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"REATTACHMENT OF ANTERIOR FRACTURED TEETH: EFFECT OF MATERIALS AND TECHNIQUES ON IMPACT STRENGTH – AN IN VITRO STUDY"

By

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ABSTRACT

Background and Objectives: Fracture of anterior teeth by trauma is the most frequent type of injury in the permanent dentition, especially among children aged from 9 to 11 years. With the advent of adhesive dentistry, restoration of such traumatized incisors by reattachment of the original tooth fragment is the most conservative treatment approach. So this invitro study was conducted to evaluate the effect of various materials like bonding agents (Single bond and Clearfil SE bond), intermediate materials (Filtek Z350 composite and Rely X U200 dual cure resin cement) and reattachment techniques (direct and circumferential chamfer) on impact strength of human maxillary incisors.

Method: Ninety human maxillary central incisors were collected and standardized fragments were obtained when eighty crowns were sectioned 3 mm from the incisal edge.

Specimens were distributed in nine groups (n = 10), according to the reattachment technique (Direct bonding or Circumferential chamfer); the adhesive system (Single Bond or Clearfil SE Bond); and the intermediate material (Filtek Z350 or Rely X U 200). Sound teeth composed the control group. Circumferential chamfer was prepared after bonding of the fragment by means of a spherical point and filled with composite Filtek Z250.

Group distribution according to reattachment technique and materials (n = 10)

	Direct bonding		Circumferential chamfer	
Materials	Filtek Z350	Rely X	Filtek Z350	Rely X
Single bond	G1	G3	G5	G7
Clearfil SE bond	G2	G4	G6	G8

GC = control group = sound teeth

The teeth specimens were mounted in acrylic and the impact strength was evaluated in a universal testing machine Instron. A compressive load was applied at a crosshead speed of 5 mm min^{-1}) on the buccal surface, 1 mm from the incisal edge. Data was analysed using One way Anova and Tukeys multiple post hoc statistical tests.

Results: Mean value of impact strength for control group was 67.81 Kgf. The fragment reattachment using Circumferential chamfer was significantly superior to Direct Bonding. The use of Single Bond significantly increased the impact strength when compared to the use of Clearfil SE. There was no significant difference among Rely X and Filtek X350.

Conclusion: No technique or material, when individually considered, was capable of achieving the mechanical strength of the sound teeth; however, the association of reattachment technique Circumferential chamfer with bonding system Single Bond could approximate the impact strength of the restored teeth to that observed in the sound teeth.

Keywords: *Reattachment; bonding agents; impact strength*