

## **Surgical Repositioning and Intentional Replantation of a Rotated Maxillary Central Incisor –A Case Report**

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**Abstract:** *The purpose of this case report is to present a novel technique of intentional replantation and repositioning with 90 degree rotation. A 28 year old male patient presented with pain, inflammation, and purulent discharge from the maxillary left central incisor(21). Periodontal probing depth of 11mm was measured in relation to 21 at the mesiobuccal site. Radiographs revealed radiolucent area extending from the mesial surface of the crown and root of 21 and enclosing the entire apical third of the tooth. Diagnosis of combined endodontic-periodontic lesion was established. The treatment chosen was planned extraction and immediate intentional replantation of the tooth 21 with repositioning. After 6 months the pocket depth had reduced to 6mm at the same site. The 12-month follow-up examination showed that the patient's esthetic and functional needs were met.*

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### **I. Case Report**

A 28 year old male patient presented to the Department of Conservative Dentistry and Endodontics at the School of Dental Sciences, Sharda University with the chief complaint of acute pain, inflammation, and purulent exudate of the maxillary left central incisor since three days (Fig. 1a). His medical history was non-contributory, no allergies or medications. No relevant dental history. Intra-oral examination revealed a sinus tract in the labial mucosa adjacent to, localized bleeding on probing and subgingival calculus. The clinical assessment of tooth mobility was done according to Miller's mobility index and was recorded as grade II. Sinus tracing was done. The periodontal probing depth of 11mm in relation to 21 was recorded at the mesiobuccal site using a graduated William's probe (Hu-Friedy, Chicago, IL, USA) (Fig 1b). On digital compression purulent discharge oozed out from the sulcus. A periapical radiograph showed radiolucent area extending from the mesial surface of the crown and root and enclosing the entire apical third of the tooth (Figure 1c). Pulp vitality tests were done for 11, 21 and 22 and the results were negative.

The patient was presented with the treatment options of extraction and a dental implant. The latter was declined by the patient. Upon the patient's decision to have the tooth extracted, the treatment option of intentional replantation with associated risks and benefits was offered and the patient signed a written informed consent.

The patient was on non-steroidal anti-inflammatory medication [Ibuprofen 600 mg every 6-8 hour] and an antibiotic regimen [Amoxicillin 500 mg every 8 hour] for seven days. The patient was advised 0.2% chlorhexidine mouthwash [Colgate Plax, India]. When the patient reported after a few days the intra oral swelling had subsided.

One hour before the procedure, the patient rinsed with chlorhexidine gluconate 0.12% and was given 600 mg of ibuprofen. 2% lidocaine containing 1:100,000 epinephrine [ICPA Health Products Limited, Ankleshwa, India] was injected. Endodontic treatment was initiated for 11 and 22 and biomechanical preparation was done using three file system (Protaper Next Dentsply) and irrigation was done with 5.25% of sodium hypochlorite. The canal were irrigated with saline solution, dried with sterile paper points and obturated by cold lateral condensation (0.04 taper Dentsply). Post- endodontic restoration was done by composite (3M ESPE) in relation 11 and 22 followed by radiograph.

Two operators were present throughout the procedure. Maxillary left central incisor was extracted with minimal trauma through the use of forceps. To avoid tooth fracture and minimize mechanical damage to the periodontal ligament, elevators were not used to luxate the tooth prior to extraction. The forceps were kept above the cemento-enamel junction (CEJ) at all times. A steady, slow rotational force was applied by using only the wrist. The extra-oral time must be as short as possible (not more than 10 minutes)

First operator kept the extracted tooth moist with saline (Fig 2a) during the entire extra-oral endodontic treatment. Retrocavity preparation was done with No.330 bur and sealed with mineral trioxide aggregate (MTA) [2X ProRoot MTA Dental Endodontic Root Canal Mineral Trioxide Aggregate Dentsply]. As the tooth was being treated, second operator irrigated the extraction site with saline. The proximal reduction of the extracted tooth was also done, so that the tooth seats as straight as possible.

