808

Kirschner-Hermanns R[1], Najjari L[2], Klosterhalfen B[3], Liedl B[4], Brehmer B[5], Klinge U[6]
1. *Continence Clinic, Clinic of Urology, University Clinic Aachen,* ***2.*** *Continence Clinic, Clinic of Gynecology, University Clinic Aachen,* ***3.*** *Institute of Pathology, Krankenhaus Dueren, Dueren, Germany,* ***4.*** *Clinic of Urology, Beckenbodenzentrum Muenchen, Muenchen, Germany,* ***5.*** *Clinic of Urology, University Clinic Aachen,* ***6.*** *General Surgery, University Clinic Rwth Aachen, Aachen, Germany*

OBJECTIVE MEASUREMENT METHODS FOR THE CHARACTERIZATION OF DIFFERENT SLING MATERIAL FOR STRESS INCONTINENCE SURGERY

Hypothesis / aims of study

In recent year's implantation of slings and meshes have become widely accepted for treatment of urinary incontinence especially in women. In women the goal is to use only little retention forces for lifting and retaining of the urethra, even performing with some stretch ability of the device to compensate shifts of the pelvic organs during abdominal straining and physical exercise. For men after radical prostatectomy with mild and moderate urinary stress incontinence the procedure is adapted from the transvaginal tension free tape used in women, however the device has to withstand considerable more tensile strength and thus require higher structural stability. We present an analysis of the textile characteristics in regard to mechanical strength, elasticity / stretch ability, and the consequences for porosity of the device.

Study design, materials and methods

We developed a standardized testing system for measuring of 1. mechanical strength, and 2. elasticity and stretch ability of medical textile fabrics, and tested commonly used materials with different textile fabric features and polymers, such as pure polypropylene (PP), PP coated with Titan or with polyglycolic acid caprolactone (PGACL), and polyvinylidene fluoride (PVDF). We furthermore measured the textile, biological and effective porosity as well as its changes under tension by means of a semiautomatic image analyzer. The variations in porosity were related with histological data from explanted mesh material of a database of about 200 explanted male and female meshes.

Results

Our testing confirm that textile structures used for male slings show a considerable higher tensile strength but lower elasticity than slings used in females. Measurements of porosity have to consider both textile and effective porosity. Devices with high stretch ability show a marked reduction of effective porosity, particularly under strain, whereas increased structural stability with decreased stretch ability preserve high porosity of the device. In both genders a high material porosity of mesh devices show improved integration in human tissue.

Material	Textile porosity [%]	Effective porosity [%]	Effective Porosity under strain [%]
PP (100%)	29,7	0	0
PP (+Titan)	50,9	0	0
PP (+PGACL)	47,5	18,0	16,3
PVDF (100%)	61,5	56,1	56,7

Interpretation of results

In comparison to women the construction of slings for men has to withstand higher mechanical forces. To maintain porosity for this indication textiles have to preserve structural stability even under tension, which can be realized with different monofilaments such as PP or PVDF. First experimental data demonstrate that slings preserving high porosity under strain are more resistant against elongation. Correspondingly, because of maintaining large pores any extensive formation of bridging scar plate is prevented. Since textile porosity seems to be the key issue for tissue integration of textile structures this is an important finding.

Concluding message

Adaptation of the textile structure to the high functional requirements and the use of material with less foreign body reaction may help to reduce sling related complications. First clinical data underline our findings.

.

Specify source of funding or grant	**None**
Is this a clinical trial?	**No**
What were the subjects in the study?	**NONE**