



# Tooth Fragmentation Reattachment using a Strip Crown with Resin Composite-A Case Report

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## Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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Case Study

## ABSTRACT

Coronal fracture of the anterior teeth is a common form of dental trauma. If the initial tooth fragment is maintained following fracture, reattachment of the broken fragment to the remaining tooth may offer higher and durable esthetics, a positive psychological response and could be a quicker and less complicated procedure. This report presents a case of a twelve-year-old boy, who came with a broken incisor due to an accident that occurred a month back. The patient also presented the fragment of the detached tooth. On radiographic examination it was revealed to be Ellis class II fracture. The treatment plan was the reattachment of the fractured crown fragment using strip crown with resin composite on right central incisor.

*Keywords: Strip crown; fragment reattachment; dental trauma.*

## 1. INTRODUCTION

In primary dentition children are most accident prone between 2 to 4 years and this range is between 7 to 12 years for the permanent dentition.

31–40% of boys and 16–30% of girls age 5 years and 12–33% of boys and 4–19% of girls age 12 years would have suffered some dental trauma. The maxillary anterior teeth are most prone to dental trauma, especially the maxillary central incisors in the primary and permanent dentitions.

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In the primary dentition concussion, subluxation, and luxation are the most common injuries, whereas uncomplicated crown fractures are most common in the permanent dentition. Reattachment of a crown fragment is a conservative treatment for crown fractures of anterior teeth amongst the various treatment options. This clinical case report the management of two coronal tooth fracture that were successfully treated along tooth fragment reattachment using a strip crown with resin composite[1].

### 1.1 Background

Coronal fractures of the anterior teeth are the most common form of dental injury that has a severe impact on the social and psychological well-being of a patient.

Divakar and Nayak have documented up to 92% of all traumatic injuries to the permanent dentition are crown fractures. 18–22% of all trauma to dental hard tissues, 28–44% being simple (enamel and dentin) and 11–15% complex (enamel, dentin and pulp) are coronal fractures of permanent incisors [2].

Lamis D Rajab in universities of Jordan in 2013 conducted a survey over a period of 4 years. Her analysis showed the prevalence of traumatic dental injuries in 14.2% of 2751 subjects. Peak incidence of injury was amongst 10-12 year age group. Boys were more affected (18.3%) than girls (10.1%). Maximum injuries occurred at home (63.3%). Leading cause if injuries were falls (49.9%). Maxillary central incisors are mostly affected (90.4%)[3].

## 2. CASE PRESENTATION

A 12 year old male patient reported to Pediatric Department with a broken front teeth (Fig 1) after an accident that happened 1month before additionally impacting his left index finger. Patient was undergoing a fracture treatment in left index finger that caused the delay.

The patient presented the fragment of detached tooth that had broken due to trauma. Since the incident, the parent kept the fragment of the detached tooth in a piece of paper and wished that the fragment be placed in its usual place.

### 2.1 Intraoral Examination

Clinical examination revealed class II Elis fracture in 11 with the fracture line running

vertically from the occlusal third of the tooth both on the labial and lingual aspect and in 21 with the fracture line running obliquely from the occlusal third to the middle third both on the labial and lingual aspect. Intraoral examination also revealed that no soft tissue laceration was present (probably healed). On examination, fragment part was found to be fitting well to the remaining tooth structure. Tooth was found to be vital in tooth vitality test.

### 2.2 Radiological Examination

An intraoral periapical radiograph indicated complete root formation and a closed apex with no periapical radiolucency and did not show any other fracture on the adjacent teeth.



**Fig. 1. Pre-operative clinical photograph 1) Elis Class II on relation to 11 2) Elis Class I on relation to 21**

### 2.3 Treatment Plan

As the broken fragment of the left central incisor was not present, it was restored with composite resin. The treatment plan was re-attachment of the fractured crown fragment using strip crown with resin composite on right central incisor. The patient did not complain about any pain and sensitivity. Patient has a good oral hygiene status and medical history was non contributory.

