

INTISARI

Kawat busur *nickel titanium* (NiTi) berpelapis *polytetrafluoroethylene* (PTFE) digunakan seiring dengan peningkatan permintaan penggunaan peranti ortodonti estetik. Ortodontis merekomendasikan penggunaan klorheksidin 0,12% selama perawatan ortodonti berlangsung. Penelitian ini bertujuan untuk mengetahui pengaruh lama perendaman kawat busur NiTi berpelapis PTFE diameter 0,014” dalam klorheksidin 0,12% selama 1, 7 dan 14 hari terhadap pelepasan ion nikel dan gaya *unloading*.

Masing-masing sebanyak 36 kawat busur NiTi 0,014” berpelapis PTFE dan tanpa pelapis sepanjang 30 mm dibagi menjadi 12 kelompok secara acak yaitu kelompok yang direndam dalam klorheksidin 0,12% dan saliva buatan selama 1, 7 dan 14 hari. Kadar pelepasan ion nikel diukur menggunakan *Atomic Absorption Spectrophotometry* (AAS) dan gaya *unloading* diukur menggunakan uji *3-point bending* menggunakan UTM. Hasil uji kadar pelepasan ion nikel dianalisis menggunakan *two-way ANOVA* dan *post hoc LSD* ($p < 0,05$). Hasil uji gaya *unloading* dianalisis menggunakan *Kruskall-Wallis* dan *Mann Whitney U* ($p < 0,05$).

Hasil penelitian kadar pelepasan ion nikel terendah pada seluruh kelompok perlakuan 1 hari perendaman. Kadar pelepasan ion nikel tertinggi pada kelompok kawat busur NiTi berpelapis PTFE dalam klorheksidin 0,12% selama 14 hari perendaman (0,49 ppm). Gaya *unloading* terendah pada kelompok kawat busur NiTi berpelapis PTFE dalam klorheksidin 0,12% selama 14 hari (0,39 N) sedangkan tertinggi pada kelompok kawat busur NiTi tanpa pelapis dalam saliva buatan selama 1 hari (0,8 N). Hasil penelitian menyimpulkan lama perendaman kawat busur nikel titanium berpelapis PTFE dalam klorheksidin 0,12% selama 14 hari meningkatkan pelepasan ion nikel dan menurunkan gaya *unloading*.

Kata kunci: kawat busur NiTi, *polytetrafluoroethylene* (PTFE), klorheksidin 0,12%, pelepasan ion nikel, gaya *unloading*

ABSTRACT

In response to the growing demand for aesthetically pleasing orthodontic appliances, nickel-titanium (NiTi) coated polytetrafluoroethylene (PTFE) archwire are utilized. Orthodontists advise using chlorhexidine 0,12% as part of orthodontic treatment. This study aims to investigate the effect of immersing a PTFE-coated NiTi archwire with a diameter of 0,014” in a 0,12% chlorhexidine solution for durations of 1, 7, and 14 days on the release of nickel ions and unloading force.

Each of the 36 0,014” NiTi archwire, which was 30 mm long and coated with PTFE or without coating, was randomly assigned to one of 12 groups. These groups were immersed in 0,12% chlorhexidine and artificial saliva for 1, 7, and 14 days. Atomic Absorption Spectrophotometry (AAS) was used for measuring nickel ion release levels, while a 3-point bending test was conducted using UTM to measure unloading forces. The levels of nickel ion release were analyzed using a two-way analysis of variance (ANOVA) and post hoc least significant difference (LSD) test ($p < 0,05$). The Kruskal-Wallis and Mann-Whitney U tests ($p < 0,05$) were used to analyze the data from the unloading force test.

According to the research findings, the levels of nickel ion release were the lowest across all treatment groups after 1 day of immersion. During a 14-day immersion in 0,12% chlorhexidine, the PTFE-coated NiTi archwires group exhibited the highest level of nickel ion release (0,49 ppm). The NiTi archwire group coated with PTFE in 0,12% chlorhexidine for 14 days had the lowest unloading force (0,39 N), while the NiTi archwire group without coating in artificial saliva for 1 day had the highest unloading force (0,8 N). The study found that immersing the nickel-titanium archwire coated with PTFE in 0,12% chlorhexidine for 14 days increased nickel ion release and decreased unloading force.

Keywords: NiTi archwire, polytetrafluoroethylene (PTFE), 0,12% chlorhexidine, *nickel ion release*, unloading force.