World Journal of Advanced Research and Reviews
eISSN: 2581-9615 CODEN (USA): WJARAI
Cross Ref DOI: 10.30574/wjarr
Journal homepage: https://wjarr.com/

(CASE REPORT)

Suture-less closure for the management socket preservation

Ernie Maduratna Setiawatie *, Nabila, Ika Febryana, and Esi Yuniza Fitrina

Department of Periodontology, Faculty of Dental Medicine, Universitas Airlangga, Surabaya, Indonesia.

World Journal of Advanced Research and Reviews, 2024, 24(02), 1111–1115

Publication history: Received on 29 September 2024; revised on 06 November 2024; accepted on 08 November 2024

Article DOI: https://doi.org/10.30574/wjarr.2024.24.2.3410

Abstract

Introduction: After tooth loss, the new edentulous area of the ridge will undergo some adaptive modifications due to changes in function in and around the socket. Socket preservation can reduce and eliminate the need for additional augmentation procedures by preventing hard and soft tissue collapse after tooth extraction. Periodontal surgical procedures that are in the aesthetic zone, sutureless can be an alternative to closing the flap. The objective of this case report is to describe socket preservation using cyanoacrylate material for flap fixation.

Case report: A 65-year-old man came to the Periodontics Specialist Clinic in Dental Hospital Universitas Airlangga with a complaint of wanting to remove the left front of the mandible. *Case management:* The first step was to perform extraoral and intraoral asepsis with povidone-iodine 10% before local anesthesia. Local anesthesia with infiltration technique, followed by atraumatic extraction of tooth 33 using a periotome and luxator, curettage of tooth 33 sockets. Then a sulcular incision was made with blade number 15c on tooth 33 by full-thickness until there was no tension on the flap, application of PRF on the pericardium membrane containing bone graft to be applied in the socket of tooth 33. Reposition the tensionless flap until the entire surgical area is closed and then fixed using cyanoacrylate material (no suturing).

Conclusion: Sutureless closure using cyanoacrylate material can be used as an alternative to suturing for flap repositioning in socket preservation.

Keywords: Socket Preservation; Sutureless Closure; Cyanoacrylate; Membrane Pericardium

1. Introduction

After tooth loss, the new edentulous area of the ridge will undergo some adaptive modifications due to changes in function in and around the socket. This bone resorption explains the need for socket preservation techniques in the aesthetic and functional fields. (1) The alveolar process is highly dependent on the teeth, alveolar bone resorption after tooth extraction occurs very rapidly within the first six months causing a decrease in alveolar height by 40% and alveolar width by 60%. (1)(2) Socket preservation involves the principles of guided tissue regeneration, atraumatic tooth extraction, and blood clot protection. Currently, available techniques use autograft, alloplastic, xenograft, bioresorbable, and non-resorbable synthetic membranes. (3) Socket preservation can reduce and eliminate the need for additional augmentation procedures by preventing hard and soft tissue collapse after tooth extraction. (1)

Regardless of the surgical technique performed, the basic goal of surgical closure is proper wound closure to reduce dead space, minimize the risk of infection, and achieve good aesthetic and functional wound edges. The most common method of wound closure is suturing but has several disadvantages such as tissue trauma, appointments for suturing removal, and unpredictable resorption rates. (4) These disadvantages are overcome using alternative treatments using plastic adhesives (cyanoacrylate). (5)(6) When performing periodontal surgical procedures that are in the aesthetic

* Corresponding author: Ernie Maduratna Setiawatie

zone, sutureless can be an alternative to closing the flap. (7) However, until now, few case studies have been conducted on periodontal tissues on the success of using cyanoacrylate materials in periodontal tissue treatment to obtain flap fixation without suturing.

2. Case Report

A 65-year-old male came to the Periodontics Specialist Clinic in Dental Hospital Universitas Airlangga with complaints that his lower left anterior tooth wanted to be extracted and wanted to be replaced with a denture. The patient admitted to no systemic diseases or allergies to drugs and food. The patient does not smoke. Extraoral clinical examination revealed no abnormalities. Intra-oral clinical assessment of the patient revealed calculus on the posterior maxilla and mandible; BOP (+) 76%; calculus on the anterior and posterior teeth of the maxilla and mandible; radix of tooth 33; and plaque in all maxillary and mandibular regions.

The clinical diagnosis was chronic apical periodontitis et causa tooth 33 radix. Before the treatment was started, the patient was explained about all the procedures to be performed including the risks and complications that might occur, and the patient gave consent to the treatment plan that he would receive.

Based on the clinical findings from the intraoral examination, in phase 1, Dental Health Education (DHE) and scaling and root planning were performed. Furthermore, an evaluation was carried out before continuing phase 2, extraction of tooth 33 accompanied by socket preservation of tooth 33 and repositioning of the flap until the entire surgical area was covered and then fixed using cyanoacrylate material (without suturing).

