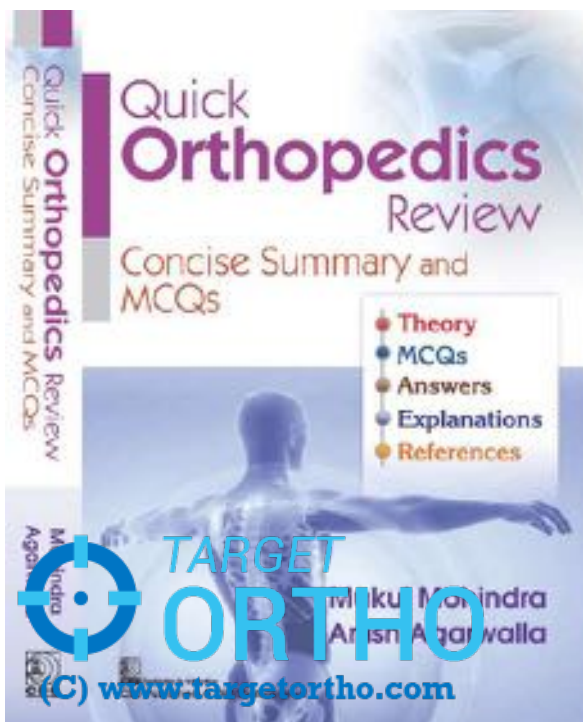
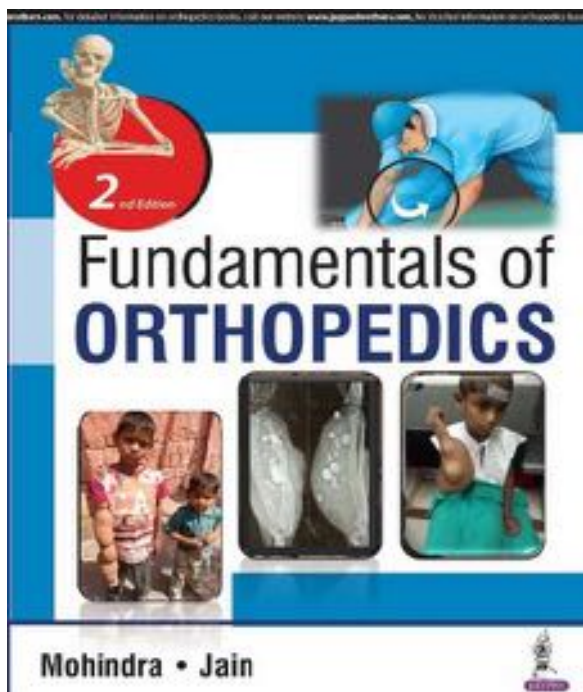




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AMPUTATIONS
ORTHOTICS
PROSTHOTICS

AMPUTATION

CAUSES

Dead limb

Crush injury in RTA

PVD

Deadly disease
in limb

Gas gangrene

Dis-useful limb

Congenital limb deficiencies



MESS Score

Mangled Extremity Severity Score

Severity of skeletal and soft tissue injury

Age

B.P

Limb ischemia

PVDs

TOT

A-B Index

Types

Closed

Stump covered with skin

Guillotine

Stump exposed



MUSCLES

Myodesis

Muscles sutured to bone
(via drill holes)