## 3. MATERIALS AND METHODS

Step 1: Select strip crown to match size of tooth– Selection of the strip crown was accomplished in second appointment (Fig 4).

Selection of an adequately sized celluloid crown is done proportionate to the mesio-distal width of the fractured crown (Fig 5).

Step 2: Crown preparation – A col ( <sup>1</sup> ) preparation was made in the selective strip

<sup>1</sup> Col – A valley like depression created to the proximal portion of the strip crown

crown by band cutting scissors for better adaptation in the fractured tooth (Fig 6).



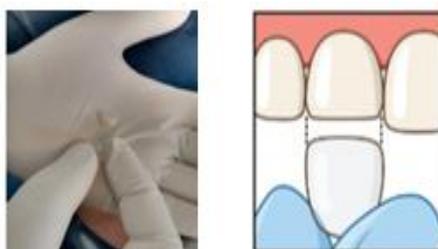
**Fig. 2. Intraoral clinical photograph of patient**



**Fig.3. Intraoral Periapical Radiograph in relation to 11 and 21**



**Fig. 4. Strip crowns**



**Fig.5. Crown selection**



**Fig. 6. Col preparation**

After finishing the preparation, it was checked that the strip crown well-fitted into the fractured teeth (Fig. 7). A conventional bevel and groove was also prepared within the dentine of the fractured fragment part.



**Fig. 7. Checking the adjustment of the crown**

Note: The fragment was washed thoroughly under running water and stored in sterile normal saline to prevent dehydration and discoloration [4].



**Fig.8. Checking tooth fragment attachment**

*labiolingually for better adaptation*

Step 3: Tooth fragment adjustment - It was checked that the fragment part of the teeth is well-fitted to the fractured tooth (Fig 8 and Fig 9).

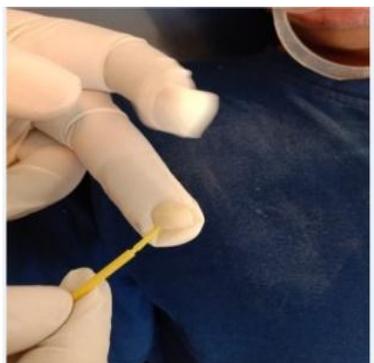


**Fig.9. Checking adjustment of the fragment part with the fractured tooth**

Step 4: The fragmented tooth was etched by 37% phosphoric acid and applied with dentine bonding agent (Fig 10 and Fig 11).



**Fig.10. Etching fragmented part with 37% phosphoric acid**



**Fig.11. Application of bonding agent**

Step 5: Similarly the partial broken tooth was etched by 37% phosphoric acid and applied with

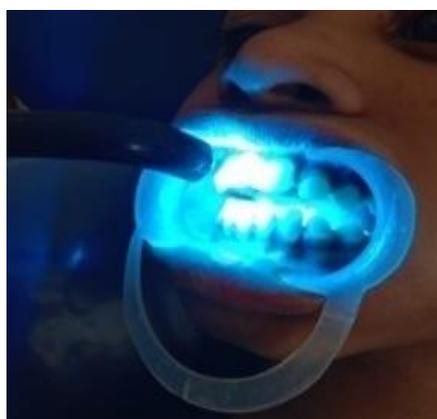
dentine bonding agent. The fragment was attached to the fractured tooth and bonded by light cure for 30seconds (Fig 12,13 and 14).



**Fig.12. Etching of fractured tooth**



**Fig.13. Application of bonding agent on fractured tooth.**



**Fig. 14. Cured with Light Cure Gun after application of bonding agent**

Step 6: Fill the strip crown with composite resin and allow the material to back-fill the cavity. Always keep the tip submerged in the material to

eliminate voids. Sheering action of the mixed tip eliminates air bubbles (Fig 15).

