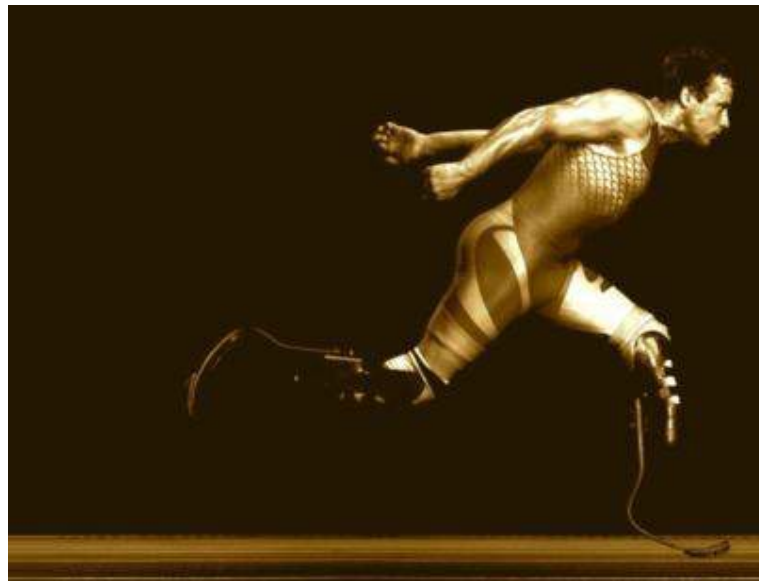


Orthotics & Prosthetics



DEFINITIONS

- **Orthotics** - The science that deals with orthoses designed to provide external control, correction, and support. (orthoses = braces)
- **Orthosis** is an appliance used to support part of a body or perform certain function.
- **Splint** is an appliance used to support / immobilize part of a body.
- **Caliper** is a device which is applied to lower limb to give support or control a joint

FUNCTION OF ORTHOSES

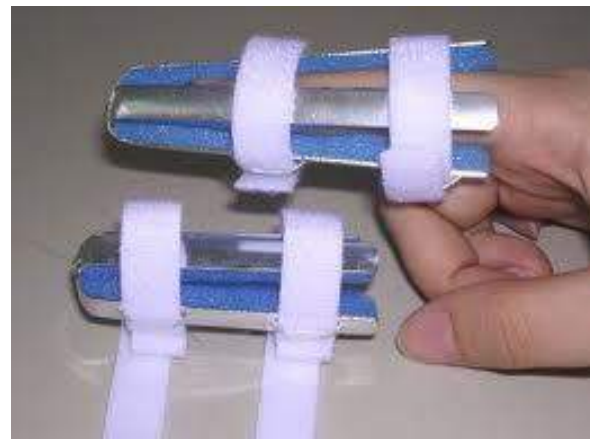
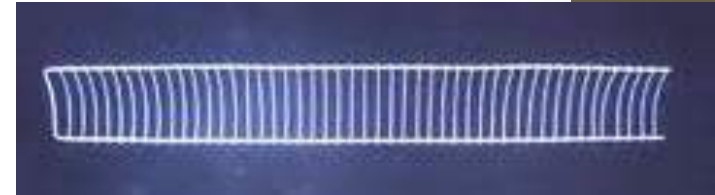
- Prevents deformity
- Corrects deformity
- Maintains correction
- Corrects instability
- Relieves pain
- Relieves weight bearing
- Facilitates ambulation