2.1. Case Management

Tooth 33 will be extracted followed by socket preservation using cyanoacrylate for the flap closure. The first step was to perform extraoral and intraoral asepsis with povidone-iodine 10% before local anesthesia. Local anesthesia with infiltration technique using Articaine® (2% Lidocaine epinephrine) on the mucobuccal fold and lingual of tooth 33 (Figure 1).

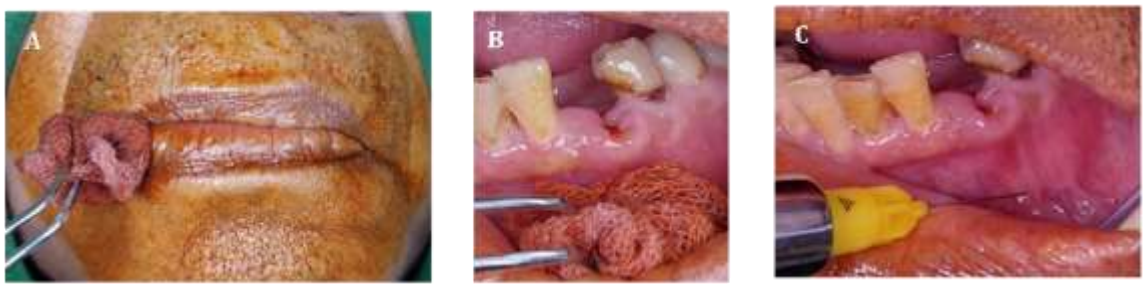

Figure 1 Socket preservation of tooth 33: (A) extraoral asepsis, (B) intraoral asepsis, (C) anesthesia with local infiltration technique on the mucobuccal fold and lingual of tooth 33

Extraction of tooth 33 was performed atraumatic using a periotome and luxator. A sulcular incision was made with blade number 15c on tooth 33 by full thickness until there was no tension on the flap. Irrigation using saline solution. Next, platelet-rich fibrin (PRF) was separated from Platelet Poor Plasma (PPP). PRF was cut from the blood clot and placed on the pericardium membrane containing bone graft to be applied in the socket of tooth 33 (Figure 2).

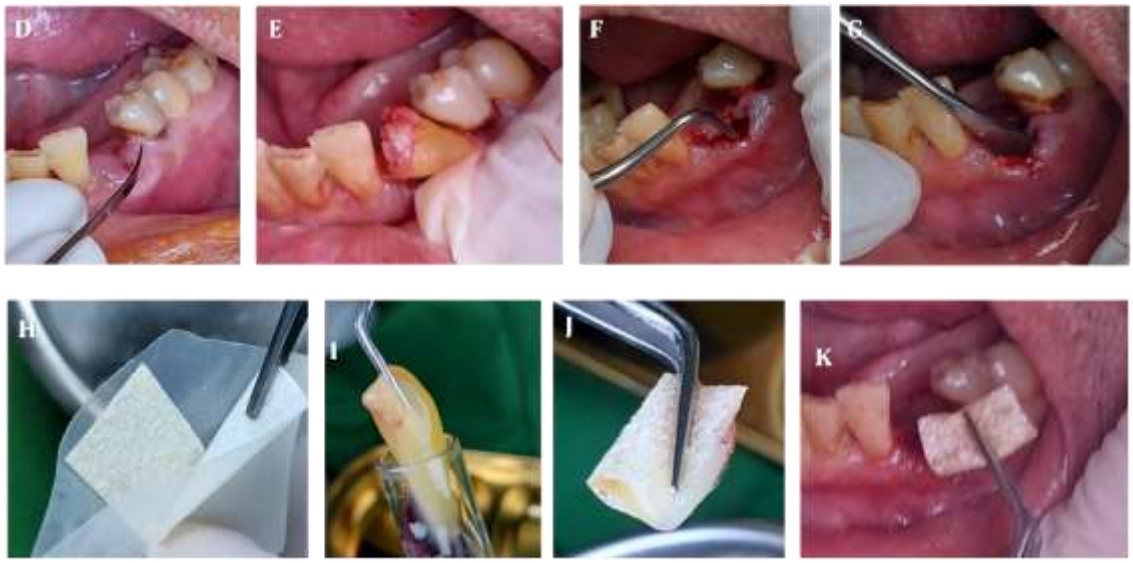

Figure 2 Socket Preservation procedure: (D) Atraumatic extraction of tooth 33, (E) Extracted tooth 33, (F) Curettage of tooth 33 socket, (G) Reflection of full thickness flap, (H) Pericardium membrane preparation containing bone graft, (I) Platelet Rich Fibrin (PRF), (J) Pericardium membrane bone graft and PRF, (K) Application of pericardium membrane bone graft and PRF on tooth 33 socket.

