



CFAO GRADUATE STUDENT POSTERBOARD ABSTRACTS

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Use of a novel anabolic conjugate drug on a synthetic biomaterial for enhancing bone regeneration in critical-sized defects

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Objective: Several graft materials have been investigated and used for treating bone defects in oral and maxillofacial surgeries. The aim of this study was to investigate whether monetite (a synthetic anhydrous dicalcium phosphate) grafts loaded with a novel bone anabolic drug (C3 conjugate) will promote greater bone regeneration in critical-sized jaw defects in rats when compared to monetite without the drug or to commercially available bovine bone graft (BioOss®).

Methods: Critical-sized bone defects (4.3mm diameter - circular through and through defects) were created bilaterally in the mandible of Sprague Dawley rats and then were filled with either BioOss®, monetite or monetite with C3 conjugate (n=12 defects/group per timepoint). After 2 or 4 weeks, post-mortem samples were analyzed using microcomputed tomography, histology and electron microscope to calculate the percentages of bone formation and remaining graft material. One-way ANOVA was used to test for statistical significance (set at p<0.05).

Results: All bone grafts integrated well onto the bone surface with new bone extending through the grafted area. At 2 and 4 weeks, monetite granules with the C3-conjugate demonstrated the highest bone formation percentage and the lowest remaining graft material percentage when compared to the other groups (p<0.05).

Conclusions: Monetite granules containing the novel C3 anabolic conjugate resulted in a greater rate of bone formation when compared to BioOss® or monetite granules devoid of conjugates. This research is expected to develop clinical treatments with materials that improve bone regeneration in oral and maxillofacial surgeries of bone defects including cleft lip and palate defects.