SURGICAL PRINCIPLES OF AMPUTATIONS

Amputation levels

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1- Chose the least mutilating procedure.

e.g preservation of the K.J →

mobility after rehabilitation.

2- The indication for amputation

In malignancy

Remove the limb at a level that includes the joint proximal to the lesion.


15
M
B
H
L
10 cm
Sc 15
SE/M
SL 9
H
L
10 cm

In trauma

The amputation site should be as distal as possible

In ischaemia

Removing dead or near-dead tissue and a proximal site sufficient to ensure healing of the wound.

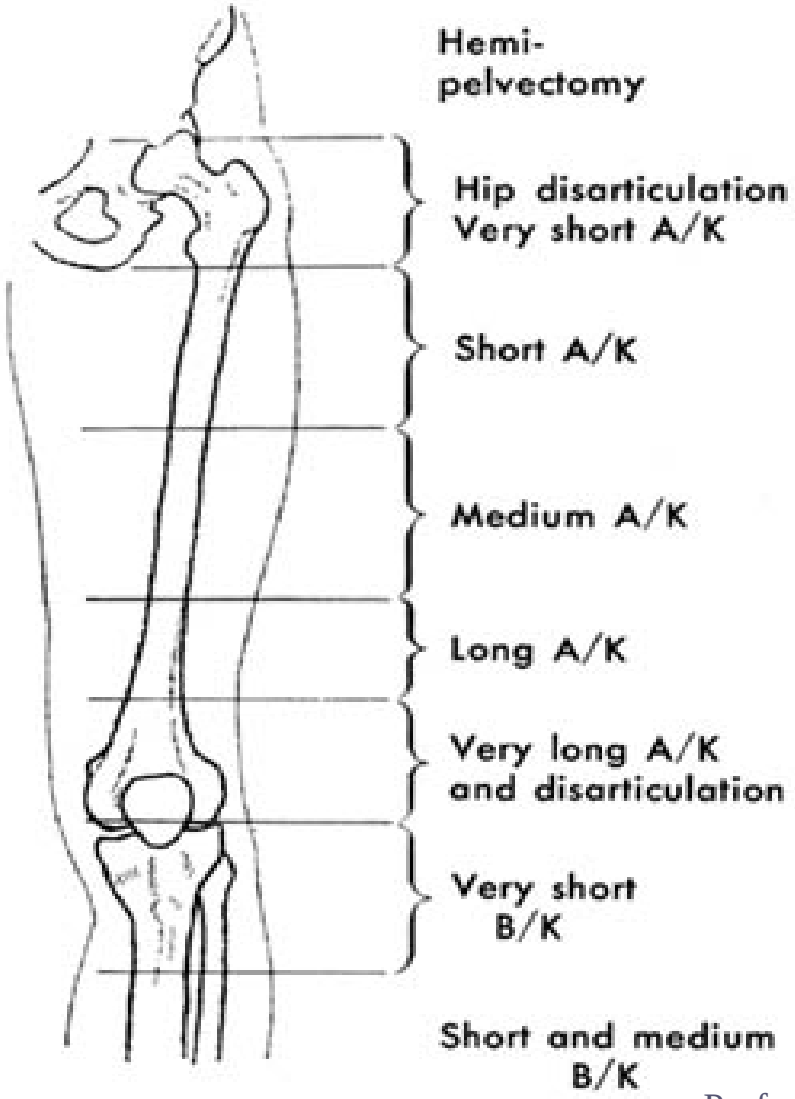
The cardinal rule is to preserve all Possible length consistent with good surgical judgment.

