

ORIGINAL RESEARCH

Evaluation of reattachment of tooth remnant with different restorative materials

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ABSTRACT:

Background: Coronal fractures of the anterior teeth are a common form of dental trauma that mainly affects children and adolescents. The present study was conducted to evaluate the restoration of fractured teeth by reattaching tooth fragment to its tooth remnant with different restorative materials. **Materials & Methods:** The present in vitro study was conducted on 24 children with fractured incisors. Teeth were divided into 2 groups. Group I teeth were uncomplicated crown fractures and group II were complicated crown fractures. Force required to fracture the segments were recorded. **Results:** Group I teeth were uncomplicated crown fracture + wet medium; group II was uncomplicated crown fracture + dry medium; group III were complicated crown fracture + wet medium, and group IV were complicated crown fracture + dry medium. Each group had 6 teeth. The mean force required to fracture reattachment teeth in group I was 198 N, in group II was 192, in group III was 234 N and in group IV was 165 N. The difference was non-significant ($P > 0.05$). **Conclusion:** Fragment reattachment can be used to treat fractured teeth successfully in children.

Key words: Crown, Dental trauma, fractured

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INTRODUCTION

Coronal fractures of the anterior teeth are a common form of dental trauma that mainly affects children and adolescents.¹ The majority of dental injuries involves the anterior teeth, especially the maxillary incisors whereas the mandibular central incisors and the maxillary lateral incisors are less frequently involved. Dental injuries usually affect only a single tooth; however, certain trauma types such as automobile accidents and sports injuries involve multiple tooth injuries. One way to treat fractured tooth due to trauma is to reattach the tooth fragment to its remnant using a composite resin.² The technique of reattaching a tooth fragment was first described by Chosack and Eidelman in 1964, and this technique has numerous advantages over the other techniques: the shape and color of the restored tooth are maintained, the patient suffers no negative social and emotional effects after tooth restoration, and it is fast, reliable, and cost effective.³ One of the options for managing coronal tooth fractures, especially when there is no or minimal violation of the biological width, is the reattachment of the dental

fragment when it is available. Tooth fragment reattachment offers a conservative, esthetic, and cost effective restorative option that has been shown to be an acceptable alternative to the restoration of the fractured tooth with resin-based composite or full-coverage crown.⁴ The present study was conducted to evaluate the restoration of fractured teeth by reattaching tooth fragment to its tooth remnant with different restorative materials.

MATERIALS & METHODS

The present in vitro study was conducted in the department of Pedodontics. It consisted of 24 children with fractured incisors. The study protocol was approved from institutional ethical committee. All patients were informed about the study and written consent was obtained. Data such as name, age, gender etc. was recorded. Teeth were divided into 2 groups. Group I teeth were uncomplicated crown fractures and group II were complicated crown fractures. The fragments in group I were reattached with dentin bonding agent, a flowable

and a hybrid resin composite, and the fragments in group II were reattached to the tooth remnant after a pulpotomy was performed. Teeth were divided equally into four subgroups: Group I were uncomplicated crown fracture + wet medium; group II was uncomplicated crown fracture + dry medium; group III were complicated crown fracture + wet medium, and group IV were complicated crown fracture + dry medium. The fragments were then reattached. Patients were recalled after 6 months and force required to fracture the segments were recorded. Results were tabulated and subjected to statistical analysis. P value less than 0.05 was considered significant.

RESULTS

Group I	Group II	Group III	Group IV
Uncomplicated crown fracture + wet medium	Uncomplicated crown fracture + dry medium	Complicated crown fracture + wet medium	Complicated crown fracture + dry medium.
6	6	6	6

Table I shows that group I teeth were uncomplicated crown fracture + wet medium; group II was uncomplicated crown fracture + dry medium; group III were complicated crown fracture + wet medium, and group IV were complicated crown fracture + dry medium. Each group had 6 teeth.

