

# AMPUTASI



# DEFINISI

- Dorland, Soelarto  
→ Pembuangan anggota gerak/anggota badan/  
hasil perkembangan badan
- Latin "amputare" → memotong/memangkas  
  
→ Tindakan pemancungan u/ menghentikan  
morbiditas

# INSIDEN

- terdapat 1.230.000 *amputee* di Amerika, dengan kasus amputasi baru yang dilakukan pertahunnya sebanyak 50.000 orang.
- Ratio amputasi ekstremitas atas dan bawah  
= 1 : 4,9

# FAKTOR PENYEBAB

- Ekstremitas atas :
  - Trauma dan kanker selanjutnya akibat komplikasi penyakit vaskular.
  - Level tersering : transradial (57%) dan transhumeral (23%).
- Ekstremitas bawah :
  - 75% - 93% penyakit vaskuler dan 6% - 10% trauma dan tumor.
  - Level tersering : transtibial (59%) dan transfemoral (35%)

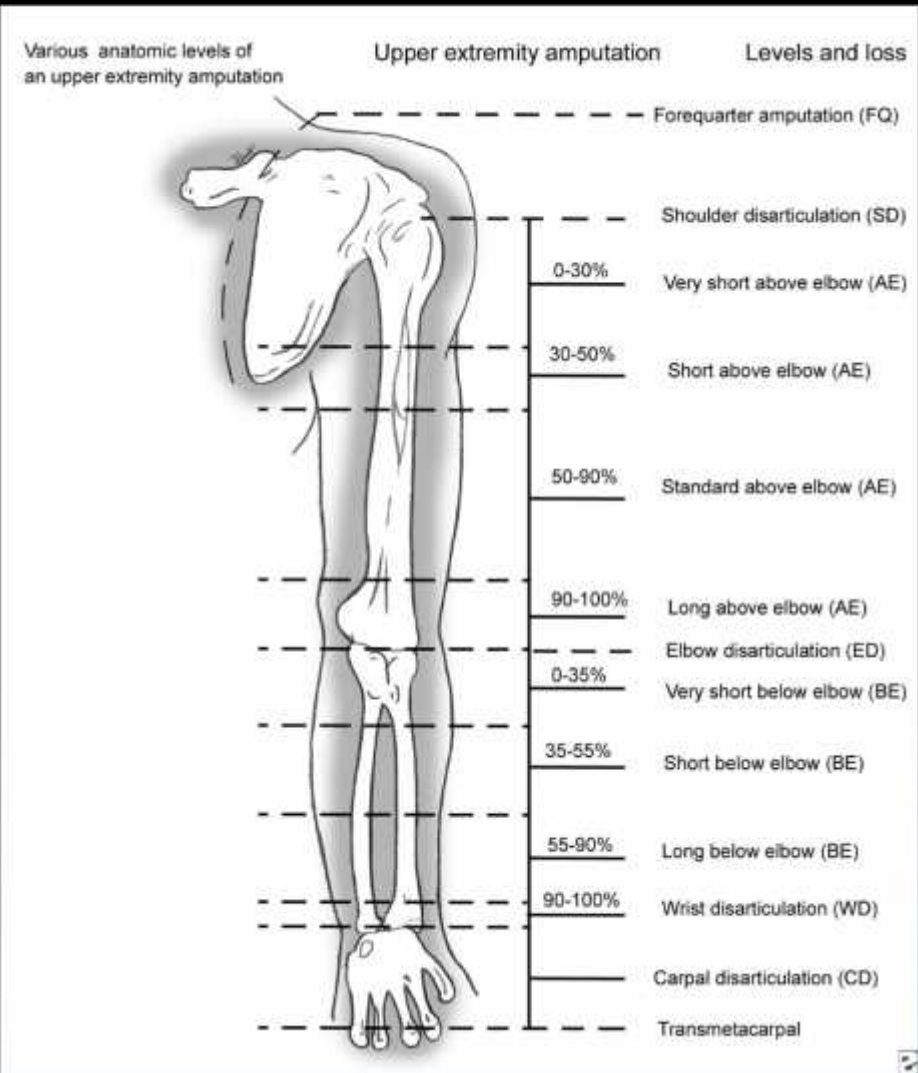
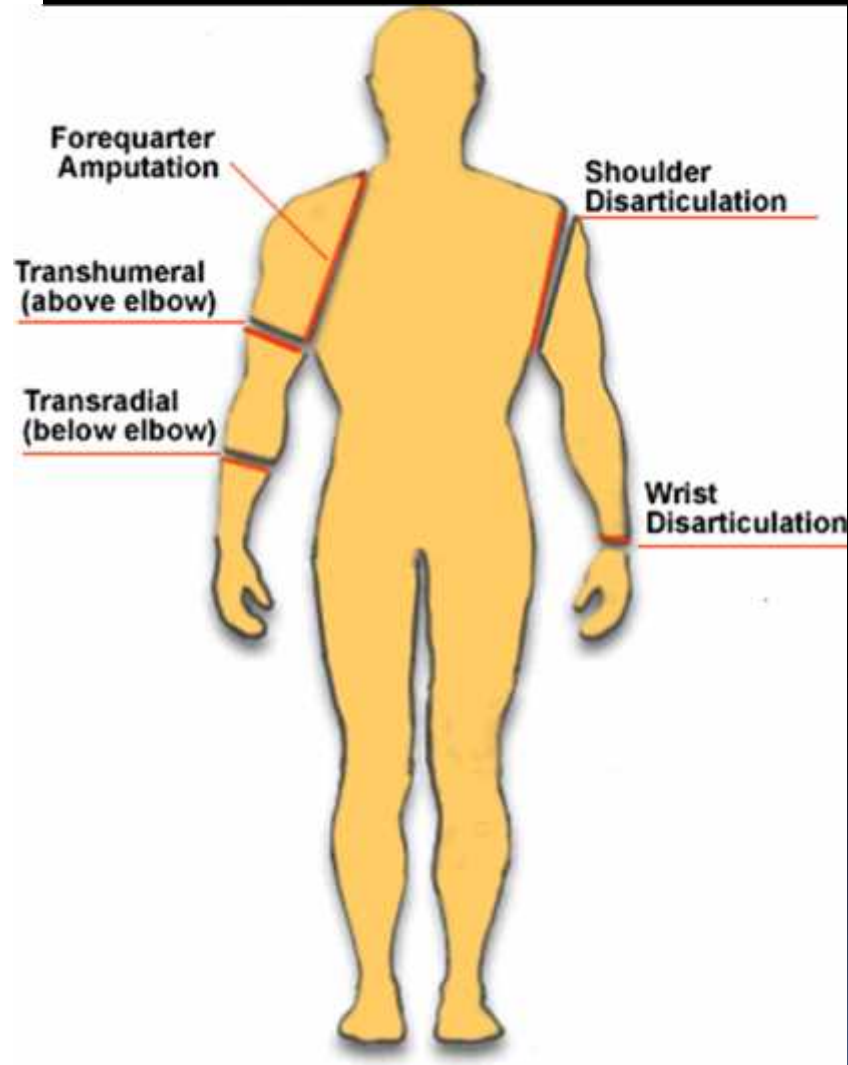
# INDIKASI

