IMMEDIATE IMPLANT PLACEMENT IN RELATION TO PATHOLOGICALLY MIGRATED UPPER ANTERIOR TOOTH USING GBR TECHNIQUE: A CASE REPORT

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INTRODUCTION.

Dental implants are an effective and predictable treatment to replace missing teeth. Using the survival rate of implants as an indicator of satisfactory clinical results, most clinical studies have shown promising results for dental implants. According to reports, successful implant therapy has a high survival rate of 95% to 99%.[1]

Dental implants have a high success rate and are very durable, but failures can occur. The maxilla has seen the most implant failures, with nearly three times as many implant losses as the mandible.[2]Early failure rates have been reported to range from 1.5 percent to 21%.[3]Mechanical debridement, antimicrobial therapy, and guided bone regeneration can all be used to successfully treat early failing implants (GBR).[4]

GBR is a dental surgical technique that uses barrier membranes to guide the growth of new bone and gingival tissue at locations where the volume or dimensions of bone or gingiva are inadequate for proper function, aesthetics, or prosthetic reconstruction. Ridge augmentation or bone regenerative procedures are often referred to as guided bone regeneration.[5]

GBR promotes alveolar bone gain as well, with predictable and consistent results.[6]GBR is based on the use of a mechanical barrier to separate the surgical site from epithelial and connective tissue cells, allowing osteogenic cells to proliferate and bone formation to occur. The membrane has the additional advantage of protecting the wound from mechanical damage and salivary contamination. [7]

In this case study, a pathologically migrated tooth with a poor prognosis is replaced with an immediate implant following extraction utilizing the GBR approach with Matrix Oss bone graft as a defect filling material and resorbable collagen membrane (Heliguide®) as a barrier membrane.

CASE REPORT

A 39-year-old male patient with nonsignificant medical history, reported to the Department of Periodontics, Annoor Dental College and Hospital, Muvattupuzha, Kerala, with the chief complaint of loose maxillary right central incisor. Clinical inspection revealed that the maxillary right central incisor had grade III mobility and was pathologically migrated. There was adequate amount of soft tissue and vestibular depth (Fig.1). On radiographic examination severe bone loss was present on the mesial aspect of 11 with slight extrusion of the tooth from the socket (Fig.2).

Scaling and root planing was done prior to the procedure to improve oral hygiene.

Procedure

Local anesthesia was administered to the surgical field. Crown portion of the tooth 11 was resected for the fabrication of temporary prosthesis using tapering fissure bur (Fig.3). Crevicular incisions were placed followed by two vertical releasing incisions for flap advancement (Fig.4).Followed by atraumatic extraction of the root, which was carried by the use of screw shaped root extractor (Fig.5). Debridement, irrigation and disinfection of the implant site was carried out. Implant osteotomy was performed by sequential drilling up to 3.65 mm (Fig.6). An implant of dimension 3.75 × 10 mm was placed into the prepared osteotomy site (Fig.7). Adequate primary stability was achieved with an initial torque of approximately 30 Ncm (Fig.8) and Intra oral periapical radiograph was taken immediately after the implant placement (Fig.9). Flap advancement was carried out using periosteal releasing incision. The membrane was tucked in between the palatal flap and was then stabilized using tissue tacks which was plugged on to the alveolar bone (Fig.10). Matrix OSS bone graft mixed with I-PRF was placed onto the defect space to augment the region (Fig.11). The grafted site was then covered with the membrane, tucked into the buccal flap and was stabilized using sutures. Intraoral periapical radiograph was taken after stabilization of the membrane (Fig.12).The flap was approximated using 5-0 vicryl sutures (Fig.13). The patient was reviewed after 1 week (Fig.14). Finally, temporization was done with resected crown using composite and ligature wire (Fig.15).

Following the 6 months review, the OPG revealed sufficient bone around the implant (Fig.16). The screw tags were removed, and the healing abutment was connected (Fig.17). The patient was then referred to the Dept. of Prosthodontics, Annoor Dental College and Hospital, Muvattupuzha, Kerala. Two weeks later closed tray impression was recorded. Jig trial was carried out to verify the impression. Cement retained crown was fabricated in the laboratory and was tried in the patients mouth and finally the prosthesis was cemented (Fig.18). A post operative intraoral periapical radiograph was taken to evaluate the outcome. (Fig.19)

Figure 1: PATHOLOGICALLY MIGRATED 11 WITH GRADE II MOBILITY AND WITH ADEQUATE SOFT TISSUE AND VESTIBULAR DEPTH .

