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## CHOICE OPERATION TO REDUCE THE REHABILITATION PERIOD IN ANGLE OF THE LOWER JAW FRACTURES

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### ABSTRACT

The author investigated 30 patients who were selected requiring reduction and fixation of a fracture of the angle of the lower jaw. Patients were divided into 3 groups depending on the surgical access (for fracture of the angle of the lower jaw) used to fix the material. The results showed that, in the first group, intermaxillary fixations were removed 3 weeks after the operation, as a result of which the rehabilitation

period lasted 4-5 weeks. In the patients of the second group, the maxillary fixation was removed 1 week after the operation, their rehabilitation period lasted 2-3 weeks, and in the third group of patients the maxillary fixation was not required, and the rehabilitation period lasted 7-10 days.

**Keywords:** bone fracture, angle of the lower jaw, osteosynthesis of the lower jaw, titanium mini-plate, buccal trocar, choice of operation.

## ОПЕРАЦИИ ДЛЯ СОКРАЩЕНИЯ РЕАБИЛИТАЦИОННОГО ПЕРИОДА ПРИ ПЕРЕЛОМАХ НИЖНЕЙ ЧЕЛЮСТИ

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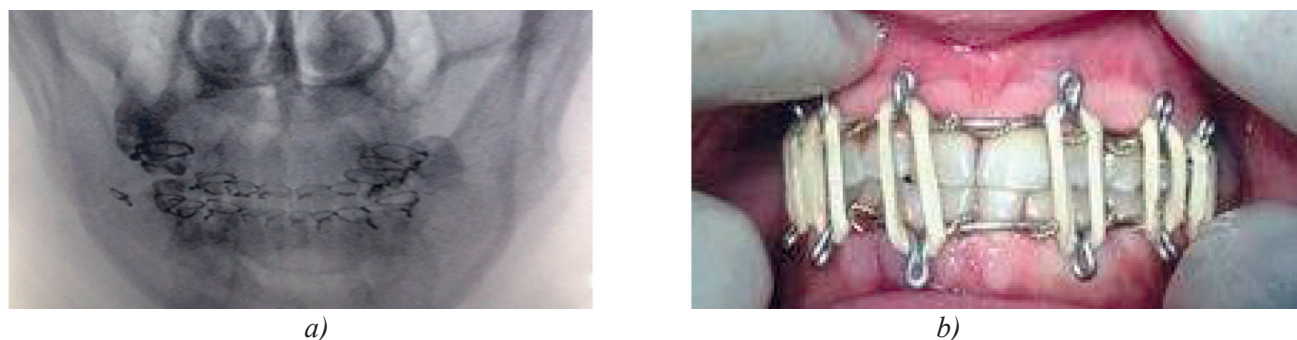
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### РЕЗЮМЕ

Автором обследовано 30 пациентов, которым требуется репозиция и фиксация перелома угла нижней челюсти. Пациенты были разделены на 3 группы в зависимости от хирургического доступа (при переломе угла нижней челюсти), использованного для фиксации материала. Результаты показали, что в первой группе межчелюстные фиксации были сняты через 3 недели после операции, в результате чего реабилитационный период длился

4-5 недель. У пациентов второй группы верхнечелюстная фиксация была снята через 1 неделю после операции, их реабилитационный период длился 2-3 недели, у пациентов третьей группы межчелюстная фиксация не потребовалась, а реабилитационный период длился 7-10 дней.

**Ключевые слова:** перелом кости, угол нижней челюсти, остеосинтез нижней челюсти, титановая мини-пластина, буккальный троакар, выбор операции.



**Fig 1. Reposition and fixation with bone suture. a) X-ray picture. b) Inter maxillary fixation**

**Relevance of the research:** The mandibular angle is usually associated with fractures due to the presence of third molars, a thinner cross-sectional area than the area carrying the tooth and the biomechanical angle of the tooth represents the “lever” area. Successful treatment of mandibular fractures depends on smooth healing in the correct anatomical position under stable conditions [3, 7].

The treatment of angular fractures is characterized by the highest complication rates among mandibular fractures and there is no specific treatment for optimal treatment [5], and the optimal treatment for an angular fracture of the mandible remains disputable. Historically, the treatment of mandibular fractures has included intraoperative maxillary fixation along with hard internal fixation [4]. At the present time, lamellar miniplates have been popular [1, 6], which ensure the stability of bone fragments. Treatment of angular fractures of the lower jaw using bone sutures with external access and intermaxillary fixation turned out to be relatively easy [2], but requires a long rehabilitation time and leads to damage to periodontal tissue, impaired oral hygiene, and exacerbation of gastrointestinal diseases.

