

Pattern of Stress Distribution in Different Ligature-Wire-Brackets Systems: A FE and Experimental Analysis

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Abstract : Since experimental devices cannot calculate stress and deformation of complex structures. The Finite Element Method FEM has been widely used in several fields of research. One of these fields is orthodontics. The advantage of using such a method is the use of an accurate and non invasive method that allows us to have a sufficient data about the physiological reactions can happening in soft tissues. Most of researches done in this field were interested in the study of stresses and deformations induced by orthodontic apparatus in soft tissues (alveolar tissues). Only few studies were interested in the distribution of stress and strain in the orthodontic brackets. These studies, although they tried to be as close as possible to real conditions, their models did not reproduce the clinical cases. For this reason, the model generated by our research is the closest one to reality. In this study, a numerical model was developed to explore the stress and strain distribution under the application of real conditions. A comparison between different material properties was also done.

Keywords : visco-hyperelasticity, FEM, orthodontic treatment, inverse method

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