Myoplasty

Muscles sutured to opposite
group of muscles

SKIN

Skewed

Long posterior flap

Scandinavian

Equal anterior and
posterior flaps

Handling N/V
bundle

Vessels

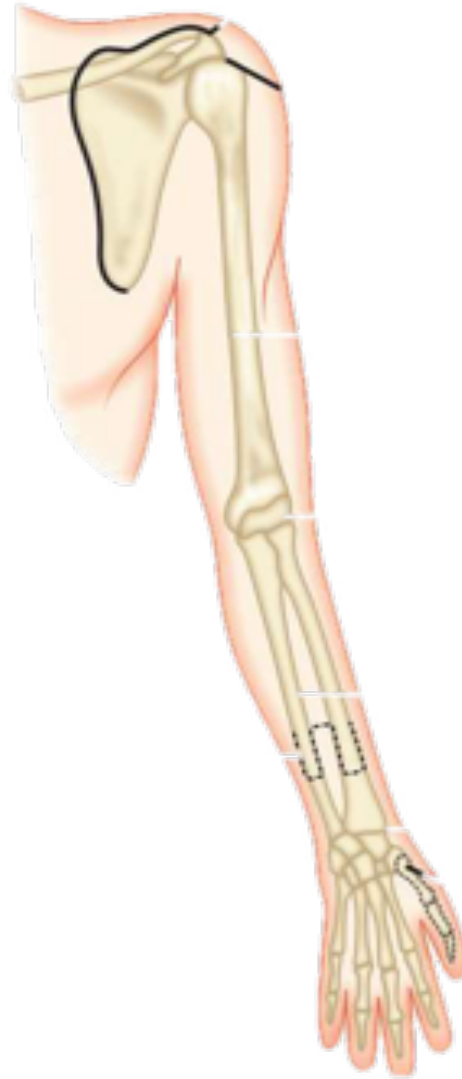
Nerves

Tourniquet

Infection

Malignancy

Nomenclature



Nomenclature



VARIATIONS OF SYME'S AMPUTATION

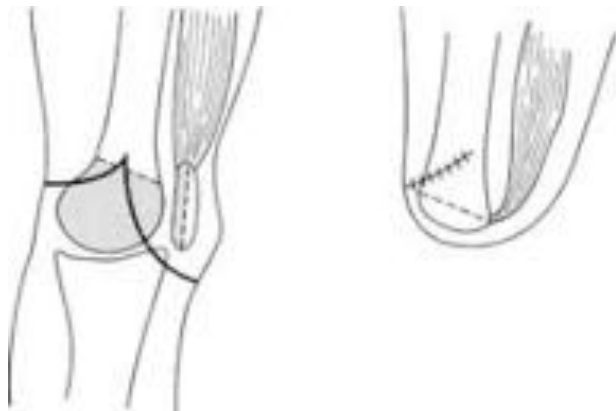
Sarmiento: 1.3 cms proximal to malleoli

Boyd: Talectomy → Shift calcaneum forward → Fuse with tibia

Pirogoff: Talectomy → Vertical section of calcaneum → Rotate to fuse with tibia



GRITTI-
STOKES



Surgical Principles

Disarticulation *OR* Amputation

Length of stump

ENERGY EXPENDITURE AFTER AMPUTATION

AMPUTATION LEVEL	ENERGY EXPENDITURE
Long Below Knee amputation	
Medium Below Knee amputation	
Short Below Knee amputation	
Above Knee amputation	
Hip Disarticulation	

Recommended Levels

Above knee amputation: _____ above
knee joint line

Below knee amputation: _____ below
knee joint line (*ideally at the musculotendinous
junction of gastrocnemius*)

Below elbow amputation: _____ below
the olecranon

Above elbow amputation: _____ above
the olecranon



COMPLICATIONS

- ☐ **INFECTION**
- ☐ **BLEEDING**
- ☐ **SKIN FLAP NECROSIS**

- ☐ **PHANTOM SENSATIONS**  Shorten down to the stump with time

- ☐ **POST AMPUTATION NEUROMA**

TOP UPs

- Trans--tibial amputation
- Below Knee Amputation
- Equinus deformity after amputation
- Congenital limb deficiencies

KRAJBICH PRINCIPLES

- Preserve the growth plates and all length possible.
- In lower limb amputations, where ever possible knee joint should be preserved.
- Disarticulation is preferred over transosseous amputation.



Terminal bone growth: Use epiphyseal caps to cover medullary canals.

REHABILITATION OF AN AMPUTEE

OSCAR PISTORIUS → 400M
at 2012 London Olympics

- A. RTA
- B. Malignancy
- C. Congenital malformation
- D. Frost bite during skiing



PROSTHESIS

A device that replaces a body part

Body powered

Battery powered



SOME IMPORTANT PROSTHESES

- Above knee prosthesis: **Quadrilateral socket prosthesis**
- Below knee amputation: **PTB prosthesis**
- Syme's amputation: **Canadian prosthesis**
- Partial foot/ finger amputations: **Fillers**