- Medik :
  - live saving
  - limb saving/limb salvage
- Non medik : eksekusi hukuman

## Level amputasi Ekstremitas atas

- Transphalangeal amputation
- Transmetacarpal amputation
- Wrist disarticulation
- Transradial amputation
- Elbow disarticulation
- Transhumeral amputation
- Shoulder disarticulation
- Interscapulothoracic disarticulation (forequarter)

# LEVEL AMPUTASI EKSTREMITAS ATAS

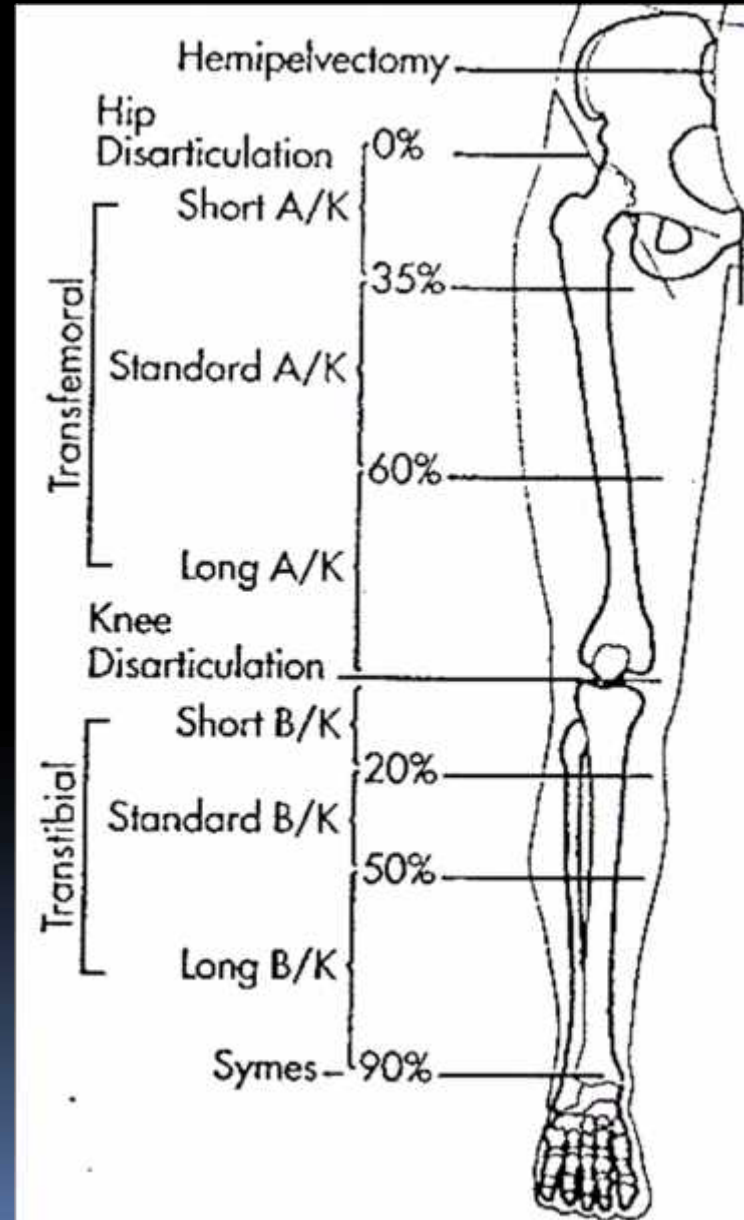
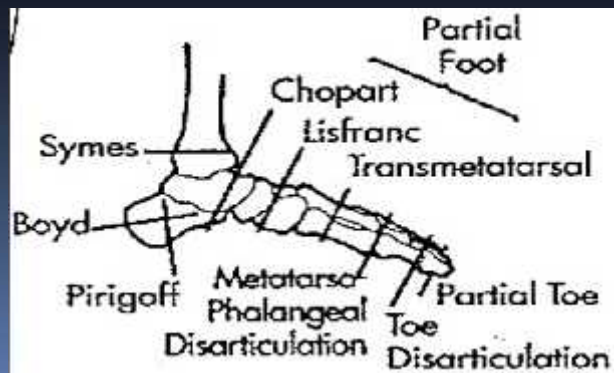
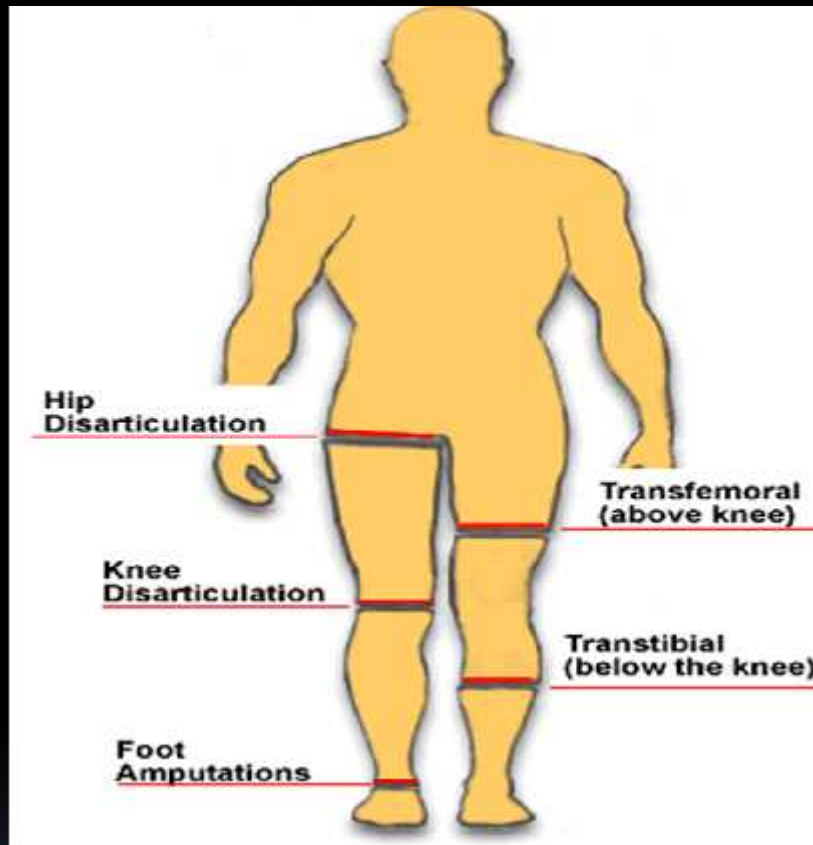


# Level amputasi Ekstremitas bawah :

- Amputasi jari kaki
- Amputasi transmetatarsal
- Amputasi *symp* (contoh *ankle disarticulation*)
- Amputasi transtibial
- *Knee disarticulation*
- Amputasi transfemoral
- *Hip disarticulation*
- Hemipelvectomy



# LEVEL AMPUTASI EKSTREMITAS BAWAH



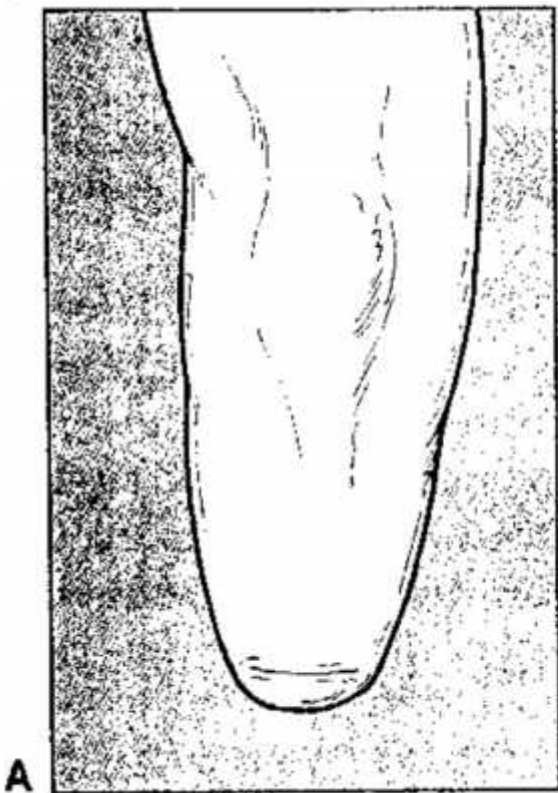


- Ekstremitas atas:

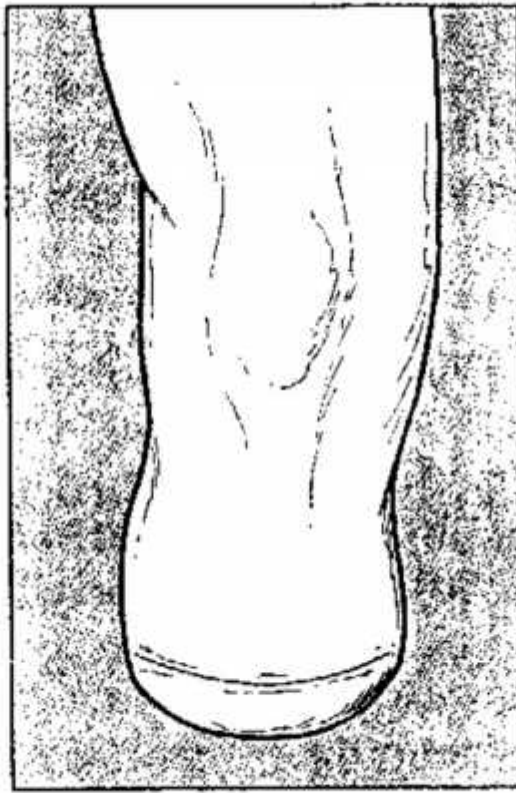
- Transhumeral : 7-10 cm proksimal dari distal condylus humeri --> elbow prostetik
- Transradial : minimal 5 cm proksimal dari distal radius  
→ externally powered terminal device
- Bentuk ideal : silinder

- Ekstremitas bawah:

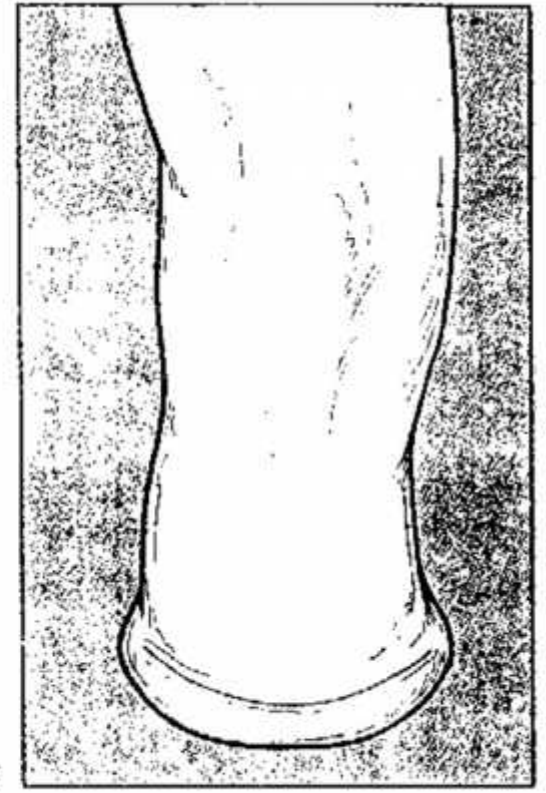
- Transfemoral : 10 cm diatas bagian terbawah dari femur, bentuk ideal konus
- Transtibial : 4-6 inchi dari tibial plateau, bentuk ideal silinder



A



B



C

Residual limb shapes: A. conical; B. cylindrical; C. bulbous.

# KOMPLIKASI

- Edema
- Hematoma
- Infeksi
- Nekrosis, ulserasi dan gangren
- Kontraktur
- Neuroma
- Nyeri dan sensasi phantom
- Trombosis vena dan emboli paru

# REHABILITASI MEDIK

- Penanganan preprostetik (*Preprosthetic management*)
- Perawatan paska operasi (*Postoperative care*)
- *Fitting* prosthetic dan training (*Prosthetic fitting and training*)
- *Follow-up* jangka panjang (*long-term follow-up care*)

# Penanganan Preprostetik

- Mulai :
  - dibuatnya keputusan untuk amputasi
  - evaluasi awal setelah amputasi traumatik
  - anak lahir dengan congenital skeletal deficiency sampai fitting dengan prosthesis.
- Evaluasi preprostetik : Pre dan post operatif -→ status fungsional dan fitting prostetik

# Penanganan Preprostetik

- Goal :  
Membantu pasien mencapai fungsional mandiri dalam ADL dengan menggunakan anggota gerak normal yang tersisa

# Perawatan Pasca Operasi

- Goal :
  - Penyembuhan luka
  - Mengontrol nyeri
  - Mempertahankan ROM khususnya bagian proksimal sendi dari ekstremitas yang diamputasi
  - Penguatan otot-otot untuk kompensasi biomekanik
  - Menyiapkan stump untuk fitting prostetik
  - Pencapaian ADL dan mobilitas mandiri tanpa prostetik
  - Penerangan tentang proses fitting prostetik dan outcome fungsional yang diharapkan
  - Support psikososial untuk beradaptasi terhadap akibat amputasi



# Penanganan Stump

- Goal :
  - Mengendalikan nyeri dan edema
  - Mempertahankan kekuatan dan ROM
  - Mempercepat penyembuhan luka dan maturasi stump

