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Research Article

ENHANCEMENT OF ARTISTIC WORK OF THE DENTIST BY SMART WORK OF CBCT IN AUTOTRANSPLANTATION

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ABSTRACT

In this case report,autotransplantation of lower left third molar for grossly decayed lower left first molar has been described. In this case report, A 19 yr old female patient reported with grossly decayed lower left first molar with poor prognosis hence extraction was advised. The preoperative assessment showed the favored position of the erupted lower left third molar. The CBCT imaging of the third molar helped in the production of a 3D prototype which has reduced the extraoral time of the donor teeth and preservation of its periodontal ligament cells c. After the preparation of neo-alveolus with the help of the 3D guide, the donor tooth extracted was placed in the socket, checked for the fit and occlusal discrepancies and sutured back. In this case report, even the other factors such as patient factors, donor factors, and recipient factors were taken into consideration. And post-operative follow-up's had shown the stability of the transplanted tooth.
Conclusion: Thus usage of the technological advancements helps in reducing the duration of the procedure, iatrogenic errors and provides a greater chance for a favorable outcome

INTRODUCTION

Esthetic smile is one most common social concern which exists since ancient time that might be the reason for the allotransplantation of the tooth, now the era has moved towards autotransplantation not only for aesthetics but for more functional demand. Autotransplantation can be used for the replacement of the missing tooth, grossly decayed tooth, and agenesis of the tooth.[1]

Autotransplantation refers to the surgical transposition of the donor's tooth to artificially prepared socket within the same individual. Cone beam computed tomography (CBCT) aided autotransplantation procedure by providing a template for recipient site preparation. Previously the procedure is carried out by the donor, but with advances in imaging technology such as CBCT as aided in the construction of a 3D model which helps to reduce the extraoral time of donor's teeth and improves the success rate of the procedure. Now this new technique was used in the case report.

Case Report

A 19 year old young female patient reported to the department of conservative dentistry and endodontics with the pain in the lower left back tooth region for 1 month. The patient gave the history of pain which was a dull and continuous type and aggravated on the intake of hot food and at night and pain was relived on the intake of medication and there was no history of swelling or pus discharge. On clinical examination the oral hygiene status was fair irt31 teeth in the oral cavity were the upper left third molar tooth has been extracted. And the site of interest revealed a deep carious lesion irt to (36) lower left first molar which was tender on percussion and with adjacent gingiva in normal condition. On radiographic examination, it revealed a radiolucency involving the furcation and with the periapical radiolucency in relation to the mesial root.

The patient was evaluated for any medical history, drug history, and allergies which were not significant. Thus the definitive diagnosis for the condition was given as grossly decayed teeth with a chronic periapical abscess.

For the treatment plan, all the factors were taken into consideration and patient was proposed with treatment option of extraction of 36 followed by autotransplantation of the 38 tooth into the extracted socket site or extraction of tooth followed by the prosthesis in the form of an implant or the fixed partial denture (FPD).

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Pre operative picture

Pre operative radiograph

The patient had chosen the first treatment plan, which requires CBCT irt 38 for the construction of the template. After explaining all the possible outcomes of the treatment, inform consent has was obtained and treatment was executed.

On the day of the procedure, i.e1hr before the intervention patient was given antibiotic prophylaxis. Later the procedure was started with the administration of local anesthesia using 2% lidocaine in 1:100000 concentration followed by elevation of the flap using Molt's periosteal elevator followed extraction of 36 using mandibular forceps. Later the extraction socket was prepared with a round bur of size 2 under copious saline irrigation, in this case, there was the necessity for the removal of interseptal bone as the donor is a single rooted tooth. And the exact preparation of socket site has been continuously evaluated through the 3D model constructed out using CBCT.
Once the 3D guide had been checked out for the fit and occlusal adjustment and its positioning was confirmed in the socket. The 3D guide was removed from the socket and the socket was thoroughly irrigated with saline and socket was made ready for the donor's teeth and then immediately donor's tooth was extracted atraumatically and placed into the recipient socket and evaluated for the fit. With the use of 3d guide, the procedure took less than a minute and the donor tooth was secured into the position and splinting was done using ribbon fibers and the elevated flap was repositioned using interrupted sutures, patient was informed about postoperative squeal and post-operative instructions was given and patient was recalled after 7 days for the suture removal.