PARTS OF A PROSTHESIS

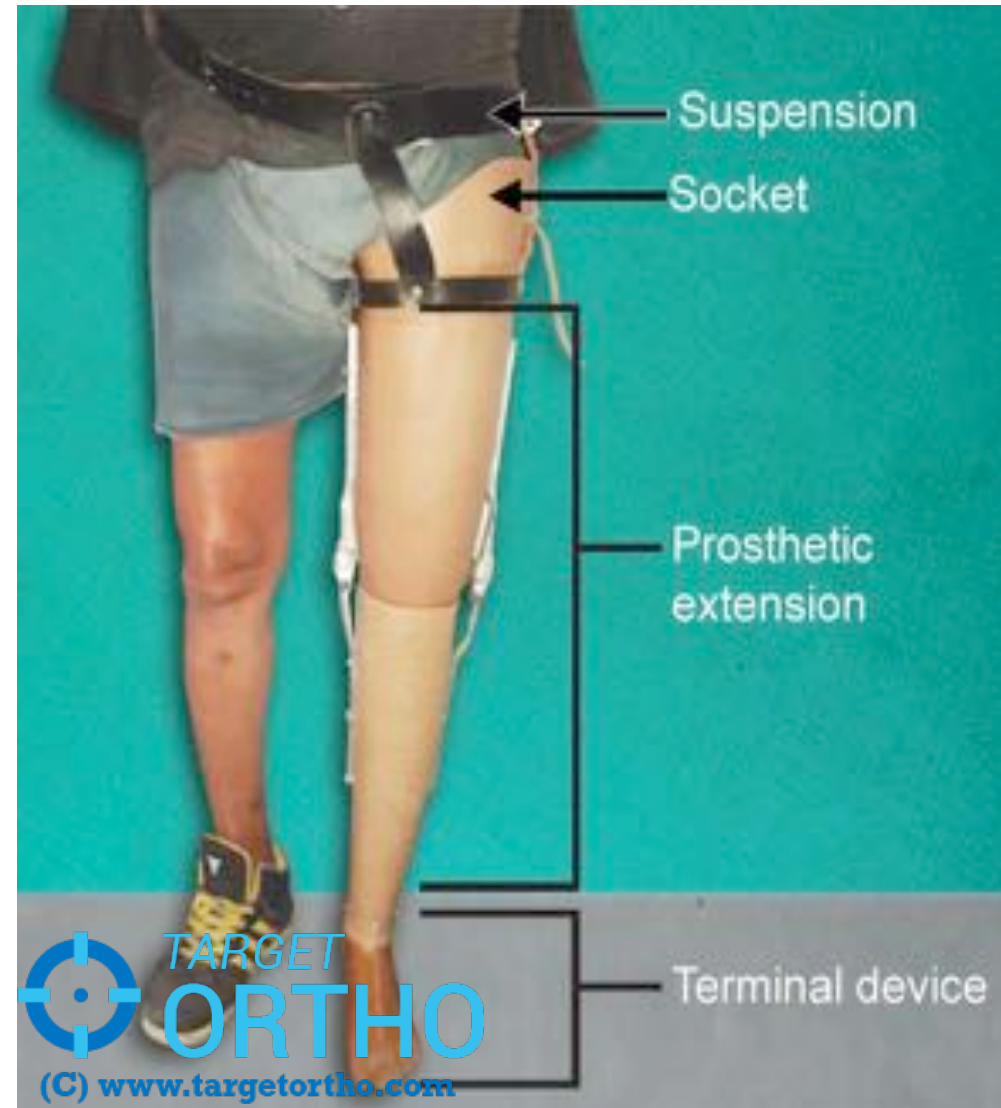
Holding stump to the socket



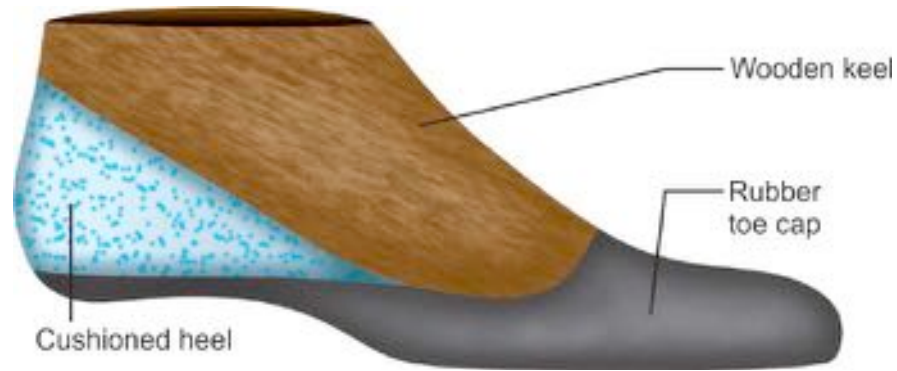
Contact the stump (padding)

Substituting bones and joints

For providing function



TERMINAL DEVICES



SACH FOOT

Solid Ankle
Cushioned Heel



JAIPUR FOOT





RECENT DEVELOPMENTS

- SAFE FOOT: **S**tationary **A**ttachment **F**lexible **E**ndo-skeletal Foot
- Energy Storing Feet

PYLON PROSTHESIS

Temporary *endoskeletal* prosthesis

Ideal time to fit a prosthesis after amputation?

- A) 2-3 weeks
- B) 2-3 months
- C) 2-3 years
- D) 1 year



ORTHOSIS

A device that AIDS (helps) a body part

STATIC

DYNAMIC

ORTHOSIS

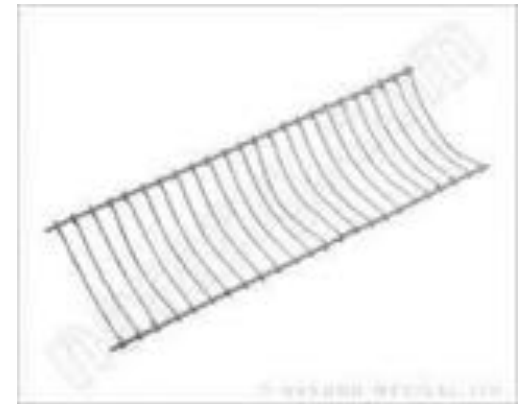
— CAST/ SLAB

— SPLINT

— BRACE

— CALIPER

— *SYSTEMATIC NOMENCLATURE*



The “Five” Basic Controls: “FARSH”

F = FREE Free motion permitted in any given direction.

A = ASSIST Application of an external force for the purpose of increasing the range, velocity, or force of a desired motion (spring, motor, alignment to use gravity, etc.).

R = RESIST Application of an external force for the purpose of decreasing the velocity or force of a desired motion.

S = STOP Inclusion of a static unit to deter an undesired motion in one direction.

H = HOLD Elimination of all motion in prescribed plane

SYSTEMATIC Nomenclature of Orthotics

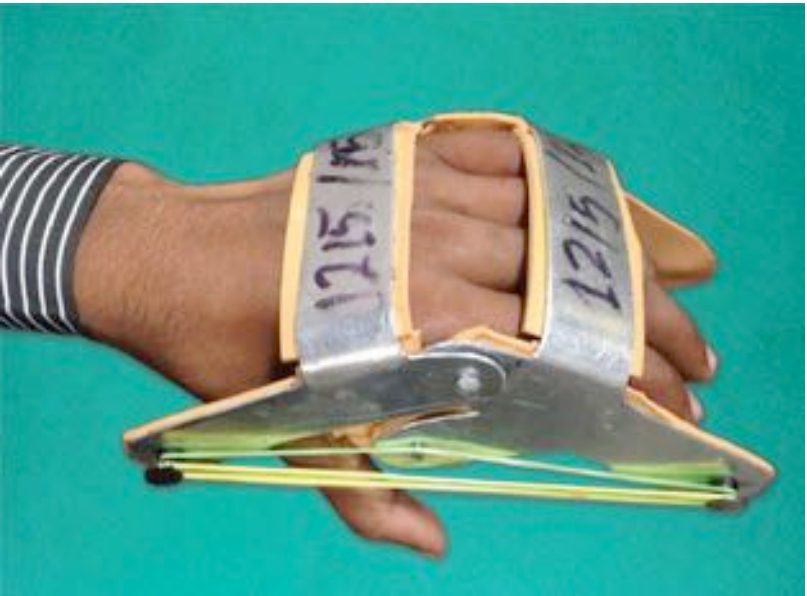
This terminology says

FIRST WRITE: first letter of each joint crossed by the orthosis in sequence

END WITH letter “O” fixed at last (signifying orthosis)