It has been shown that, when comparing intraoral access to extra oral access in the treatment of mandibular angle fractures, there were three advantages: skin scarring was minimal, visualization of the occlusion was maintained throughout the

procedure, and damage to the branches of the facial nerves and other anatomical structures was reduced. [7] In addition, the fixation of the mini-monocortical plate is a reliable method of providing rigid fixation, and it offers a reasonable alternative to bicortical coverage for most mandibular fractures.

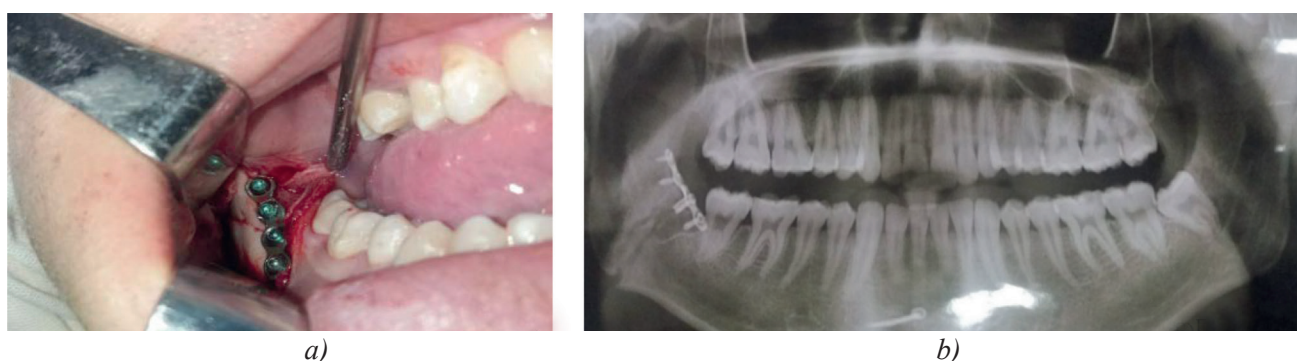
Proceeding from this, the objectives of our study were to assess and select methods of treatment for fractures of the mandibular angle, to shorten the rehabilitation period.

**Materials and research methods.** In this research, 30 patients were randomly selected regardless of age, gender, requiring reduction and fixation of the mandibular fracture. The study excluded patients with fragment fractures of the angle, patients with systemic problems. All patients underwent intermaxillary fixation during the operation. All patients were operated on under general nasotracheal anesthesia after laboratory and instrumental examination.

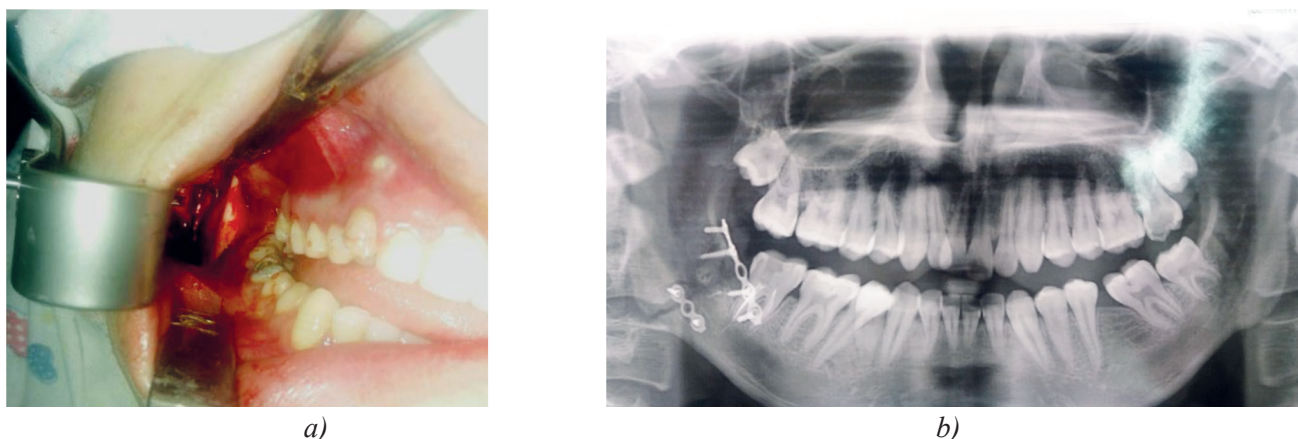
The patients were divided into 3 groups depending on the surgical approach (for the fracture of the mandibular angle) used to fix the material and precisely:

1. Extra oral group (8 patients), where access to the fracture site was through a submandibular incision. The fracture was fixed with a bone suture and an inter maxillary fixation on day 21 (Fig. 1)

2. Intra oral group (12 patients), where access to the fracture site was through an intraoral vestibular



**Fig. 2. Reduction and fixation with one mini-plate. a) Intraoperative image. b) Orthopantomogram after surgery**



**Figure 3. Screw fixation using a trocar and cannula through a transbuccal puncture incision. a) Intraoperative image. b) Orthopantomogram after surgery**

incision. The fracture was fixed with one miniplate and screws and an inter maxillary fixation for 7 days (Fig. 2).