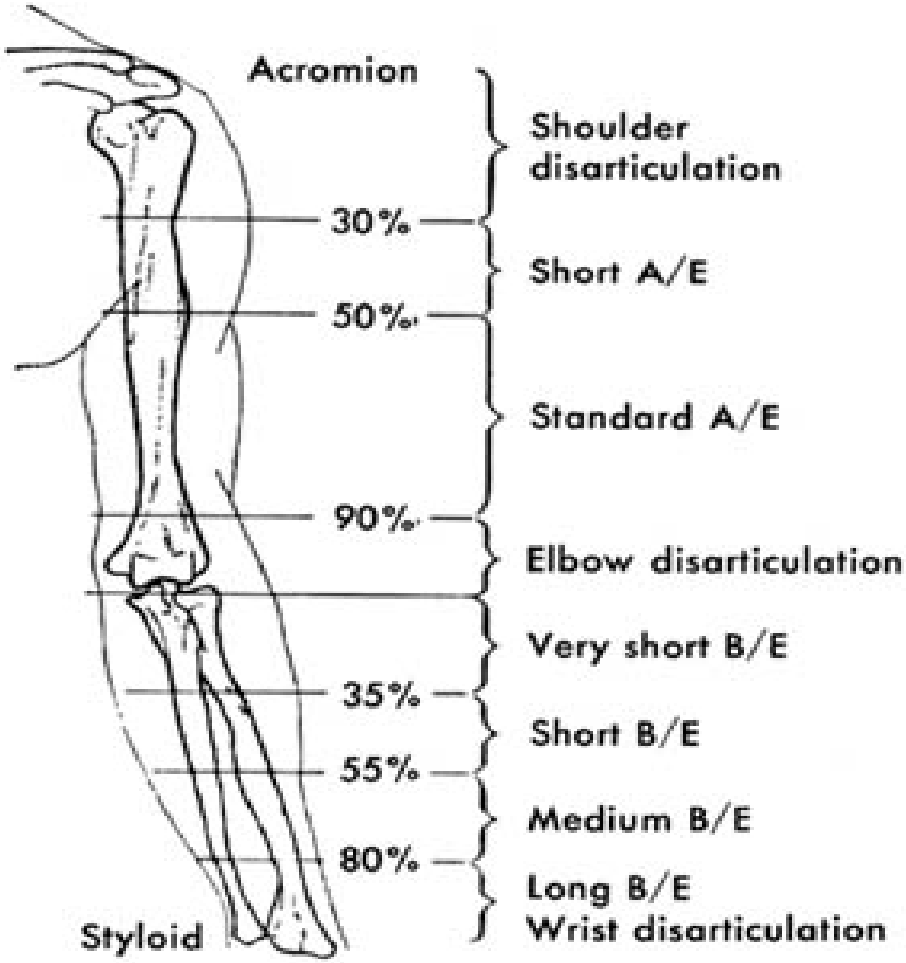
In the remote past, amputation through specific levels was Necessary for proper fitting of prostheses.

With modern total contact sockets and sophisticated prosthetic-fitting techniques, the level of amputationis less important

The amputation should be through tissues that will heal Satisfactorily and at a level that will remove the diseased or abnormal part.

Classification of amputation by level.





Lower extremity Upper extremity

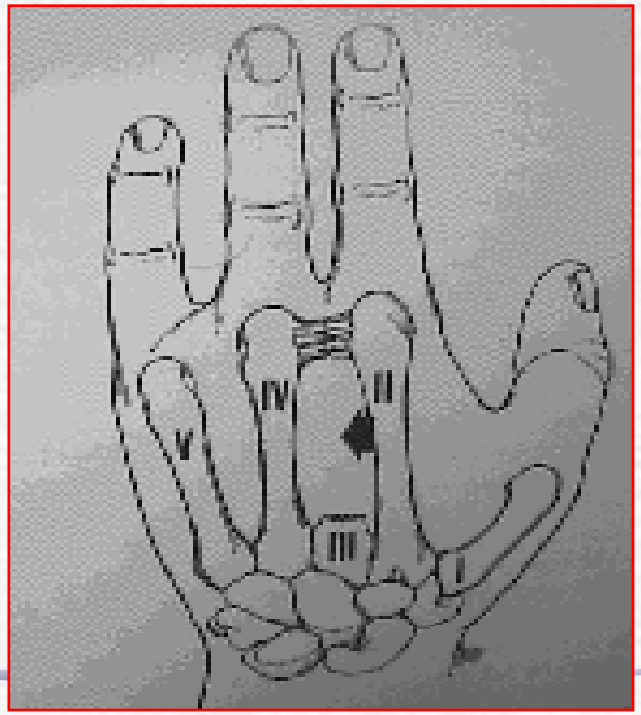
Levels of Upper Extremity Amputation

- Partial Hand e.g **Finger amputation**
- Wrist Disarticulation (W/D)
- Below Elbow (B/E)
- Elbow Disarticulation (E/D)
- Above the Elbow (A/E)
- Shoulder Disarticulation (S/D)
- Forequarter or Interscapular-Thoracic Amputation

Severe palm trauma due to the grenade explosion.