# Penanganan Stump

- Penanganan luka → Dressing

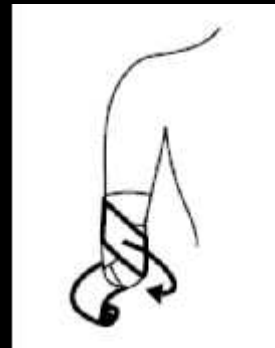
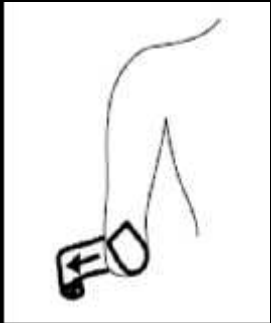
Goal :

- Proteksi luka operasi sehingga luka insisi tidak terbuka
- Mempertahankan luka bersih dan mencegah infeksi
- Kontrol swelling pasca operasi
- Mencegah kontraktur atau spasme otot yang membatasi gerak persendian
- Membentuk stump sehingga bekerja lebih baik dalam fitting socket

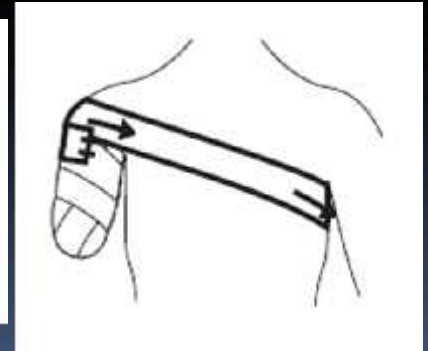
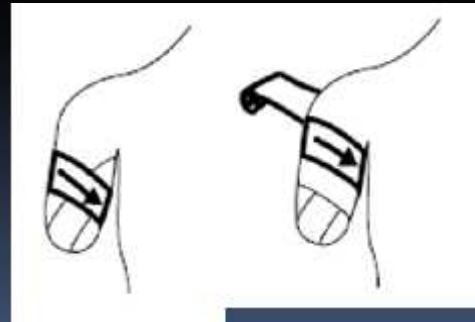
## Tipe dressing :

- Soft dressing
  - bahan elastik, dipakai 24 jam/hari kecuali mandi, dan dijaga tetap bersih → teknik *figure-of-8 wrapping*
  - Luka operasi dapat sering diperiksa
  - Tersedianya bahan bandage, 4 inchi untuk BKA dan 6 inchi untuk AKA

