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Deformation of metal brackets: a comparative study

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ABSTRACT

The purpose of this study was to determine the effect of material and design on the force and stress required to permanently deform metal brackets.

Fourteen types of metal brackets were categorized according to raw material composition, slot torque degree, and wing type. Five types of raw materials, three types of slot torque degree, and four types of wing design were tested using an archwire torque test developed by Flores.

An analysis of variance (ANOVA) and t-test showed that all three categories had a significant effect on the force and stress needed to permanently deform metal brackets. Of the three, raw material had the greatest effect on the amount of force.

Results showed that 17-4PH and 303S had higher yield strengths and regular twin brackets had higher resistance to deformation. Also, as slot torque degree increased, brackets deformed with less force. Result confirmed that brackets requiring the greatest stress to permanently deform were made of steel with the greatest hardness.

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