FOOT DROP SPLINT



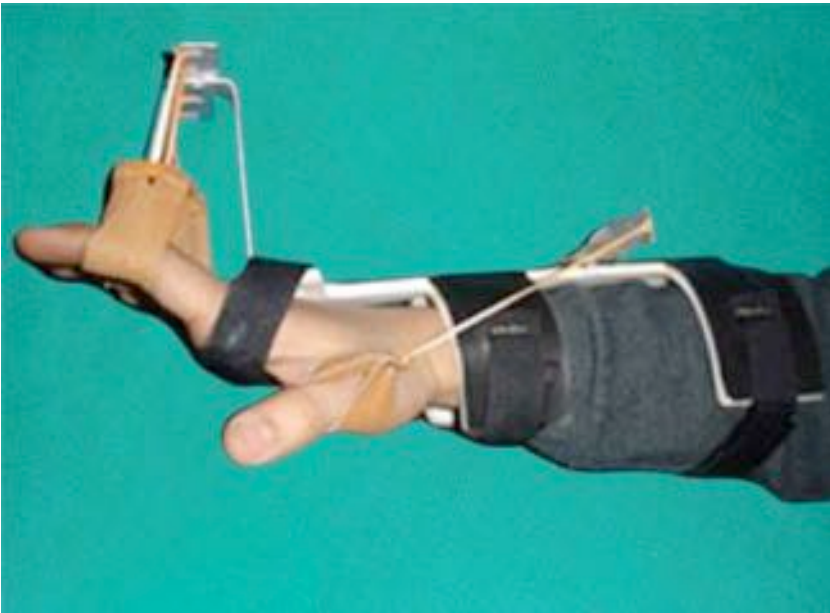


KNUCKLE BENDER

OPPONENS SPLINT



WRIST DROP SPLINT



NERVE INJURY WHEN TO SPLINT?

OPEN LACERATION

NERVE INJURY

IATROGENIC

Observation
3-6 weeks

Recovering

No Recovery

Repair

TURN BUCKLE SPLINT



Mild

Moderate

Severe

AEROPLANE SPLINT

Brachial Plexus Palsy

Plexus avulsion

No avulsion

*Micro surgical
exploration*

No recovery by 3 months

Toronto score < 3.5

Pan-plexus lesions
with Horner synd.







TENNIS ELBOW STRAP



SOFT CERVICAL COLLAR

RIGID CERVICAL COLLAR

PHILADELPHIA COLLAR



S
O
M
I



CERVICAL FRACTURE

STABLE PATTERN

UNSTABLE PATTERN

Columns > 2
Deficit ++

Reduction with Crutchfield tongs



LUMBO SACRAL BELT/ CORSET



When to use?

- A) Entire day
- B) 23 hours a day
- C) Only during standing work
- D) Only while resting on bed

TAYLOR'S BRACE (Steel Jacket)