Partial Hand

- **The amputation of one or more fingers or the loss of a portion of the hand.**



Below Elbow (B/E) Amputation

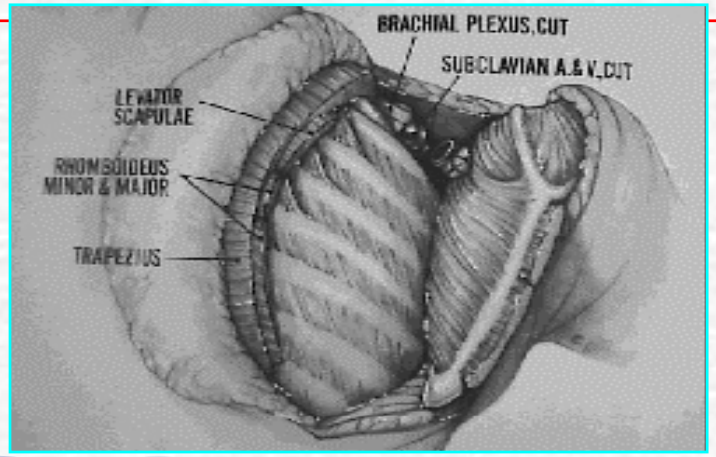
- **The removal of the arm anywhere between the elbow and the wrist.**
- **Ideal: 18 cm from tip of olecranon**

Above the Elbow (A/E) Amputation

The removal of the arm anywhere between the shoulder and the elbow joints. Ideal: 20 cm from acromion

Forequarter or Interscapular-Thoracic Amputation

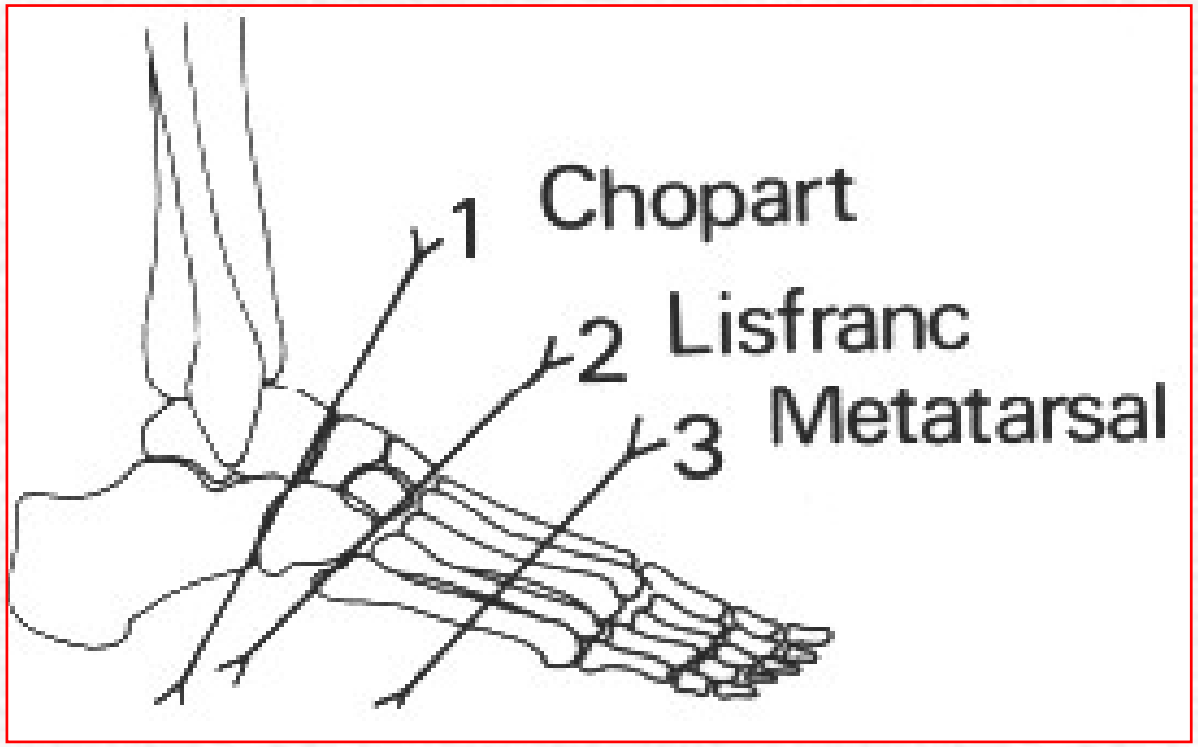
- The most severe upper extremity amputation, in which the entire arm, clavicle, and scapula are removed.



Lower Extremity Amputations Levels

- Foot
- Symes (S)
- Below -Knee (B/K)
- Through Knee (K/D) or Gritti-Stokes
- Above-Knee (A/K)
- Hip Disarticulation (H/D)
- Hemipelvectomy (hindquarter amput.)

Foot



Transmetatarsal Amputation (TM)

- Transmetatarsal amputation is removal of a portion of the foot.
- Presently there is interest in preserving as much of the foot as possible.