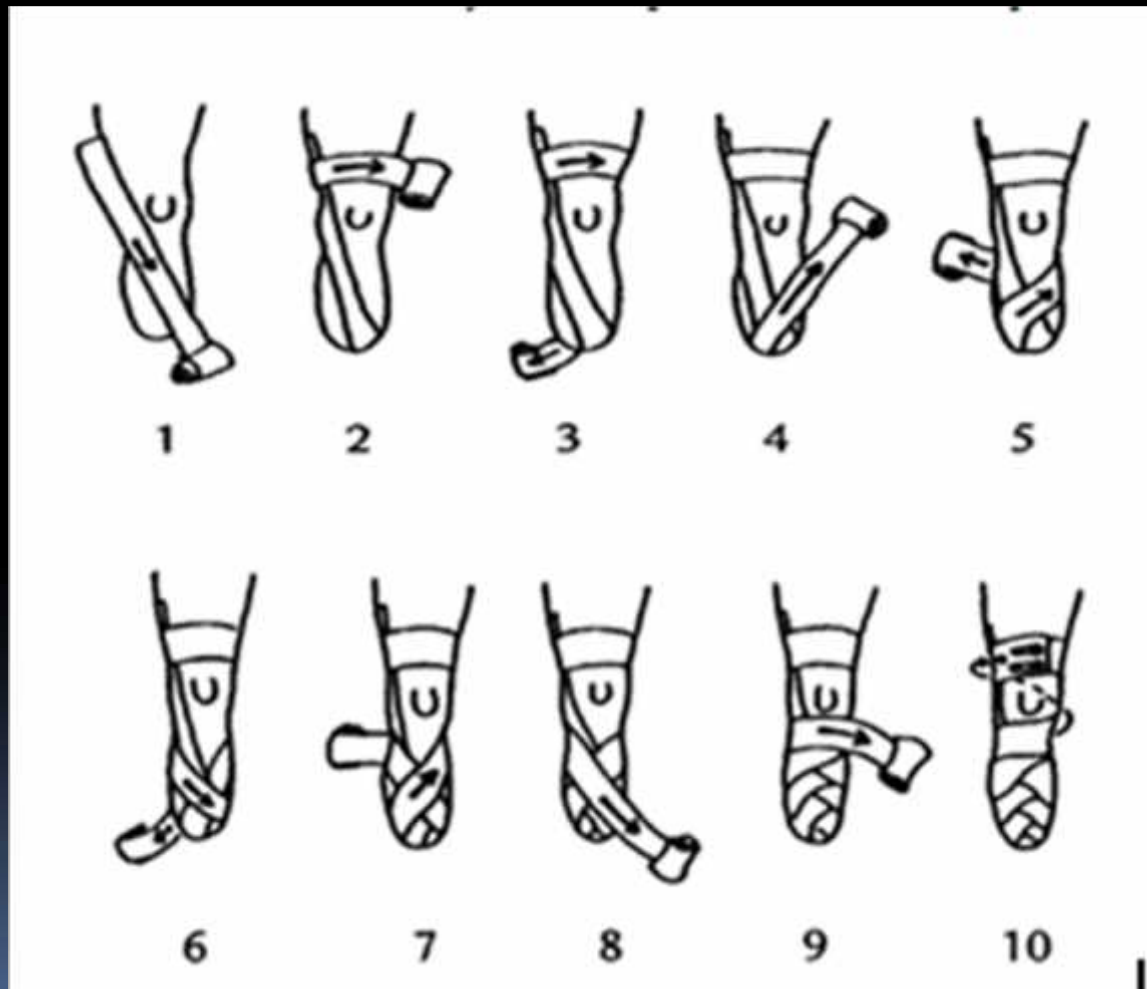
# Below Elbow Amputation



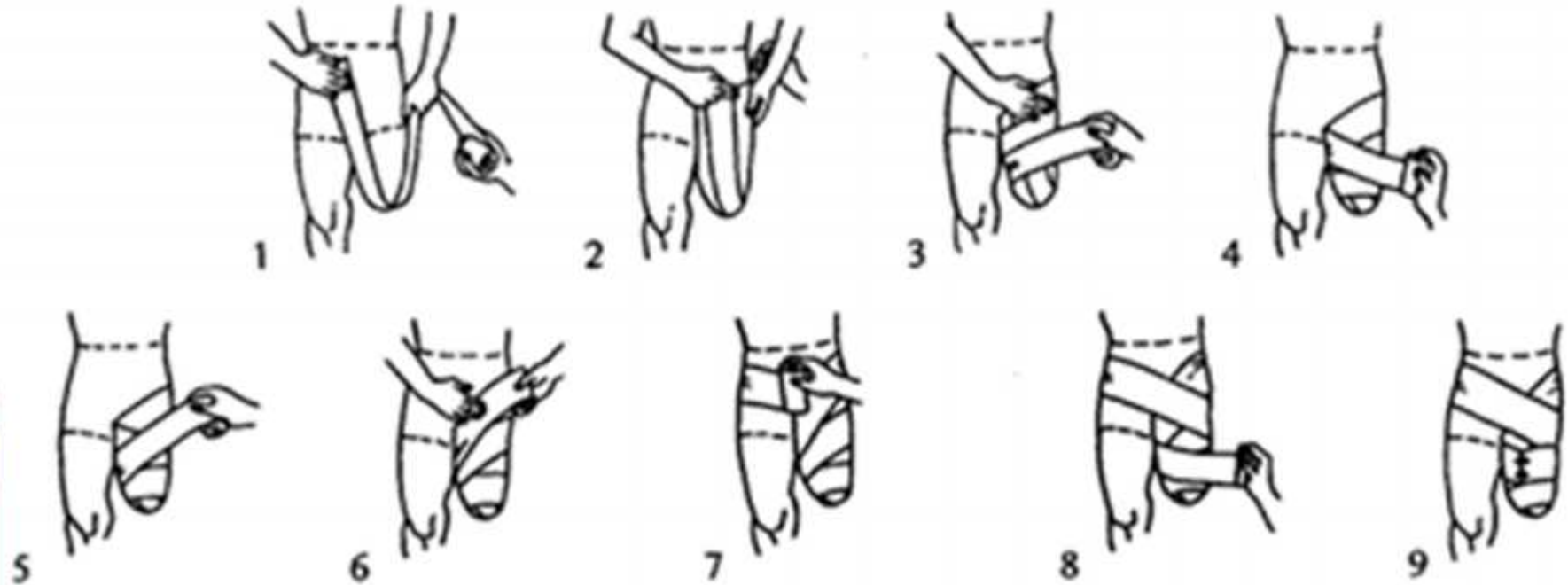
# Above Elbow Amputation



# Below knee amputation



# Above knee amputation



# Penanganan Stump

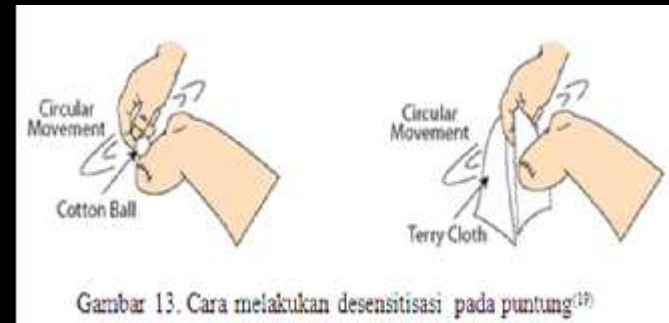
- Perawatan kulit :

Goal :

- Mencegah infeksi dan iritasi kulit
- Mempertahankan mobilitas kulit
