

INTISARI

Alat ortodonti cekat terdiri dari dua komponen, yaitu komponen aktif dan pasif. Komponen aktif adalah komponen yang dapat menghasilkan gaya yang akan diteruskan ke gigi sehingga terjadi suatu pergerakan. Kawat busur merupakan salah satu komponen aktif, diantaranya kawat busur NiTi dan CuNiTi. Pada saat dipakai dalam mulut, kawat busur berkontaminasi dengan saliva sehingga terjadi korosi dan mengakibatkan pelepasan ion nikel. Pelepasan ion nikel ini akan membuat kawat busur menjadi kasar dan menambah gaya friksi antara kawat busur dan braket. Penelitian ini bertujuan membandingkan jumlah pelepasan ion dan gaya friksi antara kawat busur NiTi dan CuNiTi dalam perendaman saliva buatan.

Subyek penelitian terdiri dari 12 kawat busur NiTi dan 12 CuNiTi, yang masing-masing jenis kawat dibagi menjadi 2 kelompok yaitu kelompok 1 : NiTi perendaman 21 hari, kelompok 2 : NiTi perendaman 28 hari, kelompok 3 : CuNiTi perendaman 21 hari, kelompok 4 : CuNiTi 28 hari. Masing-masing kawat direndam dalam 10 ml saliva, diinkubasi selama 21 hari dan 28 hari. Perhitungan pelepasan ion nikel dilakukan pada saliva perendaman menggunakan alat ICPE (*Inductively Coupled Plasma Emission*). Kawat busur yang sudah direndam dihitung gaya friksinya menggunakan alat UTM (*Universal Testing Machine*). Analisis statistik menggunakan *Anova* dua jalur dan uji *Post Hoc LSD* dengan $p < 0,05$.

Hasil penelitian menunjukkan jumlah pelepasan ion nikel dan gaya friksi pada kelompok NiTi dengan perendaman 28 hari lebih besar secara signifikan ($p < 0,5$) dibandingkan kelompok CuNiTi pada perendaman 28 hari ($p < 0,5$) dan tidak signifikan pada perendaman 21 hari ($p > 0,05$). Terdapat interaksi antara jenis kawat dan lama perendaman terhadap jumlah ion yang lepas ($p < 0,05$), namun tidak terdapat perbedaan gaya friksi pada interaksi antara jenis kawat dan lama perendaman ($p > 0,05$). Kesimpulan dari penelitian ini yaitu : Kawat busur CuNiTi memiliki pelepasan ion dan gaya friksi yang lebih rendah dibandingkan kawat NiTi setelah perendaman 28 hari.

Kata kunci : kawat busur NiTi, kawat busur CuNiti, jumlah pelepasan ion, gaya friksi

ABSTRACT

Fixed orthodontic appliance has two main component, namely active and passive component. Active component is a component which produces bring about tooth movement and incorporate active forces within the appliance resulting booth movement. The archwire is one type of active component, usually made of Nickel-titanium (NiTi) or Cupri Nikel Titanium (CuNiTi). Archwire have possible danger associated with archwire corrosion derives from the contact whitin saliva causing the released Ni ion. It also lead increases of archwire surface roughness resulting the increase of friction at the interface between the arch wire and bracket. This research aims to to evaluate the rate of ion nikel release and friction between NiTi and CuNiTi arch wires in artificial saliva.

The subjects were 12 NiTi and 12 CuNiTi arch wires divided equally into 2 main groups which each group consisted of 6 archwires : group 1 NiTi-21days, group2 Niti-28days, group 3 CuNiTi 21-day, group 4 CuNiTi -28days. Each of arch wire was immersed in 10 ml artificial saliva, incubated for 21 days, and 28 days. Ion nikel release was measured on saliva with ICPE (Inductively Coupled Plasma Emission). The immersed archwires were observed for the friction using UTM (Universal Testing Machine). Statistical analysis was performed by two-way analysis of variance (ANOVA) followed by post-hoc LSD test, with $P < 0.05$ was set as statistically difference.

The results showed significant difference on ion release and friction between NiTi and CuNiTi groups, and the immersed time in day 28 ($P < 0.05$) but not significant different in day-21 ($p > 0.05$). There was an interaction between the type of archwire and the time of immersion to the amount of ion release ($P < 0.05$), however there was no significance difference of friction in the interaction of the type of arch wire and the time of immersion ($P > 0.05$). It conclude that CuNiTi archwire has lower of ion release and lower friction compared to NiTi arch wire when it immersed on 28 days.

Keywords: NiTi arch wire, CuNiti arch wire, ion release, friction force