**Treatment of fractures**

د0عادل الهنداوي Licture-3

**Internal fixation:** types:

1- Plate and screws.

 2- Wires (transfixing, and tension-band).

3- Intramedullary nail (locked &unlocked Kuntscher nail &Rush nail).

 4- Interfragmentary screw.

**Indications**:

1- Fractures that cannot be reduced except by operation.

  2- Unstable fractures.

3- Pathological fractures.

 4- Multiple fractures.

5- To avoid nonunion e.g. femoral neck and scaphoid.

6- In elderly to avoid bed sore, DVT, pulmonary embolism and chest infection.

**Complications:** 1-Infection. 2-Nonunion. 3-Implant failure. 4- refracture.

**Contraindication:** open fracture because of fracture contamination.and active bone infection

**External fixation:** by using certain pins or wires that pass through the bone above and below the fracture and attached to external frame or bar.

**Indications:**

1- open # with severe soft tissue damage.

2- Fracture with vessel injury.

3- Severely comminuted and unstable fracture.

 4- Infected fracture.

  5- Pelvis fracture which cannot be controlled by other methods.

6- Severe multiple injuries.

7-Non-united fracture (compression/ elongation).

**Complications:**

1- neurovascular damage.

  2- over distraction.

3- pin-track infection.

**Rehabilitation:**

Exercise not only to the injured part but to the patient as whole, the objective is to reduce odema,preserve joint movement, restore muscle power to return the patient back to its normal physical activity

**Open fractures**

Open fractures are classified according to the severity of tissue destruction into 3 types   (Gustilo classification):

**G1**- the wound is small, clean &usually caused by bone spike.

    G**2**- the wound is >1cm with moderate tissue damage (bone& soft tissue).

    G3- there is extensive skin, soft tissue, bone &neurovascular damage with considerable contamination:

**G3A**- If the fracture can be covered by soft tissue.

**G3 B**- If the # require reconstructive surgery for coverage.

**G3 C**- If there is arterial injury requiring repair even if there is little tissue damage.

**Management**: open fracture is an emergency.

**At the scene**: ensure clean airway, stop bleeding, cover the wound, splint the # &transfer to the hospital.

**In the hospital:** in the emergency room reexamine the patient quickly then start resuscitation with IV line and take blood sample for cross match.

 The **priority** of treatment should be for: ensuring **A**irway,

**B**reathing and **C**irculation then do further assessment checking the level of consciousness, the neck &back, the abdomen, the pelvis and the limbs for wounds &fractures. After that, when the patient is resuscitated and become more stable, you can do more careful examination followed by the required investigations including x-rays.     

**Local treatment of open fracture:** start immediately with broad spectrum antibiotics &tetanus prophylaxis.

**In the theater**: clean the limb with soap &water, shave the skin around the wound and sterilize it with antiseptic like chlorhexidine or povidone iodine; then expose the wound and clean it with physiological saline mixed with antibacterial agent several times.

Then start **debridement**:

**Skin:** the dead edges are excised till get healthy oozing skin.

**Subcutaneous tissue**: excise all dead subcutaneous tissues.

**Muscles**: all dead muscles should be excised because they are

good food for bacteria. A dead muscle is bluish in color (not red),

does not contract if pinched and if cut it will not bleed.

**Bone**: bone ends are cleaned, bone fragments are not removed

unless they are small and totally detached. Then do stabilize

  the fracture with external fixator.

**blood vessels**: large vessels are repaired, while small bleeders are ligated or clamped.

**Nerves:** approximate the nerve ends with sutures for later repair.

**Wound closure**: if the wound is small, clean and debrided within

few hours, you can close it, otherwise the wound should be left open

for daily dressing until it become clean with healthy granulation tissue growth, then close it (secondary suture). Skin loss can be replaced by

skin graft (partial or full thickness), pedicle graft or free graft

   (cutaneous, myocutaneous or osteomyocutaneous).

Gunshot injuries

Missile wounds are a special type of open injuries .tissues damage produced by:- 1- direct injury in the pathway of missile

2- muscle contusion around the missile track.

3- bruising and congestion of soft tissues away from primary track

We have two types of missile according to speed:-

1- high velocity missile(speed more than 600m\s): in which sever cavitation and tissue distraction.

2- low velocity missile (speed of less than 600m\s)much less cavitation and tissue distraction

Treatment of missile injuries needs urgent general resuscitation and local treatment as in open fractures.