A long-term elastic behaviour of hernia meshes

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Abstract

The influence of physical aging on elasticity of polypropylene mesh Surgimesh (SM) used in surgery were revealed using tensile experiments. Mesh specimens cut two and six months after their expiration date were investigated and secant modulus at 5% deformation $E_{(5)}$ was calculated. The values of $E_{(5)}$ for human fascia were obtained after tensile testing of 85 samples from 13 donors with average age 66.3 years in the range of 45 - 87 years. The specimens were divided into three age groups- up to 64 years, between 65-80 years and between 81-90 years. The values of $E_{(5)}$ for Surgimesh and human fascia were compared. It was shown that the elastic properties of SM increase but predominantly in longitudinal direction and in the process of aging approach the mechanical properties of the fascia in direction parallel to collagen fibres.

Keywords: Hernia meshes, tensile experiments, elastic properties