

Modern Concept of Minimally Invasive Treatment of Military Personnel With Mandibular Fracture

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Abstract

Background: The treatment and rehabilitation of military servicemen with mandibular fractures at the hospital stage is an important medical, social and economic problem.

Methods: A clinical study was conducted in 63 military servicemen with mandibular fractures, which injured during warfare in eastern Ukraine in the 2014-2019. The analysis of the potential use for the fragments intermaxillary fixation standard band splint vs the titanium pins and elastic traction for the treatment of mandibular fractures in military personnel has been carried out.

Results: On the results of seven-year findings of administration in military servicemen injured during the hybrid war on the East of Ukraine, the advantages of using maxillomandibular fixation with screws for the treatment of mandibular fractures were illustrated.

Conclusion: The operative treatment of mandibular fractures in military personnel preference should be given to method of maxillomandibular fixation with intermaxillary fixation screws, which provides with the high quality reposition and fixation.

Trial registration: The work is a fragment of the research project of the Oral Surgery, Implantology and Periodontology Department of Dnipro State Medical University: «Development of methods for the prevention of complications in the treatment of inflammatory state and traumatic injuries in the maxillofacial area», state registration № 0113U005253 and applied research carried out in 2020-23 at the expense of the government funding "The prognosis, prevention and treatment of delayed union of bone tissue in patients with fractures of the jaws" № 0121U109420.

Background

Over the last decade, there has been an increase of the traumatic injuries, of which mandibular fractures (MF) rank high. The imperfection and costly characteristic of MF treatment methods are sensed by practicing maxillofacial surgeons within the conditions of protracted military conflicts in the context of hybrid wars [1]. The specialty of deliver health care in these settings is associated primarily with the fact that hostilities break out in direct proximity to populated locality, residential areas, motorways and other communication routes [2]. The fast-paced combat situation requires an adequate response in the deployment of medical aid stations, and specialized medical care is often provided in medical centers at a distance from the line of army actions [3].

Thus, the patients with MF usually do not receive adequate medical care at the triage stage, which is due to two defining points: firstly, absolutely justified when MF is combined with other severe injuries, an emergency capacity of medical care are provided and immobilization of MF fragments is carried out already in hospital; secondly, patients with MF in a satisfactory condition is rendered a minimal attention at the prehospital stage for saving time, what is especially important in the case of massive injections of wounded men.

Considering the above, the treatment of military servicemen with MF at the hospital stage is an important medical, social and economic problem that requires the health care system resources mobilization.

Methods

A clinical study was conducted in 63 military servicemen with MF, which were injured during warfare in eastern Ukraine in the 2014–2019. All patients received tardive specialized medical care in the Dnieper Military Hospital or Dnieper regional clinical hospital. The verification of the clinical diagnosis was carried out on the basis of clinical and X-ray pattern.

Results

Method of intermaxillary (IM) splinting showed low efficacy in cases of displaced MF and required additional time for postoperative correction of the fragments position.

For illustrative purposes, here is a brief abstract of case history. The patient G., 21 years old, MF in the area of 32, 33 teeth (Fig. 1A). On the primary orthopanthogram noted the diastase between the fragments is 5 mm (Fig. 1C). The band splints were applied, manual repositioning and fixation with the rubber tractions were performed. However, on the 7th day on the orthopanthogram noted a displacement of fragments (Fig. 1D), mandibular band splint was cut at the level of MF and changed the direction of the rubber traction (Fig. 1B) until the restoration of occlusion (Fig. 1E).

MMF in military personnel was a simple, minimally invasive and reliable method, which easily allows postoperative correction of their position, if necessary.

For illustrative purposes, here is a brief abstract of case history. The military serviceman P., 22 years old, MF in the area of 34, 35 teeth. MMF with six IMF Screws (See Fig. 2, 3, Additional File 1).

MMF with IMF screws also well recommended as an additional method of fixation at the gunshot fragment wounds of the mandible with major defects of bone tissue.

As an example, we will give the following clinical case: a volunteer soldier M., 56 years, received a MF as a result of a mine-blast trauma. For the fragment's fixation was used the titanium plate; for the adjunctive fixation, prevention of fragments convergence and savings of the repaired occlusion was used the MMF with IMF Screws (See Fig. 4, 5, Additional File 1). This tactic allowed for complete rehabilitation of the patient in 6 months; on his own volition, he had served with the Ukrainian military.

Discussion

MMF with IMF screws does not require a wasteful of time and volumetric funding, which is especially important for providing medical care to the maximum number of victims in cases of massive injection [4].

The protocol set of four MMF screws provides with maximum retention of the fragments in the correct position during the whole period of fixation and allows postoperative correction, if necessary.

We should pay attention to the advantages of MMF with IMF screws for occlusion adjunctive fixation after extensive osteosynthesis and prevents the convergence of fragments [5].