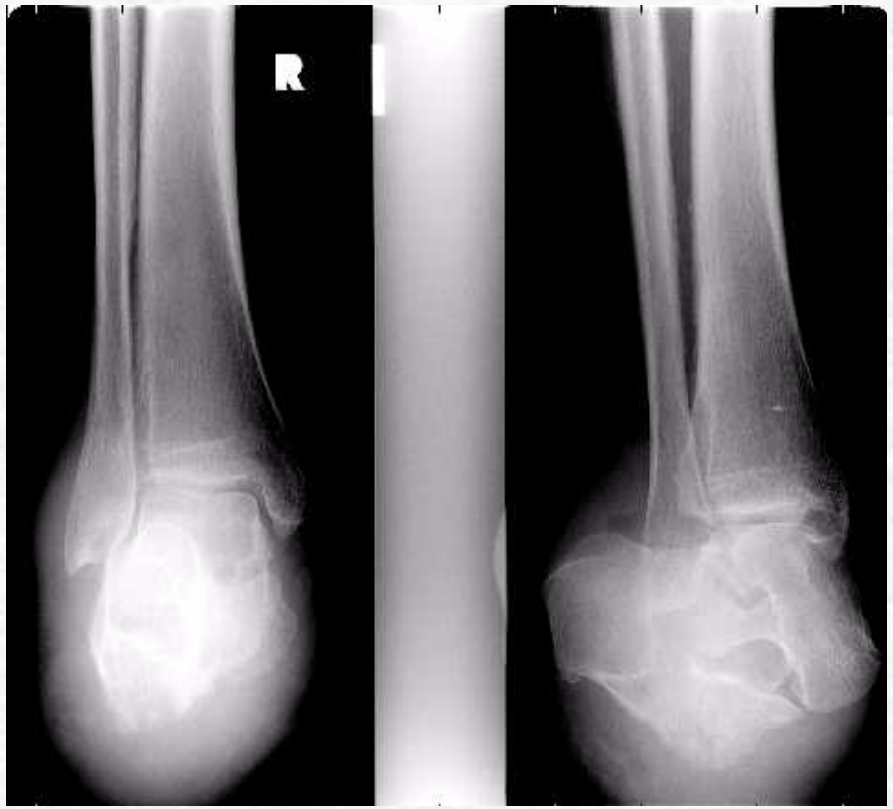

A

Ray Amputation

The more of the foot and toes that can be preserved, the less of a functional deficit will result.

Lisfranc's

Chopart



Symes Amputation

(James Symes Scottish surgeon 1799-1870)

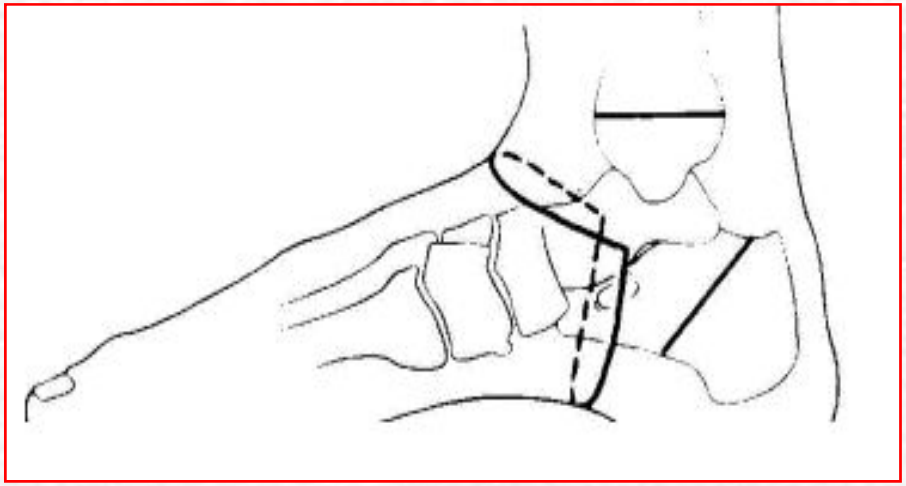
- **The Symes amputation is performed by removal of the foot at the ankle.**
- **This procedure leaves the individual with an end-bearing stump that can be used for short-distance ambulation in the house without a prosthesis.**

Pirogoffs

Calcaneum osteotomised, rotated and arthrodesis performed with the distal tibia.

Pirogoff & Boyd

both rely on fusion of the tibiocalcaneal arthrodesis.



The same patient at the moment of operation: formation of crus stump.

The same patient. Pirogoff's stump of a crus is formed.

Below-Knee Amputation (B/K)

- **B/K amputation is the removal of the lower leg anywhere between the knee and the ankle.**


R
R
BU
R
BU


The correctly formed stump of the right crus suitable to prosthetics.

