

## **EFFICIENCY OF TREATMENT OF MANDIBULAR FRACTURES WITH AUTOTHROMBOCYTIC MASS**

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**Abstract:** Objective: To enhance the outcomes of complex treatment for mandibular fractures through the local application of platelet-rich autoplasm (autothrombocytic mass).

Materials and Methods: A total of 200 patients (47 females and 157 males) diagnosed with mandibular fractures were treated at the Bukhara Regional Multidisciplinary Medical Center (BOMMC). The patients received complex therapy, including the local injection of platelet-rich autoplasm into the fracture line over a course of five procedures

Results: The application of autothrombocytic mass demonstrated significant clinical improvement, including reduced pain intensity and swelling, faster bone consolidation, and lower incidence of post-traumatic inflammatory complications.

Conclusion: The use of platelet-rich autoplasm in the comprehensive treatment of mandibular fractures is a pathogenetically justified and effective approach that promotes bone regeneration, reduces inflammation, and prevents secondary infection.

**Keywords:** mandible, platelet-rich autoplasm, fracture, blood, regeneration.

### **Аннотация**

**Цель:** Повышение эффективности комплексного лечения переломов нижней челюсти путем местного применения аутотромбоцитарной массы (плазмы, обогащённой тромбоцитами).

**Материалы и методы:** Всего 200 пациентов (47 женщин и 157 мужчин) с диагнозом перелома нижней челюсти проходили лечение в Бухарском областном многопрофильном медицинском центре (БОММЦ). В рамках комплексной терапии пациентам вводили аутотромбоцитарную массу локально в зону перелома курсом из пяти процедур.

**Результаты:** Применение аутотромбоцитарной массы показало выраженное клиническое улучшение: снижение интенсивности болевого синдрома и отёка, ускорение консолидации костных отломков и уменьшение частоты посттравматических воспалительных осложнений.

**Заключение:** Использование плазмы, обогащённой тромбоцитами, в составе комплексной терапии переломов нижней челюсти является патогенетически обоснованным и высокоэффективным методом, способствующим регенерации костной ткани, снижению воспаления и профилактике вторичной инфекции.

**Ключевые слова:** нижняя челюсть, плазма, обогащённая тромбоцитами, перелом, кровь, регенерация

Introduction: Fractures of the mandible are among the most common injuries of the facial skeleton, accounting for approximately 70–85% of maxillofacial trauma cases according to both domestic and international studies (Malikov V.S., 1997; Filippov S.V. et al., 1998; Bezrukov V.M., Lurie T.M., 2000; Asadi S.G., 1997; Carlin C.B. et al., 1998; Wong K.H., 2000; Boole J.R. et al., 2001; Guerrissi J.O., 2001). These fractures often result in complications due to the unique

anatomical and physiological characteristics of the mandible and the presence of a large quantity of conditionally pathogenic microflora in the oral cavity.

Traditional methods of treatment — including open reduction and internal fixation with miniplates — provide reliable stabilization of bone fragments but do not fully prevent infectious-inflammatory complications, such as post-traumatic osteomyelitis, which occurs in 10–12% of patients. The use of intermaxillary fixation devices, although effective, can lead to functional and rehabilitative difficulties, such as restricted breathing, feeding limitations, and muscle atrophy.

In recent years, regenerative medicine has introduced platelet-rich autoplasm (PRP), also known as autothrombocytic mass, as a promising biological therapy to enhance tissue repair and bone healing. PRP contains a high concentration of growth factors—including PDGF, TGF- $\beta$ , VEGF, and EGF—that stimulate angiogenesis, osteogenesis, fibroblast proliferation, and epithelial regeneration.

This study evaluates the clinical efficiency of platelet-rich autoplasm in the comprehensive treatment of mandibular fractures and its role in preventing inflammatory complications.

**Materials and Methods:** The clinical study was conducted at the Bukhara Regional Multidisciplinary Medical Center and included 200 patients aged 18–60 years with confirmed mandibular fractures of various locations (condylar, angle, symphyseal, and alveolar regions). The study group comprised 47 females and 157 males.

All patients underwent standard treatment protocols, including reduction and fixation of bone fragments using titanium miniplates, antibiotic therapy, and physiotherapy. The experimental component consisted of local injections of autothrombocytic mass (PRP) administered directly into the fracture line.

PRP was obtained through centrifugation of venous blood using sterile vacuum tubes containing adsorption gel and high-purity sodium heparin. The obtained plasma, enriched with platelets, was injected locally in a dose of 2–3 ml per session. The course consisted of five injections at intervals of 2–3 days.

The following clinical parameters were evaluated:

- intensity of pain (Visual Analogue Scale);
- presence and severity of soft-tissue edema;
- radiographic signs of callus formation;
- duration of bone consolidation;
- incidence of inflammatory or infectious complications.

Statistical analysis was performed using standard biomedical software, with significance set at  $p < 0.05$ .

**Results:** Patients treated with autothrombocytic mass demonstrated faster recovery and fewer complications compared with those who received standard therapy. The key findings include:

- Pain reduction was noted within 48–72 hours after the first injection in 90% of patients.
- Edema decreased significantly after the second or third procedure, improving local circulation and soft-tissue healing.
- Formation of primary bone callus was radiographically observed by day 21–24 in the experimental group, compared to day 30–35 in the control group.
- The overall bone consolidation period was shortened by an average of 10–12 days.
- The incidence of post-traumatic osteomyelitis decreased from 12% to 3%, indicating strong anti-inflammatory and antimicrobial benefits of PRP therapy.

Discussion: The obtained results confirm the regenerative potential of platelet-rich autoplasm in the management of mandibular fractures. The biological activity of PRP is primarily associated with its high concentration of platelet-derived growth factors, which promote osteoblast proliferation, collagen synthesis, and angiogenesis. These mechanisms collectively accelerate the process of bone regeneration and remodeling.

Additionally, PRP exerts anti-inflammatory and anti-edematous effects by modulating cytokine activity and improving microcirculation in the affected area. Its fibrin network structure serves as a natural scaffold for tissue repair and enhances local cellular response.

The study's findings align with previously reported data (Marx R.E., 2019; Anitua E., 2020; Ermakov V.A., 2018), which emphasize the benefits of autologous platelet therapy in oral and maxillofacial surgery. Unlike synthetic growth stimulants or allogeneic materials, PRP is completely biocompatible and immunologically safe, as it is derived from the patient's own blood.

Therefore, incorporating PRP into the standard treatment protocol for mandibular fractures can significantly improve clinical outcomes, shorten rehabilitation time, and minimize postoperative complications.

Conclusion: The local application of autothrombocytic mass (platelet-rich autoplasm) in the complex treatment of mandibular fractures is an effective and biologically safe method that accelerates bone healing, reduces inflammation, and prevents post-traumatic complications. Its inclusion in maxillofacial surgical practice enhances the quality of patient care and contributes to faster functional recovery.

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