

# Treatment algorithms of double one- and both side fractures of condylar process and mandibular body

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## ABSTRACT

Double one- and both side mandibular fractures, including the condylar process and body, are the most difficult from the viewpoint of their diagnosis and treatment. The orthopedic and surgical treatment indications of condylar fractures are very poorly described in special literature. The aim of this research is the synthesis of treatment algorithms of these fractures, based on the clinical experiment of more than 80 patients, investigated in Dentistry clinic of Yerevan State Medical University from 1992 to 1999 years.

**KEYWORDS:** *mandible, fracture, condylar process, mandibular body, osteosynthesis, pallet-lining*

**M**andibular fractures constitute from 74% to 95% of all maxillofacial fractures (P.G. Sisoliatin, N.A. Fedosov, 1987; M.A. Lamberg 1977; P. Oshanski 1980 et al.). 45,6% is presented by double one- and both side fractures of mandible. Of them 42% are condylar process fractures in combination with mandibular body fractures (B.D. Kabakov, V.A. Malishev 1981).

Diagnostics of double one- and both side mandibular fractures depending on localization has been related with certain difficulties often leading to diagnostic errors. With updating and improvement of methods of radiological investigations, computed-scanning in particular and introduction of zonography and panoramic radiography, greatly improved diagnostics of the above-mentioned disorders.

The treatment of double one- and both side mandibular fractures involving condylar process still remains as a problem due to absence of sharp indications for certain surgical and conservative interventions. All of these eventually lead to such posttraumatic period complications as disorders of occlusion, arthritis, arthrosis, false joint etc.

The aim of present work was to determine the treatment algorithms of double one- and both side mandibular fractures for improvement of patients' treatment quality.

## MATERIAL AND METHODS

Material for investigation was thorough analysis of special literature, archive material of more than 200 patients underwent treatment course in our clinic from 1992 to 1999 years, and own observations of 87 patients with double one- and both side mandibular fractures.

## RESULTS AND DISCUSSION

Treatment of patients with double one- and both side mandibular body and condylar fractures are related with certain difficulties unlike ordinary and double fractures located in dentition. It is hard and not always achieved congruence and fixation of all fragments with the commonly used methods involving splints and rubber linings.

The methods being used for treatment of patients with the above-mentioned pathology are subdivided into following groups:

### 1. Orthopedic treatment

2. Surgical treatment
3. Medicament treatment
4. Physical treatment
5. Functional treatment

Use of one or two methods of treatment has no satisfactory result and supports development of posttraumatic complications and significantly worsens quality of life.

The complex treatment of double one- and both side mandibular fractures led to firm positive results, even to complete restoration of normal occlusion and masticatory function.

Patients, who underwent different complex treatment measures were divided into three major groups.

1. Fractures without displacement – 23 patients
2. Fractures with great displacement in one of the localizations and without it, or with insignificant displacement in another – 33 patients.
3. Fractures with great displacement of fragments in both localizations – 31 patients.

The second group in turn was subdivided into two subgroups:

- A. Fractures with great displacement in condylar process and without displacement, or with small displacement in teeth row – 17 patients.
- B. Fractures with great displacement in dentition and without displacement, or with small displacement in condylar process – 16 patients.

The group I patients were subjected to orthopedic treatment using the supradental aluminium splint in the presence of quite firm teeth. In case of insufficient number of teeth, or their instability, or complete absence of them, the removable prosthesis in complex with individual plaster four-tailed bandage was used. In part of patients during treatment of double one- and both side fractures of mandibular body and condylar process using bimaxillary splints with rubber traction, interteeth elastoplastic plate was used with the purpose to remove the strain of masticatory muscles, also for prophylaxis of their coordination and dysfunction of temporo-mandibular articulation and for provision of state of physiologic rest.

