Primary mesh augmentation with fibrin glue for abdominal wall closure--investigations on a biomechanical model.

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Abstract:

BACKGROUND: The occurrence of incisional hernias after various types of abdominal procedures and incisions continues to be a problem. A number of studies conducted for diverse risk groups have identified a beneficial role for the prophylactic use of mesh augmentation. To what extent this affects the stability of a suture was tested in our biomechanical model.

MATERIALS AND METHODS: To that effect, we compared three groups, carrying out six measurements in each case: (1) single suture in a muscle specimen, (2) suture and additional reinforcement with fibrin glue, and (3) suture and additional reinforcement with a mesh fixed with fibrin glue (Tissucol, Tisseel; with an overlap of 2 cm to all sides).

RESULTS: The single suture conferred a tensile strength, which in our model, was just above the prescribed maximum abdominal pressure of 32 N (37.3 N). The additional use of fibrin glue did not have any significant impact on this result (41.8 N). Only through mesh augmentation with fibrin glue was it possible to achieve a significantly greater tensile strength (64.5 N, $p = 0.003$).

CONCLUSIONS: The prophylactic use of meshes for stabilization of laparotomy closures appears to be effective. Adequate mesh fixation can be achieved with fibrin glue alone. Further experimental studies and in particular randomized clinical trials are needed to demonstrate proof of the long-term advantages of mesh augmentation in risk groups.