

Injectable tissue-engineered cartilage using a fibrin sealant.

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Abstract:

Objective: To investigate a commercially available fibrin sealant as a vehicle for developing injectable tissue-engineered cartilage. **Methods:** Fibrin glue was mixed with autogenous chondrocytes from rabbits ($n = 15$). This isolate was injected along their nasal dorsa using 1 of 3 different fibrin glue concentrations. The samples were harvested at 8 weeks and compared with elastin and hyaline cartilage controls. **Results:** Neocartilage was created along a linear injection tract on the dorsa of the nasal bones in 5 of 15 rabbits. Higher thrombin concentrations proved to be directly correlated with successful creation of injectable cartilage. Histologically, the staining patterns of both hematoxylin-eosin and safranin O stains were identical to that of normal auricular control cartilage. The presence of elastin fibers was observed following Verhoeff staining. No foreign body reaction was observed from the host. **Conclusions:** This study demonstrated a successful method for percutaneous injection of tissue-engineered cartilage as a mixture of chondrocytes suspended in fibrin glue. The thrombin concentration, along with the concentration of fibrinogen and chondrocytes, must be optimized to succeed consistently in cartilage growth.