

INTISARI

Elastomeric chain merupakan komponen peranti ortodonti cekat yang berfungsi menghasilkan gaya untuk pergerakan gigi. Sifat mekanik *elastomeric chain*, khususnya elastisitas dan kekuatan tarik, mengalami perubahan selama penggunaan akibat pengaruh saliva, suhu, dan lama pemakaian. Perubahan tersebut berpotensi memengaruhi kestabilan gaya ortodonti. Penelitian ini bertujuan menganalisis pengaruh lama perendaman dalam saliva buatan suhu 37°C terhadap elastisitas dan kekuatan tarik *elastomeric chain* jenis *plastic chain* dan *memory chain*, serta membandingkan karakteristik mekanik kedua jenis bahan tersebut.

Penelitian ini merupakan penelitian eksperimental laboratoris *in vitro* dengan rancangan *pre and post-test only control group design*. Sampel penelitian terdiri atas 100 *elastomeric chain*, meliputi 50 *plastic chain* dan 50 *memory chain*. Masing-masing jenis dibagi ke dalam lima kelompok waktu perendaman, yaitu hari ke-0, ke-1, ke-7, ke-14, dan ke-21. Elastisitas dinilai berdasarkan nilai modulus elastisitas, sedangkan kekuatan tarik dinilai berdasarkan nilai beban titik maksimum. Pengujian dilakukan menggunakan *Universal Testing Machine*. Data dianalisis menggunakan uji *Two Way ANOVA* dan uji lanjut *Post Hoc Tukey*.

Hasil penelitian menunjukkan bahwa lama perendaman dan jenis *elastomeric chain* berpengaruh signifikan terhadap elastisitas dan kekuatan tarik ($p < 0,05$). *Plastic chain* mengalami perubahan elastisitas dan penurunan kekuatan tarik yang lebih besar, terutama pada fase awal perendaman. *Memory chain* menunjukkan respons mekanik yang lebih stabil. Terdapat perbedaan elastisitas dan kekuatan tarik antara kedua jenis *elastomeric chain* waktu pengamatan ($p < 0,05$), serta terdapat interaksi antara lama perendaman dan jenis *elastomeric chain*. Kesimpulan penelitian adalah *memory chain* memiliki elastisitas lebih tinggi dan kestabilan kekuatan tarik lebih baik dibandingkan *plastic chain* selama perendaman dalam saliva buatan.

Kata kunci: *Memory chain*, *Plastic chain*, lama perendaman, elastisitas, kekuatan tarik, saliva buatan

ABSTRACT

Elastomeric chains are components of fixed orthodontic appliances that are used to generate force for tooth movement. The mechanical properties of *elastomeric chains*, particularly elasticity and tensile strength, are altered during use due to the influence of saliva, temperature, and duration of application. These changes are considered to affect the stability of orthodontic force. This study was conducted to analyze the effect of immersion duration in artificial saliva at 37°C on the elasticity and tensile strength of *plastic chain* and *memory chain elastomeric chains*, and to compare the mechanical characteristics of both materials.

This study was designed as an *in vitro* experimental laboratory study using a *pre and post-test only control group design*. The research samples consisted of 100 *elastomeric chains*, including 50 *plastic chains* and 50 *memory chains*. Each elastomeric chain type was divided into five immersion time groups, namely day 0, day 1, day 7, day 14, and day 21. Elasticity was evaluated based on the modulus of elasticity, while tensile strength was evaluated based on the maximum load value. Mechanical testing was performed using a *Universal Testing Machine*. Data were analyzed using *Two Way ANOVA* followed by the *Post Hoc Tukey* test.

The results showed that immersion duration and *elastomeric chain* type had a significant effect on elasticity and tensile strength ($p < 0.05$). Greater changes in elasticity and larger reductions in tensile strength were observed in plastic chains, particularly during the initial immersion period. More stable mechanical responses were observed in *memory chains*. Significant differences in elasticity and tensile strength between both *elastomeric chain* types at the observation times were identified ($p < 0.05$), and an interaction between immersion duration and *elastomeric chain* type was observed. The conclusion of this study is that *memory chains* exhibit higher elasticity and better tensile strength stability than *plastic chains* during immersion in artificial saliva.

Keywords: *Memory chain*, *Plastic chain*, immersion duration, elasticity, tensile strength, artificial saliva