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Multidisciplinary esthetic restoration of crown fractures using the reattachment technique

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Introduction

Central superior incisors represent the teeth with the greatest susceptibility to fractures caused by direct trauma, due to their size and position. Crown fractures in central superior incisors generally occur in children and teenagers and usually, after recreational activities as a result of accidental injuries.
Dental trauma require adequate treatment, specific to each fracture in order to preserve the remaining tooth. Recent developments of adhesive protocols allow clinicians to predictably restore fractured teeth.
This paper presents different techniques of restoration applied in 2 cases of crown fractures of both superior central incisors.

Material and Methods

The **first case** is a 10 year-old boy, with uncomplicated crown fractures in both central superior incisors: 1.1. horizontal fracture with incisal angles involvement; 2.1. oblique fracture with mesial angle damage (fig 1.1.).
Taking into account the patient's age and the act of recuperation of one of his fractured dental fragments (fig. 1.2.), the adhesive reattachment technique was established to be the best therapeutic procedure in case of tooth 2.1. - (fig. 1.3. and fig. 1.4.).

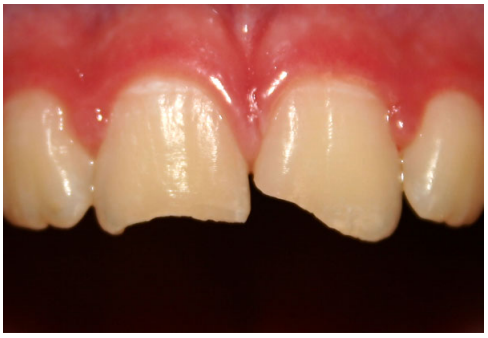

Fig. 1.1.

Fig. 1.2.

Fig. 1.3.

Fig. 1.4.

Once crown morphology of the central incisor 2.1. was restored, it was used as a chromatic map pattern of the prospective restoration and for a "mock up" in the other fractured central incisor - 1.1. A silicone putty matrix was performed over the mock-up, which was repositioned at the arch level, to serve as a conformer after provisional restoration removal, to restore crown morphology of the incisor 1.1. (Fig. 1.5. and 1.6.).
The proper restoration was done by successive composite resin layering on silicone putty matrix surface, so that, optical effects similar to those of the incisors 2.1. could be obtained (Fig. 1.7. and 1.8.). The treatment was completed with standardized finishing and polishing procedures.

Fig. 1.5.

Fig. 1.6.

Fig. 1.7.

Fig. 1.8.

Unfortunately, the frontal picture (Fig.1.9.) was focused on the incisor 1.1. (composite resin restored tooth), which seems to show a better expressed secondary anatomy, as compared with its homologue 2.1.
However, comparing the two half-section images, a similarity between secondary and tertiary morphologies of the two incisors should be noticed (Fig. 1.10.a, 1.10.b). The final general aesthetic outcome was satisfactory both for the child and the doctor.

Fig. 1.9.

Fig. 1.10.a

Fig. 1.10.b

The **second case** is a male teenager with two complete crown fractures, as follows: 1.1. - a cervical horizontal fracture, with loss of the coronal fragment (fig. 2.1.) and 2.1. - an oblique crown-root fracture, with the coronal fragment still in place; the pulp exposure could be observed during the mobilization of the crown towards facial (fig. 2.2.).
A conservative treatment was taken into consideration: the adhesive reattachment technique combined with periodontal surgery for the tooth 2.1.and a post-and-core - supported prosthetic restorations for the tooth 1.1.
Under local anesthesia, the gentle removal of the coronal fractured fragment of tooth 2.1 . was performed and the complete endodontic therapy was carried out in both upper central incisors in a single session, using rotary NiTi instruments and a combination of lateral and vertical condensation technique, with large taper and accessory cones (fig. 2.3.).
For the rehabilitation of the right incisor, we initially fabricated and cemented into the prepared root canal a cast post-and-core, made of a gold alloy (fig 2.4.).

Fig. 2.1.

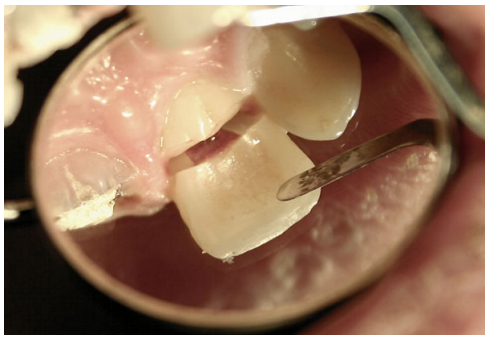

Fig. 2.2.

Fig. 2.3.

Fig. 2.4.

The noticeable subgingival and infra-alveolar extension of the fracture line in the vestibular area of the left incisor necessitated a periodontal surgical procedure: a split-thickness conventional flap was elevated to provide visibility and access to the bone and to the fractured root surface. After the resective osseous surgery was finalized and a good hemostasis was achieved the reattachment procedures was initiated by applying a translucent glass fiber post (Fig. 2.5.).

Fig. 2.5.

Fig. 2.6.

The bond of the fiber post, as well as the adhesive reattachment of the tooth's fragment was performed simultaneously, with dual resin cement of a proper shade. The flap was sutured to the periosteum in an apically displaced position (fig. 2.6.). During the periodontal tissue healing, a provisional polymeric crown (integral Artglass) was applied in order to restore the masticator and the esthetic functions. The cervical limit of this crown was 0.5 mm shorter, to prevent gingival irritations during the healing period. Ten days later, the sutures were removed and the provisional crown of 1.1. was cemented (Fig. 2.7.).

Fig. 2.7.

Conclusions

Crown fracture restorations localized in the superior incisor area need to be evaluated from several points of view, including the localization and the tissues involved in the fracture, the quality and the quantity of the remaining tooth structures, the adaptation of the fragment to the dental remnant and the patient's age.
The recent achievements of the adhesive dentistry allow the practitioner to use the natural separated fragment to restore the fractured teeth. The adhesive reattachment of dental fractured fragments may be considerate as an ultraconservative method for aesthetical rehabilitation, while the direct composite resin restoration is a minimal invasive one.
Dental trauma cases involving teeth with factures extending subgingivally and/or infra-alveolar could benefit from multidisciplinary adhesive-mucogingival approaches, with good results. However, such cases require a long-term follow-up. Additional long-term observations of similar cases are called to elucidate aspects as the resistance in time of the dissimilar restorations, the color stability, the stability of the gingival level and of the keratinized tissue.

Literature

1. Ardelean L.: Materiale, instrumente si aparate in cabinetul de medicina dentara, Eubeea, 2007
2. Bartlett D., Brunton P.: Aesthetic Dentistry, Quintessence Publ. Co. Ltd, 2005
3. Summit J.B., Robbins J.W., Schwartz R. S.: Fundamentals of operative dentistry. A contemporary approach, Quintessence Publ. Co. Inc, 2001

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Poster Faksimile:

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Clinical cases

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