



Socket seal surgery with Rehrmann flap for preservation of a freshly extracted socket with oro-antral communication (OAC): A case report

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Abstract

Tooth socket undergoes morphological changes after extraction resulting in functional and esthetic problems, particularly in implant dentistry. Hence, preservation and maintenance of implant bearing environment has gained an increased concern in current implant dentistry. Socket preservation is a surgical procedure for implant site development which aims to preserve socket dimensions and to prevent socket collapse following tooth extraction for future implant placement. The outcomes from the socket preservation methods which are already available are not predictable. Thus, the socket seal surgery is an alternative technique for the management of the post-extraction grafted socket that requires a primary closure of the wound to promote proper regeneration and socket preservation. Free Gingival Graft or Connective Tissue Graft, Acellular dermal matrix, resorbable & non-resorbable barrier membranes and collagen sponge are

the materials being used for socket sealing in various literatures. This paper presents a case report of socket seal surgery with Rehrmann flap, a buccal advancement flap for preservation of a freshly extracted socket with oro antral communication.

Keywords: Oro antral communication, Platelet Rich Fibrin, Rehrmann Flap, Socket preservation, Socket seal surgery.

Introduction

Implant site development is of increasing concern in current implant dentistry as tooth extraction disrupts the oral environment by compromising the integrated tissue morphology. The extraction induced morphological changes alters the anatomical profile of the socket, narrowing the viable treatment options. Socket preservation is a surgical procedure which aims to prevent socket collapse and preserves socket dimensions for future implant placement.¹ The outcomes from the

conventional socket preservation methods remains unpredictable. Thus, the socket seal surgery, an alternative technique described by Landsberg and Bichacho has come into existence for the management of the post-extraction grafted socket that requires a primary wound closure to promote proper regeneration and socket preservation.² Autogenous tissues like Free Gingival Graft or Connective Tissue Graft, Acellular dermal matrix, resorbable & non-resorbable barrier membranes and collagen sponge are the usual materials being used for socket sealing. Von Rehrmann in 1936 had introduced Rehrmann flap, where the buccal flap was advanced palatally to cover the Oro Antral Communication (OAC) and Oro Antral Fistula (OAF). This case report presents a case of socket seal surgery with Rehrmann flap as socket seal modality for preservation of a freshly extracted socket with oroantral communication.

Case Presentation

A 34 years old male patient was referred to the Department of Periodontics, Tamilnadu Government Dental College and Hospital for opinion regarding crown lengthening of root canal treated 15 with the history of dislodgement of crown and tooth fracture in relation to 15. On periodontal examination, the fracture line extended upto the gingival margin and a probing pocket depth of ≤ 2 mm was noted (Figure 1). Crown lengthening was not indicated, because of insufficient crown-root ratio. Close approximation of maxillary sinus to the roots of 15 noted in intraoral periapical radiograph and CBCT ruled out the immediate implant option (Figure 2). Extraction of 15 followed by socket preservation and implant placement with sinus lift after 4-6 months was planned.

Informed consent was obtained and routine hematological investigations were carried out. Following

local anaesthesia with 2% lignocaine, atraumatic extraction of tooth was done with periosteum preserving the buccal bone and the gingival tissues (Figure 3). Since, the floor of maxillary sinus was in close approximation, the extracted socket was inspected with a blunt probe for any perforations and a perforation of 3 mm on the palatal aspect of the extracted socket was detected (Figure 4). Valsalva test was performed and the test was positive confirming the presence of OAC. The extracted socket was then debrided carefully with curettes and irrigated with 0.9% normal saline. Since, the perforation was of 3mm, Platelet Rich Fibrin (PRF) was planned to be used as a barrier membrane to cover OAC. 9 ml of venous blood was collected from antecubital fossa and centrifuged at 3000 rpm for 10 minutes and the PRF membrane was prepared (Figure 5A-D). The prepared PRF membrane was tucked into the extracted socket passively covering the OAC (Figure 6).

Then the socket preservation procedure was carried out. The socket was filled with Demineralized Bone matrix (Fix Oss) upto the crest and covered with Collagen resorbable barrier membrane (Fix Gide GTR) (Figure 7 & 8). Rehrmann flap was planned for socket sealing to achieve primary closure. Two vertical divergent incisions extending to the buccal vestibule were made in relation to 15 with 15c blade and the trapezoidal buccal flap was elevated and scored horizontally on the inner sides of the flap. The flap was advanced and sutured with the palatal margins using 5-0 absorbable sutures achieving complete primary closure of the grafted extracted socket (Figure 9). Post-operative instructions were given. Antibiotics and analgesics and a nasal decongestant (Nasivion 0.05% nasal drops) were prescribed for 1 week. Patient was recalled at 2nd day & 7th day for review. Patient was asymptomatic for maxillary sinusitis. Healing was uneventful. Patient was scheduled for review at the end

of 1st, 3rd & 6th month. Complete socket seal was achieved and essential clinical and radiographic tissue configuration for functional and esthetic implant placement was developed (Figure 10,11 &12).



