DOI: 10.7860/JCDR/2026/85366.23642

Case Report

Dentistry Section

Clinical Application of Injectable Platelet-rich Fibrin-based Sticky Bone in Immediate and Delayed Dental Implant Placement: A Report of Two Cases

A SHERYL DOLLY[1], L VISHALATCHI[2], R KADHIRESAN[3], A ABDUL MIRAN[4], U ARUNMOZHI[5]

ABSTRACT

Sticky bone, formed by combining Injectable Platelet-Rich Fibrin (I-PRF) with bone graft material, represents a significant advancement in regenerative implant dentistry. Its cohesive and mouldable nature facilitates superior handling, adaptation to defect morphology, and enhanced stability at the graft site. This case report describes two female patients aged 23 and 41 years who presented with posterior mandibular tooth loss and underwent implant placement using I-PRF- based sticky bone in delayed and immediate protocols, respectively. Although adequate bone volume was present in both cases, sticky bone was used as an adjunctive regenerative measure to enhance peri-implant bone stability, manage minor peri-implant defects, preserve ridge contour, and promote favourable soft-tissue healing. Sticky bone was prepared by thoroughly mixing I-PRF with either Demineralised Bone Matrix (DMBM) or xenograft materials until a cohesive, sticky consistency was achieved. The prepared graft was placed in the defect sites following implant placement, without the use of additional membranes. Clinical and radiographic evaluations were performed periodically over a six-month healing period using qualitative outcome parameters, including peri-implant soft-tissue health, graft integration, peri-implant bone fill, ridge contour preservation, and implant stability. All cases demonstrated uneventful healing with minimal postoperative complications. Radiographic assessments revealed satisfactory bone regeneration and excellent ridge contour maintenance, while clinical observations showed stable soft-tissue coverage with healthy keratinised mucosa and preserved interdental papillae. Functional loading was achieved with optimal implant stability, and none of the cases required secondary augmentation procedures. The combined effect of the biological activity of I-PRF and the structural support of the graft material contributed to accelerated healing and predictable regenerative outcomes. Within the limitations of this case report, sticky bone can be considered a reliable and biologically favourable grafting material for enhancing osseous and soft-tissue regeneration in both immediate and delayed implant placement protocols.

Keywords: Bone graft, Growth factors, Platelet, Xenograft

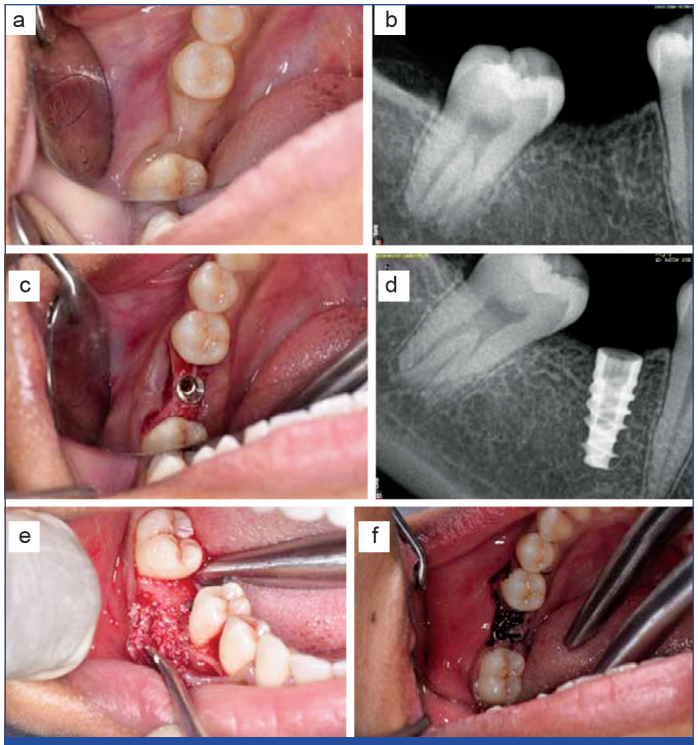
CASE REPORT

Case 1

A 23-year-old female patient reported with the chief complaint of a missing mandibular right first molar for approximately one year and sought a fixed replacement to restore mastication. The patient was systemically healthy with no relevant medical history. Despite the presence of sufficient alveolar bone for implant placement in clinical and radiographic examination, adjunctive grafting using I-PRF-based sticky bone was planned to enhance peri-implant bone stability, compensate for potential postoperative bone remodelling, preserve ridge contour, and promote optimal soft-tissue healing. The use of sticky bone was intended as a preventive regenerative approach rather than a corrective measure for bone deficiency. The patient was informed about the procedure, alternatives, and benefits, and written informed consent was obtained prior to treatment.