- Mengurangi sensitivitas kulit pada stump

# Penanganan Stump

- Perawatan kulit :
  - Hygiene dan lubrikasi
  - Inspeksi
  - Mobilisasi
  - Desensitisasi



Gambar 13. Cara melakukan desensitisasi pada puntung<sup>(17)</sup>





# Penanganan Stump

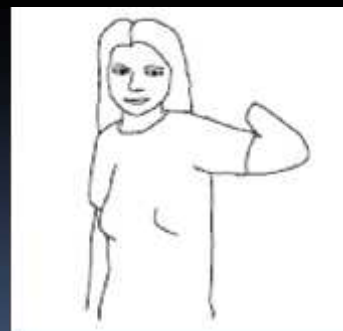
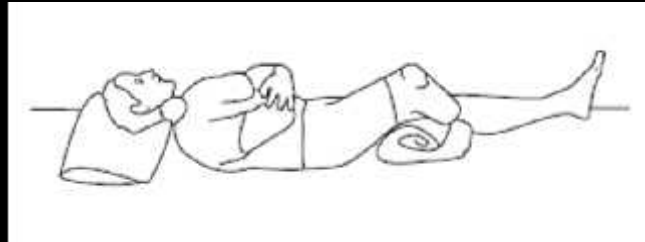
- Exercise