BKA

* Ideal length - ~ 15 cm below med. tibial articulation surface

* Stumps less than 12 cm less efficient, those < 6 cm do not function as BK stumps at all

- **The knee joint is important to preserve for functioning even if a very short B/K amputation is performed.**

- **An individual with a B/K amput. will use about 10% more energy walking on level ground than a person without one.**

"A foot for every activity"

Foot

- Peg leg
- Static foot
- Multi-axis foot
- Energy Storing Foot (ESF)

knee Disarticulation(K/D)

- **It provides greater proprioceptive (the detection of motion or position of the limb by responding to stimuli arising within the body itself) feedback.**

Advantages:

1. Large end bearing surfaces of distal femur are preserved
2. Long lever arm controlled by strong muscles is created
3. The prosthesis used on the stump is stable

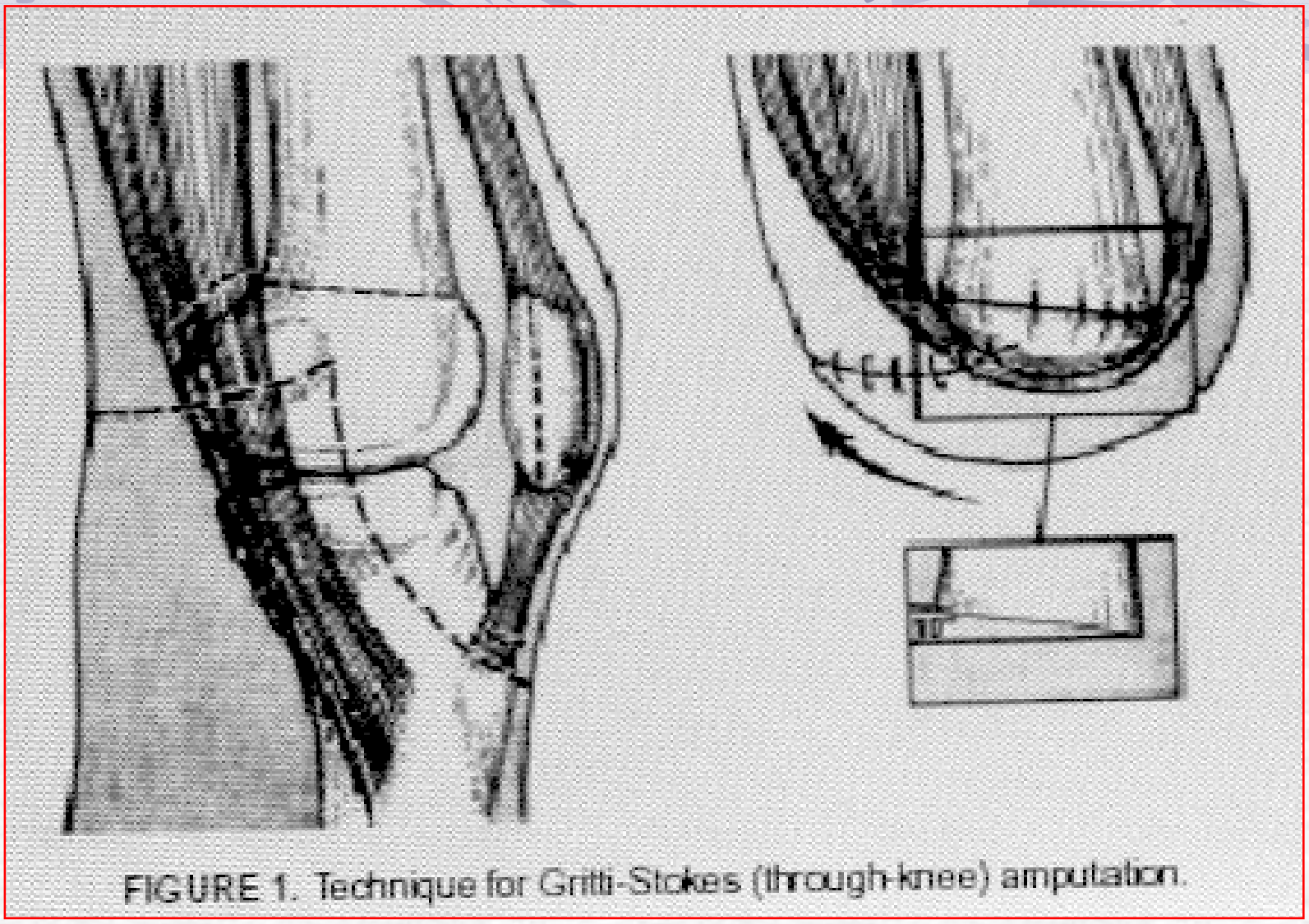


FIGURE 1. Technique for Gritti-Stokes (through-knee) amputation.

