UDK: 616.314-089.87-085.273.53

APPLICATION OF AUTOLOGOUS PLATELET-RICH FIBRIN (PRF) TO ENHANCE HEMOSTASIS, COAGULUM STABILITY, AND WOUND HEALING AFTER EXTRACTION OF TEETH 11–12–13 IN A PATIENT UNDER ANTIPLATELET THERAPY

ПРИМЕНА НА АВТОЛОГЕН ТРОМБОЦИТИТНО ЗБОГАТЕН ФИБРИН (ПРФ) ЗА ПОДОБРУВАЊЕ НА ХЕМОСТАЗАТА, СТАБИЛНОСТА НА КОАГУЛУМОТ И ЗАЗДРАВУВАЊЕТО НА РАНАТА ПО ЕКСТРАКЦИЈА КАЈ ПАЦИЕНТИ НА АНТИТРОМБОЦИТНА ТЕРАПИЈА

Ismaili Bimbashi A.[1], Evrosimovska B.[2], Apostolova G.[2], Janev E.[3], Veleska Stevkovska D.[3], Matlioska Kocevska T.[4], Laskovski H.[5], Ademi B.[6], Spasovski S.[2]

[1]PhD candidate at the Department of Oral surgery, Faculty of Dentistry in Skopje, University Sts.Cyril and Methodius, [2]Department of Oral Surgery, Faculty of Dentistry in Skopje, University Sts.Cyril and Methodius, [3]Department of Implantology, Faculty of Dentistry in Skopje, University Sts.Cyril and Methodius, [4]PhD candidate at the Department of Endodontics, Faculty of Dentistry in Skopje, University Ss.Cyril and Methodius, [5]Public Health Organization,Dental Clinical Centre St. Panteleimon, Skopje, [6]PhD candidate at the Department of Vascular surgery, Faculty of Medicine, University of Nish

Abstract

Introduction: Patients undergoing antiplatelet therapy are at increased risk of prolonged bleeding, impaired clot formation, and delayed wound healing following dental extractions. Traditional local hemostatic strategies may be insufficient, especially in elderly patients with comorbidities or during extractions involving multiple adjacent teeth. Platelet-Rich Fibrin (PRF), a second-generation autologous platelet concentrate, has demonstrated clinically significant benefits in enhancing hemostasis, stabilizing the initial clot, and accelerating softtissue regeneration. **Case report:** In this paper, we present a case of minimally traumatic extraction of teeth 11, 12, and 13 in a 74-yearold patient on ongoing aspirin therapy, followed by the immediate placement of autologous PRF membranes into the extraction sockets. Prompt hemostasis, stable clot formation, and excellent postoperative healing were observed. This case illustrates the clinical value of PRF as an adjunctive biomaterial in oral surgery for patients with impaired hemostatic capacity. **Conclusion:** The use of PRF proved to be effective in achieving local hemostasis, improving clot stability, enhancing soft tissue healing, and reducing postoperative pain and complications. As an autologous biomaterial, PRF carries no risk of allergic reactions and represents a safeand biologically favorable adjunct in oral surgical procedures for medically compromised patients. PRF should be considered a valuable hemostatic and regenerative biomaterial in the surgical management of patients maintained on antiplatelet therapy. **Keywords:** platelet-rich fibrin, antiplatelet therapy, aspirin, dental extraction, hemostasis, wound healing.

Апстракт

Вовед: Пациентите кои се на антитромбоцитна терапија се изложени на зголемен ризик од продолжено крвавење, попречена коагулација и одложено заздравување на раните по екстракцијана заби. Традиционалните локални хемостатски стратегии може да бидат недоволни, особено кај постари пациенти со коморбидитети или екстракцијана повеќе соседни заби. Фибринот богат со тромбоцити (PRF) кој претставува автологен концентрат на тромбоцити од втората генерација, покажува значајни придобивки во подобрување на хемостазата, стабилизирање на иницијалната фаза на коагулација и забрзување на регенеративното дејство кај меките ткива. **Приказ на случај:** Во овој труд презентираме случај на атрауматска екстракција на забите 11, 12 и 13 кај 74-годишен пациент на континуирана терапија со аспирин, проследено со итно поставување на автологни PRF мембрани во постекстракционите алвеоли. Забележана е брза хемостаза, стабилно формирање на крвен коагулум и одлично постоперативно заздравување. Овој случај ја илустрира клиничката вредност на PRF како дополнителен автологен биоматеријал во оралната хирургија кај пациенти со нарушена хемостаза. **Заклучок:** Употребата на PRF се покажа како ефикасна метода во постигнување локална хемостаза, подобрување на стабилноста на крвниот коагулум, забрзување на регенеративниот процес кај меките ткива и

намалување како на постоперативната болка така и на постоперативните компликации. Како автологен биоматеријал, PRF не носи ризик од алергиска реакција и претставува безбеден и биолошки поволен додаток во оралнохируршките процедури за медицински компромитирани пациенти. PRF треба да се смета за вреден хемостатски и регенеративен биоматеријал во хируршкиот третман на пациенти кои користат антитромбоцитна терапија. **Клучни зборови:** фибрин богат со тромбоцити, антитромбоцитна терапија, аспирин, екстракција на заб, хемостаза, заздравување на рани.