Step 7: Seat the strip crown – The strip crown was placed on the tooth and slight pressure was applied to eradicate the excess material (Fig 16).



**Fig.15. Filling the strip crown with composite resin**



**Fig.16. Placement of strip crown**

Step 8: Cure and cleanup – Tack cure the material on facial and lingual sides and remove the semi-set excess. Then cure for 20 seconds (Fig 17). Remove the crown from the lingual side with an explorer. Then it was trimmed and finished by finishing bur (Fig 18).



**Fig.17. Cured with Light Cure Gun after placing strip crown.**

Tip: If the crown form needs to sectioned-off, make a small slit in the lingual side with a Bard

Parkar blade or flame shaped finishing bur and peel-off away.

Placement of the highly responsive strip crown was successfully achieved with the re-attachment of the fragment to the fractured tooth (Fig 19).



**Fig.18. Removal of strip crown**



**Fig.19. Final post-operative clinical photograph.**

### 3.1 Post Operative Instruction

The below post-operative instruction was given to the patient.

The patient was asked not to incise any hard food like apple or tear chicken pieces with the treated tooth to avoid dislodgement.

The patient was also advised to replace the strip crown with a permanent crown upon reaching age 18 years under the supervision of specialist.

### 4. DISCUSSION

Strip crowns are very difficult to place, and it is one of the most technique sensitive procedure. Also the bonded resin composite strip crown for the treatment of fractured primary or young

permanent incisors is perhaps the most esthetic of all the restorations available to the clinician.

Many authors have introduced modifications to the technique of strip crown placement. Placing a layer of resin-modified glass ionomer to cover all exposed dentin before the seating of the crown form filled with composite resin is described as the "sandwich technique" by an author Ian Shuman [5].

To assist in the retention of the crown, Kenny et al. introduced the composite resin short post, popularly known as "mushroom undercut" in the dentin. In a clinical study of sample size 92 teeth with a one-year follow-up Judd et al. reported 100% retention rate of the composite resin strip crown [6,7].

Kupietzky et al. studied on 40 children and he reported the clinical and radiographic success of 112 composite resin strip crowns. His results showed that the crowns had an 88% retention rate with a mean follow-up time of 18 months. Similar retrospective study sample was used one year later to find out the parental satisfaction rate with the visual appearance of the strip crowns. The study showed 78% of parents were "very satisfied" with crowns, durability being the most satisfying factor with the crowns [8,9].

The same authors published another retrospective study with clinical and radiographic data on strip crowns after three years of follow-up in 2005. The study sample size was 145 composite resin strip crowns in 52 children. The results showed a 78% retention rate for a period of over 36 months[10].

In 2006 Ram and Fuks did a similar study on crown retention after a 2-year follow-up. This study showed 80% of the resin-bonded composite strip crowns were effective at the final examination[11].

Al-Eheideb and Herman did a study on 23 teeth with composite resin strip crowns. The study reported a 70% success rate when followed between 6 and 27 months[12].

Re-attachment of a tooth fragment is the first choice for restoring fractured teeth, whether the technique is combined with resin composites. This treatment may offer several benefits over conventional acid-etch composite restoration. Improved esthetics is obtained as enamel original shape, brightness, surface texture and colour are preserved. Additionally, the incisal edge will wear out at a similar rate to adjacent

teeth, whereas a composite restoration will likely wear out more rapidly.

Reis had reported that simple reattachment (not using any additional retentive technique) regained only 37.1% of intact tooth fracture resistance, while the buccal chamfer recuperated 60.6% and the overcontour and internal groove technique nearly brought back intact tooth fracture strength, recuperating 97.2% and 90.5%, respectively. In our study we did internal bevel with internal groove to increase the strength [13].

