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Management of jumping distance through grafting in immediate implant placement: A clinical case report

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Abstract

Immediate implant placement in the fresh extraction socket is emerging as a successful treatment option for replacing missing tooth. After immediate implant installation in fresh extraction socket, there remains a gap between the implant periphery and marginal part of recipient site. A gap can occur on any aspect of an immediately placed implant: Buccal, lingual or proximal. This space between the implant periphery and surrounding bone is called the gap or jumping distance. This clinical case report illustrates the management of the buccal gap when contemplating immediate implant placement.

Keywords: Buccal gap, jumping distance, immediate implant, grafting

Introduction

Smile is an important facial gesture. Tooth loss can be a traumatic experience for those who are undergoing extraction especially in the aesthetic areas. Hence, there is a dire need to replace the missing tooth with a definitive alternative such as implant. Immediate implant placement in the fresh extraction socket is emerging as a successful

treatment option for replacing missing tooth. The advantages of immediate implant placement are it reduces treatment time, improves esthetics and preserves soft tissue envelope. To achieve excellence when placing immediate implants, there are 5 keys aspects to consider during the decision making process, to help prevent blunders that can lead to difficult esthetic situations. The following are (I) the presence of a buccal plate, (II) primary stability, (III) implant design, (IV) filling of the gap between the buccal plate and the implant, and (V) tissue biotype.[1]

Immediate implant placement is indicated in the trauma which does not affect the alveolar bone, decay without purulence, endodontic failure, severe periodontal bone loss, residual root and root fracture. It is contraindicated when purulent exudate is present at the time of extraction, adjacent soft tissue cellulites and granulation tissue, lack of an adequate bone apical to the socket, in adverse location of the mandibular neurovascular bundle, maxillary sinus and nasal cavity and poor anatomical configuration of remaining bone.

After immediate implant installation in fresh extraction socket, there remains a gap between the implant periphery and marginal part of recipient site. A gap can occur on any aspect of an immediately placed implant: Buccal, lingual or proximal. This space between the implant periphery and surrounding bone is called the gap or jumping distance.[2] The width of horizontal defect and the height of vertical defect in this gap are the determining factors for grafting and membrane placement during implant surgery. The main objective of immediate implant placement is to provide an osseointegrated fixture suitable for an aesthetic and functional restoration.[3] To improve the bridging between the bone and the implant surface, filling the gap is very important. However, since times the management of this gap has become a challenge especially the buccal or labial gap as it plays important role in both esthetic and function of the teeth. Therefore, while positioning the implant in an ideal 3D position, the void should always be grafted with biomaterial. It is recommended to compensate soft tissue remodeling, by means of overbuilding buccally with biomaterial or by a soft tissue graft.[1]

Case report

A 45 year old male came with the chief complaint of grossly decayed upper right second premolar (Figure 1). The intraoral periapical radiograph revealed firmly embedded root structure in bone and grossly carious coronal portion with periodontal ligament widening (Figure 2). Hence the tooth was indicated for extraction and the patient desired the replacement of the tooth.

Figure 1: Preoperative view

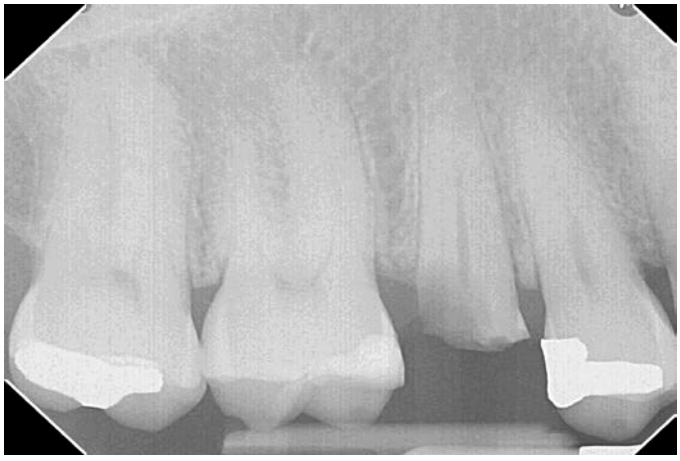


Figure 2: Intraoral Periapical view

A written informed consent both in English and Vernacular language was taken before the surgical procedure from the patient. Under local anesthesia, with 15 no. scalpel blade sharp dissection of the supracrestal fibers was done and the tooth was removed a traumatically (Figure 3)