| Group of patients<br>Methods of treatment | Group I   | Group II<br>Subgroup A   | Group II<br>Subgroup B   | Group III  |
|---|---|--|--|--|
| <b>Orthopedic</b>                         | <ol style="list-style-type: none"> <li>1. Supradental splints with grasping loops and rubber -traction</li> <li>2. Smooth splint-stirrup</li> <li>3. Fast-hardening plastic teeth-spreader at the site of extracted tooth</li> <li>4. Individual plaster four-tailed bandage</li> <li>5. Elastoplastic plate for physiologic rest at bimaxillary fixation</li> <li>6. Individual cappa</li> </ol> | <ol style="list-style-type: none"> <li>1. Supradental splints with grasping loops and rubber -traction</li> <li>2. Fast-hardening plastic teeth-spreader at the site of extracted tooth.</li> <li>3. Pallet-lining between molars from the site of condylar process fracture</li> <li>4. Elastoplastic plate for physiologic rest at bimaxillary fixation</li> </ol> | <ol style="list-style-type: none"> <li>1. Supradental splints with grasping loops and rubber -traction</li> <li>2. Individual plastic four-tailed bandage</li> <li>3. Fast-hardening plastic teeth-spreader at the site of extracted tooth</li> <li>4. Elastoplastic plate for physiologic rest at bimaxillary fixation</li> </ol>                           | <ol style="list-style-type: none"> <li>1. Fast-hardening plastic pallet for oral closure in position of central occlusion</li> <li>2. Pallet-lining between molars from the site of condylar process fracture</li> <li>3. Fast-hardening plastic teeth-spreader at the site of extracted tooth</li> <li>4. Supradental splints with grasping loops and rubber -traction</li> </ol> |
| <b>Surgical</b>                           | <ol style="list-style-type: none"> <li>1. Tooth extraction from the line of fracture</li> </ol>   | <ol style="list-style-type: none"> <li>1. Tooth extraction from the line of fracture</li> <li>2. Osteosynthesis at the region of condylar process</li> <li>3. Intraoral osteosynthesis at the region of mandibular body</li> </ol>   | <ol style="list-style-type: none"> <li>1. Tooth extraction from the line of fracture</li> <li>2. Non-oral or intraoral osteosynthesis at the region of mandibular body</li> </ol>  | <ol style="list-style-type: none"> <li>1. Tooth extraction from the line of fracture</li> <li>2. Non-oral osteosynthesis at the region of condylar process and non-oral osteosynthesis of mandibular body</li> </ol>   |
| <b>Medicament</b>                         | <ol style="list-style-type: none"> <li>1. Analgesics</li> <li>2. Antibiotics</li> <li>3. Preparations enhancing osteogenesis (Ca gluconat)</li> <li>4. Vitamins and polivitamins</li> </ol>   | <ol style="list-style-type: none"> <li>1. Analgesics</li> <li>2. Antibiotics</li> <li>3. Preparations enhancing osteogenesis (Ca gluconat)</li> <li>4. Vitamins and polivitamins</li> </ol>  | <ol style="list-style-type: none"> <li>1. Analgesics</li> <li>2. Antibiotics</li> <li>3. Preparations enhancing osteogenesis (Ca gluconat)</li> <li>4. Vitamins and polivitamins</li> </ol>  | <ol style="list-style-type: none"> <li>1. Analgesics</li> <li>2. Antibiotics</li> <li>3. Preparations enhancing osteogenesis (Ca gluconat)</li> <li>4. Vitamins and polivitamins</li> </ol>  |
| <b>Physical</b>                           | <ol style="list-style-type: none"> <li>1. Cold at the first entrance</li> <li>2. UV-radiation of collar region with suberythematous doses</li> <li>3. Electrophoresis with calcium preparations</li> <li>4. UHF-therapy of condylar process</li> </ol>  | <ol style="list-style-type: none"> <li>1. Cold at the first admission</li> <li>2. UV-radiation of collar region with suberythematous doses</li> <li>3. Electrophoresis with calcium preparations</li> <li>4. UHF-therapy of condylar process</li> </ol>  | <ol style="list-style-type: none"> <li>1. Cold at the first admission</li> <li>2. UV-radiation of collar region with suberythematous doses</li> <li>3. Electrophoresis with calcium preparations</li> <li>4. UHF-therapy of condylar process if osteosynthesis of condylar process is not carried out.</li> </ol>  | <ol style="list-style-type: none"> <li>1. Cold for 2 days after operation</li> <li>2. UV-radiation of collar region with suberythematous doses</li> <li>3. Electrophoresis with calcium preparations</li> </ol>  |
| <b>Functional</b>                         | <ol style="list-style-type: none"> <li>1. First maxillary diet for 2 weeks</li> <li>2. Transition on the second maxillary diet for 9-10 days after removal of rubber- traction</li> <li>3. Self-massage</li> <li>4. Oral cavity and dental care</li> <li>5. Exercise therapy</li> </ol>   | <ol style="list-style-type: none"> <li>1. In case of condylar process osteosynthesis, the first maxillary diet for a week.</li> <li>2. Transition on the second maxillary diet for 5-7 days after removal of rubber-traction</li> <li>3. Self-massage</li> <li>4. Oral cavity and dental care</li> <li>5. Exercise therapy</li> </ol>                                | <ol style="list-style-type: none"> <li>1. The first maxillary diet on 3<sup>rd</sup>-5<sup>th</sup> day, in case of maxillary body osteosynthesis</li> <li>2. Transition on the second maxillary diet for 5-7 days after removal of rubber-traction</li> <li>3. Self-massage</li> <li>4. Oral cavity and dental care</li> <li>5. Exercise therapy</li> </ol> | <ol style="list-style-type: none"> <li>1. During first 3-4 days – the first maxillary diet</li> <li>2. Transition on the second maxillary diet for 4-5 days</li> <li>3. Self-massage</li> <li>4. Oral cavity and dental care</li> <li>5. Exercise therapy</li> </ol>   |

