

**Case Report**

## Intra- Socket Transplantation of Bicuspid to Re-establish Biologic Width

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### KEY WORDS

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### ABSTRACT

Transplantation and reposition of a tooth in its socket is relatively simple and predictable and can be considered as an alternative treatment option particularly in patients with financial limitation.

This report describes a case of intra- alveolar transplantation of tooth #43 in a 35-year-old man. Clinical and radiographic examinations revealed tooth #43 with complicated crown-root fracture that had undergone endodontic treatment five months earlier. Reposition of mandibular bicuspid in its socket to re-establish biologic width and crown ferrule is an alternative treatment in cases with complicated crown-root fracture. Immediate replantation preserve viability of periodontal ligament cells and fibers attachment and good chance of healing is predicted.

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### Introduction

Traumatic dental injuries and crown-root fracture is one of the main challenge in dental practice. In complicated crown-root fractures, the tooth might be seriously compromised structurally and therefore, restoration can be quite challenging [1].

According to the literature, complicated crown-root fracture is common reason for tooth extraction because of consequent periodontal tissue involvement, lack of biologic width and ferrule for permanent restoration. It has been reported that biologic width can be re-established by orthodontic extrusion, surgical extrusion of tooth in its socket and use of apical reposition flap with osseous surgery.

In intra-socket transplantation(surgical extrusion), it has been reported that if the tooth immediately replanted with up to 10 minutes out of socket, excellent chance of successful healing can be expected [2]. A meta-analysis that includes eight studies published by Torabinejad and associates in 2015 determined a survival rate of 88% for intentionally replanted teeth [3]. According to the literature, transplanted teeth continue to participate in the normal development of the alveolar bone [4]. In addition to good prognosis and cost-

effectiveness, transplantation of tooth keep interdental space, is a relatively fast and easy with minimal postoperative discomfort. During the procedure, practitioner enables repositioning and rotates the root in the new position that is desired. The indication for such alternative option is limited to round-shaped roots and it is suitable if the deepest line of fracture is not on the labial aspect of the affected tooth, otherwise rotation of the tooth should be considered [5-6].

### Case Report

A 35-year-old man with non-contributory medical history presented to the endodontic clinic at the University of Shiraz, School of Dental Medicine for evaluation and possible treatment of tooth #43. He reported a positive history of trauma to the right lower jaw and fractured tooth # 43 that had been treated endodontically by an undergraduate dental student 5 months earlier. Clinical examination revealed tooth #43 with complicated crown root fracture with severe gingival detachment (Figure 1). There was no mobility on tooth #43. All adjacent teeth were normal and responded to vitality tests. The radiograph showed previous endodontic treatment with overfilling (Figure 2).



**Figure 1:** Showing tooth #43 with complicated crown –root fracture

The treatment options offered to the patient included extraction and replacement with three-unit bridge, implant and intra-socket transplantation. The patient was determined to preserve his tooth as long as possible and decided to have a surgical extrusion on tooth to lengthen crown, provide biologic width, and ferrule creation. An informed consent was obtained and treatment started.

Inferior alveolar nerve block (lidocaine 2% with 1:100,000 epinephrine) in combination with local infiltration (lidocaine 2% with 1:50,000 epinephrine) was administered. Surgery was carefully performed using an atraumatic aseptic technique; a fine periosteal elevator was used around the root and then extraction performed with a root tip forceps while avoiding pressure on the surrounding crestal bone. The root was inspected under ill-



**Figure 2:** The periapical radiograph shows previously treated tooth #43 with fractured crown. Note the line of fracture below the crestal bone



**Figure 3:** Replantation of tooth in its socket in new position to re-establish biologic width and ferrule

umination and magnification. The apical root tip of extracted tooth was cold burnished using diamond tapered bur with high-speed handpiece, and immediately replanted into its socket with about 3-4 mm extrusion (Figure 3). Suture was used and surgical dressing was placed for stabilization (Figure 4).



**Figure 4:** Surgical dressing is placed after surgery



**Figure 5:** Clinical examination showing normal attached gingiva and fabricated porcelain crown



**Figure 6:** The follow-up radiograph after 12 months shows bone formation and reappearance of lamina dura

The sutures and surgical dressing were removed after 6 days. Two months after surgery, final restoration performed with a cast post core and porcelain crown. One year recall evaluation revealed that the tooth had normal attached gingiva and was neither sensitive to percussion nor to palpation (Figure 5).

