**DEFINITION/CAUSES/DECISIONS**

**DEFINITION**
High-energy transfer or crush resulting in some combination of injuries to artery, bone, tendon, nerve, and/or soft tissue

**CAUSES**
- Motorcycle or motor vehicle crash
- Auto-pedestrian crash
- Crush injury
- Farm/industrial injury
- Fall from height
- Close range shotgun wound

**DECISIONS FOR THE TRAUMA TEAM**
- 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?

**MANAGEMENT IN THE EMERGENCY CENTER**
- 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
  - 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)

**MANAGEMENT IN THE OPERATING ROOM**
- 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
  - 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
  - Gustilo I: <1 cm wound over Fx
  - Gustilo II: >1 cm wound over Fx
  - Gustilo III:
    - 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

**AMPUTATION VS. SALVAGE**

**CRITERIA FOR IMMEDIATE AMPUTATION**
- 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 mangled or severe injury to ipsilateral hand or foot
- Severe associated polytrauma with persistent hypothermia, acidosis, or coagulopathy (“life over limb”)

**OUTCOME OF ATTEMPTS AT SALVAGE**
- 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