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BASIC RESEARCH**Alveolar ridge preservation using bisphosphonates- an experimental study in the Beagle dog**Nikola Saulacic¹; Benoit Schaller²; Eizaburo Kobayashi³; Vivianne Chappuis⁴; Antonio Cantalapedra⁵; Willy Hofstetter⁶

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Background: Osteoclastic resorption of damaged bone is an essential step in tooth-extraction socket healing. The bisphosphonates are known to suppress the osteoclasts activity, but their effect on the bone modeling following tooth extraction is unknown.

Aim/Hypothesis: This study aims to estimate the effects of local application of alendronate (ALDN) on the healing of the extraction socket in dogs. We hypothesize that there is a dose-response relationship of ALDN with respect to the vertical and horizontal extraction socket dimensions.

Material and Methods: Fifteen male Beagles dogs of approximately 12 months of age were used. The canal of the mesial roots of the four mandibular premolars (3P3, 4P4) was reamed and filled with gutta-percha. The premolars were then hemi-sectioned and the distal roots removed with the use of elevators. Three extraction sockets were treated with ALDN in concentrations of 0.5, 1 and 2 mg/mL for 15 minutes and then rinsed with sterile saline. The fourth extraction socket served as a negative control, rinsed for 15 minutes with a saline. Each group was left for a healing period of 1, 2, and 8 weeks. The vertical distance was measured between the most coronal portions of the buccal and lingual alveolar crest. The alteration in the buccal and lingual bone area was expressed in percentages. For each site, the volume of interest measuring 3 × 5 × 5 mm was positioned in the middle of the buccal bone and the bone volume and bone mineral density assessed.

Results: Dimensional alterations of the extraction socket were observed throughout the observation period. Vertical distance between the buccal and lingual bone was generally increased in ALDN-treated groups as compared to the control, without significance between the groups. Buccal bony areas at 1-week and 2-week healing period were greater on the ALDN-treated sites and at 8-week healing period at control sites. Lingual areas were greater on the ALDN sites at 1-week and 8-week healing period and at 2-week on control sites. ALDN groups showed higher values of bone volume than control group, being significant at 2-week time-period for ALDN-pooled sites compared to control. Bone mineral density for all groups per a given healing period was similar.

Conclusions and Clinical Implications: Within the limitations of the present study, ALDN affected the bone modeling following tooth extraction in dogs. However, different ALDN concentration failed to demonstrate a dose-response relationship to the alteration of the extraction socket dimensions. Further studies shall confirm if the time of bisphosphonates application would affect the maintenance of the buccal bone volume in relation to the implant placement.