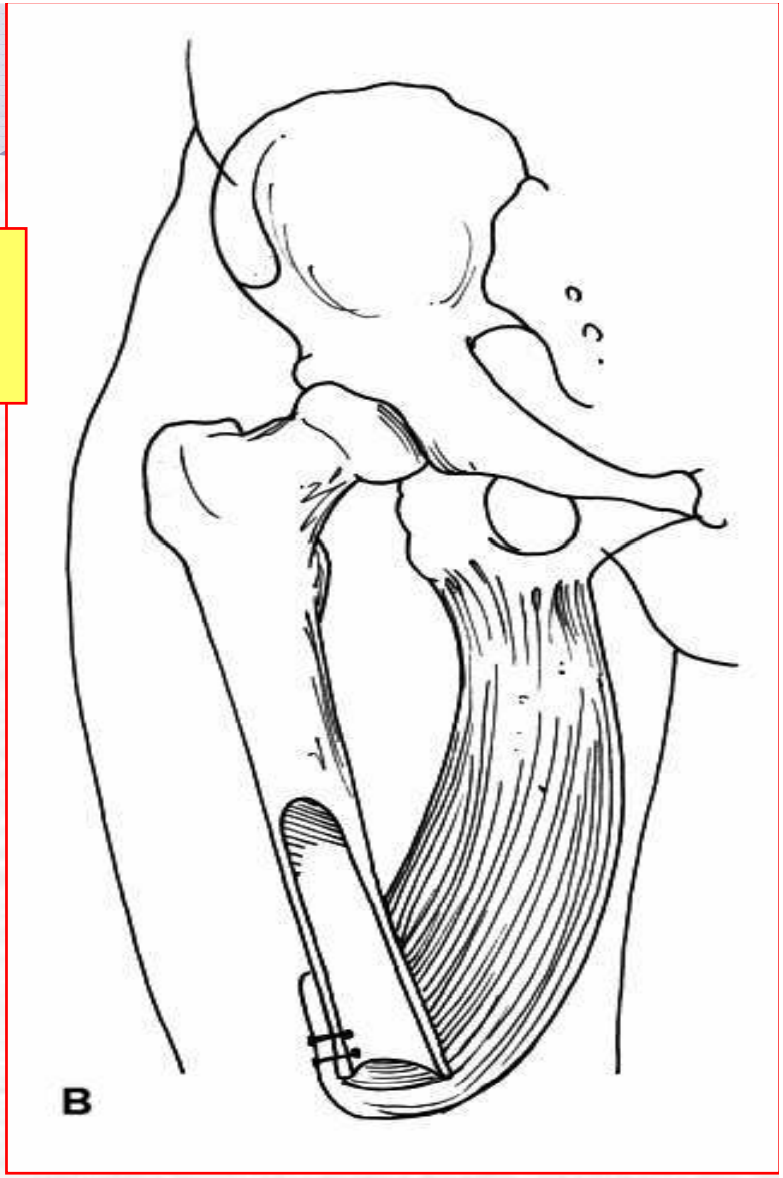
Above-Knee Amputation (A/K)

