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Case Report

Post extraction palatal socket implants. A case report

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ABSTRACT

The article presents a case report of a 42-year-old man with missing maxillary left first premolar first and second molars due to endodontic treatment failure and symptomatic periapical disease. The article discusses the challenge of replacing maxillary molars with dental implants and presents a surgical approach called Post Extractive Palatal Socket Implant with a "one time one abutment" approach. The article highlights the use of a primary prosthetic implant component to combine the palatal positioning of the implant with the "one time one abutment" approach. The technique aims to optimize osteointegration and periointegration in one surgical time for challenging cases. The article discusses the advantages of such a technique for maxillary molar replacement with dental implants.

INTRODUCTION

Dental implants are an optimal treatment option for replacing missing teeth, whether the absence is due to pathological, acquired, congenital, or traumatic events, even in cases where no alveolar bone is available (1-5). Several techniques have been proposed over the years to minimize surgical invasiveness by reducing time and treatment phases (6). Timing of implant insertion was one of the most investigated topics, and immediate placement gained broad consensus since it was proposed in 1978 by Schulte (7). Implant placement can be distinguished, according to the ITI Consensus Report (8), as immediate, if an implant is placed the very day of the tooth extraction, early if soft tissue healing or partial bone healing (4-8 weeks) are to be waited before implant placement, or delayed if an implant is placed in a fully healed socket. Literature finds a high survival rate for every insertion protocol if applied under recommended indications (9).

When opting for Immediate Implant Placement (IIP), multirooted teeth pose additional challenges, such as large socket left after the exodontic procedure, reduced bone height apically to the extraction sites, difficult implant bed preparation (10) and greater occlusal forces if compared to the anterior regions. Additionally, the maxillary molar area often exhibits a Lekholm class III or IV bone quality (10), complicating the achievement of high primary stability for the implants (11), and the position determined by the post-extraction socket is not suitable for optimal implant placement (12). The combination of those factors lowers the predictability of IIP in the maxillary molar region. To predictably determine an ideal implant position when dealing with maxillary immediate implants in the molar zone, many techniques have been proposed, such as utilizing the retained roots after decoronation as surgical drill guidance during the implant bed preparation (13, 14) or the use of osteotomies to relocate the interradicular septum in combination with localized socket lifts in the upper molar region (15-17). However, maxillary molar sites are still challenging to treat without regenerative procedures (18), and conventional surgical protocols cannot achieve immediate placement (19).

Delayed protocols often involve regenerative procedures and sinus augmentation, reaching zygomatic implants for the most severe forms of atrophy (20), increasing the risk of complications, and lowering patient satisfaction (21). These factors may make palatal implants a safe and viable option (11). To further enhance results when adopting such a protocol, dedicated prosthetic solutions, such as "one time one abutment", should be paired to reduce marginal bone loss (MBL) and probing depth (22). The aim of this article is to present and discuss a novel surgical approach for post-extractive palatal socket implant placement of maxillary molar that joins the prosthetic advantages of palatal positioning with a "one time one abutment" approach.

Case report

A 42-year-old man with a noncontributory medical history needed to have his maxillary left first premolar, first, and second molar replaced due to endodontic retreatment failure and symptomatic periapical disease (Fig. 1, 2).

Fig. 1. *Initial situation. Posterior maxillary failing restoration with unrestorable teeth are present.*

Fig. 2. *Pre-operative intraoral X-rays.*

Extractions were performed atraumatic: after infiltration anesthesia (articaine plus epinephrine 1:100,000), the crown of the molars was removed, roots were separated using a cutting drill and then removed with luxators and forceps. No incisions were made. After the atraumatic extractions, implants (4.3x6, 4.3x9, GTB, Advan, Udine, Italy) were placed in the palatal socket of the first and second molar, achieving an insertion torque higher than 35 Ncm. A periapical radiograph was performed after the insertion. (Fig. 3, 4).

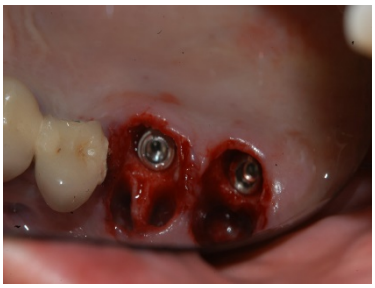

Fig. 3. *Surgical step of author's technique. Implants were placed in the palatal socket.*

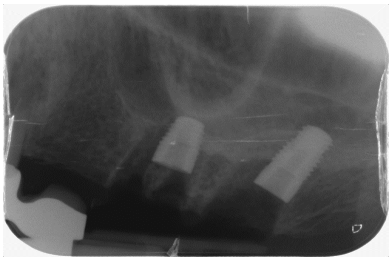

Fig. 4. *Intraoal X-rays showing implant placement.*

Implants were also placed to restore the first and second maxillary left premolars. A primary prosthetic component (gingival former (GFA), Advan, Udine, Italy) was immediately placed following the "one time one abutment" approach and left in position during all the prosthetic steps (Fig. 5).