Introduction

Antiplatelet therapy is widely used for the prevention of thromboembolic events, particularly in elderly patients with coronary artery disease, coronary stents, or a history of myocardial infarction or ischemic stroke[1,2]. Aspirin, the most commonly prescribed antiplatelet agent, irreversibly inhibits cyclooxygenase-1(COX-1), suppressing thromboxane A_2 production and platelet aggregation[3]. While cardioprotective, this pharmacologic effect increases the risk of perioperative bleeding during dental procedures, particularly during tooth extractions.

Multiple studies have reported that patients on aspirin, clopidogrel, ticagrelor, or dual antiplatelet therapy exhibit prolonged bleeding times, reduced early clot stability, and delayed epithelialization following oral surgery[4-6]. Despite these risks, current clinical guidelines strongly advise against the discontinuation of antiplatelet therapy for routine dental extractions, as its interruption can precipitate major cardiovascular complications, including myocardial infarction or stent thrombosis[3,7,8]. Postoperative bleeding is typically mild, controllable with local hemostatic measures, and rarely requires systemic intervention[5,6,9].

To address these challenges, autologous platelet-derived biomaterials have gained attention for their hemostatic and regenerative potential. Platelet-RichFibrin (PRF), introduced by Choukroun et al., is prepared without anticoagulants, forming a dense fibrin scaffold containing platelets, leukocytes, cytokines, and growth factors such as PDGF, TGF-β1, and VEGF[10]. PRF accelerates angiogenesis, enhances softtissue regeneration, stabilizes the coagulum, and reduces postoperative inflammation-clinically relevant advantages in patients with compromised hemostasis[11,12].

Recent randomized clinical trials and systematic reviews have demonstrated that PRF improves hemostasis, reduces postoperative bleeding, accelerates epithelialization, and decreases postoperative complication rates such as alveolar osteitis, in patients on antiplatelet or anticoagulant therapy[13-15]. Given the increased bleeding tendency in elderly patients taking aspirin, especially in highly vascularized anatomical regions such as the anterior maxilla, PRF represents a safe, autologous, and effective approach to support hemostasis and tissue regeneration.

Case presentation

The patient, a 74-yearold female taking long-term antiplatelet therapy with acetylsalicylic acid (aspirin, 100 mg/day) for cardiovascular prophylaxis, presented to the dental clinic with complaints of pain, discomfort, and increased mobility of the maxillary anterior teeth 11, 12, and 13. Clinical examination revealed advanced periodontal destruction, chronic periapical inflammation, and severe loss of alveolar bone support affecting all three teeth. To accurately assess the extent of bone resorption and root condition, both panoramic radiography (orthopantomography) was performed, confirming extensive vertical and horizontal bone loss that rendered the teeth non-restorable and indicated the need for extraction (Figure 1, 2).

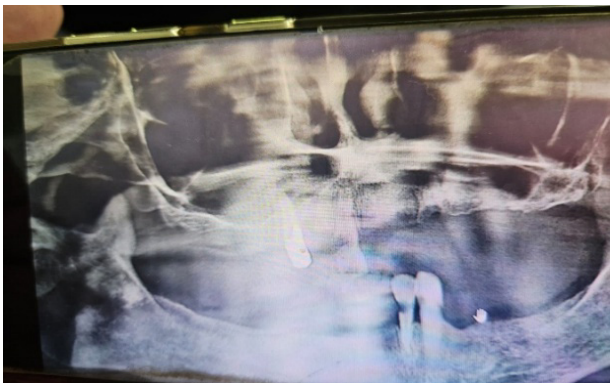

Figure 1. *Pre-operative panoramic radiograph presentation prior to PRF application*

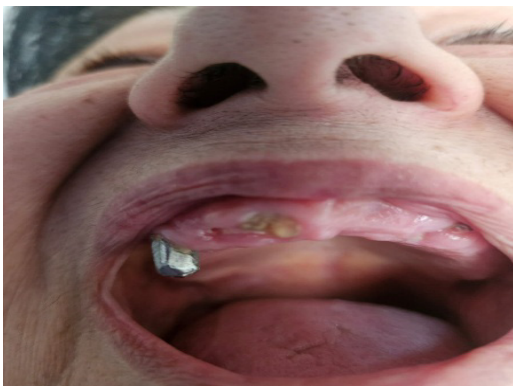

Figure 2. *Intraoral clinical*

Considering the patient's age, systemic status, and continuous aspirin therapy, the treatment plan followed current evidence-based clinical recommendations, which advise against discontinuation of single-antiplatelet therapy prior to routine dental extractions due to increased thromboem-

