1) Amputation of Extremities - Dr. Omar Barawi

Definition: Cutting of the extremity or part of the extremity through the bone. While cutting of the extremity or part of the extremity through the joint is disarticulation.

Indications (3 D’s)

1. Dead (or dying) limb
2. Dangerous limb
3. Damn nuisance limb
   • Amputation can be regarded as a treatment and not tragedy

Dead or Dying Limb

• Peripheral vascular disease (90%)
• Sever traumatized limb
• Burns
• Frostbite

Dangerous Limb

• Malignant tumors
• Lethal sepsis
• Crush injury leading to crush syndrome (renal failure from release of compression)

Damn Nuisance

• Remaining the limb is worse than having no limb at all. Because of:
  o Pain
  o Gross malformation
  o Recurrent sepsis
  o Sever loss of function

Varieties of Amputations

Provisional amputation

• When primary healing is unlikely
• The limb amputate as distal as the causal factor will allow
• Skin flap is sutured loosely over a pack
• Re-amputation is performed when stump condition is favorable

Definitive end-bearing

• When weight is taken through the end of the stump
• The scar must not be terminal
• Bone end must be solid (cut near the joint)
• Example through knee, Syme’s

Definitive non-end-bearing

• Commonest variety
• All upper limb & most lower limb amputations are come under this type
• The scar can be terminal
Amputations at the sites of election

- The “sites of election” are determined by:
  1. The demand of the prosthetic design
  2. Local function e.g. below the most distal palpable arterial pulsation
- Too short a stump → slips out from the prosthesis
- Too long a stump → painful, ulcerate, complicates the incorporation of the joint in the prosthesis
- Now a day the skill of orthotiest make amputation possible at any level

Principles of technique

- Tourniquet is used unless there is vascular insufficiency
- Skin flaps are cut so that their combined length equals one & half the width of the limb at the site of the amputation
- Equal flaps are for upper limb & trans-femoral amputations, long posterior flap for below – knee
- Muscle cut at distal level from the level of the bone proposed
- Myoplasty: when the muscles sutured together over the bone
- A raw nerve end should not bear weight
- Divide the nerve proximal to the bone cut
- Saw is used to make the bone ends smooth, and for beveling the tibia interiorly
- Fibula is cut 3 cm shorter
- Remove the tourniquet and stop bleeding
- Suture the skin without tension
- Apply suction drain
- Bandage the stump tightly

Aftercare

- Evacuate the hematoma as soon
- Elastic bandaging the stump for shrinkage
- Exercise the muscles
- Keep joints mobile
- Advice using the prosthesis

Amputations other than the sites of election

**Upper Limb Amputations**
- Interscapulo - thoracic amputation which is known as fore-quarter amputation
- Disarticulation of the shoulder
- Transradial amputation
- Amputations in the hand

**Lower Limb Amputations**
- Hemipelvectomy
- Disarticulation through the hip joint
- Transfemoral (at least 12 cm)
- Around the knee (Stokes – Gritti)
- Through knee
- Transtibial (14 cm)
- Above the ankle (Syme’s)
- Boyd’s amputation in which there is calcaneo tibial fusion
- Mid-tarsal joint (chopart)
- Tarsometatarsal joint (lisfranc)
- Ray excision of entire toe
Complications of the amputation stump

- Stump is the terminal segment of the limb remaining after the amputation

Early Complications

1. Secondary hemorrhage
2. Breakdown of the skin flaps (may be due to ischemia or excessive suture tension)
3. Gas gangrene: Clostridia & spores from perineum that infect a high above-knee amputation

Late Complications

1. Skin
   - Eczema
   - Purulent lumps
   - Fissuring & ulceration → due to poor circulation
   - Infected epidermoid cyst
   - Squamous cell carcinoma
   - Verrucous hyperplasia
2. Muscle: If excessive muscle left, it will produce unstable, loose cushion → excise excessive tissue
3. Artery: poor vascularity gives
   - Cold
   - Blue color stump
   - Liable to ulcerate
4. Nerve: A cut nerve always forms a painful neuroma attached to the scar
5. Phantom Limb
   - A feeling that the amputated limb still present
   - It is difficult to be treated
6. Joint
   - The joint above the site of amputation may become stiff or deformed
   - Deformities are fixed flexion & fixed abduction in above-knee stumps. Fixed flexion in below-knee amputations.
   - Fore-foot amputation maybe complicated by equineus deformity.
7. Bones
   - Terminal bone spur may cause pain & infection
   - Stump bone fracture may result from sever osteoporosis

Prosthesis

Ideal Prosthesis

- Fits comfortably
- Function well
- Looks presentable
- Fit as soon after the operation

- In the upper limb the distal portion is detachable & can be replaced
- In lower limb weight can be transmitted through the greater trochanter, tibial tuberosity, patellar tendon, upper tibia or soft tissues
- Electrically powered limb is present now