Orthopedic Emergency

- Trauma is the main cause of death
- Limb injuries predominate
- Head and visceral injuries the most lethal

- Trauma mortality has a trimodal distribution

1) Most death occur during 1st hour after injury
2) A second peak 1-4 hours after injury
3) A third peak several weeks later

Remember

- Airway
- Breathing
- Circulation

- The exception to this is casualty suffering external, peripheral hemorrhage.

- Catastrophic hemorrhage
- Airways
- Breathing
- Circulation

- Life threatening,external bleeding is controlled first and then followed by ABCsequence.

Open fracture

Initial management

- Appropriate treatment at the scene isimportant
- Wound should be covered with sterile dressing or clean material and left undisturbed until pt reach A&E
- In hospital, rapid assessment and any life threatening condition are addressed
- Tetanus prophylaxis are administered

- Wound carefully inspected, ideally should be photographed with polaroid camera, so that it can be covered and left undisturbed until reach operation theater
- Assess: nature of wound, state of skin around the wound, circulation and nerve

Classification of injury (Gustilo's classification)

- Classified based on
  - size
  - amount of soft tissues damage
  - Severity of contaminated
  - Vascular involvement

Grade I

- Wound: < 1cm
- Contamination: clean puncture
- Soft Tissue: little damage/ no crush
- Fracture: simple transverse/ oblique with minimal comminution
- Vascularity intact

Grade II

- Wound: > 1cm
- Contamination: moderate
- Soft Tissue: moderate
- Fracture: moderate comminution

Grade III

- Wound: extensive skin loss,more than 10cm
- Contamination: high degree
- Soft Tissue: extensive soft tissue damage
- Fracture: highly comminuted

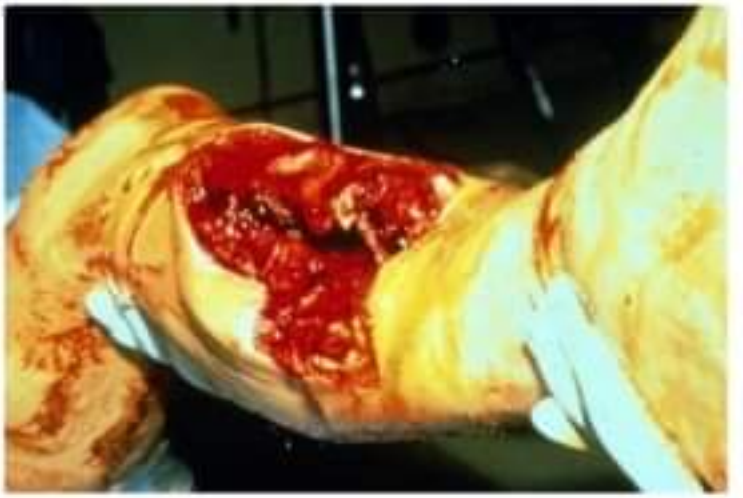
- Includes:
  - High velocity trauma
  - Gunshot injuries
  - Farmyard injuries
  - Fractures requiring vascular repair

Grade IIIa

- Grade III with
  - Sufficient tissue to allow bony cover.

Grade IIIb

- Grade III with
  - Extensive soft-tissue damage with periosteal stripping and bone exposure.
  - Inadequate soft tissue for bony cover.



Grade IIIc

- Any open fracture with vascular injury that requires repair (for survival of the limb).
- Associated arterial injury

Infection & Amputation Rates

Gustilo Grade	Infection Rate	Amputation Rate
I	0 – 2%	-
II	2 – 7%	-
IIIa	7%	2.5%
IIIb	10 – 50%	5.6%
IIIc	25 – 50%	25%

Principle of treatment

- All open # must be assumed to be contaminated – to prevent them from beinginfected.
- The 4 essential are:
  a) Prompt wound debridement
  b) Antibiotic prophylaxis
  c) Stabilization of fracture
  d) Early definitive wound cover

ANTIBIOTIC PROPHYLAXIS

- Antibiotics are given as soon as possible.
- In most cases, a combination of benzyl penicillin and flucloxacillin are given 6 hourly for 48 hours.
- If wound is heavily contaminated, it is wise to cover also for Gram negative organisms and anaerobes by adding gentamicin/ metronidazole for 4-5 days.

WOUND DEBRIDEMENT

- Aim to render the wound free of foreign material and of dead tissue, leaving a good blood supply throughout.
- Under general anaesthesia, clothing removed and maintain traction and hold it still
- Dressing previously applied is replaced by sterile pad and surrounding skin is cleaned and shaved

- The pad is then taken off and wound is irrigated thoroughly with copious amount of physiological saline
- For high energy injuries with severe soft tissues damage, the following principle must be observed

a) Wound excision

- Wound margin are excised, but only enough to leave healthy skin edges

b) Wound extension

- Thorough cleansing necessitate adequate exposure
- If extension needed they should be planned so as not to jeopardize the creation of skin flaps for wound cover if this should be needed

c) Wound cleansing

- All foreign material and tissue debris should be carefully removed
- Wound then washed out with copious amount of saline
- 6-12L of saline maybe needed to irrigate and clean an open #

d) Removal of devitalized tissue

- Devitalized tissue provides nutrient medium for bacteria
- Dead tissue – purplish color, mushy consistency, fail to contract when stimulated, fail to bleed when cut
- All doubtfully tissue should be removed

e) Nerves and tendons

- It is best to leave cut nerves and tendon alone
- Provided the necessary expertise is available, they can be suture

WOUND CLOSURE

- A small, uncontaminated wound can be sutured. All other wounds must be left open until the dangers of infection has passed.
- Type III wound may have to be debrided more than once.
- Skin grafting, free flap cover.

STABILIZATION OF FRACTURE

- Important in reducing the likelihood of infection and assisting in recovery of the soft tissues
- The methods of fixation depends on :
  - the degree of contamination,
  - the length of time from injury to operation
  - the amount of soft tissue damage.
- If there is no obvious contamination, open fractures of all grades up to type IIIA, can be treated as for closed injury; cast splintage, intramedulary nailing/external fixation.
- Severe injuries might require a soft tissue cover.

Aftercare

- Limb is elevated and circulation is carefully watched
- Antibiotic cover is continued
- Culture is obtained, if needed, different antibiotic is subtituted
- If wound is left open, inspect at 2-3 days
- Delayed primary suture is then often safe
- If there is much skin loss – split-skin graft or skin flap applied