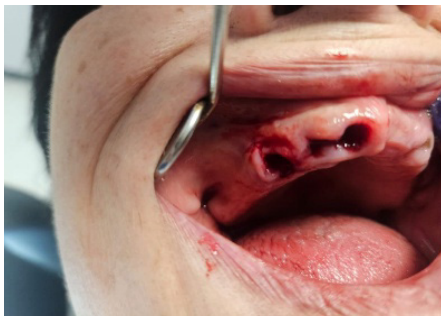

Figure 3. *Immediate post-extraction socketFigure*

Figure 4. *Blood taken for PRF preparation*

Figure 5. *Autologous PRF membrane prepared for application*

bolic risk. The patient was informed of the procedure, the possible bleeding risks, and the proposed measures for local hemostasis. Informed consent was obtained.

Atraumatic extraction of teeth 11, 12, and 13 was performed under local anesthesia, with careful preservation of the surrounding socket walls (Figure 3.). Immediately after extraction, platelet-rich fibrin (PRF), prepared from the patient's venous blood, was placed into all three extraction sites. PRF was selected to enhance clot stability, reduce postoperative bleeding, and promote softtissue and bone healing, serving as a bioactive scaffold rich in growth factors (Figure 4, 5.). The membranes were adapted into the sockets and stabilized with gentle pressure to ensure optimal tissue adaptation (Figure 6, 7.).

Appearance before PRF placement

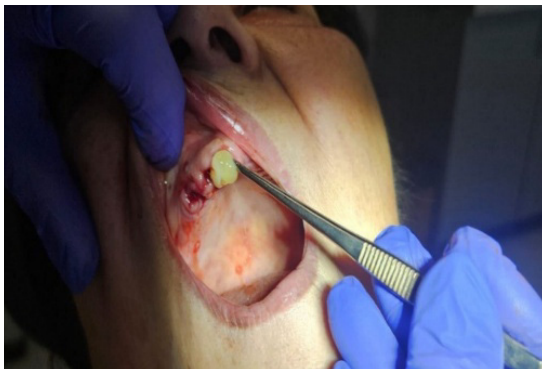

Figure 6.

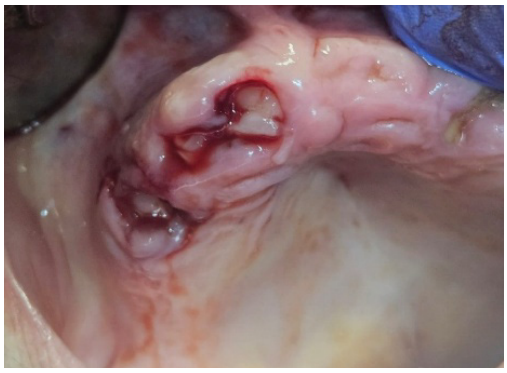

Figure 7.

Figure 6, 7. *Intraoperative placement of autologous PRF into the extraction socket*

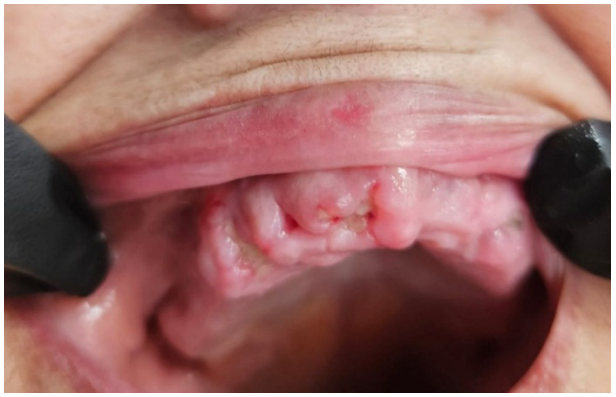

Figure 8. *Clinical appearance on follow-up demonstrating early soft-tissue healing after PRF application*

No immediate postoperative bleeding or complications were observed. Hemostasis was achieved through local measures without the need to alter aspirin therapy. The patient received postoperative instructions including avoidance of vigorous rinsing, monitoring of bleeding, and the use of analgesics compatible with antiplatelet therapy. At the 48-hour follow-up, the surgical sites showed satisfactory initial healing with no signs of infection or secondary hemorrhage. After one week, significant softtissue epithelialization and stabilization were evident (Figure 8.)

