Delivery of demineralized bone powder by fibrin sealant.

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Abstract:

The main purpose of this study was to determine whether the use of fibrin sealant as a delivery vehicle for demineralized bone powder would result in bone induction in heterotopic and orthotopic sites. Rat demineralized bone powder alone or in different concentrations of fibrin sealant matrix (4, 8, 15, and 45 mg/ml) was bioassayed for bone induction by implantation in intramuscular sites. Distribution of treatment groups was as follows: demineralized bone powder alone (n = 12), demineralized bone powder plus 4 mg/ml fibrin sealant (n = 11), demineralized bone powder plus 8 mg/ml fibrin sealant (n = 11), demineralized bone powder plus 15 mg/ml fibrin sealant (n = 11), demineralized bone powder plus 45 mg/ml fibrin sealant (n = 10), 4 mg/ml fibrin sealant (n = 13), and 45 mg/ml fibrin sealant (n = 11). In a second group of rats, 8-mm critical-sized calvarial defects were created and treated with demineralized bone powder plus 30 mg/ml fibrin sealant. Intramuscular implants were retrieved after 28 days, while calvarial implants were retrieved at 28 days (n = 8), 3 months (n = 8), or 4 months (n = 5). Implants were then x-rayed and submitted for histology. Results showed bone formation as evidenced by radiopacity and histology. Radiopacity measurements of demineralized bone powder implants alone or in a fibrin sealant matrix were associated with immature woven bone at the implantation site. Fibrin sealant allowed bone formation by demineralized bone powder to occur, improved the handling of demineralized bone powder, and facilitated the shaping of implants.