General classification

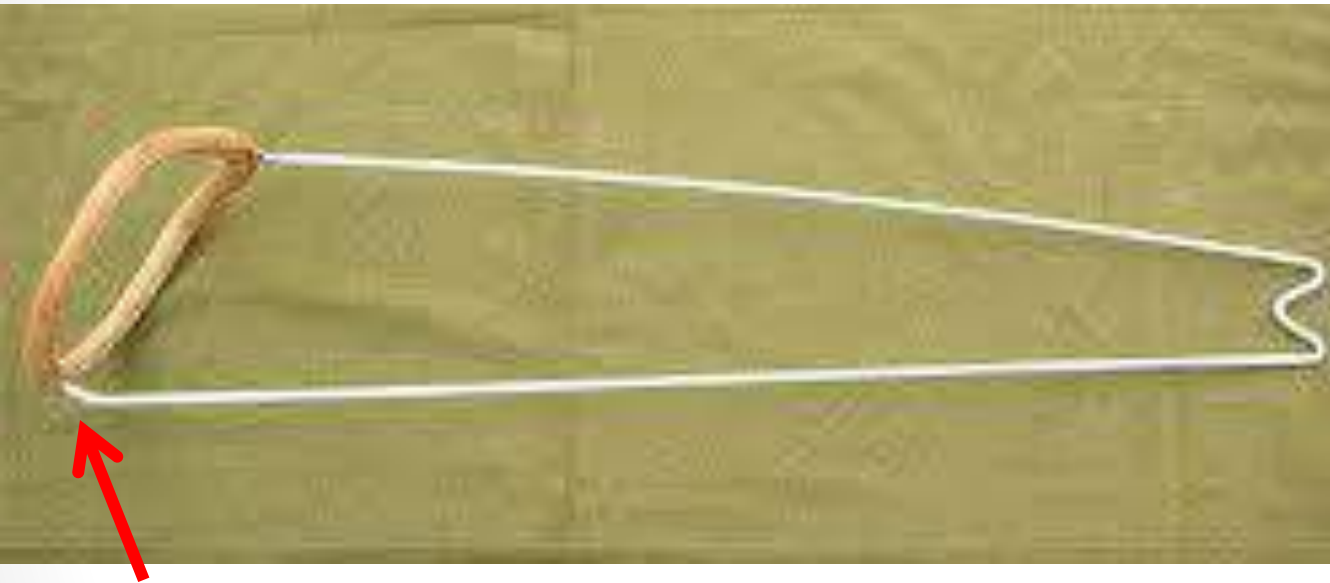
- ❖ **Static orthoses**: As the word static implies, these devices do not allow motion. They serve as a rigid support in fractures, inflammatory conditions of tendons and soft tissue, and nerve injuries.
- ❖ **Dynamic/functional orthoses**: These devices do permit motion on which its own effectiveness depends. These types of upper extremity orthoses are used primarily to assist movement of weak muscles.

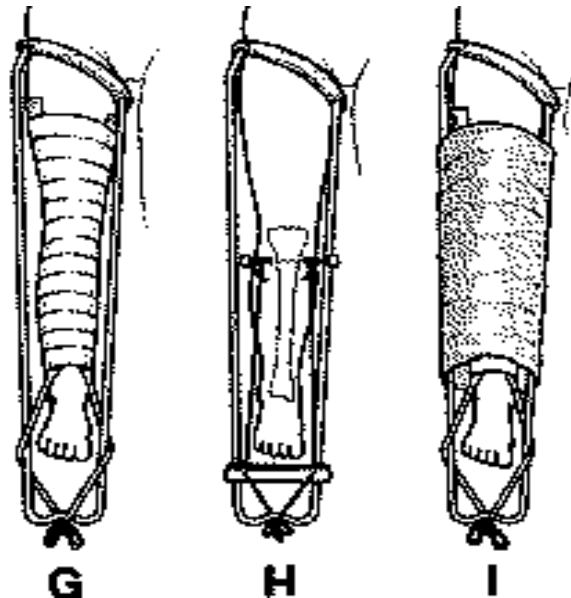
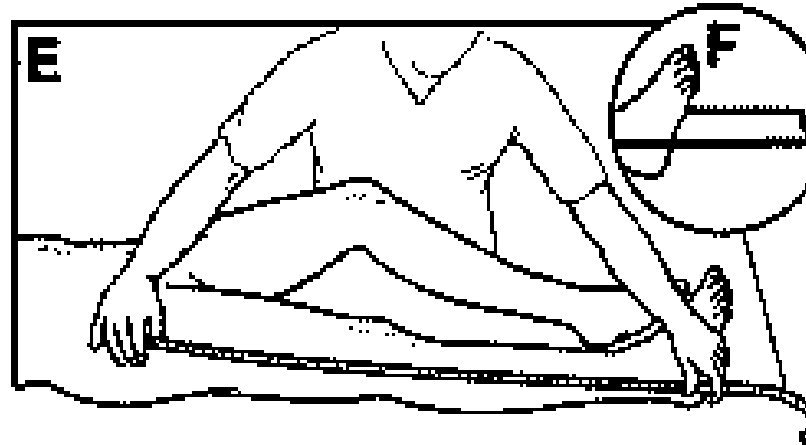
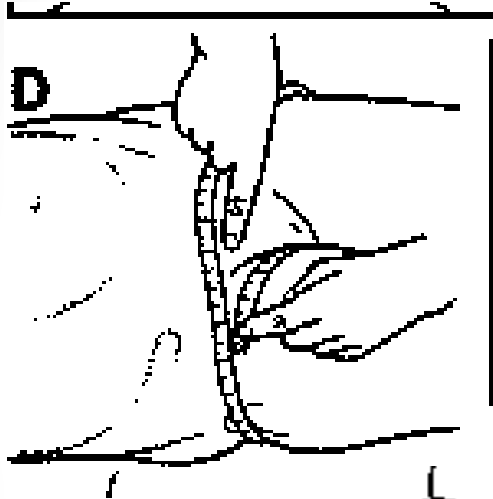
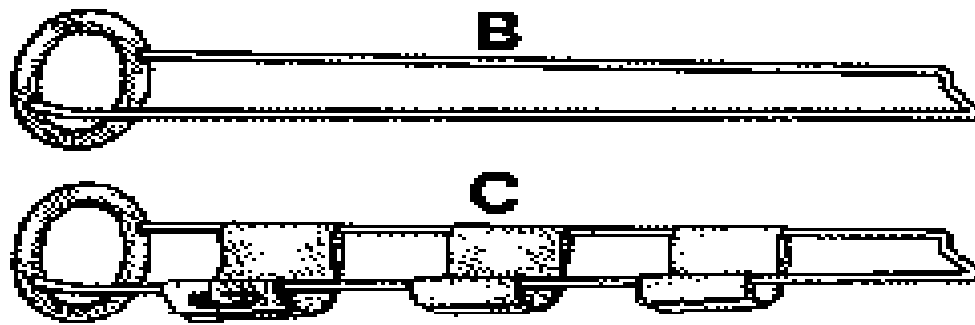
COMMON SPLINTS & BRACES AND THEIR USES

