

# EXPERIMENTAL INVESTIGATION OF ANISOTROPIC MECHANICAL BEHAVIOR OF EX VIVO HUMAN URETHRAL TISSUES

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The mechanical behavior of most tissues and organs has already been observed [1] but the urinary tract remains an exception. To this day, the only available data were obtained on animals, but their tissues seem to be anatomically different from humans [2]. This work aims at observing the mechanical behavior of urethras sampled on male cadavers in compliance with French regulations on post-mortem testing, in accordance with the Scientific Council of body donation center of Grenoble. In this perspective, a thermostatic water tank was designed to conduct *ex vivo* pure shear tests in a physiological environment, *i.e.* in a saline solution at a temperature of  $37 \pm 1$  °C. The membranous and spongy portions of the urethra were investigated. In order to observe the anisotropy of the tissues, the samples were tested in two directions that were determined using histological images of the subject of interest. Tests consisting of a series of load-unload cycles of increased amplitudes were performed to highlight their viscous behavior. Observed behaviors can be described using an anisotropic hyper-elastic or visco-hyper-elastic matrix-fiber model [3].

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