Under local anaesthesia (2% lidocaine with 1:80,000 adrenaline), a full-thickness mucoperiosteal flap was elevated, and the implant osteotomy was prepared at site 46. A NORIS implant measuring 4.2 × 10 mm was placed with an insertion torque of 35 Ncm, and a cover screw was secured. I-PRF [Table/Fig-1] was prepared by centrifuging 10 mL of autologous venous blood at 700 rpm for three minutes as per the protocol described by Miron RJ et al., (2017) [1]. The obtained I-PRF was mixed with DMBM graft material (Fix-OSS®, Synerheal Pharmaceuticals, India) to form sticky bone, which was moulded and placed around the implant to support peri-implant bone stability. The flap was repositioned and sutured using simple interrupted sutures [Table/Fig-2].

[Table/Fig-1]: Centrifugation protocol for preparation of Injectable Platelet-Rich Fibrin (I-PRF) showing the obtained yellow superficial I-PRF layer after centrifugation.



[Table/Fig-2]: a) Preoperative intraoral clinical photograph showing missing mandibular right first molar; b) Preoperative periapical radiograph demonstrating adequate alveolar bone height and width for implant placement; c) Clinical view after implant placement showing correct positioning of the implant fixture; d) Immediate postoperative radiograph confirming proper implant angulation and depth without marginal bone loss; e) Clinical photograph after placement of sticky bone graft around the implant site; f) Immediate postoperative after suture placement.

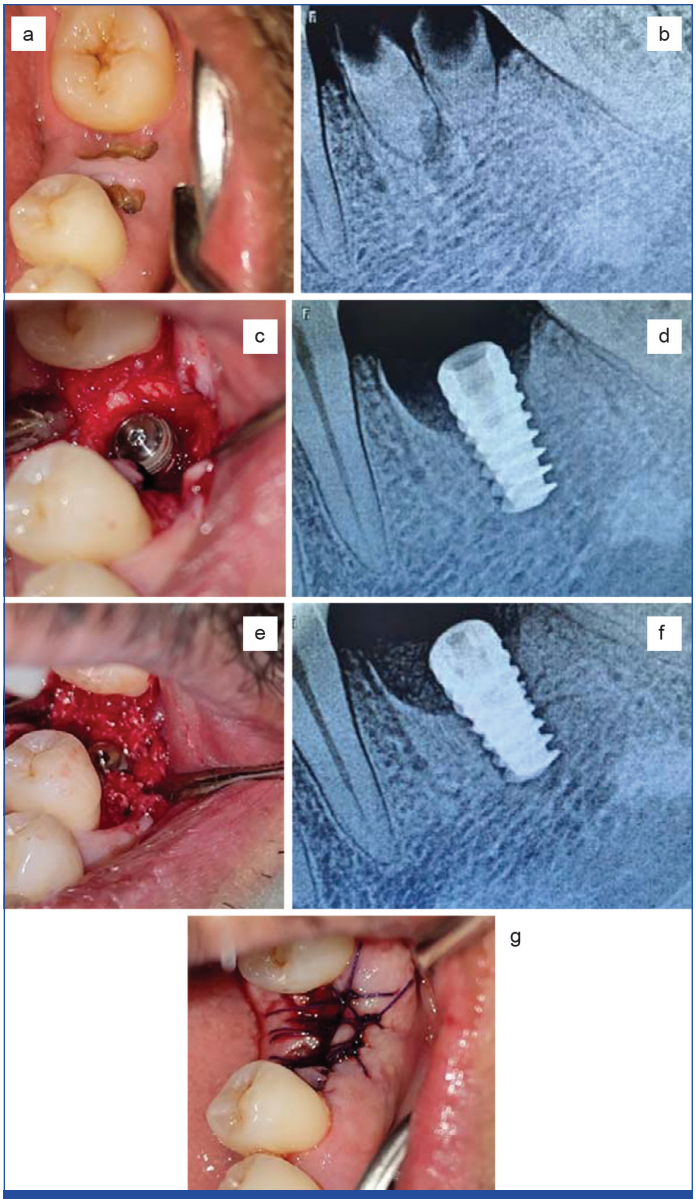
Case 2

A 41-year-old female patient presented with a history of a grossly decayed mandibular left first molar for more than six months, associated with difficulty in chewing. The patient was systemically healthy, and medical history was non-contributory. Although sufficient bone volume was present for immediate implant placement, sticky bone grafting was incorporated to manage the peri-implant jumping distance, enhance graft stability, and support ridge preservation during early healing. Following atraumatic extraction of the residual roots, immediate implant placement was planned. To manage the peri-implant gap and support ridge preservation, adjunctive sticky bone grafting was incorporated. The patient was informed about the surgical procedure and provided written informed consent prior to intervention.

