



INFLUENCE OF RISEDRONATE HYDROGEL TOWARDS ALKALINE PHOSPHATASE DURING RELAPSE MOVEMENT

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INTRODUCTION

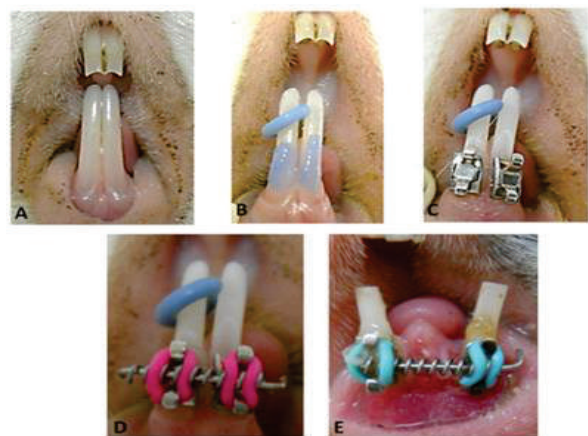
Relapse after orthodontic movement has the same mechanism as orthodontic tooth movement. Bone remodeling that occurs during orthodontic tooth movement is a biological process that involves an acute inflammatory response in periodontal tissue (Perinetti, et al, 2002). Bone remodeling can be considered as complex process, including bone resorption and bone formation requiring the coordination of osteoclasts, osteocytes and osteoblasts (Su, et al, 1997). The increasing of osteoblast activities during bone formation then will be accompanied by the increasing of alkaline phosphatase enzyme expressions (Intan, et al, 2008).

OBJECTIVE:

The aim of this study was to investigate the effect of intrasulcular application of bisphosphonate risedronate with gelatin hydrogel as a carrier towards the changes of alkaline phosphatase levels in gingival crevicular fluid during relapse movement.

METHOD:

Lower incisors of guinea pigs (n=75) were moved distally using an orthodontic appliance (open coil spring) to reached ± 3 mm length. Gelatin hydrogel was fabricated to result a semisolid controlled released manner of bisphosphonate risedronate. There were divided into 3 groups: Bis-CR000 (0mmol/L or without risedronate) as control, Bis-CR250 (250mmol/L) and Bis-CR500 (500mmol/L), then applied intrasulcular into the mesial subperiosteum area (n=25 each group). After stabilization for 14 days, open coil spring was removed and the tooth will move back to its original position (relapse). Alkaline phosphatase (ALP) was measured on day 0, 3, 7, 14, and 21. ANOVA were used to determine differences of the ALP levels among day intervals and groups.



Lower incisor of 75 guinea pigs were moved distally using open coil spring until ± 3 mm.



