

24th EACMFS CONGRESS



18-21 September 2018
MUNICH - GERMANY



Facing the future together



European Association for
Cranio - Maxillo - Facial Surgery

www.eacmfs.eu

Scientific Program



A Comparative Biomechanical Evaluation Of Different Types Of Osteosynthesis (Titanium Screws, Bioresorbable Pins And Miniplates) Used For Management Of Intracapsular Condylar Head Fractures.

Trauma

Tetiana - Pavlychuk¹, **Andrii - Kopchak¹**, **Mykola - Shidlovsky²**

1. Bogomolets National Medical University, Kiev, Ukraine
2. National Technical University of Ukraine “Igor Sikorsky Kyiv Politechnic Institute”, Kiev, Ukraine

Objectives

The aim of the present experimental study was to evaluate the biomechanical behavior of different types of osteosynthesis (titanium screws, bioresorbable pins and miniplates) that are used in management of intracapsular condylar head fractures.

Methods

Experimental models of the condylar head fractures were simulated on 15 dry human cadaveric mandibles. In this study a type B condylar head fracture was reproduced by osteotomy of the mandibular head. Osteotomized mandibles were randomly divided into three groups with different fixation systems used: 1- 15mm long titanium screw, 2- 15mm long 2.1 mm bioresorbable pins SonicPins Rx, 3 - T-shaped titanium mini plate and 7mm long titanium screws. After reduction and fixation of the fragments mandibles were loaded in the TIRA-test (Germany) testing machine. The main types of deformations: torsion in the horizontal plane, bending and shifting in sagittal and frontal planes were simulated to study the biomechanical characteristics of the fixation systems.

Results

The results of this experiment showed that the lowest mechanical resistance to bending and shifting in sagittal and frontal planes was found in group 3, and the highest in group 1 (titanium screws). The average stiffness in this group was 46.9 ± 31.37 N / mm when load was applied in sagittal direction and 36.92 ± 20.34 N / mm – in frontal direction. When the mandibles were fixed by a T-shaped plate the stiffness was 10.9 ± 10 N / mm – for sagittal loading and 17.9 ± 10.11 N / mm – for frontal.

Conclusions

Experimental data show that different types of fixation for the condylar head fractures demonstrate different ability to withstand the certain types of loads and it should be considered in clinical practice during the operation planning.