



PhD in Biomedical Sciences

Research Area: Clinical Research in Orthodontics

Title: Evaluation of Physical, chemical and Mechanical Properties of Different Thermoplastic Materials used in Clear Orthodontic Aligners

The aim of this study is to evaluate all the commercially available thermoplastic materials for the manufacturing of clear aligners, by comparing and understanding their different characteristics. The study will be divided into four phases.

For the first phase, a search for all the commercially available products which are specifically indicated for the manufacturing of clear aligners will be conducted.

Secondly, a comparative descriptive analysis will be carried out for the transparency, capacity to absorb water, solubility, stiffness and flexion of the different materials.

Thirdly, the behavior of the different materials and thicknesses will be analyzed with specific focus on the characteristics that are directly related to orthodontics. The same model will be printed several times and used to fabricate aligners using different materials of varying thicknesses in order to evaluate the following: adaptability, retention, effect of the different cut outs of the margin on retention and effect of attachment position on retention.

Finally, the deterioration of the different materials will be evaluated clinically. A group of volunteers will be divided into subgroups and will be given a passive aligner to wear 22 hours per day for 7 days, after which each will be analyzed.

Keywords: Orthodontic, Mechanical Properties, Thermoplastic, Clear Aligners

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