3. Transbuccal group (10 patients), where the fracture site was repaired through an intraoral vestibular incision, and drilling and fixation of screws with a trocar and cannula through a buccal puncture incision. The fracture was fixed with 2 miniplates and screws without inter maxillary fixation (Fig. 3).

Results and discussion: All cases were followed up for a minimum of 6 months and a maximum of 24 months. Initially, after discharge from the hospital, patients were followed weekly for the first month, then once every 15 days for the next 2 months, then once every 3 months. All cases were assessed according to the following parameters:

- Fracture type: assessed by orthopantomogram, MSCT and intraoperative clinical examination.
- The necessity for intermaxillary fixation, the duration of the intermaxillary fixation.
- The fate of the tooth in the fracture line. The tooth is removed if there is a fracture of the tooth itself or

if it interferes with the reduction of the fracture or if there is an infection or any periodontal problems.

- Occlusal discrepancy: There was no change in occlusion within 4 weeks. Occlusion was assessed as follows:

1. Normal occlusion / functional occlusion.
2. Moderate disorder - reasonable but not accurate bilateral contact.
3. Gross disorder - no contact or contact in one or two teeth or open bite.

- Pain Assessment: Assessment using a visual analogue scale given to patients on a printed form on the following days:

Visual analogue scale: (0-10)

- Trismus Assessment: Trismus is measured as the maximum width between the incisors (meso-incisal angle of the right upper and lower central incisors) using a divider and calibrated ruler and recorded value. If incisors are missing, adjacent teeth are considered.

- Infection at the site of the fracture: Edema, pain, soreness, wound enlargement, or pus at the site of surgery are assessed.



**Figure 4. Buccal trocar, cannulas, drill and screwdrivers**



Chart 1. Criteria for assessment of patients patients in the compared groups by type of surgery

Criteria of assessment	Extraoral (10 patients)	Intraoral (12 patients)	Transbuccal (8 patients)
Paresthesia	Reported in 3 patients	Reported in 2 patients	Reported in 2 patients
Occlusion	Functional occlusion was achieved in all patients	Functional occlusion was achieved in all patients	Functional occlusion was achieved in all patients
Pain	From midle to moderate	From midle to moderate	From midle to moderate
Maximum mouth opening	3 weeks after surgery 22.60mm, 1 month after surgery 40.10mm	1 week after surgery 23.17mm, 1 month after surgery 40.83 mm	The day after surgery 22.88mm, 1 month after surgery 40.75 mm
Recurrent infection	Observed in 1 patient	Observed in 1 patient	Not observed in any patient
Tooth fracture in line	Retrieved from all patients	Retrieved from all patients	Retrieved from all patients
Scar	In all patients, an inconspicuous scar in the submandibular region	No scar found	Invisible scar like a freckle in the cheek area
Necessity to removing the plate	In one patient due to recurrent infection	In one patient due to recurrent infection	not observed

Mild to moderate infection – controlled by postoperative antibiotic therapy and / or incision and drainage.

Severe recurrent infection - Treated with antibiotic therapy and plate removal.

- Scar on the operated area: assessed only by clinical examination.

The use of a single mini-plate for fractures of the mandibular angle, where access to the fracture site was through an intraoral vestibular incision, was a reliable technique with relatively few complications, but intermaxillary fixation was still required.

The treatment of angular fractures of the mandible using two mini-plates, where the fracture site was repaired through an intraoral vestibular incision, and drilling and fixation of screws with a trocar and

cannula through a buccal puncture incision, turned out to be technically relatively difficult, but led to a complete abandonment of intermaxillary fixation.

Criteria for evaluating patients in the compared groups by types of surgery for fractures of the mandibular angle (chart 1.).

As can be seen from the table, the use of a transbuccal approach with two mini-plates for the treatment of fractures of the mandibular angle led to a complete rejection of intermaxillary fixation, which was the cause of long rehabilitation, damage to periodontal tissue, impaired oral hygiene, and exacerbation of gastrointestinal diseases. Beneficial outcomes in the treatment of an angular fracture depend on proper care, adequate armor, knowledge of surgical anatomy, and the necessary fracture management skills.

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