An ADIN implant measuring 5×11.5 mm was placed in the extraction socket with a primary stability of 40 Ncm. Sticky bone was prepared by combining I-PRF xenogeneic bone graft material (Osseograft®, Advanced Biotech Products Pvt., Ltd., India) and placed around the implant to fill the jumping distance. The surgical site was closed using figure-of-eight sutures [Table/Fig-3].

Postoperative Care

Immediate postoperative radiographs were taken in both cases to confirm correct implant positioning and graft placement. Postoperative outcomes were assessed using commonly accepted clinical and radiographic parameters employed in implant case reports. Clinical evaluation included assessment of peri-implant soft-tissue health, presence or absence of inflammation, wound healing, keratinised mucosa stability, and implant stability. Radiographic evaluation focused on peri-implant bone fill, graft consolidation, marginal bone levels, and ridge contour preservation using standardised intraoral periapical radiographs. Patients were prescribed antibiotics and analgesics for five days and were instructed regarding postoperative oral hygiene measures. One week postoperatively, sutures were removed, and clinical examination revealed satisfactory soft-tissue healing without signs of infection or inflammation.

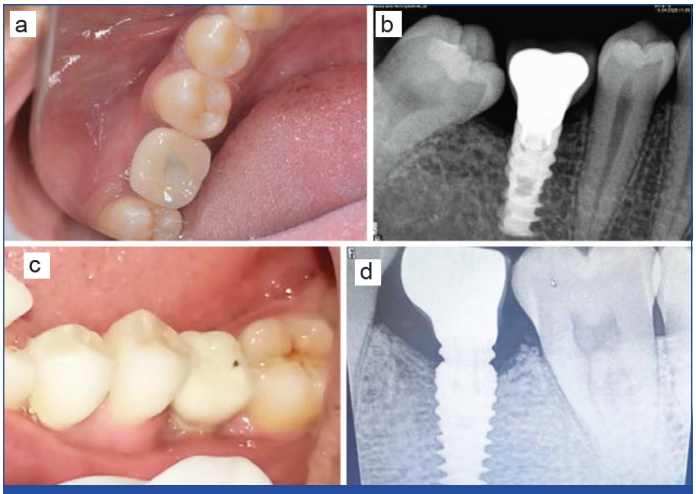


[Table/Fig-3]: a) Preoperative intraoral clinical photograph showing grossly decayed mandibular left first molar; b) Preoperative radiograph demonstrating sufficient bone volume for immediate implant placement; c) Clinical view after immediate implant placement following atraumatic extraction; d) Immediate postoperative radiograph confirming primary stability and correct positioning of the implant; e) Clinical photograph showing placement of sticky bone graft to fill the peri-implant jumping distance; f) Postoperative radiograph demonstrating stable graft placement around the implant without marginal bone loss; g) Immediate postoperative after suture placement.

At the three-month follow-up, clinical evaluation showed healthy peri-implant mucosa with stable soft-tissue contours, while radiographic assessment demonstrated progressive graft consolidation and peri-implant bone fill. At six months, re-entry procedures were performed, which revealed satisfactory graft integration and preserved ridge contour around the implants. Healing abutments were placed, and after adequate soft-tissue maturation, prosthetic rehabilitation was completed using screw-retained restorations. Final clinical and radiographic evaluations confirmed functional stability and favourable peri-implant tissue response [Table/Fig-4].

DISCUSSION

Immediate implant placement, when feasible, offers several clinical advantages such as reduced treatment duration, decreased morbidity, and preservation of ridge architecture [2]. The success of dental implant therapy depends on adequate bone volume, quality, and stability to achieve predictable osseointegration. Even in sites with sufficient bone for implant placement, minor peri-implant defects, jumping distances, and postoperative remodeling may compromise long-term ridge contour and peri-implant tissue stability. Therefore, adjunctive regenerative approaches aimed at



[Table/Fig-4]: a-d) Clinical and radiographic photograph showing final prosthetic restoration (screw-retained prosthesis) after completion of the healing phase, demonstrating satisfactory soft-tissue contour and functional rehabilitation.

enhancing peri-implant healing and preserving alveolar architecture have gained increasing clinical attention [3]. In the present cases, sticky bone was not employed to correct severe bone deficiencies but was used proactively to optimise peri-implant healing, minimise post-extraction remodelling, and enhance long-term peri-implant tissue stability, even in sites with adequate native bone.

