

## INTISARI

Pergerakan gigi secara ortodonti terjadi karena proses *remodeling* jaringan periodontal, diatur oleh osteoblas pada daerah tertarik (pembentukan tulang) dan osteoklas pada daerah tertekan (resorpsi). Proses *remodeling* berjalan seimbang pada dewasa muda, tetapi terjadi ketidakseimbangan pada individu berusia tua karena penurunan diferensiasi, aktivitas, dan masa hidup osteoblas, serta peningkatan osteoklas. Osteoblas menghasilkan *alkaline phosphatase* (ALP) saat pembentukan tulang yang menjadi indikator tingkat *remodeling* jaringan selama pergerakan gigi. *Olive oil* banyak mengandung senyawa fenolik yang dapat meningkatkan diferensiasi osteoblas. Penelitian bertujuan mempelajari perbedaan aktivitas ALP antara usia tua dan muda, dan perbedaan antara pemberian *olive oil* terhadap aktivitas ALP pada usia tua dan muda pada pergerakan gigi secara ortodonti. Sampel penelitian adalah 12 *guinea pig* yang dibagi menjadi 4 kelompok (*guinea pig* muda ( $\pm 4$  bulan) tidak diberi *olive oil*, *guinea pig* usia muda diberi *olive oil*, *guinea pig* tua ( $\pm 2,5$  tahun) diberi *olive oil*, *guinea pig* tua diberi *olive oil*). Gigi digerakkan dengan *open coil spring* yang dipasang pada braket pada kedua insisivus bawah. Sampel cairan sulkus gingiva diambil pada hari ke-0, 7, dan 14 pergerakan gigi pada sisi tertarik. Aktivitas ALP diukur dengan *spectrophotometer* (panjang gelombang 405 nm). Hasil dianalisis dengan uji statistik Anova 3 jalur dan *post hoc* menunjukkan aktivitas ALP usia muda dengan tua berbeda signifikan pada hari ke-14. Aktivitas ALP baik pada usia muda dan tua diberi *olive oil*, berbeda signifikan dengan kelompok tidak diberi *olive oil* pada hari ke-14. Aktivitas ALP usia tua yang diberi *olive oil* tidak berbeda signifikan dengan usia muda yang tidak diberi *olive oil* pada hari ke-7 dan 14. Kesimpulan penelitian adalah aktivitas ALP kelompok usia muda lebih tinggi dibandingkan usia tua pada hari ke-14 dan *olive oil* meningkatkan aktivitas ALP pada usia tua yang diberi *olive oil* menjadi sama dengan usia muda yang tidak diberi *olive oil* pada hari ke-7 dan 14.

**Kata kunci:** *alkaline phosphatase*, pergerakan gigi secara ortodonti, usia, *olive oil*, cairan sulkus gingiva

## ABSTRACT

Orthodontic tooth movement occurred because of the remodeling process of periodontal tissue, regulated by osteoblasts at tension site (bone formation) and osteoclasts at pressure site (resorption). The process of remodeling balanced in young adults, but in older individuals there was an imbalance in the remodeling process due to a decrease in differentiation, activity, and lifetime of osteoblasts, as well as an increase in osteoclasts in old age. Osteoblasts produced ALP during bone formation. Observation of alkaline phosphatase (ALP) activities in gingival crevicular fluid could be an indicator the level of tissue remodeling during tooth movement. Olive oil contains many phenolic compounds that can increase osteoblasts differentiation. This study aimed to study differences in ALP activities between young and old age, and the difference between olive oil administration to ALP activities in both old and young ages before and after orthodontic tooth movement. This study samples were 12 guinea pigs which were divided into 4 groups (young guinea pigs ( $\pm$  4 months) were not given olive oil, young guinea pigs were given olive oil, old guinea pigs ( $\pm$  2.5 years) were not given olive oil, old guinea pigs were given olive oil. The teeth were moved with open coil spring mounted on the brackets on both lower incisors of guinea pigs, gingival sulcus fluid samples were taken before and 7<sup>th</sup> and 14<sup>th</sup> day after tooth movement at the tension site. ALP activities were measured using a spectrophotometer (405 nm wavelength). The results were analyzed by 3-way Anava and post-hoc statistical tests. The results showed that ALP activities between young and old age groups were significantly different on 14<sup>th</sup> day. ALP activities in young and old age groups were given olive oil, significantly different from the group were not given olive oil on 14<sup>th</sup> day. There were not significantly different between young age group who were not given olive oil and old age groups were given olive oil on day 7<sup>th</sup> and 14<sup>th</sup>. The conclusion of this study was ALP activities in young age groups were higher than old age groups than old age groups on day 14<sup>th</sup> and olive oil increased ALP activities in old age groups who were given olive oil became similar to young age groups who were not given olive oil on days 7<sup>th</sup> and 14<sup>th</sup>.

**Key words:** alkaline phosphatase, orthodontic tooth movement, age, olive oil, gingival crevicular fluid