Name	Use
Cramer-wire splint	Emergency immobilization
Thomas splint	Fracture femur -anywhere
Bohler-Braun splint	Fracture femur -anywhere
Aluminium splint / stack splint/ Frog splint	Immobilization of fingers



THOMAS SPLINT







FIXED TRACTION



SLIDING TRACTION



PIERSON'S ATTACHMENT

© R.L. Huckstep 1997

BOHLER BRAUN SPLINT

FOOT DROP

UPPER TIBIAL,
DISTAL FEMORAL

LOWER TIBIAL,
CALCANEAL

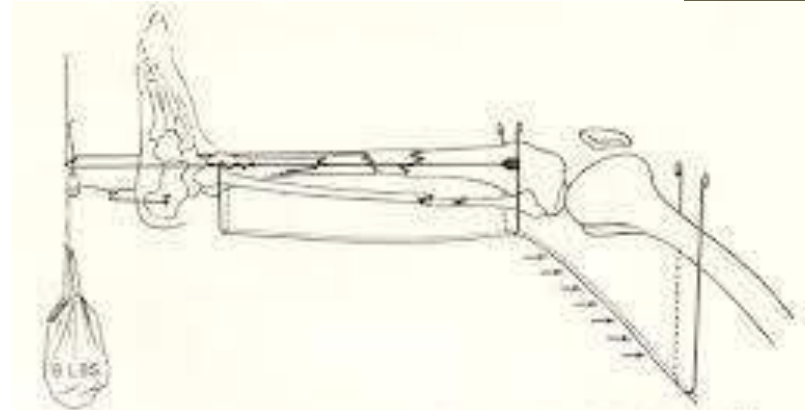


FIGURE 3.—Mechanism of action with splint in traction obtained through Piroson attachment incorporated in long leg plaster cast. The countertraction is mainly from a loop to which the Piroson attachment is clamped at right angles, and also, but slightly, from the ventral aspect of the cast against the thigh.

Wright, M. B.; Ellis, L., and Quigley, J. B. A Heavy Traction Splint for Compound Compound Fractures of the Tibia and Fibula. *Fracture 20* 40-42, 1928.

Name	Use
Volkman's splint / Turnbuckle	Volkman's ischaemic contracture (VIC)
Toe-raising spring	For foot drop
Cock-up splint	Radial nerve palsy
Kunckle bender splint	Ulnar nerve palsy
Aeroplane splint	Brachial plexus injury