Autogenous bone grafts have long been considered the gold standard due to their osteogenic, osteoinductive, and osteoconductive properties [3]. Nevertheless, their use is limited by donor site morbidity, postoperative pain, infection, haematoma formation, and restricted availability. These drawbacks have encouraged the exploration of alternative biomaterials and biologically active substitutes capable of promoting bone regeneration without donor site complications [4]. The advent of platelet concentrates, such as PRF and its advanced Injectable Form (I-PRF), has marked a significant advancement in regenerative dentistry [5]. Sticky bone, a biologically active composite formed by combining I-PRF with particulate bone grafts, has been introduced as an effective regenerative adjunct in implant dentistry. The fibrin network formed by I-PRF binds graft particles together, providing mechanical stability while serving as a reservoir for sustained release of growth factors such as Platelet-Derived Growth Factor (PDGF), Transforming Growth Factor-β (TGF-β), and Vascular Endothelial Growth Factor (VEGF), which promote angiogenesis, osteogenesis, and soft-tissue healing [1,6-8]. This biological synergy improves graft handling, reduces micromovement, and eliminates the need for barrier membranes in selected cases [9].

Previous studies and case reports have demonstrated favourable outcomes with the use of sticky bone in ridge augmentation and peri-implant defect management. Sohn DS et al., reported enhanced graft stability and accelerated healing when sticky bone was used in implant sites compared to conventional particulate grafting [9]. Similarly, Soni R et al., documented successful implant placement with improved bone fill and soft-tissue healing using I-PRF–based sticky bone as an adjunctive regenerative material [3]. These findings are in accordance with Gassling V et al., and other studies, which highlighted the regenerative efficacy of platelet concentrates in bone augmentation procedures, supporting the biological plausibility and clinical applicability of sticky bone in implant therapy [10].

In the present case report, sticky bone was used in both delayed and immediate implant placement scenarios as a preventive and regenerative adjunct rather than as a corrective measure for severe bone deficiency. Outcome assessment was based on qualitative clinical and radiographic parameters commonly employed in implant case reports, including peri-implant soft-tissue health, graft integration, ridge contour preservation, and radiographic bone fill [3,9]. Although these parameters do not provide standardised quantitative data, they offer clinically relevant information regarding postoperative healing and regenerative outcomes. Radiographic evaluation at six months demonstrated satisfactory bone fill and stable peri-implant bone levels, while clinical examination revealed healthy peri-implant mucosa, stable keratinised tissue, and absence of postoperative complications, indicating favourable tissue response following sticky bone application.

In immediate implant placement, the use of sticky bone additionally facilitates management of the peri-implant jumping distance and supports socket preservation by maintaining graft stability during the early healing phase. Compared with particulate bone grafting alone, the incorporation of I-PRF enhances biological activity through sustained release of growth factors, potentially improving healing dynamics and patient comfort [1,7]. However, due to the descriptive nature and limited sample size of this case report, direct comparison with alternative grafting techniques or definitive conclusions regarding superiority cannot be established.

A limitation of the present case report is the absence of standardised quantitative outcome measures, such as marginal bone level measurements, resonance frequency analysis (ISQ values), or volumetric radiographic analysis. Additionally, the small sample size inherent to case reports limits the generalisability of the findings. Future prospective clinical studies incorporating standardised objective outcome measures are required to further validate the regenerative efficacy of I-PRF- based sticky bone.

CONCLUSION(S)

After implant placement, osseous regeneration is a useful tactic in regions with inadequate bone. By promoting polymerisation, which promotes bone regeneration by releasing growth factors gradually, injectable PRF improves the stability of bone grafts within defect sites. Because of its autologous origin and straightforward preparation method, PRF is a dependable and useful choice for regular clinical use.