Figure 1: Pre-operative – Clinical View

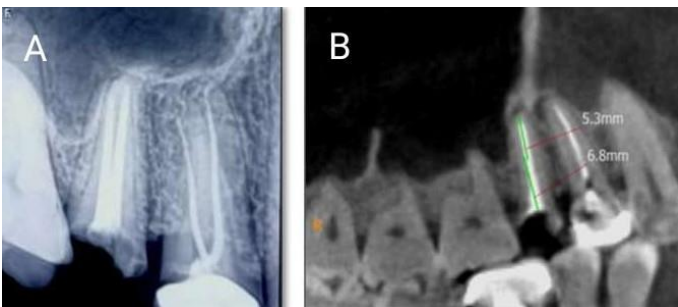


Figure 2: (A) - Pre operative IOPA (B) - Preoperative CBCT

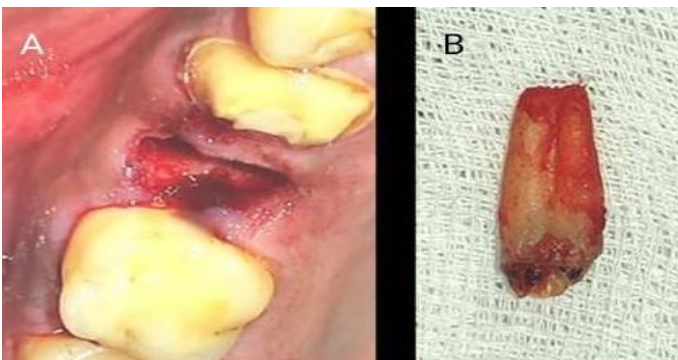


Figure 3: (A) - Extracted Socket (B) - Extracted Tooth



Figure 4: Oro Antral Communication

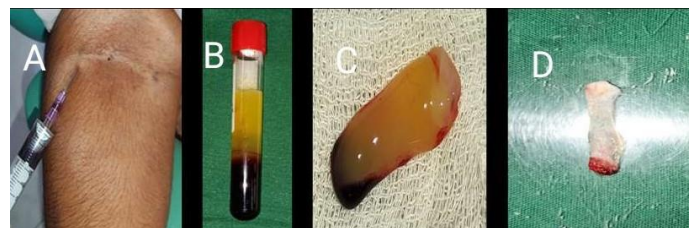


Figure 5: (A) – Blood collection (B & C) – PRF after centrifugation (D) – PRF membrane



Figure 6: PRF membrane tucked into the socket to cover OAC



Figure 7 : Demineralized Bone Matrix (Fix-Oss) & Collagen membrane (Fix-Gide GTR)



Figure 8 : Socket filled with bone graft and covered by resorbable membrane



Figure 9 : Socket sealing with Rehrmann flap



Figure 10: 1 month clinical Post-operative clinical view

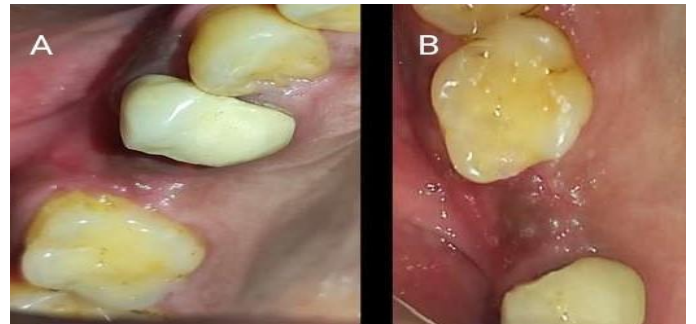


Figure 11: (A) - 3rd month clinical Post-operative (B) - 6th month clinical post-operative

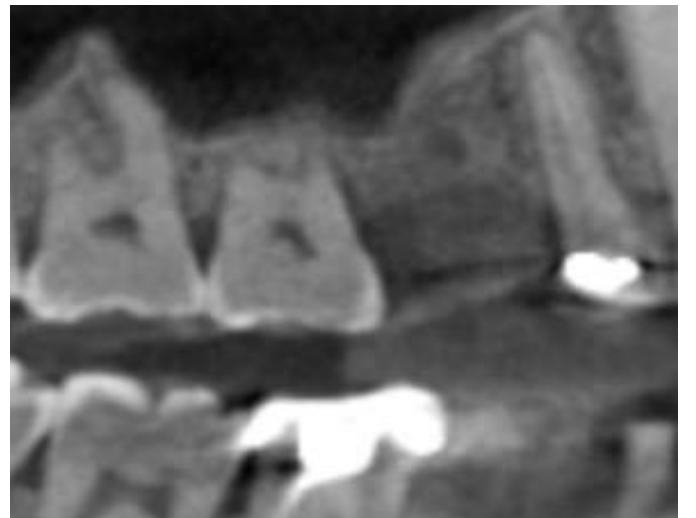


Figure 12: 6th month post-operative CBCT

Discussion

According to American Academy of Periodontology, the rationale behind the socket preservation procedure is the maintenance of adequate tissue dimensions of an extracted socket for implant placement by repairing the socket defects following extraction. The limitations in achieving primary closure in the advanced surgical methods adversely influences the outcome. Hence, it is

advantageous in implementing an adjunctive technique to achieve primary closure. Socket seal surgery is a sensitive procedure which is indicated in cases where the fresh extraction socket is relatively intact with no signs of inflammation.²