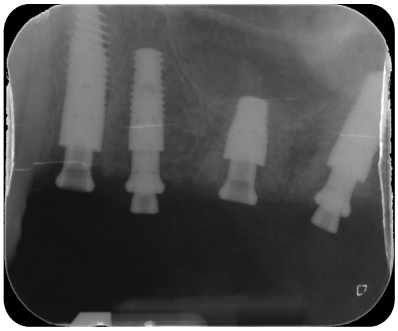

Fig. 5. *Intraoral X-rays showing the GFA in place.*

Bone graft (Bio-Oss, Geistlich) was used to fill the alveolar socket. A membrane was employed to protect the grafted site (Bio-gide, Gesitlich). Stitches were placed to stabilize the graft further. Postoperative treatment included amoxicillin-clavulanic acid 875 mg + 125 mg in tablet formulations twice daily for 6 days and ibuprofen 600 mg in tablet formulations twice daily for 3 days. The patient was instructed to rinse with 0.12% chlorhexidine mouthwash for 10 days, to apply cold packs over the treated area immediately after surgery to minimize the inflammatory response, and to sleep with two pillows to reduce postoperative swelling. Sutures were removed after 10 days. Three months after surgery, the prosthetic treatment was carried out, and the case was completed with a metal-ceramic screw-retained restoration (Fig. 6, 7).

Fig. 6. *Final restoration in place.*

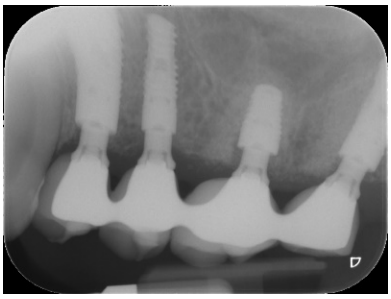

Fig. 7. *Final intraoral X-rays.*

A 5-year follow-up (Fig. 8, 9) showed optimal perio-integration and marginal bone stability. The probing depth around the implant was < 2 mm, and no prosthetic complications were reported.

Fig. 8. *Intraoral clinical situation at 5 years follow-up.*

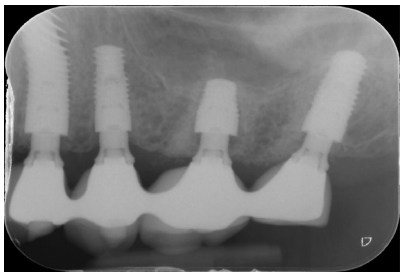

Fig. 9. *Radiograph at 5 years follow up.*

DISCUSSION

Most publications on immediate maxillary molar implants refer to centrally positioned implants using the interradicular bone (23, 24). Smith et al. (25) proposed a classification of molar extraction sockets to better assess the chance of taking advantage of the interradicular septum to stabilize immediate implants. In type A sockets, the implant's coronal portion is fully contained inside the residual septal bone, thus not requiring additional procedures to obtain adequate primary stability. On the other hand, type B sockets, where the implant's coronal portion is partially allocated in the septum, and type C sockets, where no septal bone is available, are often perceived as contraindications to immediate implant placement and require additional procedures.

A recent paper by Mustakim and colleagues (26) considered, besides the interradicular septum, the alveolar bone height (ABH) as a crucial parameter to assess immediate implant viability in molar sites, assessing that only Grade A (ABH>8.0 mm) can surely grant enough primary stability without socket lifting. Grade B (6.0 mm≤ABH≤8.0 mm) may accommodate shorter implants. Due to the aforementioned reasons, the interradicular septum may not always provide sufficient primary stability, requiring additional regenerative procedures, such

as transcrestal sinus lifting, due to insufficient torque (15). Wychowanski et al. (11) investigated 61 palatal molar implants, showing promising results in terms of both primary stability (> 60 ± 8 ISQ) and MBL after 2 years (mean 0.19 ± 0.03), suggesting that this approach may reduce the need for additional procedures in scenarios where the interradicular septum is not adequate for IIP. The aim of this paper is to propose a further enhancement by providing a predictable protocol to obtain hard and soft tissue integration through the combination of the proposed approach with the use of primary prosthetic component (GFA, Advan, Udine, Italy) as outlined in the "one time one abutment" approach (22).

A key consideration when dealing with palatal positioned immediate implants is related to proper implant-prosthetic connection selection. The authors employed, in the case presented in this paper, a one-time abutment with an 11° angled collar and 1.2 mm height (GFA, Advan, Udine, Italy) torqued to 35Ncm that uses a conometric connection and a "one abutment one-time" approach to promote soft tissue integration and hard tissue stability. These features shift the nanoleakeage coronally to the implant shoulder (27), reduce the exposure of the transmucosal path to bacteria during subsequent prosthetic phases, and minimize micromotion, which is known to be the source of detrimental mechanical stresses on connection structures and the surrounding bone (28). Notably, implants inclinations up to 15°-20° are reported to be safely manageable in posterior single crown implant-supported restorations, as reported by Lin et al. (29, 30); greater angulations may be considered unfavorable for IIP, as excessive strain is applied at the implant-bone surface, thus posing a limit on the palatal positioning of immediate implants.

CONCLUSIONS

The present paper registered optimal results combining a palatal implant positioning and "one abutment one-time" approach for immediate implant placement of maxillary molars, with no screw loosening and optimal probing depth (PPD < 2mm) after 5 years from final restoration delivery.

The planning of the implant mainly relies on hard tissue 3D reconstruction, but it should not be limited to what is immediately evident. A surgeon's clinical experience should always guide the process, with knowledge of the patient's anatomy and evaluation of the quality and of the soft tissue response being taken into consideration (31). In the coming years, better algorithms and new, fully automated methods of 3D comparison will probably be developed, making this kind of surgery even more precise and dependable (32).

Nonetheless, since there's not sufficient literature comparing traditional IIP protocols in molars with the presented approach, further investigations are required to accurately assess the clinical outcome, specifically focusing on MBL, probing depth, and prosthetic complications of the proposed protocol.

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