Reposition the tensionless flap until the entire surgical area is covered and then fix it using cyanoacrylate material (no suturing) (Figure 3).

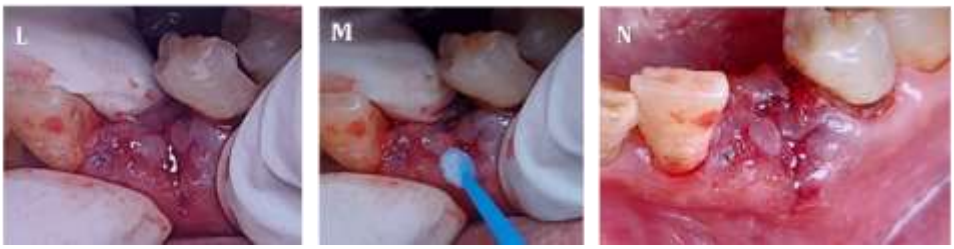

Figure 3 Cyanocrilate procedure application: (L) Position the tensionless flap, (M) fixation using cyanocrilate material, (N) Clinical photo after socket preservation of tooth 33 with cyanocrilate.

Figure 4 Control after Socket Preservation with Cyanoacrylate: (A) 7 days after surgery, (B) 14 days after surgery, (C) 35 days after surgery

The patient was prescribed antibiotics clindamisin 300 mg to be taken every 8 hours, mefenamic acid 500 mg for pain, and chlorhexidine mouthwash 2 times a day. The patient was instructed to avoid hot, sour, spicy, and hard foods; not to rinse the mouth too hard; maintain oral hygiene by not brushing the teeth on the surgical area; avoid chewing on the side of the surgical area; avoid sucking the surgical area; and control 7 days later after surgery (Figure 4). The 1-month follow-up showed no inflammation or infection in the area of the previous surgery. At 5 months follow up, the patient had no complaints and the gingival tissue looked normal.

3. Discussion

In this case, the patient had a residual root of tooth 33 that she wanted to extract because she wanted a denture to replace the tooth. After tooth extraction, bone remodeling is unpredictable, posing problems for future rehabilitation with conventional and implant-supported prostheses. (8)(9) Tooth extraction can trigger surrounding soft tissue and alveolar bone loss. Socket preservation procedures can preserve alveolar bone volume. (10)

Atraumatic extraction aims to reduce trauma to the bone and tissue around the tooth to be extracted to allow a faster and optimal healing process. (11) The use of a sulcular incision, in this case, is by the indications, namely for flap access, surgical access for Guided Tissue Regeneration (GTR), in narrow keratinized gingiva ≤ 3 mm, aesthetic areas. The sulcular incision can reduce trauma to the bone and tissue surrounding the socket, allowing for a better healing process and reducing bone resorption. (12)

The application of membrane pericardium bone graft and PRF in dental socket 33 aims to scaffold and bone formation in the process of tissue regeneration. Bone substitutes and scaffolds are the main key materials for bone augmentation techniques. Scaffolds include resorbable and non-resorbable membranes. Pericardium membrane is one example of a resorbable membrane. Pericardium membrane in addition to being resorbable also has several advantages, namely good biocompatibility and mechanical stability, permeable, antibacterial, angiogenic, derived from natural materials, easy to use. (13) Platelet-rich fibrin (PRF) is rich in growth factors so it has the potential to be used as a biomaterial for tissue regeneration and bone healing. PRF releases growth factors at a slower pace over a longer period, resulting in faster wound healing. (3)(14) The release of growth factors is greatest in the first 60 minutes. (3) The use of PRF in extracted sockets is more effective because it promotes osteoblast formation, and angiogenesis, and acts as a potential replacement for osteogenic medium in bone regeneration by enhancing effects on stem cell proliferation, differentiation, migration, and mineralization during bone formation.(15)(16)

The most common method of wound closure is suturing, which presents some drawbacks related to tissue trauma, the need for a second appointment for suture removal, and the unpredictable resorption rate).(17) In recent years, tissue adhesive is believed to have adequate adhesive strength, proper polymerization in a humid environment, biocompatibility, stability, and good working time. (1)(17) The flap fixation in this case used cyanoacrylate for wound closure. Cyanoacrylate glue is an acrylic resin that consists of two separate liquids, one for pouring into the mold and another used sparingly as a hardener, but in the case of cyanoacrylate glue, the hardener is water.(17)

Newer generation cyanoacrylate includes n-butyl-2-cyanoacrylate, octyl-2-cyanoacrylate, and n-hexyl-cyanoacrylate.(17) The advantages of using cyanoacrylate are that conventional suturing only provides marginal fixation while using cyanoacrylate makes the tissue adhere to its entire surface; biocompatibility reduces surgical time, is easier to apply, with faster polymerization; produces immediate homeostasis; it can save a lot of time; bacteriostatic; it is easier to fix tissue in hard-to-reach areas and aesthetic areas; it saves suturing costs; it is comfortable on the surgical side due to the absence of suturing; it does not require suture removal. Suture removal may be annoying or painful for some patients. (1) (7)

