

Transforming growth factor-beta2 (TGF-beta2) reverses the inhibitory effects of fibrin sealant on cutaneous wound repair in the pig.

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Abstract:

Tensile strength of 2-cm, full-thickness, surgically incised porcine skin wounds sealed with fibrin sealant was enhanced compared to conventionally sutured wounds at 6 hours postwounding, but was significantly reduced after 3 days. Supplementation of fibrin sealant with transforming growth factor-beta2 (TGF-beta2) reversed the inhibitory effects of fibrin sealant on tensile strength at 3 days, and enhanced tensile strength at 7 days compared to suture or fibrin sealant alone. By 14 days, the tensile strengths of all wounds were similar, although wounds treated with fibrin sealant supplemented with TGF-beta2 showed a small, but statistically significant, improvement in wound strength compared to wounds treated with fibrin sealant alone. Histological assessment at day 7 revealed significant remnants of fibrin sealant at the wound site following fibrin sealant treatment alone, while wounds treated with fibrin sealant supplemented with TGF-beta2 or suture exhibited fibroblast infiltration and extracellular matrix deposition. At day 7, TGF-beta was immunolocalized in the base and margins of only wounds treated with fibrin sealant supplemented with TGF-beta2. A significant increase in matrix metalloproteinase-9 activity was found in fibrin sealant-treated wounds at day 7 as compared to sutured wounds. Addition of TGF-beta to the fibrin sealant suppressed the up-regulation of matrix metalloproteinase-9 in these wounds. These results suggest that fibrin sealant supplemented with TGF-beta may provide superior wound healing as compared to fibrin sealant alone.