Figure 2: IOPA IRT 11

Figure 3: CROWN RESECTED FOR FABRICATION OF TEMPORARY PROSTHESIS

FULL THICKNESS MUCOPERIOSTEAL FLAP REFLECTED ON LABIAL AND PALATAL ASPECT

Figure 7:IMPLANT OF DIMENSION 3.75 x10 mm PLACED INTO THE PREPAREDOSTEOTOMY SITE

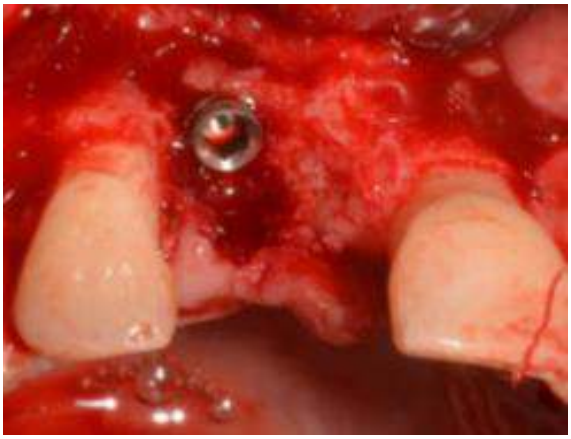

Figure 8: ADEQUATE PRIMARY STABILITY WITH AN INITIAL TORQUE OF APPROXIMATELY 30 Ncm

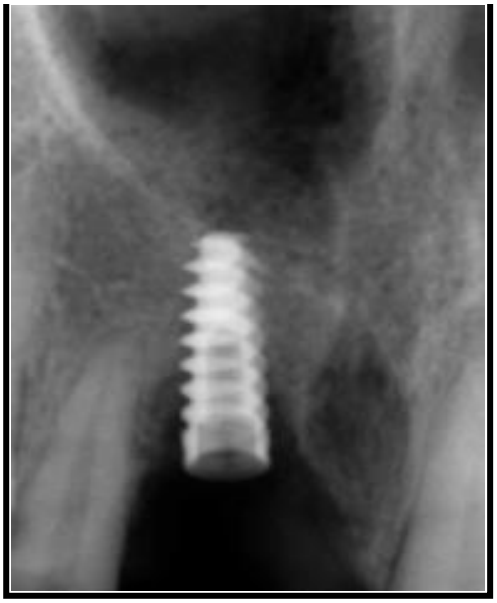

Figure 9: IOPA IMMEDIATELY AFTER PLACEMENT OF THE IMPLANT

Figure 10: MEMBRANE STABILIZED USING TISSUE TACKS

Figure 11: MATRIX OSS BONE GRAFT MIXED WITH I-PRF AND PLACED INTO THE DEFECT SPACE TO AUGMENT THE REGION

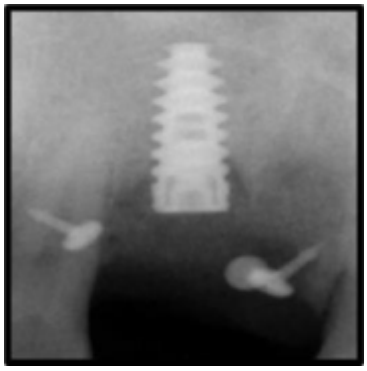

Figure 12: IOPA AFTER PLACEMENT OF IMPLANT AND STABILIZATION OF MEMBRANE WITH TISSUE TAGS

Figure 13: FLAP APPROXIMATED USING 5-0 VICRYL SUTURES

Figure 14: ONE WEEK REVIEW

Figure 15: TEMPORIZATION DONE WITH RESECTED CROWN USING COMPOSITE AND LIGATURE WIRE

Figure 16: SIX MONTHS POSTOPERATIVE RADIOGRAPHIC VIEW-OPG

Figure 17: HEALING ABUTMENT

Figure 18: FINAL PROSTHESIS

PLACED IRT 11

Figure19: IOPA IMMEDIATELY AFTER CEMENTATION OF CROWN

FINAL OUTCOME

BEFORE

AFTER

Discussion

Extraction of the tooth is indicated when a tooth has non restorable condition or cannot be maintained in terms of function or aesthetics over a long period of time. If the tooth is extracted traumatically or if there is a preexisting periodontal disease or endodontic lesion, the risk of bone loss is enhanced. The extraction sockets has been classified by Elian et al in 2007 – into

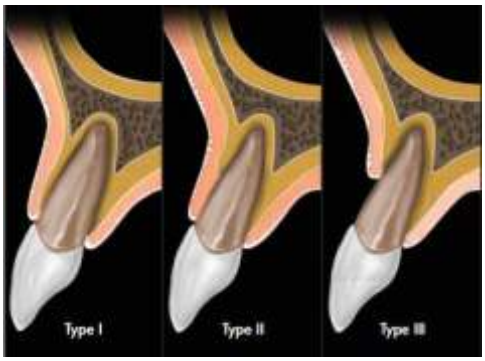

Figure 20: EXTRACTION SOCKET CLASSIFICATION.[8]

- Type I Socket. The facial soft tissue and buccal plate of bone are at normal levels in relation to the CEJ of the pre-extracted tooth and remain intact post extraction .
- Type II Socket. Facial soft tissue is present but the buccal plate is partially missing following extraction of the tooth.
- Type III Socket. The facial soft tissue and the buccal plate of bone are both markedly reduced after tooth extraction.[8]

In the present case , the extraction socket was classified as type II as there was an adequate amount of facial soft tissue present with partial loss of buccal bone . Bone augmentation was indicated for the immediate placement of implant , and guided bone regeneration with the use of membrane (Heliguide®) and bone graft (Matrix Oss)was planned.

