

OP35 CREVICULAR ALKALINE PHOSPHATASE ACTIVITY DURING THE APPLICATION OF TWO PATTERNS OF ORTHODONTIC FORCE

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AIMS: Optimal orthodontic force is characterized by maximal cellular response from the supporting tooth tissues. However, no evidence-based force level can be recommended for optimal efficiency in clinical orthodontics. The objective of this study was to test the hypothesis that using a gradually increasing orthodontic force would induce increased osteoblast activity compared to a relatively constant orthodontic force.

SUBJECTS AND METHOD: Twelve orthodontic patients participated in this study. In a split mouth design, one maxillary canine undergoing distal movement received a relatively constant continuous retraction force, while the contralateral canine received a gradually increasing retraction force. Gingival crevicular fluid samples were collected from both experimental sites at weekly intervals and analyzed spectrophotometrically for the activity of alkaline phosphatase (ALP) enzyme, which was used as a biological marker for osteoblastic activity. A one-way ANOVA test was conducted to determine the presence of significant differences between each groups' means, followed by *post-hoc* tests to investigate the difference between each groups' means. A paired-samples test was used to compare enzyme levels at different points in the two experimental groups.

RESULTS: With the exception of the maxillary first molar receiving gradually increasing orthodontic force, the results revealed a consistent pattern of ALP activity. This pattern included an initial rise from baseline to the first week, then a peak in the second week. This peak was followed by a reduction in enzyme activity in the third week. The overall increases in enzyme activity at the maxillary canines and the maxillary first molars in the relatively constant force group were 179.76 and 332.90 per cent, respectively. The overall increases in enzyme activity at the maxillary canines and maxillary first molars in the gradually increasing force group were 304.81 and 493.08 per cent, respectively.

CONCLUSION: The use of gradually increasing orthodontic force induces increased activity of osteoblasts during the initial stage of orthodontic tooth movement compared to that induced by a relatively constant orthodontic force.