3D Template

Teeth 36 extraction

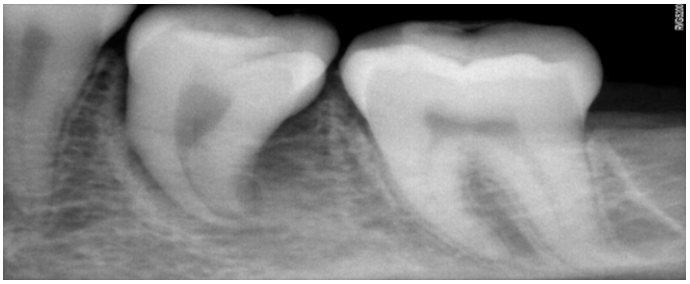
After 7days healing of the tissue was evaluated and the sutures were removed and later patient was recalled after 14 days for evaluation of the splinting. On second visit mobility of the tooth was evaluated, as mobility of tooth was evident splinting was not disturbed and vitality of the tooth was assessed though there was no response in the initial period, later when patient was recalled after one month, the patient responded to the cold test and splinting was removed and pocket depth was measured. Similarly, the patient was evaluated after three months and six months for the pulp sensibility using cold test and results showed a positive response.

3D template placed in extraction socket

38 teeth placed in socket of 36

Post operative radiograph

Splinting with ribbond fibers



6months follow up

DISCUSSION

In this case, a young patient presented with a tooth having deep dental caries with radiolucency involving furcation area radio-graphically, in this condition saving the tooth neither with customized RCT followed by prosthesis nor withhemisection or bicuspidisation is good treatment options because of the extensive occlusal caries.

An overall examination of patient's oral cavity favored the autotransplantation of the third molar which was also confirmed radiographically, factors such as patient's age and benefits of autotransplantation such as retaining proprioception, maintaining the alveolar bone height and the possibility for the orthodontics in future if required were taken into consideration. This could be not possible if the implant was the treatment option.

Prior to the procedure patient was advised for the CBCT irt 38 using which 3D model guide has been prepared.The use of 3d model helps to decrease the extraoral time of the donor's tooth which helps in the preservation of vitality of periodontal ligament cellsand preparation of the socket which in turn prevents damage to the periodontal ligament cells which occurs during placement and removal and all together helps in the regeneration of pdl. Lee *et al* was the first to introduce CT for the construction of the 3D model for autotransplantation.[2]

In this case, decayed molar has been removed atraumatically and the socket was curetted in the mesial socket and thoroughly irrigated.As the donor third molar is single rooted it requiresremoval of the inter-septal bone. Proper fit of the 3D guide evaluatedsuch that tooth guide is not tucked into the socket, as tight fit may not provide space for pdl proliferation which can often lead to ankylosis. According to Chung *et al* direct contact of the tooth to bone may cause ankylosis of the tooth.[3]

Patient's age[4, 5], alveolar bone height,width was in favorable condition suggesting the proper outcome of the procedure. Prescription of antibiotics pre and postoperatively reduces any chance of infection, fractures and root resorption. The Meta-analysis by Chung *et al* showed that studies not using Systemic antibiotic therapy showed 1.4 times higher RR studies than using it.[3]

After the preparation of the socket was completed, the teeth 38 was extracted atraumaticallyand immediately placed into the socket and the whole process has taken less than 1 min with the use 3D guide. Thus preparation of extraction socket and placement of the tooth immediately can lead to a more favorable prognosis. According to Cardaropoli *et al*extraction socket and surgically prepared socket show different healing depending on the presence and absence of the pdl in the socket.[6]

After the placement of the donor's tooth into the socket the tooth was stabilized with ribbondfibers which act as a semi-flexible type of splinting since initial rigid splinting can often lead to ankylosis. Kristerson and Andreasen suggested that high initial stability of the tooth can hamper the revascularization potential of the tooth thus physiological micromovements are encouraged.[7]

Raised flaps are sutured back occlusion and contacts were evaluated. The patient was then recalled after one week for suture removal. During this visit, the patient was evaluated for the proper tissue healing which on confirmation sutures were removed and the patient further recalled after 14 days during which mobility and vitality of the tooth were evaluated. Splinting is retained for one week as the socket is large and some more time required for healing. Vitality evaluation of the tooth showed a lingering response to the cold test.

During the third visit that was after 3 months periodontal status was evaluated with a probing depth of 4mm and no mobility, along with surrounded healthy gingiva. Cold test for the tooth waspositive.

And during the fourth visit, that is after 6 months periodontal condition of the tooth was healthy and vitality of the tooth was regained.

The favorable outcome of this case report might be due to consideration given to all the prognostic factors which include, patient factors such as young age and systemic health, donor factors such as open apex of third molar and single rooted tooth and recipient factors such as adequate height of the buccal and lingual walls and no sign of inflammation on the gingiva.

Even though all these factors were given consideration, the usage of the 3D template in this case report has added the advantage by the reduction of procedural time greatly, which

helped to prevent the extraoral dry time and preservation of the pdl cells.

CONCLUSION

Autotransplantation of the tooth can be a better option for the replacement of the tooth and usage of the 3d guide which helps to reduce the extraoral time and preserves the vitality of the periodontal ligament cells.

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