Figure 3: Tooth extraction

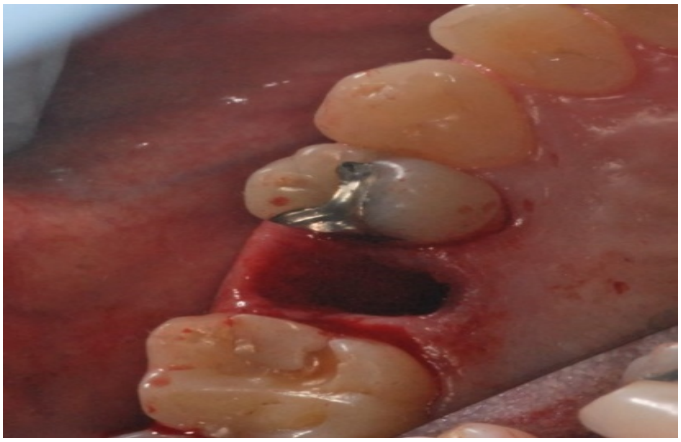


Figure 4: Extracted tooth

The socket was well irrigated with saline and debrided with a bone curette. An intact buccal bone plate was found after extraction of the tooth.

The implant used, in this case, was OSSTEM with a diameter of 4.0 mm, with 13 mm length. The initial osteotomy site was prepared with D2.20 mm pilot drill. (Figure 5 & 6). The depth and axis/direction of drilling is decided by the pilot drill. Drill speed with the pilot drill was kept to 800 RPM.

Figure 5 & 6: Pilot Drill done.

Following the pilot drilling, the osteotomy site was progressively widened with the D3.5 mm drill up to the same depth. Implant of diameter 4 mm was inserted in the prepared osteotomy site with the torque ratchet. The torque ratchet was used for the final tightening with an optimal insertion torque.

A buccal gap was seen after the insertion of implant (Figure 7). A gap between the bone and the implant, which may exist with standard cylindrical implants, requires the use of membranes.[5] A membrane was placed around the implant using 'Poncho technique.'[4] (Figure 9)

Figure 7: Buccal gap is seen between the implant and buccal plate

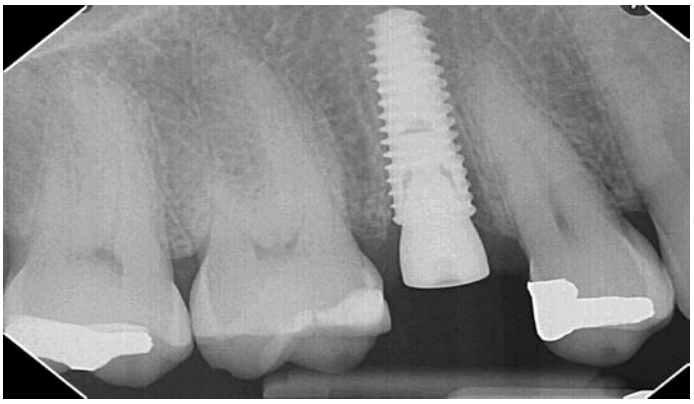


Figure 8: Intraoral Periapical view

The buccal gap between the buccal plate and the implant was filled with a Cortico-cancellous DFDBA Maxxeus for CTS bone graft material (Figure 10). To maximize the volume of graft material that can be placed, the graft material was packed and condensed against the buccal plate and the implant up to the most coronal aspect of the free gingival margin. Hence, the buccal gap and the thin buccal plate were managed.

