When a laminate is indicated for a tooth that contains multiple composites and to evaluate the failure types after fracture strength test. Indirect composite laminates on teeth containing differently conditioned, aged resin ceramic laminates are more frequent on existing composite restorations. In general, replacement of underlying pre-existing resin composite restorations require removal adhesion, such studies were conducted on specimens with standard geometries, surface conditioning methods have been proposed to facilitate composite-composite contains no or less unreacted monomers on the surface layer. Although several inhibited layer of unpolymerized resin. Pre-polymerized or aged resin restorations adhesion between two composite layers is achieved in the presence of an oxygen-dentin. The objectives of this study were: a) to compare the fracture strength of indirect composite laminates on teeth containing differently conditioned, aged resin composites and b) to evaluate the failure types after fracture strength test.

Materials and Methods

Specimens

Sound human maxillary central incisors (N=60, 10 per group) were used. Standard Class III box preparations in 50 teeth using ultrasonic burs (Groups 1 to 5) (Fig. 1) and air-abrasion of Class III composite (30 μ, Al2O3) for 1 m, Al2O3 (CoJet®-Sand, 30 μ, Al2O3) (Groups 6) were fabricated. Acid-etching with 35% H3PO4 (Ultra-etch) for 30 s + Rinsing with water, air-drying and silanization group. Anterior surface, dentine to etch and silanized group. 

Surface Conditioning Protocols

Cementation of the Laminates

Conditioning the inner surfaces of the laminates-silanization Ultrasonic Cementation (Panavia F2.0, Kuraray) Light polymerization (40 s) from four directions

Embedding the teeth with the cemented laminates in PMMA

Water storage at 37°C for 1 m

Load application at 137° (crosshead speed: 1 mm/min) from the incisal direction to the laminate-tooth interface (Fig. 2)

Failure Analysis

Digital photos, two calibrated operators (x20)

Results

Significant difference was observed in fracture strength values between the groups (ANOVA, p = 0.0261). The only significant difference was between Group 2 (299±103 N) and Group 3 (471±126 N) (p = 0.0239) (Tukey’s). The mean fracture strength values in the descending order were 471±125, 416±146, 363±118, 352±117, 339±96 and 299±103N for Groups 3, 5, and 6 respectively (Fig. 2).

The majority of the failure type experienced in all groups was mixed failure type (Type C) when chipping of the laminate was seen together with enamel exposure (35/60). This type of failure was followed by Type B (21/60) (Table 1).

Fracture strength of laminates tested, did not show a significant difference

Conclusions

• Fracture strength of laminates tested, did not show a significant difference when they were bonded to teeth with aged Class III composite restorations or to intact teeth only but the failure types varied between the groups.

• The lowest results were obtained from air-particle abraded (50 μ, Al2O3), and silanized group.

References