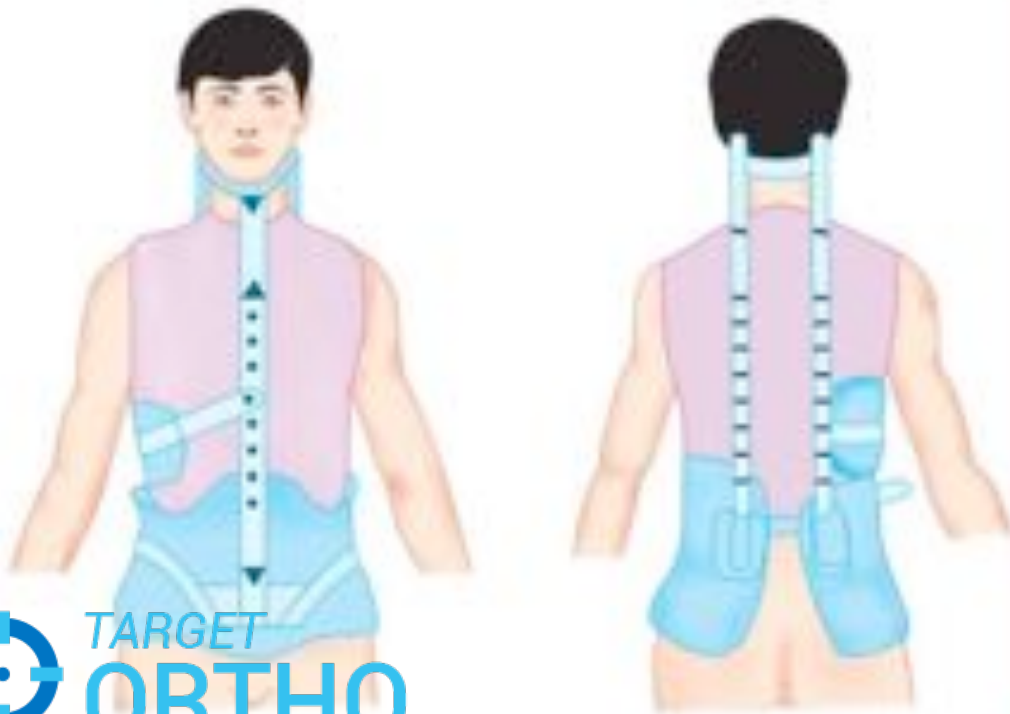


A
S
H
E



SCOLIOSIS

Milwaukee brace

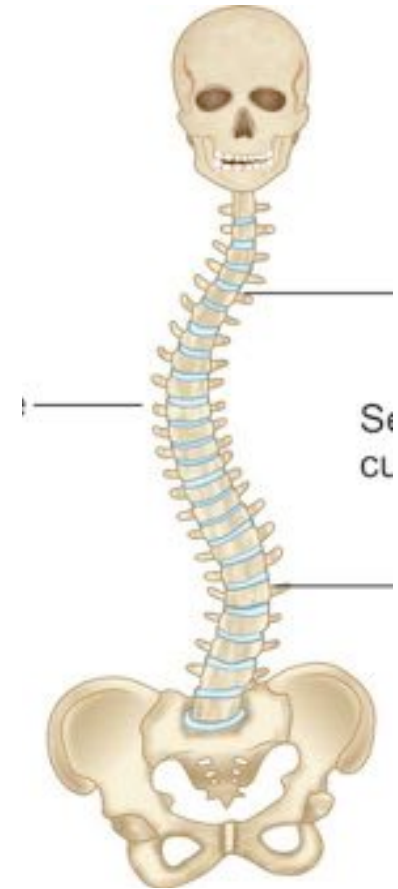


Boston brace



Charlston brace



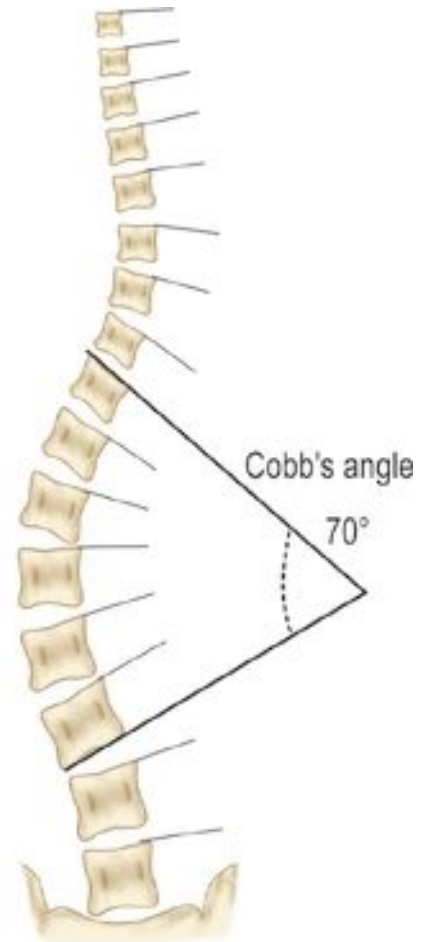
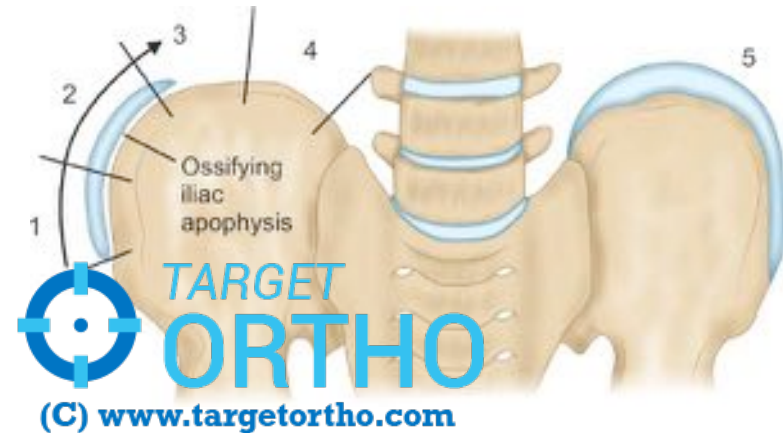
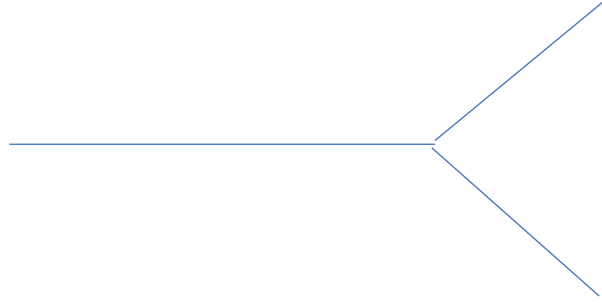


Boston brace



- Negative mould/ blueprint
- Low Profile
- Areas of relief opposite areas of pressure
- Can allow for lumbar flexion
- Exerts derotational forces