Bone Graft [ $\beta$ -Tricalcium Phosphate (TCP)] was placed in the socket. The tooth, which remained outside the socket for 8 minutes, was then replanted with a 90 degree rotation using mild digital pressure ( Fig.2b)

Semi-rigid stabilization was done with fibre splints from canine to canine labially as well as palatally (Fig. 2c). The splint enabled physiological movement of the tooth to prevent ankylosis. Intra-oral periapical radiograph was taken to confirm replanted and splinted tooth (Fig. 2d). We decided not to proceed with the crown immediately after stabilisation to prevent loading of the tooth. The patient was advised soft food and bacteria control with chlorhexidine mouthrinse. The patient was recalled after one week. Splint removal was done after two weeks (Fig 3a). The patient was called periodically for follow-up after 6 and 12 months (Fig. 3a, 3b, 3c).

## II. Discussion

Intentional replantation was first reported in the 11<sup>th</sup> century by Abulcasis. In 1890, Scheff addressed the role of periodontal ligament in prognosis of replanted teeth [1]. In 1955, Hammer reported the importance of an intact periodontal ligament in an intentionally replanted tooth [2]. With the high prevalence of traumatic dental injuries in North Indian population, intentional replantation becomes a relevant treatment modality [3].

In 2001 Kawanami et al. successfully demonstrated that intentional replantation of a rotated tooth for the treatment of endodontic-periodontal lesions with involvement of apex (4). The tissue exhibited adequate bone healing with recovery of the alveolar bone height due to the absence of bacteria. After rotation, the remaining healthy periodontal ligament approximated the alveolus with connective tissue at the site where periodontal breakdown had taken place.

Mineral trioxide aggregate was used as retrograde material. The sealing ability, marginal adaptation, promotes deposition of new cementum and stimulates osteoblastic adherence to the retro-filled surface, biocompatibility, favourable sealing ability, mechanical strength and a capacity to promote periradicular tissue healing.

The most common causes of failure are replacement resorption (external inflammatory resorption) and ankylosis caused by periodontal ligament damage and further necrosis of the PDL and cementum. These complications are related to the degree of periodontal ligament damage. The success or failure of the intentional replantation depends on vitality of periodontal ligament cells (5). Schwartz et al reported that a temperature of 22° C (room temperature) is adequate for storing teeth in saline in the necessary extra-alveolar period (6). On the other hand, Kratchman showed the increase the risk of ankylosis on touching the walls of socket (7). In the present study, the socket was rinsed with sterile saline.

Since time immemorial, systemic and/or topical antibiotics have been used prior to replantation. Such as penicillin, systemic tetracycline, tetracycline-HCL. In this study,  $\beta$ -Tricalcium silicate (TCP) was used.  $\beta$ -TCP is a porous form of calcium phosphate, with similar proportions of calcium and phosphate to cancellous bone. It supports the attachment, proliferation and differentiation of osteoblasts and mesenchymal cells along with bone growth. Tricalcium phosphate ceramic is biocompatible and osteoconductive (8).

As reported by Kratchman, the indications of intentional replantation included limited access, anatomical limitations, and perforations in areas not accessible to surgery, failed apical surgery and persistent chronic pain. There is less chance of damage to the adjacent vital structures.

## III. Conclusion

In the present study, the replanted tooth has given good results after twelve month follow-up. Intentional replantation case selection must be done with utmost care. It is a tenable, inexpensive treatment as opposed to exorbitantly priced implants.

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**Figures:-**



Fig 1a Purulent exudate from maxillary left central incisor



Fig 1 b Periodontal probing depth of 11mm in relation to 21 using a graduated William's probe



Fig 1c Intraoralperiapical radiograph



Fig 2 a Extracted tooth in saline



Fig 2 b Replantationwith 90 degree rotation



Fig 2 c Semi-rigid stabilization using fibre splints



Fig 2 d Post operative replanted and repositioned tooth



Fig 3 a Splint removal two weeks post operative



Fig 3 b Six months post operative radiograph



Fig 3 c Twelve month post operative radiograph

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