

The Influence of CAD/CAM Ceramic and Heat Processed Composite Inlays on the Fracture Resistance of Premolars

An In-vitro Study

A thesis

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Abstract

The fracture resistance of maxillary first premolars significantly reduced by cavity preparation, this will cause fracture of the tooth under extra compressive loading. The strengthening effect of bonded esthetic inlay restorations on weakened teeth has been reported. The aim of this study is to assess the resistance to fracture maxillary premolar restored with heat processed composite and CAD/CAM ceramic inlays and to identify fracture modes of the experimental groups. Forty extracted maxillary first premolars of approximately comparable sizes were divided into four groups as follow:

Group (A): Ten intact teeth (control group).

Group (B): Ten teeth prepared with standardized mesio-occluso-distal (MOD) inlay cavity but not restored.

Group (C): Ten teeth prepared with standardized MOD inlay cavity and restored with indirect heat processed composite (SR Adoro).

Group (D): Ten teeth prepared with standardized MOD inlay cavity and restored with CAD /CAM ceramic material (e max CAD).

Fracture strength of the experimented teeth was measured by using universal testing machine (an axial compression test). Data were analyzed statistically by one way ANOVA test and least significant difference tests, The results showed that sound teeth group (A) had more fracture resistance values than all experimental groups and the results are highly significant. Unrestored teeth group (B) showed the least fracture resistance values than group C & D and the results are highly significant.

Group (D) restored with CAD/CAM ceramic inlays showed more resistance to fracture than teeth restored with SR Adoro composite inlays group (C), but the values are statistically not significant. The fracture Mode of SR Adoro composite inlays seems to be 80% restorable while CAD/CAM ceramic inlays 90% of it are restorable.