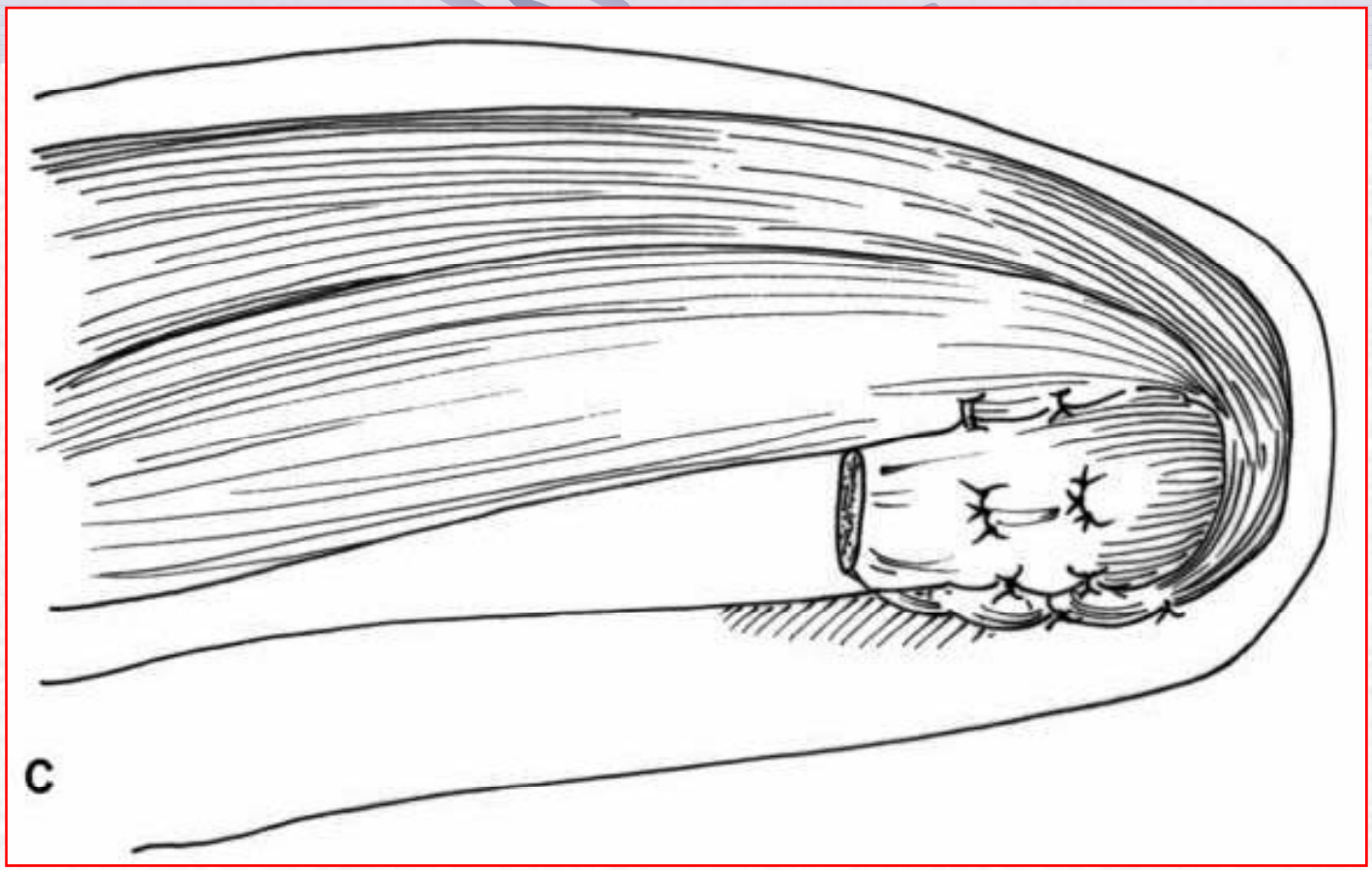
- A/K amputation is the removal of the leg anywhere between the hip and the K.J.

AKA

ideally between 12 cm above knee & 18 cm below G. trochanter

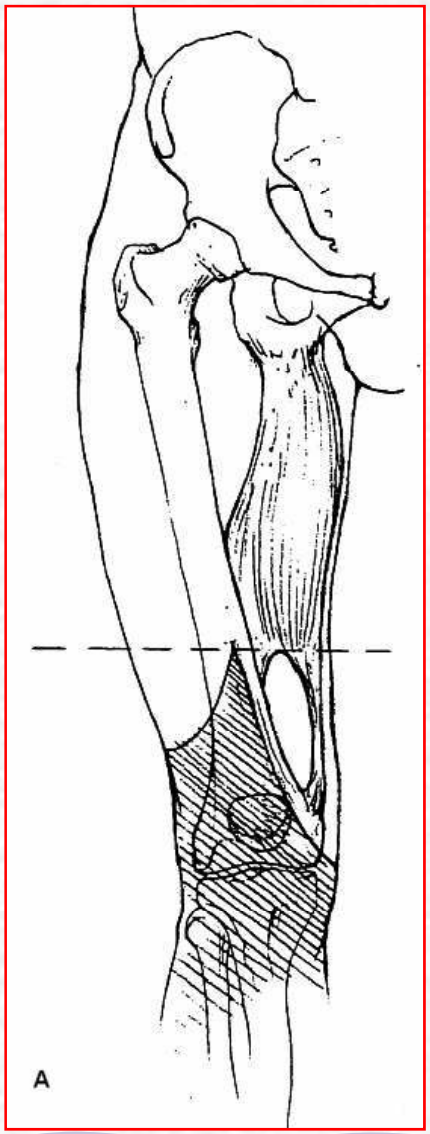
attachment of the adductor magnus to the lateral part of femur

