

**Effect of Orthodontic Force on Salivary
Levels of Alkaline phosphatase and Lactate
dehydrogenase Enzymes**
(A Clinical Study)

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Abstract

Orthodontic tooth movement is characterized by tissue reactions, which consist of an inflammatory response in periodontal ligament and followed by bone remodeling in the periodontium depending on the forces applied. These processes trigger the secretion of various proteins and enzymes into the saliva.

The purpose of this study was to evaluate the activity of the alkaline phosphatase (ALP) and lactate dehydrogenase (LDH) enzymes in saliva during orthodontic tooth movement using different magnitude of continuous orthodontic forces.

Thirty orthodontic patients with class II division I malocclusion all requiring bilateral maxillary first premolar extractions, participated in this study. Those patients were randomly divided into three groups according to the magnitude of the force application (40 gm, 60 gm and 80 gm). A sectional fixed appliance was bonded and designed to give labial force to the maxillary first premolar for three weeks. Unstimulated saliva was collected from the patients before force application, then 1 hour after force application, followed by 1 day, 7 days, 14 days and 21 days. Salivary levels of ALP and LDH were measured using spectrophotometer and compared with the baseline level.

The results revealed that ALP and LDH enzymes level increased with increasing magnitude of orthodontic force (from 40 to 80gm). This was statistically insignificant for ALP after 1 hour and 1 day of force application, but significant after 7, 14 and 21 days. While, for LDH it was significant after 1 hour, 1, 7, 14 and 21 days of force application.

The ALP level significantly increased from baseline after 7 days of force application. While LDH significantly increased from baseline after 1 hour. Both ALP and LDH enzymes peaked at 21 days for all the three force levels (40gm, 60gm and 80gm).

The ALP and LDH levels reflect the biological activity that takes place in the periodontium during orthodontic tooth movement, and therefore they can be used as a diagnostic tool for monitoring of correct orthodontic tooth movement in clinical practice.