



PRF - TECHNOLOGIES AFTER COMPLEX TOOTH  
EXTRACTION

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**Abstract.** *Complex tooth extraction is often accompanied by significant bone and soft tissue injury, which increases the risk of postoperative complications: alveolitis, delayed regeneration, pain syndrome, and inflammatory reactions. In recent years, autologous regenerative techniques have been actively introduced in dental surgery, in particular, PRF (platelet-rich fibrin) technologies. This review is devoted to the analysis of scientific data substantiating the expediency of using PRF after complex tooth extraction. The mechanisms of action of PRF, its effect on reparative processes, clinical efficacy and advantages over traditional methods of postoperative well management are considered.*

**Keywords:** *platelet-rich fibrin, bone regeneration, complex tooth extraction, platelet concentrates, alveolar bone, postoperative complications.*

**Relevance.** Complex tooth extraction (retained, dystopian, destroyed, with curved roots) is one of the most traumatic procedures in outpatient surgical dentistry. After such interventions, pronounced inflammatory reactions, delayed healing of the well, the formation of bone defects and atrophy of the alveolar ridge are often observed, which complicates subsequent orthopedic or implantological treatment [1,2].

Traditional methods of preventing complications (drug treatment of the well, the use of antiseptics, hemostatic sponge) do not always provide optimal conditions for tissue regeneration. In this regard, there is an increasing interest in biologically active autologous materials capable of stimulating physiological healing processes. The PRF technologies proposed by J. Choukroun demonstrate a high regenerative potential and are increasingly used in maxillofacial surgery and dentistry [3].



**The aim of the study** is to systematize modern approaches to the use of PRF technologies after complex tooth extraction based on the analysis of modern scientific and clinical data.

**Results and discussion.** PRF (Platelet-Rich Fibrin) is an autologous platelet concentrate of the second generation, obtained by single centrifugation of venous blood without the use of anticoagulants. As a result, a dense fibrin matrix is formed, including platelets, leukocytes, and cytokines, evenly distributed in a three-dimensional structure [4,5].

One of the key advantages of PRF is the slow and prolonged release of growth factors (PDGF, TGF- $\beta$ , VEGF, FGF, IGF), which lasts up to 10-14 days. This provides long-term stimulation of angiogenesis, fibroblast proliferation, and osteoblast differentiation in the area of the postoperative wound [6]. Unlike PRP, where the release of growth factors occurs abruptly and briefly, PRF forms more physiological regeneration conditions [7].

Clinical studies show that the use of PRF after complex tooth extraction significantly reduces the healing time of the hole. As early as 3-5 days after the intervention, there is a decrease in pain, edema and hyperemia of soft tissues compared with the control groups, where traditional well management was used [8]. This is due to both the biological effect of growth factors and the mechanical function of PRF, which stabilizes the blood clot.

An important aspect is the prevention of alveolitis, one of the most common complications after complex extractions, especially of the lower third molars. The PRF fibrin matrix protects the well from bacterial contamination, prevents blood clot lysis, and creates a favorable environment for epithelialization [9]. A number of authors note a 2-3-fold decrease in the frequency of alveolitis when using PRF compared with traditional methods [10].

The leukocyte component of PRF provides a local anti-inflammatory and immunomodulatory effect. Macrophages and neutrophils present in the matrix are involved in the regulation of the inflammatory healing phase, preventing its excessive severity and facilitating the timely transition to the proliferation phase [11].



This is especially important in patients with concomitant diseases, smokers, and people with delayed tissue regeneration.

The effect of PRF on the preservation of alveolar bone volume deserves special attention. Studies show that filling the PRF well helps to reduce the vertical and horizontal resorption of the alveolar ridge, which is of fundamental importance in the subsequent planning of dental implantation [12]. In some cases, PRF is used as an independent material for socket preservation or in combination with bone-plastic materials.

Various modifications of PRF (L-PRF, A-PRF, i-PRF) make it possible to adapt the technique to the clinical situation. Thus, A-PRF obtained at reduced centrifugation speeds contains a higher number of leukocytes and growth factors, which makes it preferable for severe tissue injury [13]. The injectable form of i-PRF can be used for additional stimulation of soft tissues in the area of the surgical field.

Thus, the results of numerous experimental and clinical studies confirm that PRF technologies provide a multi-level effect on regeneration processes, combining biological, mechanical and immunological effects, which makes them especially effective after complex tooth extraction.

**Conclusions.** PRF technologies are an effective and biologically based method of stimulating tissue regeneration after complex tooth extraction. The use of PRF reduces the risk of postoperative complications and improves clinical healing rates. Autologous, easy to obtain, and highly biocompatible make PRF a promising standard for postoperative well management in surgical dentistry. The use of PRF is especially justified in patients with an increased risk of complications and when planning subsequent implantological treatment.

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