**Tab.1** Distribution by age group, marital status and educational levels.

Surgical treatment of patients in this group involved tooth extraction from the line of fracture. Thereafter, in the area of extracted tooth, the teeth spreader was made from fast-hardening plastic by the method of V.V. Lisenko and G.R. Kocharian (1986).

Splint with teeth spreader provided best fixation of mandibular body fragments.

Medicament treatment has been selected individually and has symptomatic nature.

Physical treatment denotes application of cold immediately at the entrance of patient. From the second day, the UHF-therapy of condylar process, UV- radiation of collar region and on the 5th –6th days electrophoresis with calcium preparations in the region of mandibular body fracture have been used.

In the second group patients the great displacement of fragments in one of the two localizations and in another localization - absence or insignificant displacement of fragments have been observed. In the first subgroup of patients the orthopedic treatment included use of bimaxillary splints with grasping loops. Thereafter, according to indications the tooth was extracted from the fracture line and in the region of extracted tooth the teeth spreader, made from fast-hardening plastic, was manufactured. The pallet-lining, made of fast-hardening plastic material, has been used as well. It was placed before application of rubber traction between molars of upper and lower jaws at the site of condylar process fracture.

When indications for surgical removal of tooth from the line of fracture (in an attempt to harden fixation of fragments in the region of mandibular body fracture) are absent, before placing of pallet-lining, the intraoral

osteosynthesis with the use of titanic constructions has been carried out.

In case of great displacement of condylar process, when orthopedic methods of treatment are unable to provide normal position and fixation of fragments, the osteosynthesis has been performed.

Treatment of the second subgroup patients involve tooth extraction from the line of fracture according to indications, and intra- or non- oral osteosynthesis in the region of mandibular body. Orthopedic treatment includes manufacture of individual plaster four-tailed bandage or double-jaw splinting.

The third group patients underwent surgical treatment – non-oral osteosynthesis, and in some cases – intra-oral osteosynthesis

The patients of all groups were subjected to complex medicament, physical and functional treatment as had been described.

The generalized methods of treatment in the form of algorithms have shown in details in *Tab.1*.

### CONCLUSIONS

Suggested scheme of treatment algorithms provides preconditions for complex approaches to double one- and both side mandibular fractures, including the condylar process and mandibular body that provides high-quality treatment of patients suffering from the above-mentioned pathology in maximally short-period of time and prophylaxis of posttraumatic near and farther complications.

Use of treatment algorithms improved results of treatment of more than 80 patients of given category, who were under observation and treated in our clinic.

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## **Лечебные алгоритмы одно- и двухсторонних переломов мыщелкового отростка и тела нижней челюсти**

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### **Р Е З Ю М Е**

Одно- и двухсторонние мандибулярные переломы, включая мыщелковый отросток - самые трудные с точки зрения их диагностики и лечения. Ортопедическое и хирургическое лечение мыщелкового перелома недостаточно освещается в специальной литературе. Цель исследования – синтез лечебных алгоритмов этих переломов, основанных на клиническом эксперименте свыше 80-и пациентов, исследованных в стоматологической клинике Ереванского медицинского университета в 1992-96 г.г.

**Ключевые слова:** *нижняя челюсть, перелом, мыщелковый отросток, мандибулярное тело, остеосинтез*