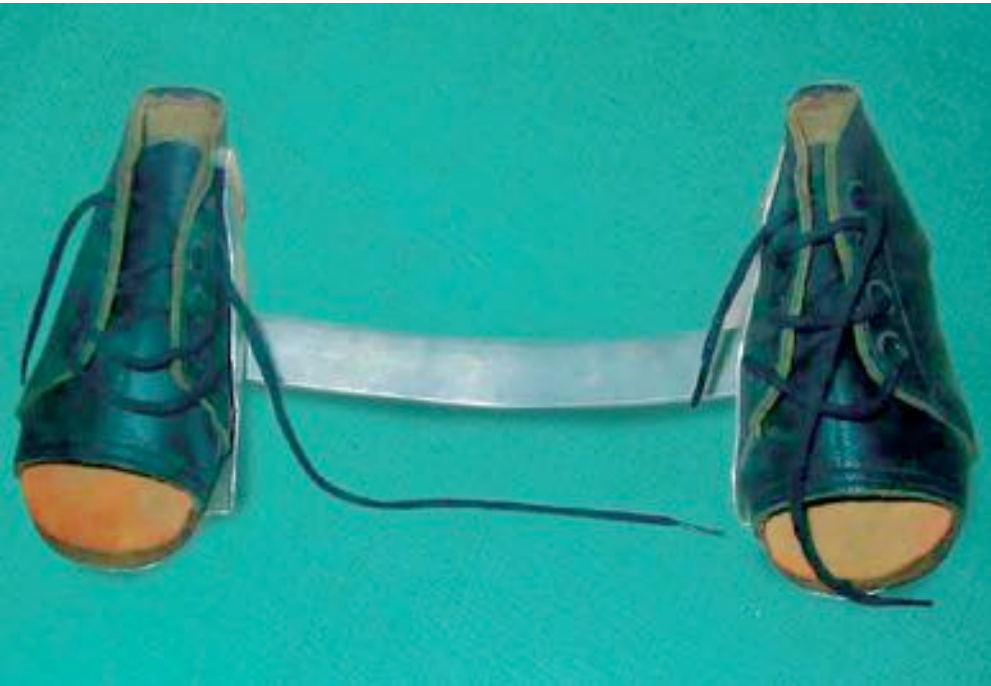
- Infantile
- Juvenile
- Adolescent
- Adult





PAVLIK HARNESS





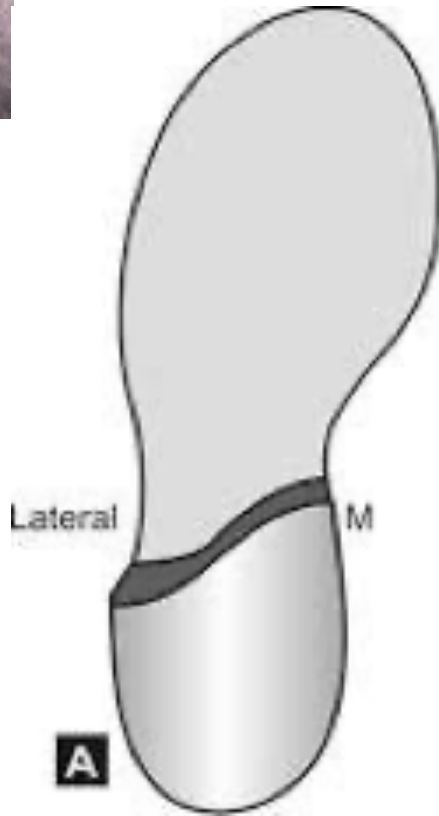
HALLUX VALGUS (BUNION)



FOOTWEAR MODIFICATIONS



FLAT FOOT ORTHOSIS



PAINFUL FOOT ORTHOSIS



FLOOR REACTION ORTHOSIS

- Polio
- Cerebral Palsy
- Spina bifida



Knee in flexion

Reacting force on knee



Foot touches in equinus

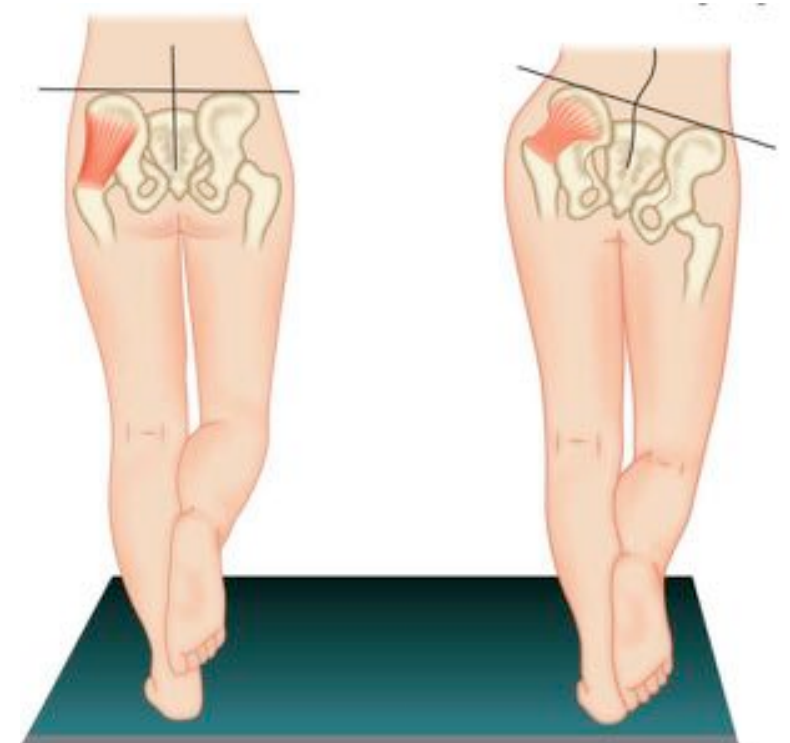


Weight of body



AMBULATORY AIDS

Stabilize your COG by
increasing the “area of support”



