Amputations and Disarticulations of the Upper and Lower Extremities

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Indications to Amputations

1. Trauma and its complications (anaerobic infection, osteomyelitis)

2. Malignant tumors of skeleton and soft tissues of limbs

3. Vascular diseases (thrombosis, diabetic angiopathy, obliterating endarteritis)
Classification of Amputations

Primary amputation (within first 24 hours)

Secondary amputation (7-8 days after injury)

Re-amputation (repeated amputation)
Levels of Amputations

- Low-Thigh Amputation
  - Ice-level
  - Tourniquet
  - Saw-line
  - Stump end

- Leg Amputation
  - Ice-level
  - Tourniquet
  - Saw-line
  - Stump end
Steps of Amputation

I. Cutting of soft tissue

II. Treatment of periosteum and cutting of bone

III. Stump treatment
Types of Amputations
(according to soft tissues cutting)

1. Flap amputations:
   - single-flap amputation
   - double-flap amputation

2. Circular amputations:
   - one-step (guillotine) amputation
   - two-step amputation (variety – “cuff” method of forearm amputation)
   - three-step (conical-circular) amputation
Standard Above-knee Amputation (AKA)
Stages of Transfemoral Amputation
Transfemoral amputation – Above-knee Amputation: marking-out of skin flaps
Creating of Flaps and Cutting of Soft Tissues
Methods of Periosteum Treatment

1. Periosteal

2. Aperiosteal

3. Subperiosteal
Treatment of Periosteum and Cutting of Bone
Exposure and Ligation of Main Vessels
Arrest of Bleeding from Small Vessels by Electrocoagulation after Removing of Tourniquet
Exposure and Cutting of Nervous Trunks
Stitching of Soft Tissues above Bone Stump and Draining of Wound
Aseptic Bandage and Immobilization of the Limb Stump
The most common complications of amputation are:

- **massive haemorrhage** that occurs when a suture becomes loose
- infection
- rash, blisters, and skin breakdown caused by immobility, pressure, and other sources of irritation
- **pneumonia**, blood clots, and breathing problems associated with immobility
- formation of nerve cell **tumors** (neuromas) at severed nerve endings
Complications of Amputation

Mistakes of I step of amputation:
1. conical stump
2. mace-shaped stump

Mistakes of II step of amputation:
3. terminal necrosis of bone
4. forming of large osteophytes

Mistakes of III step of amputation:
5. forming of trophic ulcers
6. phantom pain

7. Chronic osteomyelitis caused by secondary infection inside a wound
Osteo-plastic Amputations
(Gritti-Stokes and Sabanajeff amputations)
Pirogoff Amputation
Callander Amputation
(this gives an excellent end-bearing stump)
Below-knee Amputation

[Diagram showing bone section, tibial plateau, myotendinous junction, and various annotations A, B, C.]
Amputation in Middle Third of Leg
Schemes of Foot Amputations
Syme Amputation
Sites of Election for Amputations of Upper Extremity

- Amputation middle of forearm
- Disarticulation at elbow
- Amputation middle of arm
Different Types of Prosthesis