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The fracture strength of ceramic brackets: a comparative study

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ABSTRACT

Recent demand for esthetic brackets has led to the development and use of ceramic brackets in orthodontics.

The purpose of this study was to compare the fracture strength of different ceramic brackets under different surface conditions and ligation methods using a torsional wire bending force. Five different bracket types (two polycrystalline, two single-crystal, and one metal) were tested using elastic and wire ligation, with half being scratched and the other half remaining unscratched.

Results showed a significant difference between bracket types and surface conditions. Non-scratched single-crystal brackets had higher fracture strengths and slightly higher fracture loads than polycrystalline brackets. However, single-crystal brackets were significantly adversely affected by surface damage (scratching), while polycrystalline brackets were not significantly affected by surface damage.

The fracture behavior of ceramic brackets followed the Griffith model where fracture strength decreased following surface damage.

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