One month after the procedure, complete softtissue regeneration was observed, with stable and healthy mucosa covering all extraction sites and no late complications. The outcome demonstrated that the use of PRF in patients maintained on aspirin therapy provides effective local hemostasis and accelerates tissue repair, making dental extractions safe without interruption of antiplatelet medication.

Discussion

Dental extractions in patients under antiplatelet therapy are challenging due to impaired platelet functionand prolonged hemorrhage risk. Stopping aspirin is generally contraindicated, as thromboembolic events carry a higher morbidity and mortality risk than minor postoperative hemorrhage[3,7].

PRF enhances outcomes via several mechanisms. First, its dense fibrin matrix acts as a mechanical hemostatic plug and scaffold for platelet aggregation, stabilizing the initial clot in patients with reduced platelet function. Second, PRF provides sustained growth factor release, including PDGF, TGF-β1, and VEGF, which stimulate angiogenesis, fibroblast proliferation, collagen formation, and epithelial migration. Third, PRF reduces postoperative complications such as alveolar osteitis, infection, and delayed wound closure, while also minimizing pain and inflammation[11,12].

Several studies (2020–2025) have confirmed these findings: Varghese et al. demonstrated that PRF is superior to chitosan dressings in antiplatelet patients, achieving better hemostasis and faster epithelialization[10]. Andrade et al., in a systematic review, reported that PRF consistently reduces postoperative bleeding and promotes soft-tissue healing in patients on anticoagulant or antiplatelet therapy[11]. Rahman et al., in a meta-analysis of split-mouth randomized clinical trials, highlighted the efficacy of PRF in accelerating wound healing and reducing complications after dental extractions[12]. Compared with other local hemostatic agents, such as gelatin sponges or tranexamic acid, PRF provides both hemostatic and regenerative benefits, making it ideal for systemically compromised patients[13–15].

The presented case aligns with these findings. PRF allowed atraumatic extractions of three adjacent anterior teeth in a high-risk patient without discontinuation of aspirin, achieving rapid hemostasis, stable coagulum formation, and excellent softtissue healing.

Conclusion

In this case, PRF demonstrated clinical efficiacy as an adjunct in dental extractions for a patient on continuous aspirin therapy. It provided prompt and reliable hemostasis, stabilized the primary clot, accelerated softtissue healing, and minimized postoperative complications, all without interrupting antiplatelet medication. PRF should be considered as a valuable adjunctive measure in similar clinical cases where patients present with impaired hemostasis.

Reference

1. Napeñas JJ, Hong CH, Brennan MT. Dental management of patients on antiplatelet therapy. J Am Dent Assoc. 2013;144:1249–1260.
2. Lillis T, et al. Bleeding risk during dental extraction in patients taking antiplatelet drugs. J Oral Maxillofac Surg. 2014;72:2340–2347.
3. Sánchez-Pérez A, et al. Bleeding after dental extraction in patients receiving antiplatelet therapy. Clin Oral Investig. 2015;19:1915–1923.
4. Bajkin BV, et al. Dental extractions and risk of bleeding in patients taking single or dual antiplatelet therapy. J Oral Maxillofac Surg. 2015;73:1452–1459.
5. Ho J, et al. Risk of postoperative bleeding in patients on antiplatelet agents. Oral Surg Oral Med Oral Pathol Oral Radiol. 2018;125:55–61.
6. Ock C, et al. Bleeding frequency after dental extraction in patients on ASA, clopidogrel, or ticagrelor. J Am Dent Assoc. 2017;148:411–418.
7. Wahl MJ. Myths of dental surgery in patients receiving antithrombotic medications. J Am Dent Assoc. 2014;145:322–329.
8. Choukroun J, et al. Platelet-rich fibrin: a second-generation platelet concentrate. Oral Surg Oral Med Oral Pathol Oral RadiolEndod. 2001;92:429–435.
9. Miron RJ, Fujioka-Kobayashi M. Biology and clinical applications of PRF. Biomaterials. 2017;76:148–169.
10. Varghese KG, et al. Efficacy of PRF vs chitosan in antiplatelet patients. J Clin Exp Dent. 2020;12:e234–e241.
11. Andrade A, et al. PRF in patients under anticoagulant/antiplatelet therapy: systematic review. 2024;15:123–135.
12. Rahman S, et al. PRF in post-extraction healing: meta-analysis of RCTs. 2025;16:56–68.
13. Study: PRF vs tranexamic acid in patients on anticoagulants. 2022.
14. Study: PRF vs gelatin sponge in anticoagulated patients. 2023.
15. Evaluation of local hemostatic efficacy after dental extractions in patients taking antiplatelet drugs: randomized clinical trial. 2020.