Bone augmentation is frequently required to achieve the desired gingival shape and aesthetics. The rationale for socket grafting is to have adequate bone to insert implants in the appropriate location for a successful implant prosthesis[9], and studies have shown that the survival percentage of implants placed in grafted bone is comparable to that of implants inserted in native bone.[10]

Guided bone regeneration is used to promote bone growth of the alveolus for implant placement and around peri-implant defects. Historically, the concept of GBR has been originally developed for treatment of experimental spinal fusion and maxillofacial reconstruction by Hurley et al. (1959).[11] Dahlin et al. in 1983 placed implants in less desirable ridge areas using GBR techniques to gain bone on the exposed threads.[12] Lazzara et al. in 1989 was credited with the first reported use of GBR techniques with implants in immediate extraction sites.[13]

Tenting of the periosteum and soft tissue matrix maintains space improves the efficacy of the bone transplant. Large vertical alveolar defects can be repaired in a predictable functional and cosmetic manner with this approach.

The goal of the GBR technique is to keep non-osteogenic cells in the surrounding soft tissues at bay so that osteogenic cells can proliferate and differentiate.[10] It's usually used for deformities that require vertical bone augmentation of roughly 2 - 7 mm. The entire effectiveness of this surgery is on correct tissue flap design and reflection, thorough degranulation, and tension-free primary closure. Scoring the periosteum results in tension-free primary closure while simultaneously promoting angiogenesis by generating bleeding in to the graft material.[14]

CONCLUSION

Guided bone regeneration is used to promote bone growth of the alveolus for implant placement and around peri-implant defects. GBR with tenting screws is a viable alternative to the gold standard of block grafting. It has been shown to be effective in the regeneration of atrophic extraction sockets. It is a highly predictable, cost-effective operation that results in shorter healing time and morbidity for the patient. It should be regarded as one of the therapeutic choices in extraction socket management.

REFERENCES

1. Zitzmann NU, Berglundh T. Definition and prevalence of peri-implant diseases. J Clin Periodontol 2008;35 w:286-91.
2. Friberg B, Jemt T, Lekholm U. Early failures in 4,641 consecutively placed Branemark dental implants: A study from stage 1 surgery to the connection of completed prostheses. Int J Oral Maxillofac Implants 1991;6:142-6.
3. Esposito M, Hirsch JM, Lekholm U, Thomsen P. Biological factors contributing to failures of osseointegrated oral implants. (I). Success criteria and epidemiology. Eur J Oral Sci 1998;106:527-51.
4. Alghamdi AS. Successful treatment of early implant failure: A case series. Clin Implant Dent Relat Res 2012;14:380-7.
5. Larsen P, Ghali GE (2004). Peterson's Principals of Oral and Maxillofacial Surgery. Hamilton, Ont: B.C. Decker. ISBN 978-1-55009-234-9
6. Aghaloo T, Moy P. Which hard tissue augmentation techniques are the most

successful in furnishing bony support for implant placement? Int J Oral Maxillofac Implant. 2007;22(Suppl):49–70.

7. Liu J, Kerns DG. Mechanisms of guided bone regeneration: a review. Open Dent J [Internet]. 2014;8(1):56–65. doi: 10.2174/1874210601408010056.

8. Elian N, Cho S, Froum S, Smith RB, Tarnow DP. A simplified socket classification and repair technique. Practical Procedures and Aesthetic Dentistry. 2007 Mar 1;19(2):99.

9. Tarnow DP, Eskow RN. Preservation of implant esthetics: soft tissue and restorative considerations. J Esthet Dent. 1996;8:12–19.

10. Fiorellini JP, Nevins ML. Localized ridge augmentation/ preservation. A systematic review. Ann Periodontol. 2003;8:321–327.

11. Buser D, Dahlin C, Robert KS. Guided bone regeneration in implant dentistry. Quintessence Publishing Co, Inc, 1994.

12. Dahlin C, Sennerby L, Lekholm U, Linde A, Nyman S. Generation of new bone around titanium implants using a membrane technique: an experimental study in rabbits. Int J Oral Maxillofac Implants. 1989 Spring; 4(1): 19-25. 9.

13. Lazzara RJ. Immediate implant placement into extraction sites: Surgical and restorative advantages. Int J Periodontics Restorative Dent 1989; 9:333-343

14. Gielkens PF, Bos RR, Raghoebar GM, Stegenga B. Is there evidence that barrier membranes prevent bone resorption in autologous bone grafts during the healing period? A systematic review. Int J Oral Maxillofac Implants. 2007;22:390–398.