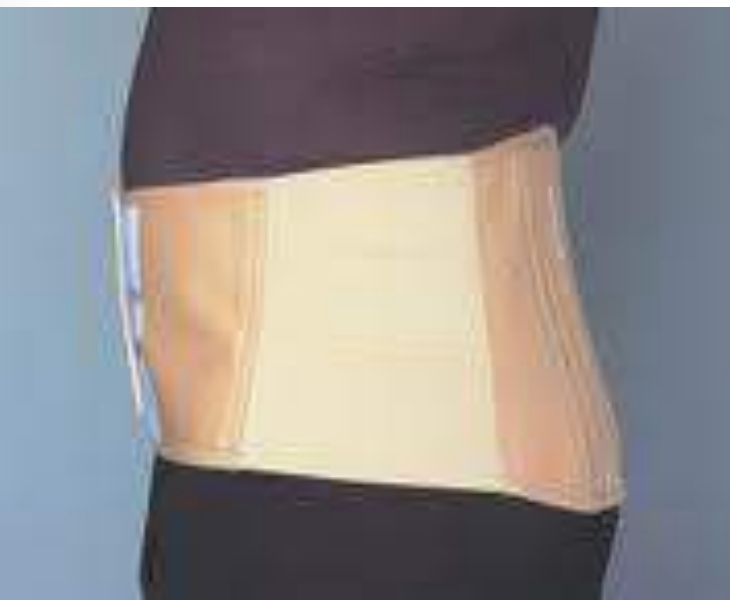
Name	Use
Von Rosen splint, Pavlik harness	CDH
Dennis Brown / Steenbeck splint	CTEV



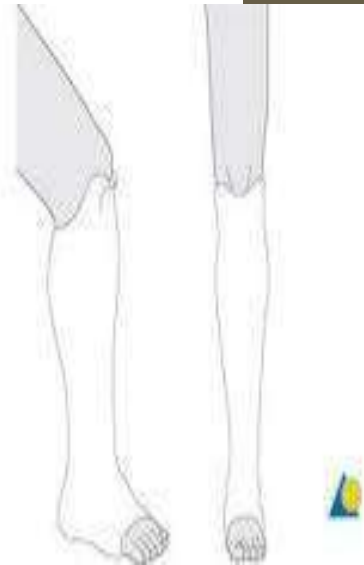
Name	Use
Cervical collar	Neck immobilization
Philadelphia collar	Neck immobilization
Four- post collar SOMI Brace	Cervical spine injury
Halo vest	Cervical spine injury TB cervical spine



Name	Use
Lumbar corset, LS belt	Backache
ASHE (Anterior spinal hyper extension) brace , Taylor's brace	Dorso-Iumbar spinal injury



Name	Use
Milwaukee brace, Boston brace	Scoliosis
Patellar tendon bearing (PTB) brace	Fracture both bone leg



- **Prosthetics** - The science that deals with functional and/or cosmetic restoration for all or part of a missing limb. (prostheses = artificial limb).
- **Prostheis** is an appliance used to replace part of a body (an amputated / removed part).

Prosthesis can be:

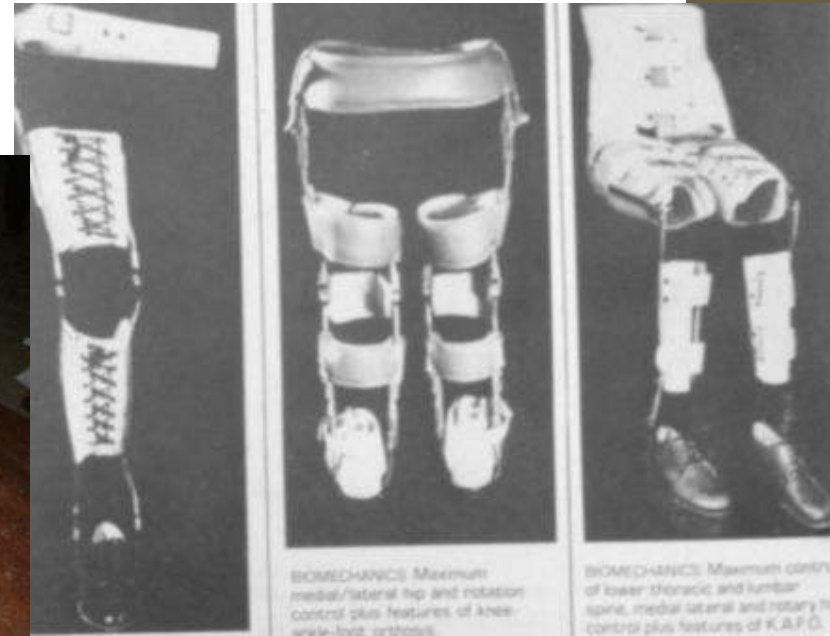
- Exoprosthesis (common orthopaedic prostheses)
- Endoprostheesis (Austin Moore prosthesis, Cardiac valve prosthesis)

INTERNATIONAL Nomenclature

Common name

- AFO
- KAFO
- HKAFO
- THKAFO
- LSO
- TLSO
- CTLSO
- Surgical shoe

- Below knee caliper
- Above knee caliper
- LS belt / corset



BIOMECHANICS: Maximum medial/lateral hip and rotation control plus features of knee-ankle-foot orthosis.