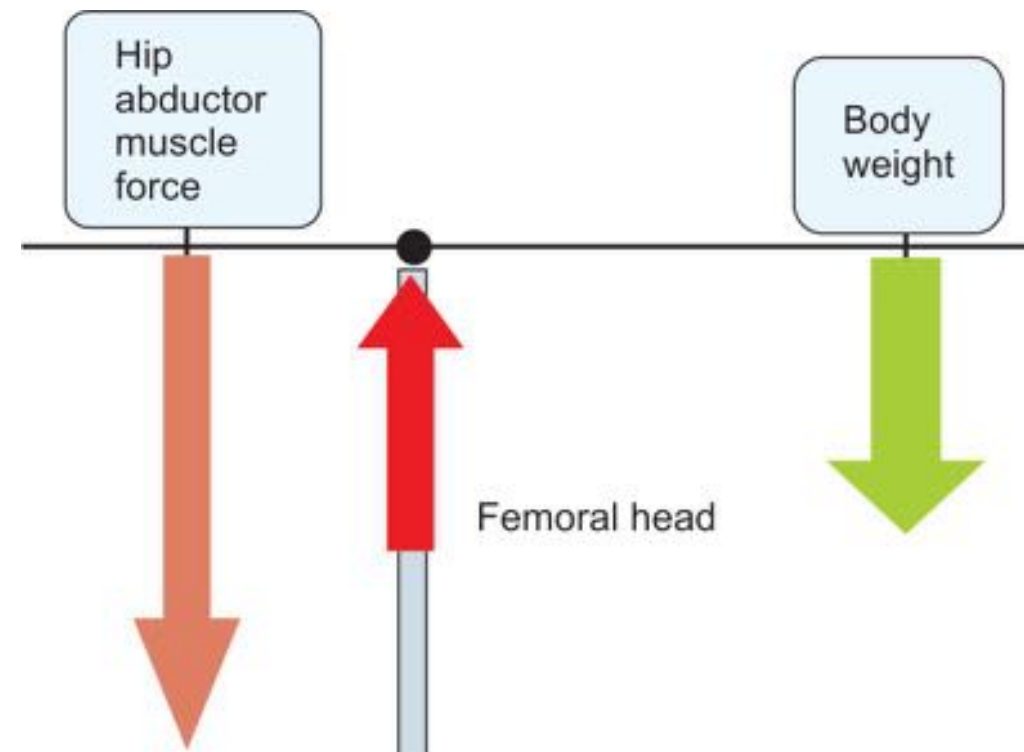
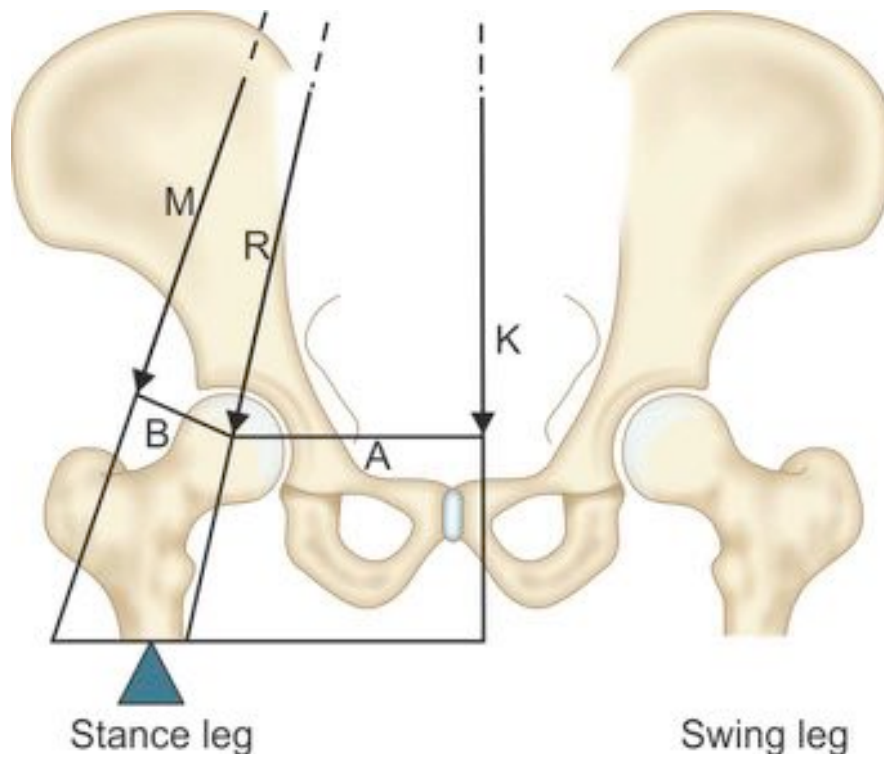
Finding your correct height/ size