Goal :

- Meningkatkan/mempertahankan ROM semua anggota gerak
- Meningkatkan kekuatan anggota gerak
- Meningkatkan ketahanan ADL

# Penanganan Stump

- Exercise
- 1. ROM



# Penanganan Stump

- Exercise
  2. Positioning



# Penanganan Stump

## ■ Exercise

### 3. Stretching

- “good stretch”
- Mild discomfort → N
- Lama regangan 30 detik, diulang 10 kali
- Dilakukan 3 kali/hari atau sepanjang hari, tiap hari.

#### Stretching Exercise



Hamstring Stretch



Hip Flexor Stretch



Hip Flexor Stretch



Knee Bending



## Stretching for lower extremity amputations

### 1. Knee to the chest, other leg flat on the mat

- Pull one leg towards the chest while pressing the other leg flat against the bed or mat. Mild pulling is felt in both hips.
- Repeat stretch with the opposite leg pulled toward the chest, and the other leg pressing flat to the mat or bed.
- A caregiver can assist with this stretch by pushing one thigh to the chest while keeping the other leg flat on the mat.



### 2. Straightening the knee.

- The person is seated with his amputated limb supported straight on a solid surface. The knee is then stretched as straight as possible by pushing down with the hands on the thigh just above the knee. Mild pulling should be felt at the back of the knee.



## Stretching for upper extremity amputations

### 1. *Shoulder elevation stretch*

- Lift the limb upward using the other hand to push until a good stretch is felt just below the armpit.



### 2. *Shoulder cross-body stretch*

- Stretches the limb across the body using the other hand to pull it across. A good stretch is felt in the back of the shoulder.



### 3. *Chest stretch*

- First, stabilize the front of the limb against an immovable surface (e.g. a wall or tree). Then twists the trunk /body away from the arm. A good stretch is felt in the chest area.



# Penanganan Stump

- Exercise

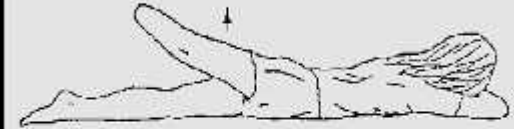
- 3. Strengthening

- 3-5 set, 10-20 repetisi, istirahat 10 detik antar set dan 1-2 menit antar tiap exercise

## Strengthening Exercise



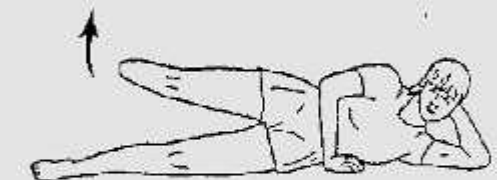
Hip Extension 1



Hip Extension 2



Hip Abduction 1



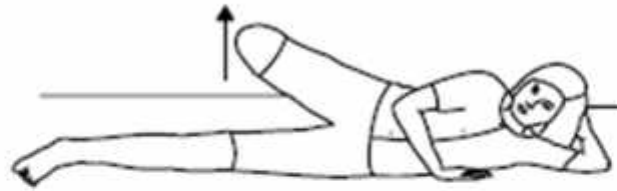
Hip Abduction 2



Hip Adduction

**How to add resistance to exercises:**

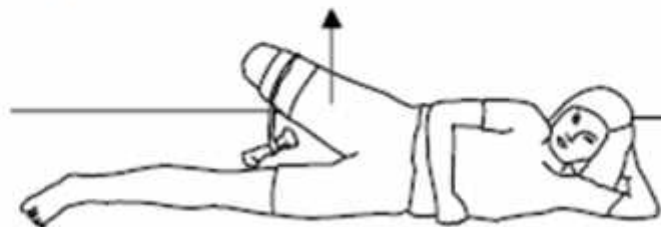
**Against gravity:** Lift the limb or body against gravity.



**Manual resistance exercises:** Have someone press against the limb as it is lifted.



**Use a weight for resistance,** like a bag of sand, can goods or container of water attached to the limb and lift the limb with the added weight.



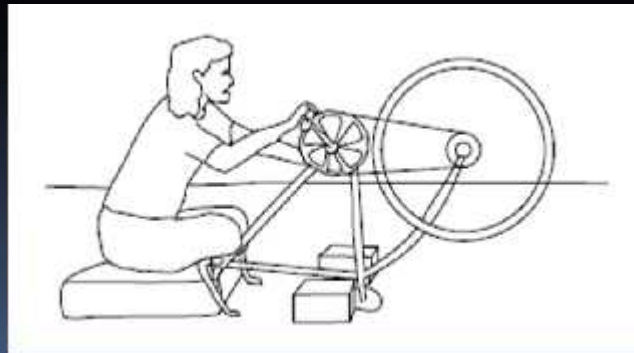
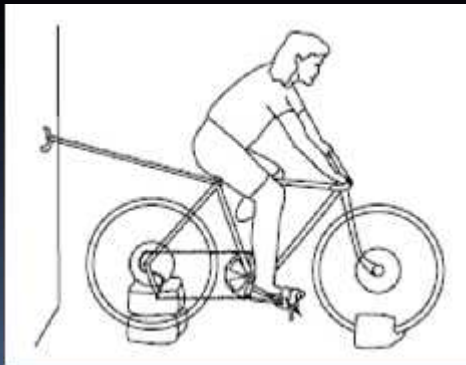