Specifically, the tissue adhesive replaces the sutures in the fixation as it induces less host tissue damage and provokes less postoperative pain. (17)

4. Conclusion

Based on this case report, the use of cyanoacrylate as a material in sutureless actions can be used in socket preservation actions.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

References

[1] Khan J, Bandi S, Gangineni S, Kummari S, Pradeep DG, Hinduja T. Evaluation of Alveolar Ridge Dimensions by Socket Preservation Therapy Using a Bone Graft and Platelet-Rich Fibrin: A Randomized Controlled Trial. Cureus. 2024;16(5):6–13.

[2] Araujo MG, Lindhe J. Dimensional ridge alterations following tooth extraction. An experimental study in the do. J Clin Periodontol. 2005;32:212–3.

[3] Lakshmi Rathan AC, Satheesan S, Divya VC, Narayanan V, Ramakrishnan K. Comparison of activated Platelet Rich Fibrin and Platelet Rich Fibrin in osseous regeneration of freshly extracted socket- A double blinded randomized clinical study. J Stomatol Oral Maxillofac Surg. 2024;000.

[4] Alovisi M, Erovigni F, Bianchi L, Longhi B, Scotti N, Pasqualini D, et al. Surgical Wound Repair with Innovative Hemostatic Glue: Clinical Case Report. Appl Sci. 2023;13(15).

[5] Shupak R., Blackmore S, Kim R. Skin hypersensitivity following application of tissue adhesive (2-octyl cyanoacrylate). Bayl Univ Med Cent Proc. 2021;34:736–8.

[6] Silverstein L., Kurtzman G., Shatz P. Suturing for Optimal Soft-Tissue Management. . J Oral Implant. 2009;35:82–90.

[7] Jathal B, Trivedi A, Bhavsar N. Use of fibrin glue in periodontal flap surgery. J Indian Soc Periodontol. 2008;12(1):21.

[8] Sharma A, Ingole S, Deshpande M, Ranadive P, Sharma S, Kazi N, et al. Influence of platelet-rich fibrin on wound healing and bone regeneration after tooth extraction: a clinical and radiographic study. J Oral Biol Craniofac Res. 2020;10(4):385–90.

[9] Ustaoglu G, Goller Bulut D, Gumus KC. Evaluation of different platelet-rich con- ˛ centrates effects on early soft tissue healing and socket preservation after tooth extraction. J Stomatol Oral Maxillofac Surg. 2020;121(5):539–44.

[10] Samad A, Ahmed J, Ali HM, Shihab O, Haider A, Karpavicius D. Extraction Socket Seal Technique for Socket Preservation after Tooth Extraction: An Innovative Approach. Erbil Dent J. 2024;7(1):101–10.

[11] Resnik RR. Extraction and Socket Grafting: Part 1 — Atraumatic Extraction [Internet]. 2019. Tersedia pada: https://glidewelldental.com/education/chairside-magazine/volume-14-issue-1/atraumatic-extraction

[12] Raphael Borchard, Heinz Erpenstein. Incisions and Tissue Management in Periodontal Surgery: a Revaluation. Int J Adv Res. 2018;6(10):718–24.

[13] Angelis N, Pesce P. 3d-printable Biopolymers for Socket Preservation Technique : Soft Tissues Response . A Randomized Clinical Trial. 2024;1–16.

[14] Feigin K, Shope B. Use of platelet-rich plasma and platelet-rich fibrin in dentistry and oral surgery: introduction and review of the literature. J Vet Dent. 2019;36(2):109–23.

[15] Dutta SR, Passi D, Singh P, Sharma S, Singh M, Srivastava D. A randomized comparative prospective study of platelet-rich plasma, platelet-rich fibrin, and hydroxyapatite as a graft material for mandibular third molar extraction socket healing. Natl J Maxillofac Surg. 2016;7(1):45–51.

[16] Gurbuzer B, Pikdoken L, Tunali M, Urhan M, Kucukodaci Z, Ercan F. Scintigraphic evaluation of osteoblastic activity in extraction sockets treated with platelet-rich fibrin. J Oral Maxillofac Surg. 2010;68(5):980–9.

[17] Alovisi M, Erovigni F, Bianchi L, Longhi B, Scotti N. applied sciences Surgical Wound Repair with Innovative Hemostatic Glue : Clinical Case Report. 2023;

[18] Zheng K, Gu Q, Zhou D, Zhou M, Zhang L. Recent progress in surgical adhesives for biomedical applications. Smart Mater Med. 2021;3:41–65.