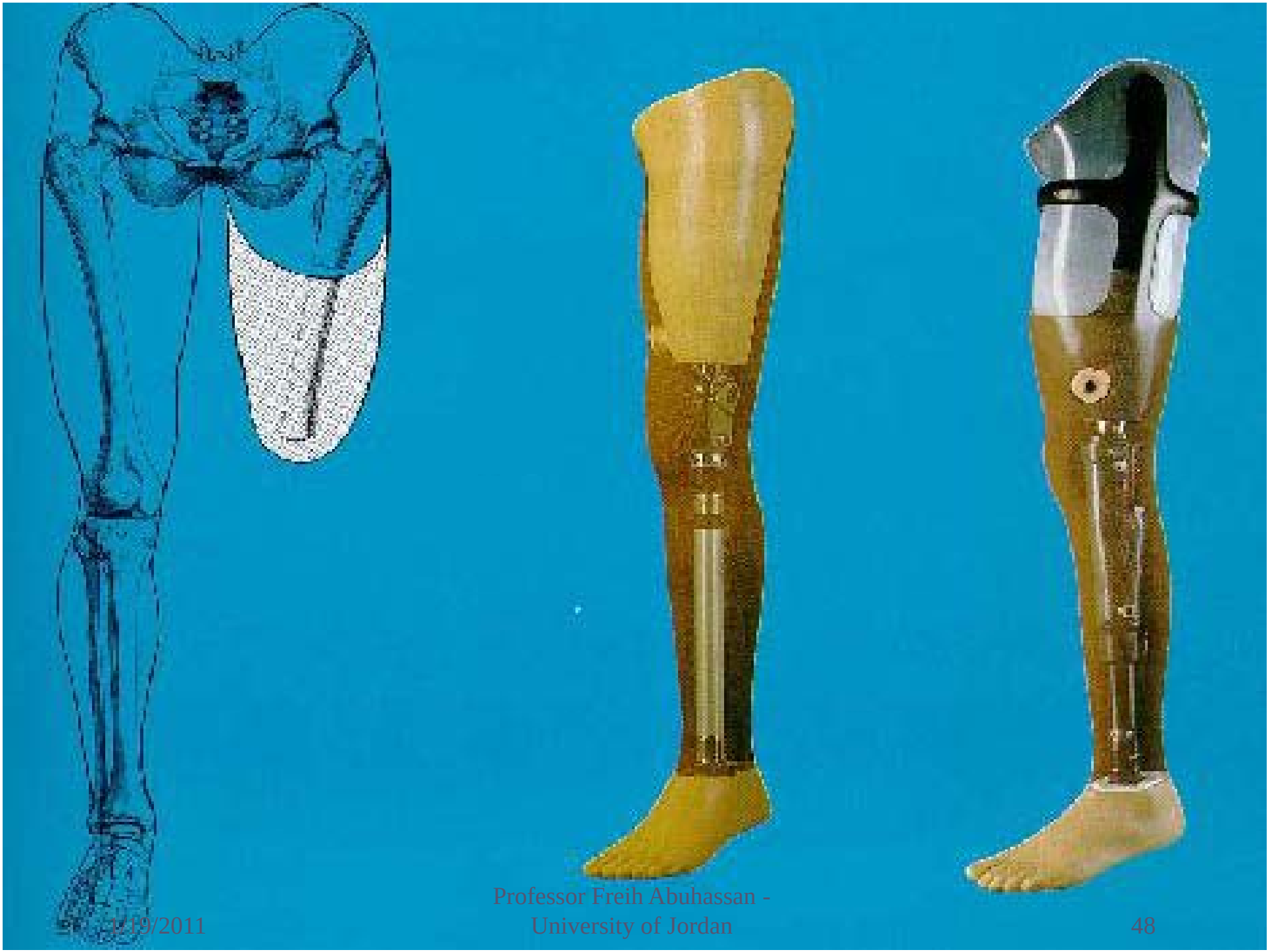




attachment of the quadriceps over the adductor magnus

the proposed skin flaps and level of bone section





- **The person with an A/K amputation expends about 60% more energy walking the same distance as a person without one.**

Running

100 meters
12.4 seconds

Hip Disarticulation (H/D) Amputation

- H/D amputation is removal of leg at the hip joint.
- This type of amputation causes the individual a major functional deficit.

- **Many persons with this type of amputation would rather use crutches than a prosthesis.**

- **With a prosthesis, individuals with a H/D amputation will use 75% more energy than a person without one to walk the same distance.**

Hemipelvectomy (H/P)

- **H/P amputation is total removal of L.L and 1/2 of the pelvis.**
- **This is also called a hindquarter amp.**
- **The sitting bone (ischial T) is usually absent.**

How fast can you run?