The mobility and probing depths were within normal range. The 12-month control radiograph revealed bone formation and re-appearance of lamina dura with no signs of root resorption (Figure 6).

### Discussion

Factors such as the role of natural tooth at a relatively early age that alveolar bone does not establish its full and normal volume, financial limitation in patients that cannot afford dental bridge and dental implant are situation in which intra-socket transplantation may be an alternative option in complicated crown root fracture. In intra-socket transplantation procedure, viability of periodontal ligament cells, which is dependent on extraoral time, is a key factor for successful result. In meta-analysis studies [3], some of the cases subjected apical resection and apical preparation and root-end filling which had taken more extraoral time up to 30-60 minutes. In our case report, apical root tip just grinded to clean overfilled material and reinserted in its socket immediately.

Intra-socket transplantation of a natural tooth has

significant advantages over bridge replacement or dental implant treatment. In the case described here, clinical examination and radiograph revealed #43 with complicated crown-root fracture and biologic width involvement. If the biologic width is lost, it must be re-established before restoration by the use of orthodontic extrusion, surgical extrusion, and the use of the gingivoplasty or alveoloplasty [7-8].

Biologic width cannot be re-established by orthodontic extrusion alone because the gingiva and the alveolar bone moves coronally and causes aesthetic problems [7]. Therefore, periodontal surgery is required after orthodontic extrusion. Gingivoplasty or alveoloplasty needs gingival flap and it may not be esthetically acceptable because of the very inconsistent topography created between the adjacent teeth [8].

Surgical extrusion that was described and employed in this case was simple and predictable with good outcome. The criteria used to evaluate successful intra-socket transplantation are absence of progressive resorption, bone formation and reappearance of PDL and lamina dura, normal periodontal tissue adjacent to replanted tooth and ferrule creation [9-10].

### Conclusion

In conclusion, intra-socket transplantation as a feasible alternative to bridge restoration or implant in cases with complicated crown-root fracture allows the preservation of alveolar bone growth and function of periodontal tissues. It is recommended to adopt the multidisciplinary approach, adequate case selection, and follow-up radiographs for treatment success.

### Conflict of Interest

The authors disclose no potential conflicts of interest.

### References

- [1] International Association of Dental Traumatology: Guideline for the management of traumatic dental injuries, 2007. Available at: <https://www.iadt-dentaltrauma.org/>
- [2] Andreasen JO. A time-related study of periodontal healing and root resorption-activity after replantation of mature permanent incisors in monkeys. *Swed Dent J.* 1980; 4: 101-110.
- [3] Torabinejad M, Dinsbach NA, Turman M, Handysides R, Bahjri K, White SN. Survival of Intentionally Replanted

- Teeth and Implant-supported Single Crowns: A Systematic Review. *J Endod.* 2015; 41: 992-998.
- [4] Consolaro A, Pinheiro TN, Intra JBG, Roldi A. Autogenous dental transplants: A solution to orthodontic cases and a Brazilian cases. *Dental Press Ortodon Ortop Facial.* 2008; 13: 23-8.
- [5] Kahnberg KE. Surgical extrusion of root-fractured teeth-- a follow-up study of two surgical methods. *Endod Dent Traumatol.* 1988; 4: 85-89.
- [6] Tegsjö U, Valerius-Olsson H, Olgart K. Intra-alveolar transplantation of teeth with cervical root fractures. *Swed Dent J.* 1978; 2: 73-82.
- [7] Heithersay GS. Combined endodontic-orthodontic treatment of transverse root fractures in the region of the alveolar crest. *Oral Surg Oral Med Oral Pathol.* 1973; 36: 404-415.
- [8] Friedman N. Periodontal Osseous Surgery: Osteoplasty and Osteoectomy. *J Periodontology.* 1955; 26: 257.
- [9] Andreasen JO. Periodontal healing after replantation and autotransplantation of incisors in monkeys. *Int J Oral Surg.* 1981; 10: 54-61.
- [10] Sorensen JA, Engelman MJ. Ferrule design and fracture resistance of endodontically treated teeth. *J Prosthet Dent.* 1990; 63: 529-536.