



## CFAO GRADUATE STUDENT POSTERBOARD ABSTRACTS

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### **The Effect of Pigmentation on Thermoplastic and Thermoset Elastomeric Power Chain**

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**Aim:** The purpose of this study was to determine differences in the effect of pigmentation on thermoplastic (TP) versus thermoset (TS) elastomeric power chains used in orthodontic treatment.

**Materials and Methods:** The groups tested consisted of American Orthodontics (AO) closed TP power chain in 5 colors and closed TS power chain in 2 colors, and Rocky Mountain Orthodontics (RMO) closed TS power chain in 5 colors. Testing was performed over a 6 week period at the intervals of initial (T0), 1 hour (T1), 24 hours (T2), 1 week (T3), 2 weeks (T4), 4 weeks (T5), and 6 weeks (T6). Ten samples of each were tied from canine to first molar on a 3D printed model of a standard dentoform with brackets. An Instron Universal Testing Machine with a custom set-up was utilized to stretch the sample the same distance (25mm) and measure the force level. The chains were placed back on the 3D model and were stored in distilled water at 37°C between the tested time points.

**Results:** At initial application (T0) the majority of TP chains had a significantly higher force level than TS chains. By 24 hours (T1) this relationship reversed where the majority of TS chains generated significantly higher force values than TP chains and this pattern continued up to the final 6-week test (T6). In general, all chain force levels significantly decreased at each successive time point. The decrease was larger for the TP groups early on followed by a leveling out, while the TS groups exhibited a more continuous but lesser decrease over time. Chain pigmentation made no difference in the pattern of force degradation except for AO TS Grey at weeks 4 (T5) and 6 (T6) where it had a significantly lower mean force than the corresponding AO TS Clear.

**Conclusions:** Pigmentation played a minimal role in force levels and their degradation over time for the majority of power chains regardless of the manufacturer or chain material.