Conclusion

Thus, for the operative treatment of MF in military personnel preference should be given to method of MMF with IMF screws, which provides with the high quality reposition and fixation.

Abbreviations

IM

Intermaxillary

IMF

Intermaxillary fixation

MMF

Maxillomandibular Fixation

MF

Mandibular fracture

Declarations

Ethics approval and consent to participate

Not applicable

Consent for publication

Not applicable

Availability of data and materials

The data and materials are all available from this review.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

Natalia Idashkina, Igor Matros-Taranets, Olexandr Gudarian, Alla Shepelia, Hanna Kinchur contributed equally to this work. All authors read and approved the final manuscript.

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Figures

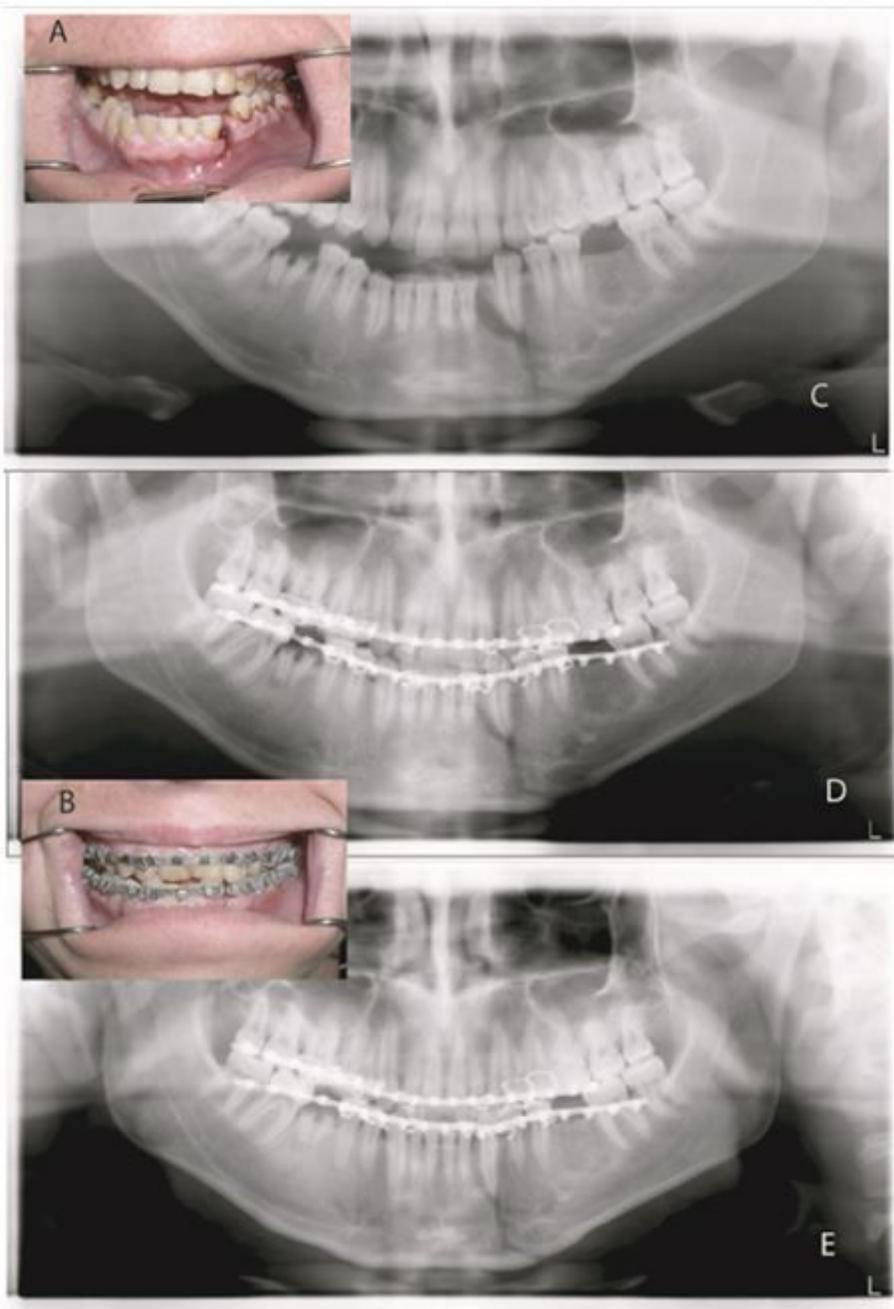


Figure 1

A, B - The interrelationship of mandible fragments before and on the 21st day after the splintage respectively. C, D, E - The orthopanthogram of the jawbones before treatment, on the 7th and 21st day after fixation of the standard tape splint respectively

Supplementary Files

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