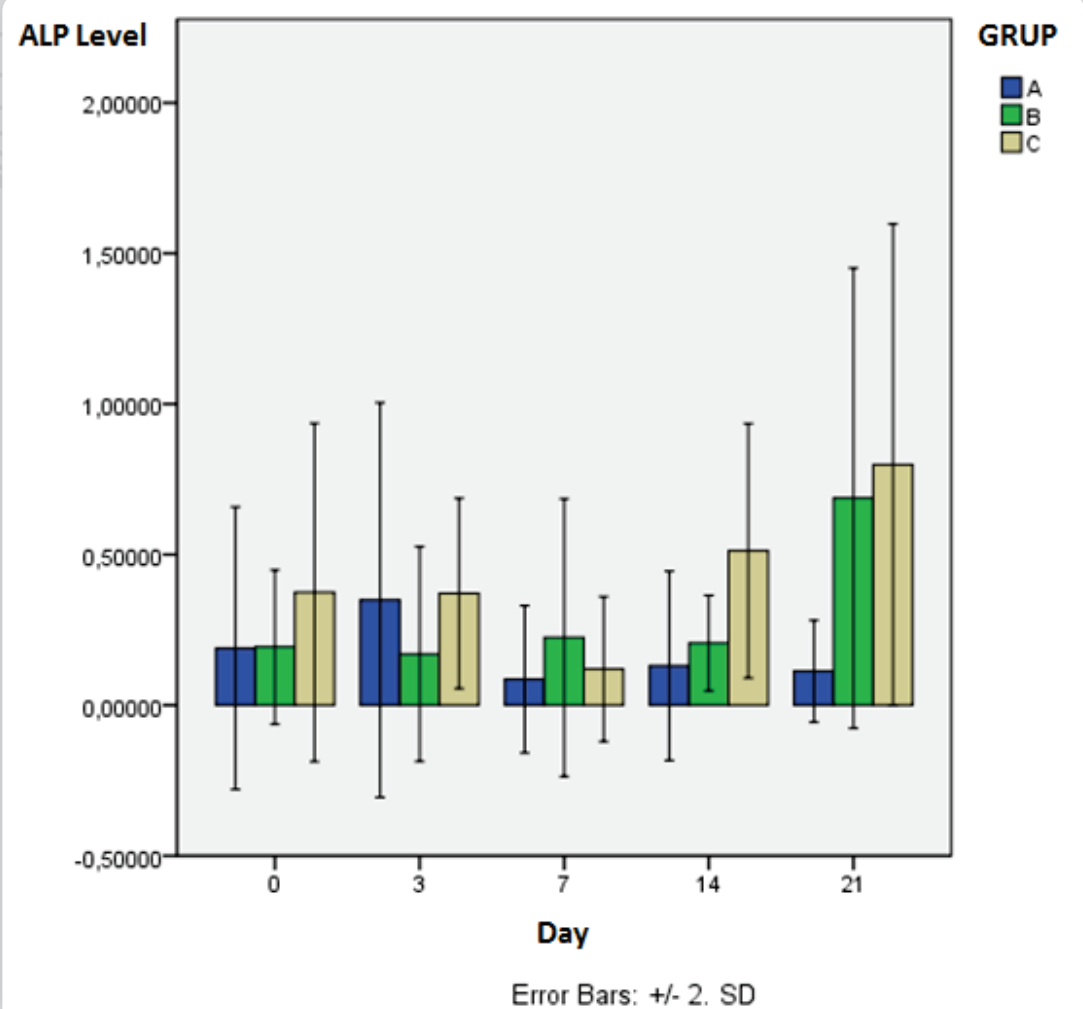
Risedronate hydrogel concentration of 250 μ mol/L (Group B) and 500 μ mol/L (Group C) was applied to each 25 guinea pigs in the gingival sulcus mesial area every three days.



Relapse movement and taking gingival crevicular fluid by using paper point.

RESULTS:

On the day 0, 3 and 7, there were no significant differences in ALP levels among groups, but a significant difference was indicated of the ALP levels in gingival crevicular fluid on day 14 and 21 ($p < 0.05$) where groups Bis-CR250 and Bis-CR500 are higher than group Bis-CR000. Bis-CR500 gives more effect to increase the ALP levels (p -value 0.009) than other groups.



DISCUSSION :

In the early stages of tooth movement, bone resorption more than the bone deposition, but in the next phase resorption and deposition to be in synchronize (King et al. cit Batra, 2006)

Measurement of ALP levels in this study was on the relapse movement when it has been done stabilization for approximately 1 week so that the possibility has occurred synchronous phase between resorption and deposition, so there is no significant difference on day-to-0.3 and 7. On day 14 And 21 begins to show the effect of the bisphosphonate risedronate hydrogel where there is a significant difference in the ALP levels between the groups without bisphosphonates (A) and the group receiving bisphosphonate hydrogel (B and C).

CONCLUSION:

Significant differences in ALP levels on days 14 and 21 indicate the effect of bisphosphonate risedronate hydrogel increasing osteoblast proliferation and maturation because mature osteoblasts will secrete alkaline phosphatase. Increasing the number of osteoblasts that play a role in the process of new bone formation is expected to improve the stability of teeth after being moved and prevent relapse movement.

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