve density significantly correlated with fewer muscle cell numbers (P = 0.02) (see right graph below). Nerve Density also declined with increasing age (p=0.004) (left graph). There were fewer nerves in parous women, (mean 199, SD = 125, range 72-396) than in the nulliparous women (324, SD = 127.8, range 224-543 p<0.05). The larger nerve fascicles were seen predominantly in the distal half (13.1 axons per nerve, ± 5.7) as compared with the proximal part of the SUGS (1.2, ± 2).





Conclusions: There is considerable variation in the quantity of neural tissue among individuals. Reduced nerve density correlates significantly with reduced muscle fibers and with advancing age. Larger nerves lie at the distal end of the striated urogenital sphincter suggesting that the nerve supply to the SUGS travels up from the urogenital diaphragm. *Comment*: This data associates decreased nerve density in the SUGS with reduced striated muscle mass. The association between decreased neural tissue and advancing age parallels the data we have reported in striated muscle mass (1). The presence of larger supply nerves in the distal urethra is consistent with supply of this portion of the urethra from the pudendal nerve rather than from above by the pelvic autonomic nerves that descend from above. This helps explain why muscle is lost near the vesical neck where the muscle lies furthest from the supply nerves (2).

References:

1) Neurourol Urodynam 1997;16:405-7

2) Neurourol Urodynam 1997;16:407-8

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PULL-OUT STRENGTH OF REATTACHMENT SITES IN RECONSTRUCTIVE PELVIC SURGERY: A BIOMECHANICAL STUDY

Aims of Study: (1) to test the pull-out strength of various tissues commonly employed in reconstructive pelvic surgery, including vaginal wall fascia and muscularis, arcus tendineus fascia pelvis (white line), obturator internus fascia and muscle, ischial periosteum, Cooper's ligament, sacrospinous ligament, and presacral fascia (anterior longitudinal ligament) in female cadavers using a precision biomechanical measuring device (load cell transducer) while carefully controlling the vectors of pull and (2) to compare cadaver to cadaver variance for such variables as age, height, bone length and extremity diameter to possibly delineate predictors for pull-out strength.

Methods: Fifteen fixed female cadavers were dissected exposing the pelvic floor and side wall. A 30 pound push-pull force gauge transducer was used to measure the breaking force strengths of the vaginal fascia and muscularis at three separate sites: the level of the urethrovesical junction at the anterior vaginal wall, the lateral midvagina, and the two lateral surfaces of the vaginal apex. We sequentially tested the arcus tendineus fascia pelvis (white line), obturator internus muscle and fascia, ischial periosteum, and sacrospinous ligament, exposing each of these structures by layered dissections [1-4]. Cooper's ligament was tested at its insertion nearest the pubic symphysis and 2 cm