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MANAGEMENT OF HIGH-ENERGY LONG-BONE INJURIES

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Background:

High-energy long-bone injuries are complex orthopedic conditions often associated with extensive soft-tissue damage, hemorrhage, neurovascular compromise, and multiple-organ trauma. Their management requires a systematic approach that prioritizes patient survival, limb preservation, and functional recovery.

Objective:

To review the key principles of assessment, stabilization, and definitive management of high-energy long-bone injuries, with emphasis on individualized treatment strategies and complication prevention.

Methods:

A narrative review of the principal approaches to high-energy long-bone trauma management, including initial trauma assessment, radiological evaluation, fracture classification, open fracture management, damage control orthopedics, definitive fixation, and postoperative care.

Results:

Initial management focuses on identifying and treating life-threatening conditions, controlling hemorrhage, and assessing the patient's physiological status. Radiological evaluation and fracture classification guide treatment planning. The choice between temporary stabilization and early definitive fixation depends primarily on physiological stability and associated injuries. Treatment options include intramedullary nailing, plate fixation, and external fixation, selected according to fracture morphology, soft-tissue condition, and patient status. Open fractures require prompt

antibiotic prophylaxis, appropriate surgical debridement, and coordinated soft-tissue management. Repeated neurovascular examinations and early recognition of compartment syndrome are essential. Postoperative care includes infection prevention, thromboembolism prophylaxis, mobilization, and individualized rehabilitation.

Conclusion:

Successful management of high-energy long-bone injuries depends on timely assessment, appropriate stabilization, careful selection of fixation techniques, and multidisciplinary coordination. Balancing physiological safety, mechanical stability, and preservation of biological healing potential is essential to minimize complications and optimize functional outcomes.

Keywords: High-energy trauma; long-bone fractures; damage control orthopedics; fracture fixation; open fractures; complication prevention.