O08 BIOMECHANICS OF MANUAL, STAPLED, AND MANUAL-STAPLED SUTURES ON FASCIA LATA. TIPS FOR ABDOMINAL WALL SURGEONS

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Aim: No data on the biomechanical properties of staplers' use in the repair of abdominal wall defects are available. Our objective is to study prospectively the biomechanical properties of manual, stapled and mixed manual/stapled fascial sutures.

Material-Methods: Stress/strain tests were performed on 16 human cadaver fascial samples. The data on strength, strain (deformability), Young's modulus (elasticity), and dissipated energy (toughness modulus) were recorded for each type of suture.

Results: Stapled and mixed suture showed a significantly higher *strength* (manual 0.83, stapled 2.10, mixed 2.68 MPa), and a trend towards a higher *strain* as compared to manual sutures (manual 344, stapled 249, mixed 280%). Stapled and mixed suture were four-fold higher as compared to manual sutures (manual 1.779, stapled 7.374, mixed 6.964 MPa). Manual and mixed sutures showed significantly higher *dissipated energy* (manual 0.99, vs stapled 0.73, vs mixed 1.35 mJ-mm^3).

Conclusions: Stapled and mixed sutures have better strength performances than manual sutures. On the other hand, stapled and mixed sutures have significantly higher Young's modulus and lower ultimate strain, showing less deformability, possibly translating in less efficiency in large midline defects, where manual sutures might display higher elasticity. Also, hand-sewn sutures (in manual or over-sewn stapled) appear to increase the ability to absorb mechanical energy, whereas stapled sutures showed to be less tough. Furthermore, an over-sewn stapled suture, as compared to a stapled suture, gains in term of strength, ultimate strain, Young's modulus, and dissipated specific energy, suggesting the need of over-sewn stapled sutures in case of larger fascial defects.