MANAGEMENT OF COMPLICATED CROWN FRACTURE USING FRAGMENT REATTACHMENT TECHNIQUE – CASE REPORT

Authors (Goa Dental College)
Dr. Renita Soares, Post Graduate
Dr. Ida de Noronha de Ataide, Professor and HOD
Dr. Marina Fernandes, Asst Professor
Dr. Rajan Lambor, Asst Professor

Introduction

Coronal fractures of anterior teeth are a distressing and agonising occurrence. Hence restoring functionality and esthetics in such cases is of paramount importance.

The incidence of complicated crown fractures ranges from 2% to 13% and the most commonly involved tooth is the maxillary central incisor. The exposure of the pulp makes the treatment challenging. The prognosis of treatment depends on the extent of the injury, the quality and promptness of initial care and the follow up protocol.[1]

With advances in restorative materials and adhesive protocols, clinicians can predictably restore fractured teeth. Thus, it has become possible to preserve the original structure of the tooth by using the reattachment technique which was first described by Chosack and Eidelman in 1964.[2,3]

Therefore, if a broken fragment is available, the restoration of a tooth with its own fragment should be considered. The advantages of this method include:

- regaining color and size of the original tooth,
- being worn away in a similar proportion to adjacent tooth without trauma,
- giving an emotionally and socially positive response due to the protection of natural tooth structure,
- rapid and conservative nature of the treatment,
- economical aspect of a one-visit treatment.[4,5]

The following case report describes the management of a complicated crown fracture using glass fibre reinforced post and reattachment technique.

Case Report

A 25 year old male patient reported to the Dept. of Conservative Dentistry and Endodontics with dental injury to the maxillary right central incisor. The patient reported that the injury had occurred the previous day during a football match.

Clinical and radiographic examination revealed an incomplete complicated horizontal crown fracture (Figure 1).

Figure 1: Horizontal crown fracture in relation to the middle third

The treatment options presented to the patient included;

i. Extraction of fractured segment and reattachment

ii. Post and Core and crown

iii. Extraction of remaining fragment followed by prosthetic rehabilitation

After being explained about each of the procedures, the patient elected to have the fragment reattached. Local anaesthesia was administered and rubber dam isolation was done, following which the fractured segment was removed and stored in normal saline. The endodontic treatment was then initiated.

Following pulp extirpation, working length was determined and chemomechanical preparation of the canal was done with the aid of 5.25% Sodium hypochlorite and Protaper files. The fit and length of the master cone was verified radiographically and the apical 5mm of the canal was obturated using sectional obturation technique(Figure 2) with resin based sealer (AH Plus)

Figure 2: Sectional obturation

Figure 3: Fibre post trial

Figure 4: Internal groove made on the palatal aspect

The post space preparation was carried out using reamer size #2 (Nordin Glassix) and the corresponding light-transmitting fibre post size was tried in the canal and cut at the desired length (Figure 3). An internal groove was made on the fractured segment to receive the fibre post (Figure 4). The post was etched for 15seconds. Dual cured resin cement was utilised for bonding the post and light cured. Similar steps were followed for the remaining tooth structure and the fractured segment. Following application of the dual cured resin cement, the fractured segment was approximated and light cured for 40seconds.

Figure 5: Radiographic image of the reattached segment and bonded fibre post

At the completion of polymerization, the residual excess at the margins was finished with a series of finishing burs and then polished with the composite polishing kit. (Figure 5 & 6)

Figure 6: Postoperative frontal view

At the one year recall visit, the tooth demonstrated harmonious integration of color and form of the fractured segment with the soft tissue and absence of symptoms and periapical pathology. (Figure 7)

Figure 7: One year follow up – clinical and radiographic view

Discussion

The storage and preparation of the fragment prior to its reattachment are critical steps and are key determinants of the overall clinical outcome. It has been recommended that the fragment be kept moist in physiologic saline until its reattachment to prevent dehydration and its

associated problems i.e. fragment discoloration and decreased bond strength. Literature reports that the bonding and thereby survival of the reattached fragment can be significantly improved by additional preparation of the tooth remnant and/or fragment such as making an internal enamel groove, internal dentin groove, or a V-shaped groove in the external enamel of the tooth remnant and/or fragment.[3]

There are several papers confirming the successful treatment achieved with fibre reinforced posts used to create central support and increase retention of the reattached crown fragment.[6] They possess several advantages over cast metal posts, such as esthetics, bond to tooth structure, modulus of elasticity similar to that of dentin, but still require dentin preparation to fit into the canal.[7]

The prognosis of reattached teeth still remains a matter of concern. There exists insufficient data predicting the clinical outcome and long term survival rate of reattached teeth. Cavalleri and Zerman treated fractured crowns using either a composite resin when the fragment was not available, or fragment reattachment when the fragment was available. Five years after restoration, they found that 100% of the teeth that had been restored by fragment reattachment re-fractured, whereas 40% of the teeth that had been restored using a composite resin re-fractured. Spinas reported that all teeth that had been restored by fragment reattachment needed to be replaced completely 7 years after restoration.[3] Thereby emphasizing the need for mandatory recall protocol.

Conclusion

Reattachment using the original fragment is advantageous over composite restorations and prosthetic rehabilitation. Apart from being an ultraconservative and cost effective alternative, it provides immediate esthetics and functional rehabilitation. However long term follow up is necessary to evaluate the clinical outcome.

References

1. Aggarwal V, Logani A, Shah N. Complicated crown fractures – management and treatment options. Int Endodontic Journal 2009;42:740–53.

2. Anca Silvia Vaˆlceanu, Stefan-Ioan Stratul. Multidisciplinary approach of complicated crown fractures of both superior central incisors: a case report. Dent traum 2008;24:482-86.

3. Yucel Yilmaz, Cigdem Guler, Hakan Sahin, Ozge Eyuboglu. Evaluation of tooth-fragment reattachment: a clinical and laboratory study. Dent traum 2010;26:308-14.

4. Yucel Yilmaz, Cigdem Zehir, Ozge Eyuboglu, Nihal Belduz. Evaluation of success in the reattachment of coronal fractures. Dent traum 2008;24:151-58.

5. Turgut MD, Go¨nu¨ N, Altay N. Multiple complicated crown–root fracture of a permanent incisor. Dent Traumatol 2004;20:288-92.

6. Igor Stojanac, Bojana Ramic, Milica Premovic, Milan Drobac, Ljubomir Petrovic. Crown reattachment with complicated chisel-type fracture using fibre-reinforced post. Dent traum 2012:1-4.

7. Suparna Ganguly Saha, Mainak Kanti Saha. Management of a Fractured Tooth By Fragment Reattachment- A Case Report. International Journal Of Dental Clinics 2010;2:43-47.