Table II Fracture resistance forces of reattachment teeth

Groups	Force (N)	P value
Group I	198	0.51
Group II	192	
Group III	234	
Group IV	165	

Table II, graph I shows that mean force required to fracture reattachment teeth in group I was 198 N, in group II was 192, in group III was 234 N and in group IV was 165 N. The difference was non-significant (P > 0.05).

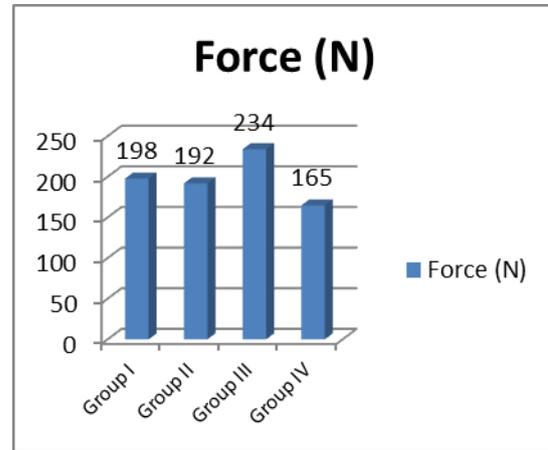
DISCUSSION

Several factors influence the management of coronal tooth fractures, including extent of fracture (biological width violation, endodontic involvement, alveolar bone fracture), pattern of fracture and restorability of fractured tooth (associated root fracture), secondary trauma injuries (soft tissue status), presence/absence of fractured tooth fragment and its condition for use (fit between fragment and the remaining tooth structure), occlusion, esthetics, finances, and prognosis.

Patient cooperation and understanding of the limitations of the treatment is of utmost importance for good prognosis. When there is a substantial associated periodontal injury and/or invasion of the biological width, the restorative management of the coronal fracture should follow the proper management of those associated issues. Coronal fractures must be approached in a systematic way to achieve a successful restoration.⁵ The present study was conducted to evaluate the restoration of

fractured teeth by reattaching tooth fragment to its tooth remnant with different restorative materials.

Graph I Fracture resistance forces of reattachment teeth



We found that group I teeth were uncomplicated crown fracture + wet medium; group II was uncomplicated crown fracture + dry medium; group III were complicated crown fracture + wet medium, and group IV were complicated crown fracture + dry medium. Each group had 6 teeth. We observed that mean force required to fracture reattachment teeth in group I was 198 N, in group II was 192, in group III was 234 N and in group IV was 165 N. The difference was non-significant (P > 0.05).

Robertson et al⁶ proposed that post procedural complications with pulp involvement in restored teeth after fragment reattachment are related to the injury itself rather than the treatment. Furthermore, they noted that obliteration of the pulp canal and pulpal necrosis occurs rarely in coronal fractures, even when the pulp is exposed. However, they did comment that luxation injuries that occurred concomitantly with crown fractures have a significant deleterious effect on pulpal prognosis with respect to pulpal necrosis and obliteration of the pulp canal.

Worthington RB et al⁷ found that the restored teeth were followed up for 2 years. Neither the type of trauma nor the storage medium had any significant effect on the survival, color, and bond strength of the restored teeth when assessed in the clinical and laboratory study. The color disharmony that was encountered initially in restored teeth resolved significantly on its own accord within 12 months after reattachment of the fragment. Farik et al⁸ recommended that fragments that were initially kept in a dry environment should be kept moist (in water) for at least 24 h prior to their reattachment. Lee et al⁹ reported that the residual chlorine from saline solutions that are used to store tooth fragments can negatively influence bond strengths. They found that the bond strength of tooth fragments that were kept in 0.9% saline solution prior to reattachment was significantly lower than those that was in distilled water prior to reattachment. Capp et al¹⁰ reported that fracture strength of a tooth that had been kept in a dry environment for 48 h could be restored when restored after only 30 min

rehydration, and this may be promising for conserving the original color of the tooth.

CONCLUSION

Authors suggested that fragment reattachment can be used to treat fractured teeth successfully in children.

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