CONCLUSION:
1) Cadaveric fascia has equivalent mechanical properties, *in vitro*, independent of the preservation technique. In addition, our results demonstrate that decellularized cadaveric dermis has equivalent tensile strength to cadaveric fascia when adjusted for sample thickness. However, studies have yet to be performed which support the extrapolation of *in vitro* mechanical properties to *in vivo* long-term clinical performance. Clearly, *in vivo* studies, which evaluate tensile strength and durability over time, would be necessary for before an "ideal" reconstructive allograft tissue is identified.
2) The technique for securing suture to the fascial edge has a definite effect on "pull-through" strength. Comparison of the four different suture techniques revealed that forces applied parallel to the fascial grain cause separation of the fibers and tissue failure. The cross-fold technique reorients the fascial grain 45 degrees to the applied force decreasing the tendency to "pull through" between the fibers. Due to the ease of performing this technique and its demonstrated strength, we would recommend the cross-fold technique as the ideal method to secure suture when using fascia for reconstructive urologic and gynecologic procedures.

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ASSESSMENT OF PELVIC FLOOR FUNCTION IN WOMEN WITH GENUINE STRESS INCONTINENCE: A COMPARISON BETWEEN ULTRASOUND, DIGITAL EXAMINATION AND PERINEOMETRY

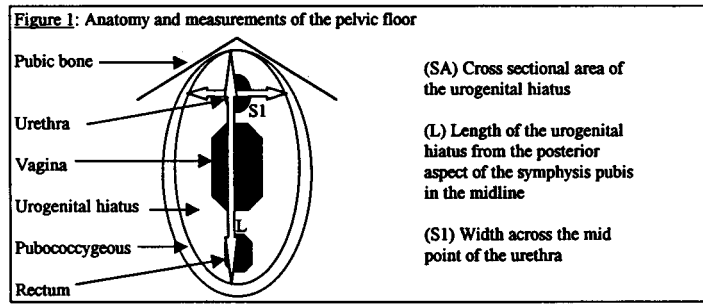
AIMS OF STUDY

A number of different tools can be used to grade the severity of genuine stress incontinence including urinary symptom questionnaires and quality of life instruments. Objective assessments include cystometry, pad testing and evaluations of pelvic floor musculature such as ultrasound, digital assessment and perineometry. These latter tests are frequently used as outcome measures in studies of conservative therapies for incontinence including pelvic floor exercises, electrical stimulation and vaginal cones. The purpose of this study was to correlate measurements of pelvic floor function with urodynamic parameters and pad testing in women with genuine stress incontinence.

METHODS

Consecutive women entering a physiotherapy research program with urodynamically proven genuine stress incontinence were prospectively evaluated. Each underwent a standardized half hour pad test with 250ml of normal saline in the bladder. The urogenital hiatus and pubococcygeus were imaged using transvaginal ultrasound at the level of the bladder neck. The measurements shown in Figure 1 were recorded at rest and during a maximal voluntary pelvic floor muscle contraction. Assessment of pelvic floor musculature was performed by a specialist physiotherapist who was blind to the ultrasound and pad test results; digital assessment was made using a modified Oxford grading scale (0-5) and for perineometry a Peritron 9300+ precision perineometer was used.

Figure 1: Anatomy and measurements of the pelvic floor



RESULTS

50 women with a mean age of 49.6 years (range 30-76) were recruited to the study. On the basis of cystometry 9 (18%) women were diagnosed as having mild, 20 (40%) moderate and 21 (42%) severe genuine stress incontinence. The

median pad test loss was 2.3 grams (IQR 1.18-8.20), digital grade 2 (IQR 2-3) and perineometry measurement 10cmH_20 (IQR 8-15).

Voluntary pelvic muscle floor contraction resulted in a highly significant reduction in the length and surface area of the urogenital hiatus, and in the transverse measurement of the hiatus in the region of the urethra on ultrasound (Table 1). Values are given as mean (SD). The Wilcoxson Signed Ranks Test was used to compare rest and squeeze measurements.

MEASUREMENT	REST	CONTRACTION	SIGNIFICANCE
Surface area (SA) (cm^2)	17.5 (2.8)	16.1 (3.1)	P<0.001
Length (L) (mm)	56.8 (7.4)	53.4 (6.8)	P<0.001
S1 (mm)	34.8 (4.1)	32.7 (4.7)	P=0.001

The change in length of the urogenital hiatus on ultrasound between rest and a maximal contraction correlated with pelvic floor function using perineometry (r=0.437, P=0.029) but not with digital assessment. However, there was no correlation between transvaginal ultrasound, digital grading or perineometry and the degree of leakage as assessed by either cystometry or pad testing suggesting that pelvic floor function is not the major factor in determining the severity of genuine stress incontinence.

CONCLUSIONS

Voluntary contraction of the pubococcygeous results in changes in the dimensions of the urogenital hiatus which can be assessed using transvaginal ultrasound. Maximal pelvic floor contraction produces a reduction in the length of the hiatus and narrowing of its transurethral diameter. The change in length of the hiatus correlates with measurement of pelvic floor strength using perineometry. However, none of the measurements of pelvic floor function correlate with the severity of genuine stress incontinence and we therefore question if their continuing use in the assessment of this group of patients can be justified.

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PELVIC FLOOR CONNECTIVE TISSUE MECHANICAL PROPERTIES: IS THERE AN ASSOCIATION WITH PELVIC ORGAN PROLAPSE?

AIMS OF STUDY: The purpose of this research was to measure the mechanical properties of the pelvic connective tissues thought to be associated with prolapse The null hypothesis is that the mechanical properties of these pelvic tissues in women would be the same regardless of prolapse.

METHODS: A prospective observational study enrolled thirty-four women undergoing benign hysterectomy, vaginal or abdominal. Five abdominal and 29 vaginal hysterectomies were performed. The Pelvic Organ Prolapse Quantification system was used on 27 patients, and the Baden half-way system on seven others, extrapolated to POPQ staging. Patients with POPQ stage 0 – 1 were designated no prolapse, stage 2 – 4 was designated as prolapse. Exclusion criteria included prior hysterectomy, bladder surgery, cone or LEEP of the crevix, personal history of connective tissue disease or chronic steroid use. At surgery for prolapse, tissues obtained were: vaginal wall anteriorly and posteriorly with underlying connective tissue; vesicovaginal adventitia, rectovaginal wall with connective tissue, and uterosacral ligaments bilaterally. Anterior and posterior vaginal wall and uterosacral ligaments were obtained from women without prolapse. Mechanical properties measurements were done on a servohydraulic-testing machine, after 10 pre-conditioning cycles. Cross-sectional area and initial gauge length were measured with a digital caliper. The tissue was loaded in tension until failure. A typical stress – strain curve is shown in Figure 1. Ultimate tensile stress, strain and stiffness were calculated. T-tests for independent means, paired t-tests for within group differences, non-parametric tests for comparison of means and regression analysis for outcome variables were used where appropriate.

RESULTS: Regression analysis shows no correlation between age, weight or parity, and stress, strain and stiffness. Mechanical properties are not significantly different when the effect of hormones on prolapse is analyzed in the groups of premenopausal (endogenous) and postmenopausal (exogenous HRT) patients vs. postmenopausal patients without hormones. No significant difference is found as a function of hormone replacement in postmenopausal women with prolapse.