Oro antral communication is an abnormal connection between maxillary sinus and oral cavity. The root tips of premolars and molars in close approximation with maxillary sinus with a thin bony lamella are the most common site for OAC after extraction. Valsalva test is the common clinical diagnostic aid for OAC where the patient is asked to exhale air through closed nostrils. The test is said to be positive when air bubbles present at the defect as the air passes through the perforation.³ OAC was managed following the technique used by Mounzer Assad et al⁴ where Platelet Rich Fibrin was used as a membrane to cover OAC. PRF is a second generation autologous platelet concentrate developed by Choukron et al. The fibrin matrix guides the cell migration into the wound thereby preventing the epithelialization of OAC and promotes neoangiogenesis which enhances a complete healing. The growth factors released from PRF possess osteoinductive & osteoconductive property which facilitates the bone tissue regeneration.⁵

Various authors have used different materials as socket seal modalities to achieve complete socket seal. Landsberg et al have used soft tissue grafts procured from the palate to achieve socket seal after socket preservation procedure.⁶ Luczyszyn et al grafted the socket with resorbable Hydroxyapatite and sealed the socket with Acellular Dermal matrix and reported an increased soft tissue thickness around the socket.⁷ Faciola Pessôa de Oliveira et al & Kim et al reported better outcomes with Polytetrafluoroethylene membrane & collagen sponge respectively.^{8,9} Since, this socket preservation case presented with oro antral

communication, Rehrmann flap was used for socket sealing. Rehrmann flap is a buccal advancement flap introduced by Von Rehrmann in 1936 which is considered to be the most common technique in the management of OAC & OAF.¹⁰ Sufficient blood supply and high survival rate of the flap resulted in complete socket seal in the 2nd post-operative week itself with uneventful healing. But, reduction in the buccal vestibule depth after surgery is a limitation of this flap which may need an additional surgery in future.

Conclusion

Socket seal surgery is an advanced adjunctive technique which improves the outcomes of socket preservation methods for a better implant site development. It seals the socket, preserves the soft tissues and prevents the contamination of grafts. Socket sealing with various materials have been reported with favourable results in various literatures. For an intact socket wall with adequate vestibule depth, Rehrmann flap may also be a better socket seal modality because of its high survival rate and adequate blood perfusion to the tissues.

References

1. American Academy of Periodontology, Glossary of Periodontal Terms, American Academy of Periodontology, Chicago, IL, USA, 2001.
2. Landsberg CJ, Bichacho N. A modified surgical/prosthetic approach for optimal single implant supported crown. Part I--the socket seal surgery. *Pract Periodontics Aesthet Dent.* 1994;6(2):11-7.
3. Parvini P, Obreja K, Begic A. Decision making in closure of oroantral communication and fistula. *Int J Implant Dent* 2019;5(1):13.
4. Mounzer Assad, Waseem Bitar, Mohammed Nasser Alhadj. Closure of Oroantral Communication Using

- Platelet-rich Fibrin: A Report of Two Cases. *Ann Maxillofac Surg*. 2017; 7(1): 117–9.
5. Dohan DM, Choukroun J, Diss A, Dohan SL, Dohan AJ, Mouhyi J, et al. Platelet-rich fibrin (PRF): A second-generation platelet concentrate. Part II: Platelet-related biologic features. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod*. 2006;101:e45–50.
 6. Landsberg CJ. Implementing socket seal surgery as a socket preservation technique for pontic site development: surgical steps revisited--a report of two cases. *J Periodontol* 2008;79:945-54.
 7. Luczyszyn SM, Papalexiou V, Novaes AB Jr, Grisi MF, Souza SL, Taba M Jr. Acellular dermal matrix and hydroxyapatite in prevention of ridge deformities after tooth extraction. *Implant Dent* 2005;14:176-84.
 8. Faciola Pessôa de Oliveira PG, Pedroso Bergamo ET, Bordin D, Arbex L, Konrad D, Gil LF et al. Ridge architecture preservation following minimally traumatic exodontia techniques and guided tissue regeneration. *Implant Dent* 2019;28:319-28.
 9. Kim YK, Yun PY, Lee HJ, Ahn JY, Kim SG. Ridge preservation of the molar extraction socket using collagen sponge and xenogeneic bone grafts. *Implant Dent* 2011;20:267-72.
 10. Kwon, MS, Lee BS, Choi BJ, Lee JW, Ohe JY, Jung JH, Kwon YD. Closure of oroantral fistula: a review of local flap techniques. *Journal of the Korean Association of Oral and Maxillofacial Surgeons* 2020;46(1):58-65.