Intracanal bisphosphonate does not inhibit replacement resorption associated with delayed replantation of monkey incisors

Thong Y. L.
Messer H. H.
Rosnah Binti Zain, University of Malaya
Saw L. H.
Yoong L. T.

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Abstract:

Progressive replacement resorption following delayed replantation of avulsed teeth has proved to be an intractable clinical problem. A wide variety of therapeutic approaches have failed to result in the predictable arrest of resorption, with a good long-term prognosis for tooth survival. Bisphosphonates are used in the medical management of a range of bone disorders and topically applied bisphosphonate has been reported to inhibit root resorption in dogs. This study evaluated the effectiveness of a bisphosphonate (etidronate disodium) as an intracanal medicament in the root canals of avulsed monkey teeth, placed before replantation after 1 h of extraoral dry storage. Incisors of six Macaca fascicularis monkeys were extracted and stored dry for 1 h. Teeth were then replanted after canal contamination with dental plaque (negative control) or after root canal debridement and placement of etidronate sealed in the canal space. A positive control of calcium hydroxide placed 8-9 days after replantation was also included. All monkeys were sacrificed 8 weeks later and block sections were prepared for histomorphometric assessment of root resorption and periodontal ligament status. Untreated teeth showed the greatest extent of root resorption (46% of the root surface), which was predominantly inflammatory in nature. Calcium hydroxide treated teeth showed the lowest overall level of resorption (<30% of the root surface), while the bisphosphonate-treated group was intermediate (39%). Ankylosis, defined as the extent of the root surface demonstrating direct bony union to both intact and resorbed root surface, was the lowest in the untreated control group (15% of the root surface), intermediate in the calcium hydroxide group (27%) and the highest in the bisphosphonate group (41%). Bony attachment to the tooth root was divided approximately equally between attachment to intact cementum and to previously resorbed dentin. Overall, bisphosphonate resulted in a worse outcome than calcium hydroxide in terms of both root resorption and ankylosis.
animal; article; cementum; dentin; endodontics; female; incisor; injury; instrumentation; Macaca; male; methodology; pathology; periodontal ligament; time; tooth disease; tooth injury; tooth plaque; tooth root; treatment outcome

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