

## Mechanical and Physical Properties of Various Types of Dental Floss

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**Abstract :** Objective: To compare maximum load, percentage of elongation, physical characteristics of 4 types of dental floss: (1) Thai Silk Floss (silk, waxed), (2) Oral B® Essential Floss (nylon, waxed), (3) Experimental Floss Xu (nylon, unwaxed), (4) Experimental Floss Xw (nylon, waxed). Materials & method: Four types of floss were tested (n=30) with a Universal Testing Machine (Instron®). Each sample (30 cm long, 5 cm segment) was fixed, and pulled apart with load cell of 100 N and a test speed of 100 mm/min. Physical characteristics were investigated by digital microscope under 2.5×10 magnification, and scanning electron microscope under 1×100 and 5×100 magnification. The size of the filaments was measured in micron (µm) and the fineness were measured in Denier. Statistical analysis: For mechanical properties, the maximum load and the percentage of elongation were presented as mean ± SD. The distribution of the data was calculated by the Kolmogorov-Smirnov test. One-way ANOVA and multiple comparison (Tukey HSD) were used to analyze the differences among the groups with the level of a statistical difference at  $p < 0.05$ . Results: The maximum load of Floss Xu, Floss Xw, Oral B and Thai Silk were 47.39, 46.46, 25.38, and 23.70 N, respectively. The percentage of elongation of Oral B, Floss Xw, Floss Xu and Thai Silk were 72.43, 44.62, 31.25, and 16.44%, respectively. All 4 types of dental floss showed statistically differences in both the maximum load and percentage of elongation at  $p < 0.05$ , except for maximum load between Floss Xw and Floss Xu that showed no statistically significant difference. Physical characteristics of Thai silk revealed the most disintegrated, the smallest, and the least fine filaments. Conclusion: Floss Xu had the highest maximum load. Oral B had the highest percentage of elongation. Wax coating on Floss X increased the elongation but had no significant effect on the maximum load. The physical characteristics of Thai Silk resulted in the lowest mechanical properties values.

**Keywords :** dental floss, maximum load, mechanical property, percentage of elongation, physical property

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