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URETHRAL RECONSTRUCTION WITH HOMOLOGOUS ACELLULAR URETHRAL MATRIX (AUM)

Aims of Study To evaluate urethral replacement by a free homologous urethral graft of acellular matrix in a rabbit model.

Methods In 24 male New Zealand rabbits, a 0.8- to 1.1-cm segment of the urethra was resected, replaced with an acellular matrix graft of 1.0 to 1.5 cm (mean 1.3 cm), and placed on an 8-F feeding tube. Before sacrifice the animals underwent retrograde urethrography. At the time of explantation the implants were measured. The grafted specimens were prepared for electron and light microscopy as well for rt-PCR.

Results The acellular matrix graft remained in its original position. The production related length increase of the matrix (≈11%) was almost kept (≈5.8%) over 8 months postoperative time. Histologic examination showed complete epithelialization and progressive vessel infiltration. At 3 months, smooth muscle bundles were first observed infiltrating the matrix at the end-to-end anastomosis; after 6 months, the smooth muscle bundles had grown into 1/3 of the matrix. Urodynamics did not detect any difference between the control and matrix-grafted animals. Rt-PCR detected an increase in IGF and HB-EGF in the graft from day 10 through month 6. After 6 months, it was difficult to differentiate host from implant by urethrography.

Conclusions The acellular urethral matrix allows single-stage urethral reconstruction without sign of matrix shrinking or strictures. All tissue components are seen in the grafted matrix after 3 months, with further improvement over time. However, the smooth muscle in the matrix is less than in normal rabbit urethra and is not well oriented.