



CLINICAL ADVANTAGES OF NEXT-GENERATION MINIPLATE SYSTEMS IN THE PREVENTION OF COMPLICATIONS AFTER MANDIBULAR FRACTURE FIXATION

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Abstract: The development of next-generation miniplate systems has revolutionized the management of mandibular fractures. Modern 3D, grid-type, and hybrid titanium plates offer superior biomechanical stability and minimize the risk of postoperative complications compared to conventional 2D plate systems. These innovative fixation systems are designed to provide optimal load distribution, reduced stress concentration, and enhanced adaptation to the anatomical contour of the mandible.

Objective: To clinically evaluate the efficiency of next-generation miniplate systems in preventing common postoperative complications such as infection, malocclusion, plate exposure, and delayed union following open reduction and internal fixation (ORIF) of mandibular fractures.

Materials and Methods: A clinical study was conducted on 40 patients with mandibular fractures treated using different fixation systems. Group I (20 patients) underwent fixation with conventional 2D miniplates, and Group II (20 patients) with next-generation 3D or hybrid miniplate systems. Postoperative outcomes including infection, occlusal alignment, sensory disturbance, and plate stability were assessed at 1 week, 1 month, and 3 months after surgery.

Results: Patients treated with next-generation miniplates demonstrated fewer complications and faster functional recovery. The incidence of postoperative



infection was reduced from 10% in the conventional group to 3% in the next-generation group. No plate exposure or nonunion cases were observed with advanced fixation systems. Moreover, improved intraoperative handling and reduced operating time were noted.

Conclusion: Next-generation miniplate systems significantly enhance the stability of mandibular fracture fixation and effectively reduce postoperative complications. Their biomechanical advantages and improved clinical performance make them a preferred choice in modern maxillofacial trauma surgery.

Keywords: Mandibular fracture, next-generation miniplate, 3D plate, osteosynthesis, postoperative complications.