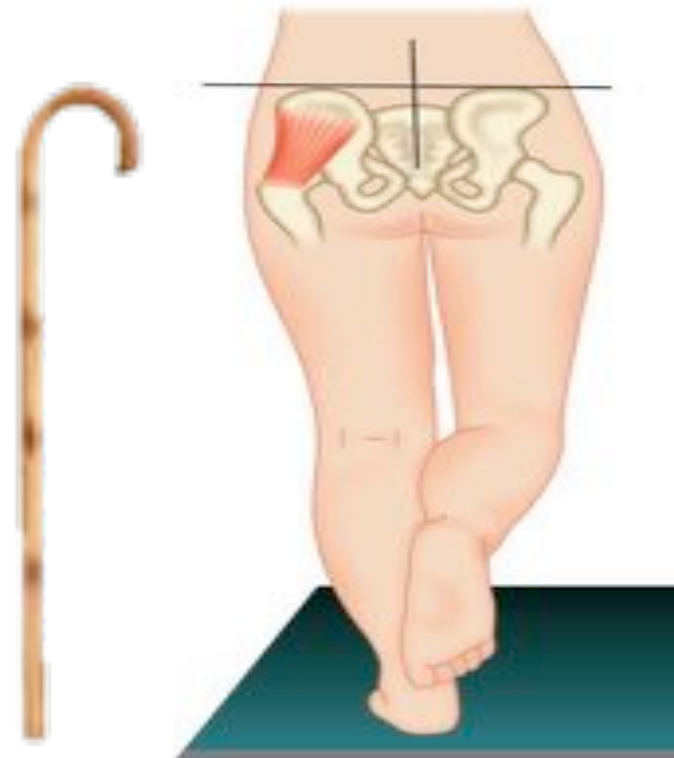


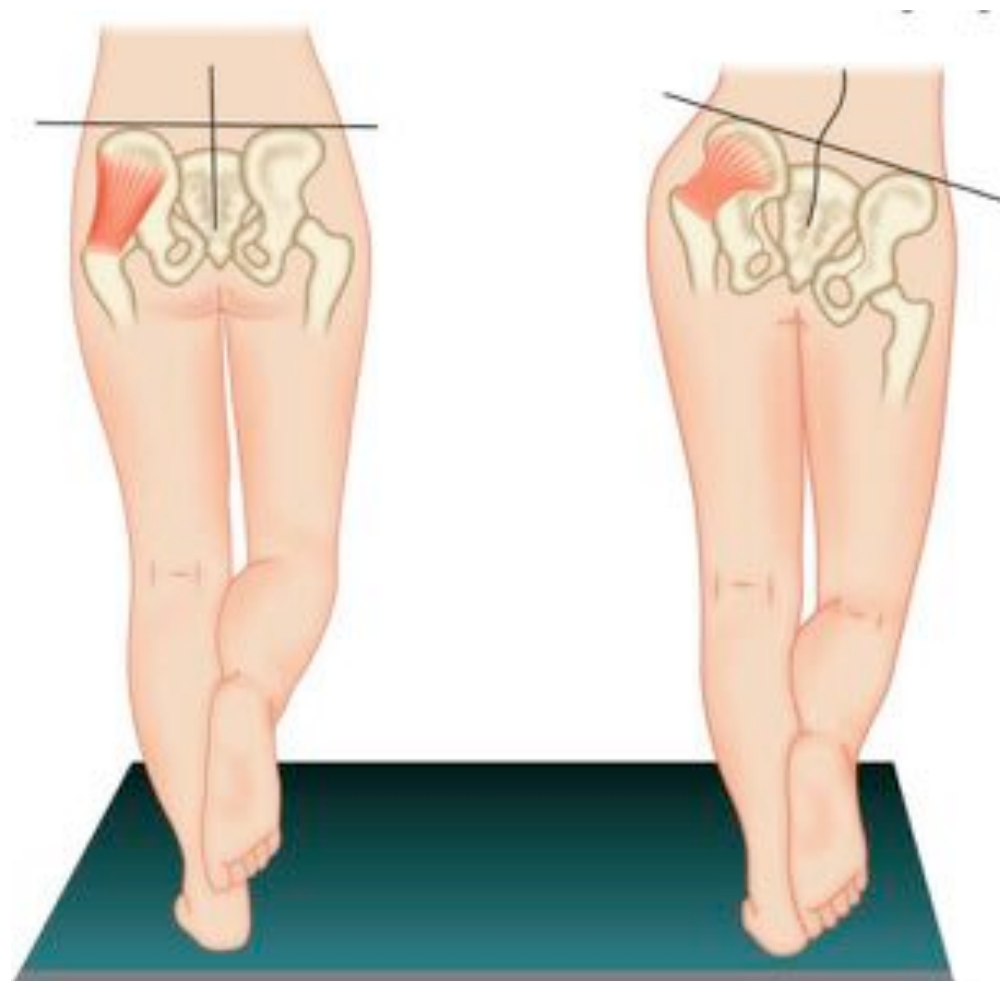
In which hand to hold the stick?

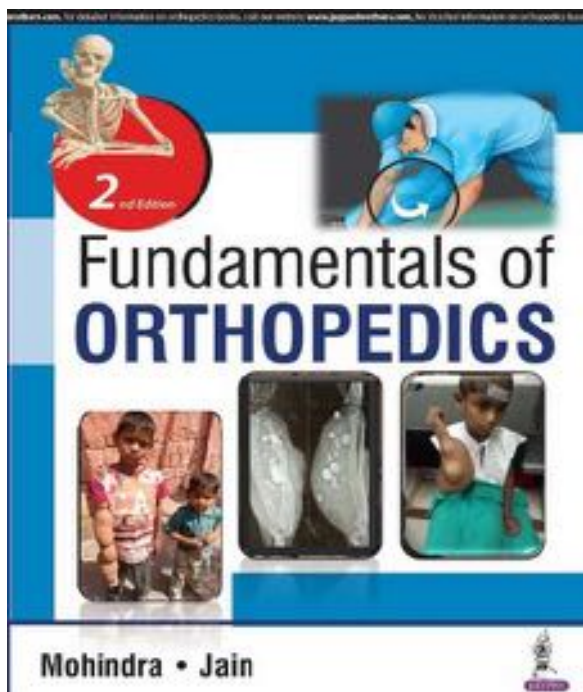
Q. A patient has AVN of right hip that is causing troublesome pain. He should be advised to hold the cane in which hand?

- A. Left hand
- B. Right hand
- C. Either side, benefit is same
- D. Either side, stick is just cosmetic









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