# Penanganan Stump

- Exercise

- 4. Meningkatkan endurance :

- Walking (20-45 menit, 5-7hari/minggu)
    - Jogging (30-45 menit, 3 hari/minggu)
    - Sepeda statis (20-45 menit, 3-5 hari/minggu)



# *Fitting* Prostetik

- Preparatory/temporary prosthetic
  - Desain sederhana
  - Terdiri dari socket, pylon dan foot
  - Ambulasi dini
  - Membantu penyusutan stump
  - Memfasilitasi maturasi stump
  - Sampai 3 – 6 bulan setelah amputasi



# *Fitting* Prostetik

- Definitive/permanent prosthesis
  - Stump matur/3-9 bulan setelah amputasi
  - Rata-rata jangka waktu 3-5 tahun
  - Dibuat khusus secara kosmetik sesuai kebutuhan ADL, vocational dan avocational (anak-anak sesuai usia perkembangan motorik menurut milestones)

# Training

- Exercises sebelum berjalan
  - Mampu menggerakkan berat badan secara tepat diatas prosthesis dan keseimbangan pada prostesis
  - Dilakukan didepan cermin sehingga pasien dapat melihat postur dan pergerakan lebih baik

### **5.1.1 Shifting Bodyweight from Side to Side**

- Start by standing with both hands supported (such as on two chairs or in a door frame), place the bodyweight on both feet equally. (Figure 5.1a )
- Then shift the weight onto the prosthesis, moving the hips/trunk over the prosthetic foot, and then returning back to equal weight. (Figure 5.1b) Repeat 30 times. Important: DO NOT lean over to the side, stand tall.
- When this becomes easy, repeat the exercise holding on with one hand, and then try it without arm support. For a greater challenge, try the exercise with the eyes closed.



**Fig. 5.1a**



**Fig. 5.1b**

# Training

- Berjalan pada lantai datar menggunakan alat bantu :

## 5.2.1 Walking Frame

- The frame should be no higher than waist level, and high enough to allow the elbows to bend about 15 degrees
- To walk, he should move the frame forward about 20-30 cm, make it steady it with both arms and then step with the prosthesis into the middle of the frame.
- Next, he steps with intact leg just past the toe of the prosthetic foot.
- Walking should be comfortable and done as often as possible to mild fatigue.



# Training

- Berjalan pada lantai datar menggunakan alat bantu :

## 5.2.2 Crutches or Canes

- Crutches should be at least three fingers width below the armpits, and canes should be high enough to allow the elbows to be bent slightly. (Figure 5.5)
- Both devices should be placed about 20cm away from the body, to the side.
- A person should move either device forward about 20-30cm and step with the prosthesis between the crutches or canes.
- Next, he steps past the toe of the prosthesis with the intact leg.



Fig. 5.5

# Training

- Naik dan turun :

### **5.3.1 Steps with a Rail**

- Use the crutch or cane in the hand opposite of the rail.
  - Going up: Step up with the intact leg first. Then step up with prosthesis. (Figure 5.6a)
- Going down: Place crutches or cane down first then step down with the artificial limb. Step down with the intact limb. (Figure 5.6b)



**Fig. 5.6a**



**Fig. 5.6b**



# *Follow-up* Jangka Panjang

- Tiap 3 bulan (18 bulan pertama), problem (+)  
→ lebih sering
- Selanjutnya tiap 6 bulan

# *Follow-up* Jangka Panjang

- Problem amputee :
  - Masalah kulit : edema, dermatitis kontak, folikulitis, adheren scar, ulserasi
  - Nyeri : Nyeri insisi (sembuh 4-5 hari) → rigid dressing post-operatif
  - Neuroma → modifikasi socket, eksisi pembedahan
  - Nyeri phantom → TENS, modifikasi perilaku, konseling psikososial, antidepresan, dan antikonvulsif
  - Kontraktur → stretching dengan/tanpa US, gips serial, dynamic splint, pembedahan



# *Follow-up* Jangka Panjang

- Problem amputee :
  - Problem tulang
  - Skoliosis → koreksi panjang protesa
  - Iskemi stump
  - Masalah penyesuaian psikososial → konseling psikologis
  - Masalah Aktivitas Kehidupan Sehari-hari (AKS) dan penyesuaian pekerjaan

# Problem amputee

Problem kulit	Kemungkinan Penyebab	Penanganan
Edema	Jepitan proksimal stump oleh socket	Modifikasi protesa
Dermatitis kontak	Sensitifitas terhadap krem kulit, sock wool stump, plastic resin pada socket protesa	Kompres dingin, antipruritic lotion
folikulitis	staphilococcus	Pakai sarung nylon tipis antara kulit stump dan socket, merubah stump socket
Adherens scar	Gesekan konstan terhadap jaringan parut pada protesa	Massage, modifikasi socket protesa
ulserasi	Penekanan socket berlebihan/gerakan stump dalam socket	Modifikasi socket



Terima kasih