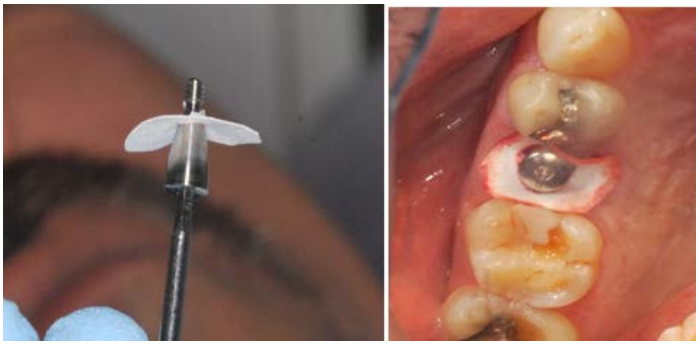


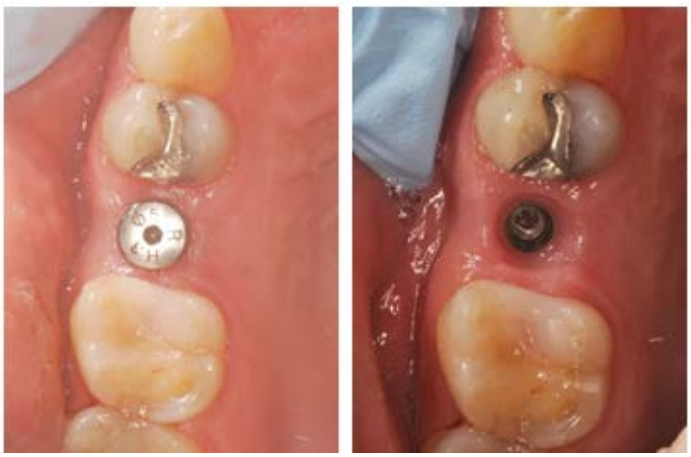
Figure 9: Membrane placed around the implant

Figure 10: The buccal gap is filled with a bone-graft material

Figure 11: Sutures placed

3-0 Chromic gut resorbable Sutures were given on the surgical site for complete closure (Figure 11).

The patient was prescribed the anti-inflammatory, analgesic and antacid drug. 0.2% Chlorhexidine mouthwash was prescribed to use twice daily and instructions to not to brush in that area for next 3 days were given. Oral hygiene instructions were given for proper maintenance. Postoperative examination was performed 1 week later. Follow up was done after 3 months. (Figures 12 & 13)



Figures 12 & 13: Follow up

Discussion

With the hectic lifestyle nowadays, everyone desires a quick replacement. Immediate implants have been emerging as a popular treatment option for replacing the

missing teeth. Extraction socket plays a guiding role in placement of immediate implant. Management of the buccal gap and reducing buccal plate resorption are important considerations when contemplating immediate implant placement.[3]This case report shows how grafting the gap or jumping distance proves to be a better aid in healing and bone regeneration.

A meta-analysis by Alkudmani et al. and Clementini et al. suggested that bone grafting of the buccal gap simultaneously with immediate implant placement resulted in preserving hard and soft tissue dimensions.[5] In a study by Bo Rosenquist and Björn Grenthe, they calculated the success rate of immediate placement of implants into fresh extraction sockets. The implant survival rate was found to be 93.6%.[6]

Management of jumping distance can be done with various other procedures depending on whether the implant is placed with flap or flapless technique. Grafting and the use of a barrier membrane should be considered whenever a circumferential defect of more than 1.0 mm exists around the cervical aspect of the implant.[7] Various grafting materials can be used to fill this empty space, including autogenous bone, hydroxyapatite and demineralized freeze-dried bone.[4] [In] addition to these methodologies, soft-tissue augmentation (e.g. connective tissue graft) can be provided on the buccal aspect depending on the aesthetic demands of the case.[8]

On the contrary, studies by Chen and Buser compared autogenous bone graft to control sites (no bone graft) and reported no significant difference in dimensional changes of the horizontal buccal defect width, the buccal plate resorption, vertical defect height, or horizontal defect depth at the 6 month follow up. Chen and Buser studies were supported by Paolantonio et al., who proved that no graft is needed for immediate dental implant placement.[9,10] However, when the buccal plate is intact flapless procedure is indicated which is more favorable for esthetics. Furthermore, it may not involve the use of grafting materials or it may involve the use of grafts alone or in combination with the barrier membrane depending on the amount of gap present, thickness of the bone plate or the surgical paradigm.

This case report shows that management of jumping distance through grafting in immediate implant placement without flap elevation can be a successful treatment option if the principles such as an atraumatic tooth removal without flap elevation and placement of a bone graft in the residual gap around the implant and the immediate fresh extraction socket are followed.

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