

Biomechanical and immunobiological properties of human fascia lata (HFL) vs TiMesh®: implications for pelvic reconstructive surgery

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Introduction The use of autologous human fascia lata (HFL) in pelvic reconstructive procedures such as sacrocolpopexy (SCP) has become increasingly desired by patients, due to a greater awareness of potential complications of mesh and restrictions on their use in Urogynaecology.

Aims This study aimed to compare the morphometric and biomechanical properties, and in vivo foreign body response of HFL with TiMesh®, in a pre-clinical murine abdominal incision model.

Methods HFL was harvested from women undergoing sacrocolpopexy or pubovaginal sling insertion (n=26). HFL and TiMesh® were characterised using uniaxial tensiometry. HFL or TiMesh® was implanted in C57/BL6 immunocompetent mice via an abdominal skin incision (n=8 mice/gp/time-point). Explanted tissue analysis at 7 and 90 days included histology and electron microscopy for cellular infiltration, angiogenesis, elastin and collagen content. Quantitative fluidigm PCR assessed 80 genes associated with ECM homeostasis, cell adhesion, angiogenesis and inflammation. Data analysis was conducted using the Mann-Whitney test in GraphPad Prism version 7.0.

Results HFL consists of acellular fibrous collagen, exhibiting superior tissue integration and host cell infiltration to TiMesh®, which demonstrated loose integration and increased acute inflammation. HFL had higher resistance to passive repetitive loading and absolute tensile strength in comparison with TiMesh®. At 90 days, there was a significant increase in genes associated with ECM production (Tgfrb1), ECM regulation (Mmp2) and angiogenesis (Fgf1, Ang-1) in the HFL group compared with TiMesh®, indicating significantly improved wound healing.

Discussion HFL is an ideal alternative surgical graft for augmentative urogynaecological procedures, with superior mechanical adaptability, durability and tissue integration compared to TiMesh®.

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