In this study, we have used strip crown along with tooth fragment for successful restoration of fractured teeth. After removal of the strip crown the composite acts as a thin jacket (<sup>2</sup>) which surrounds all the tooth structure and maintains more strength and resistance to fracture. In this procedure as the biological fractured teeth is retained and is restored with the usage of strip crown, it uses less composite resin material which in turn makes the whole process more cost-effective.

## 5. CONCLUSION

For the restoration of a fractured anterior tooth, whenever possible reattachment of the fractured tooth segment is one of the best techniques. The reattachment of the fractured tooth fragment is the most biological and conservative method. It is advisable not to use the simple reattachment technique as this technique may not be able to bring back sufficient fracture strength.

In this case report of the tooth fragment reattachment with the help of strip crown it was found to be esthetically more predictable for translucency, opalescence, fluorescence, characterizations and texture of the surface. Moreover, this technique also restores stress resistance comparable to intact tooth tissue. Additionally, the technique prevents the patient, especially children and young adolescent and their parents, from an emotional trauma of loss of a body part. They are mostly satisfied as, of the original fragment being used in the restoration of their fractured tooth.

## CONSENT

As per international standard or university standard, patients' written consent has been collected and preserved by the author(s).

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<sup>2</sup> Strip crown was removed altogether after the reattachment process

## ETHICAL APPROVAL

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

## REFERENCES

1. Pal A, Dev S, Zahir S, Kundu GK. Avulsed Anterior Permanent Tooth Replaced by Fixed Functional Interim Prosthesis with Natural Crown: A Case Report. *J Dent Indones.* 2019;26(2):105-108
2. Divakar HD, Nayak M, Shetty R. Changing concepts in fracture reattachment of teeth—a case series. *Endodontology.* 2007;2013:27–35
3. Rajab LD, Baqain ZH, Hamdan MA, Abu Ghazaleh S. Traumatic dental injuries among 12-year-old schoolchildren in Jordan: prevalence and risk factors (submitted for publication in the journal *Oral health and Preventive Dentistry*).
4. J Nat. Tooth fragment reattachment: An esthetic, biological restoration: *Sci Biol Med.* 2015;205-207.
5. Muhamad, Abu-Hussein, Abdulgani, Azzaldeen Mai, Abdulgani. Strip Crowns Technique for Restoration of Primary Anterior Teeth: Case Report. *IOSR Journal of Dental and Medical Sciences*;2015. DOI:10.9790/0853-141284853
6. Kenny DJ, Johnston DH, Bamba S. The composite resin short-post: a review of 625 teeth. *Ont Dent.*1986;63(5)12-18.
7. Judd PL, Kenny DJ, Johnston DH, Yacobi R. Composite resin short-post technique for primary anterior teeth. *J Am Dent Assoc.* 1990;120(5):553-555.
8. Kupietzky A, Waggoner WF, Galea J. The clinical and radiographic success of bonded resin composite strip crowns for primary incisors. *Pediatr Dent.* 2003;25(6):577-581.
9. Kupietzky A, Waggoner WF. Parental satisfaction with bonded resin composite strip crowns for primary incisors. *Pediatr Dent.* 2004;26(4):337-340.
10. Kupietzky A, Waggoner WE, Galea J. Long-term photographic and radiographic assessment of bonded resin composite strip crowns for primary incisors: results after 3 years. *Pediatr Dent.*2005; 27(3):221-225.
11. Ram D, Fuks AB. Clinical performance of resin-bonded composite strip crowns in primary incisors: a retrospective study. *Int J Paediatr Dent.*2006;16(1):49-54.
12. Al-Eheideb AA, Herman NG. Outcomes of dental procedures performed on children under general anesthesia. *J Clin Pediatr Dent.*2003;27(2):181-183.
13. Reis A, Loguercio AD, Kraul A, Matson E. Reattachment of fractured teeth: A review of literature regarding technique and materials. *Operative Dentistry.* 2004;29(2):226–33. Strip Crowns Technique for Restoration of Primary Anterior Teeth: Case Report.

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