

Management of the Mangled Extremity

David V. Feliciano, MD, FACS

American College of Surgeons
Committee on Trauma
Subcommittee on Publications ©2002

DEFINITION/CAUSES/ DECISIONS	MANAGEMENT IN THE EMERGENCY CENTER	MANAGEMENT IN THE OPERATING ROOM	AMPUTATION VS. SALVAGE
<p>DEFINITION</p> <p>High-energy transfer or crush resulting in some combination of injuries to artery, bone, tendon, nerve, and/or soft tissue</p> <p>CAUSES</p> <ul style="list-style-type: none"> • Motorcycle or motor vehicle crash • Auto-pedestrian crash • Crush injury • Farm/industrial injury • Fall from height • Close range shotgun wound <p>DECISIONS FOR THE TRAUMA TEAM</p> <ul style="list-style-type: none"> • If patient's life is in danger from injuries, immediate amputation must be considered • If patient can be stabilized, should salvage of the mangled limb be attempted? • If salvage is decided, what is the appropriate sequence of repairs? • If salvage fails, when should delayed amputation be performed? 	<ul style="list-style-type: none"> • Primary survey—assess ABCs • Only the attending surgeon or senior resident should remove field dressing and confirm that mangled extremity is present • Control bleeding from the injured extremity <ul style="list-style-type: none"> —Pressure dressing —Proximal tourniquet —Proximal pressure point • Reapply dressing • Decide on need for diagnostic evaluation of other injuries using FAST (ultrasound of pericardium/abdomen or CT of head/thorax/abdomen) • Administer appropriate intravenous broad-spectrum antibiotics and tetanus prophylaxis • If no other injuries, move patient to operating room for continued resuscitation and further evaluation of the mangled extremity 	<ul style="list-style-type: none"> • Continue resuscitation if patient is hypotensive • Assess sensation in hand or foot before patient is intubated • X-ray the mangled extremity • Determine if arterial flow to hand or foot is intact <ul style="list-style-type: none"> —Physical examination —Doppler pulse device —Percutaneous arteriogram by surgeon • If there is no arterial flow and salvage is still a consideration, insert intraluminal shunts into injured artery and vein • Classify bony/soft tissue injury <ul style="list-style-type: none"> —Gustilo I: <1 cm wound over Fx —Gustilo II: >1 cm wound over Fx —Gustilo III: <ul style="list-style-type: none"> A—Extensive soft tissue injury B—Periosteal stripping C—Arterial injury needing repair • Visualize major nerves to hand or foot in open extremity • Classification or scoring system for mangled extremity may be applied now 	<p>CRITERIA FOR IMMEDIATE AMPUTATION</p> <ul style="list-style-type: none"> • Shredded muscle and transected nerves beyond elbow or knee, especially posterior tibial nerve in lower extremity • Crushed or mangled extremity with >6 hours arterial occlusion upon arrival • Associated mangling or severe injury to ipsilateral hand or foot • Severe associated polytrauma with persistent hypothermia, acidosis, or coagulopathy (“life over limb”) <p>OUTCOME OF ATTEMPTS AT SALVAGE</p> <ul style="list-style-type: none"> • 5–7 operative procedures • 30%–50% usefully employed if salvage is successful • Eventual amputation rate of 30% if Gustilo IIIC fracture at time of injury <p><small>This publication is designed to offer information suitable for use by an appropriately trained physician. The information provided is not intended to be comprehensive or to offer a defined standard of care. The user agrees to release and indemnify the American College of Surgeons from claims arising from use of the publication.</small></p>