REFERENCES

[1] Miron RJ, Fujioka-Kobayashi M, Hernandez M, Kandalam U, Zhang Y, Ghanaati S, Choukroun J. Injectable platelet rich fibrin (i-PRF): Opportunities in regenerative dentistry? Clin Oral Investig. 2017;21(8):2619-27.
[2] Watzek G, Haider R, Mensdorff-Pouilly N, Haas R. Immediate and delayed implantation for complete restoration of the jaw following extraction of all residual teeth: A retrospective study comparing different types of serial immediate implantation. Int J Oral Maxillofac Implants. 1995;10(5):561-67.
[3] Soni R, Priya A, Yadav H, Kumar V. Utilizing autologous growth factor–enriched bone graft matrix (sticky bone) and platelet-rich fibrin membrane to enable dental implant placement: A case report. IP Ann Prosthodont Restor Dent. 2019;5(1):16-19.
[4] Peck Thabit M, Marnewick J, Stephen L. Alveolar ridge preservation using leukocyte and platelet-rich fibrin: A case report. Case Rep Dent. 2011;2011:345048. Doi: 10.1155/2011/345048.
[5] Lourenço ES, Mourão CFA, Leite PEC, Granjeiro JM, Calasans-Maia MD, Alves GG. In vitro release of cytokines and growth factors from fibrin membranes produced through horizontal centrifugation. J Biomed Mater Res A. 2018;106(5):1373-80. Doi: 10.1002/jbm.a.36346.
[6] Choukroun J, Diss A, Simonpieri A, Girard MO, Schoeffler C, Dohan SL, et al. Platelet-rich fibrin (PRF): A second-generation platelet concentrate. Part IV: Clinical effects on tissue healing. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2006;101(3):e56-e60. Doi: 10.1016/j.tripleo.2005.07.011.
[7] Dohan Ehrenfest DM, Rasmusson L, Albrektsson T. Classification of platelet concentrates: From pure platelet-rich plasma (P-PRP) to leucocyte- and platelet-rich fibrin (L-PRF). Trends Biotechnol. 2009;27(3):158-67.
[8] Lee MB. Bone morphogenetic proteins: Background and implications for oral reconstruction. J Clin Periodontol. 1997;24(6):355-65.
[9] Sohn DS, Huang B, Kim J, Park WE, Park CC. Utilization of autologous concentrated growth factors (CGF) enriched bone graft matrix (sticky bone) and CGF-enriched fibrin membrane in implant dentistry. J Implant Adv Clin Dent. 2015;7:11-18.
[10] Gassling V, Purcz N, Braesen JH, Will M, Gierloff M, Behrens E, et al. Comparison of two different absorbable membranes for the coverage of lateral osteotomy sites in maxillary sinus augmentation: A preliminary study. J Craniomaxillofac Surg. 2013;41(1):76-82.

PARTICULARS OF CONTRIBUTORS:
1. Senior Lecturer, Department of Periodontics and Oral Implantology, Priyadarshini Dental College and Hospital, Chennai, Tamil Nadu, India.
2. Postgraduate Student, Department of Periodontics and Oral Implantology, Sri Venkateswara Dental College and Hospital, Chennai, Tamil Nadu, India.
3. Professor, Department of Periodontics and Oral Implantology, Sri Venkateswara Dental College and Hospital, Chennai, Tamil Nadu, India.
4. Postgraduate Student, Department of Periodontics and Oral Implantology, Sri Venkateswara Dental College and Hospital, Chennai, Tamil Nadu, India.
5. Professor and Head, Department of Periodontics and Oral Implantology, Sri Venkateswara Dental College and Hospital, Chennai, Tamil Nadu, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:
Dr. A Sheryl Dolly,
Senior Lecturer, Department of Periodontics and Oral Implantology, Priyadarshini Dental College and Hospital, Pandur, Thiruvallur, Chennai-631203,
Tamil Nadu, India.
E-mail: drsheryldolly@gmail.com

PLAGIARISM CHECKING METHODS: [Jain H et al.]
- Plagiarism X-checker: Nov 28, 2025
- Manual Googling: Feb 27, 2026
- iThenticate Software: Mar 02, 2026 (7%)

ETYMOLOGY: Author Origin

EMENDATIONS: 6

AUTHOR DECLARATION:
- Financial or Other Competing Interests: None
- Was informed consent obtained from the subjects involved in the study? Yes
- For any images presented appropriate consent has been obtained from the subjects. Yes

Date of Submission: **Nov 13, 2025**
Date of Peer Review: **Jan 12, 2026**
Date of Acceptance: **Mar 05, 2026**
Date of Publishing: **Jun 01, 2026**