BIOMECHANICS: Maximum control of lower thoracic and lumbar spine, medial/lateral and rotary hip control plus features of K.A.F.O.

Usual Shoe modifications

- Heel Raise
- Total Raise
- Arch Support
- Thomas Heel
- Reverse C&E Heel
- Sole Wedge
- MT Bar
- Toe wedge



Thomas Heel



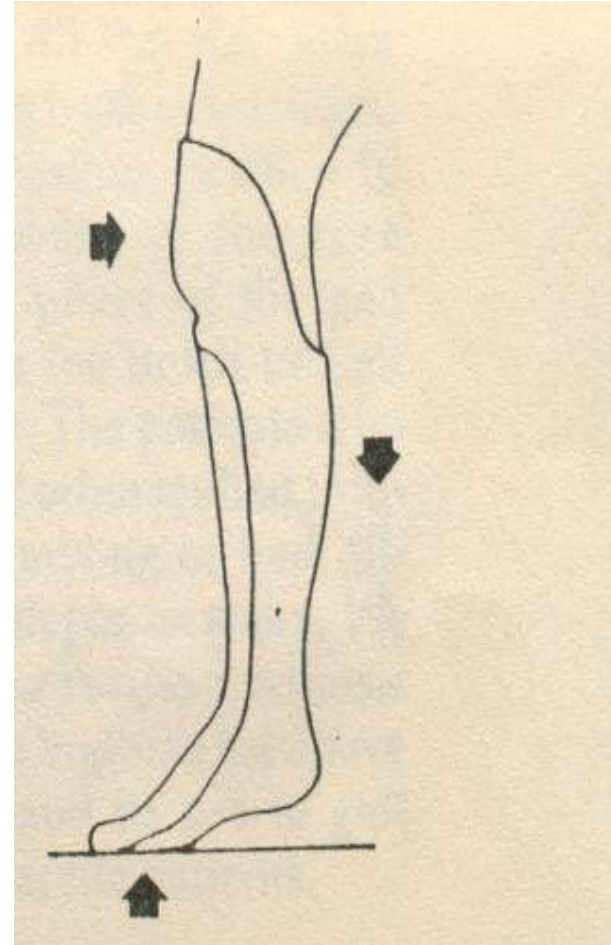
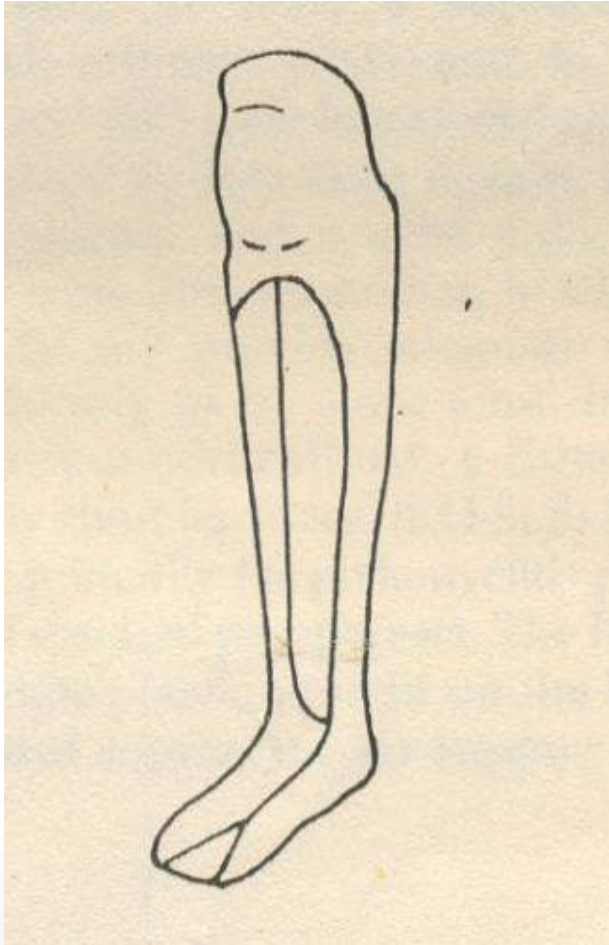
After



Metatarsal bar



Floor Reaction Orthosis

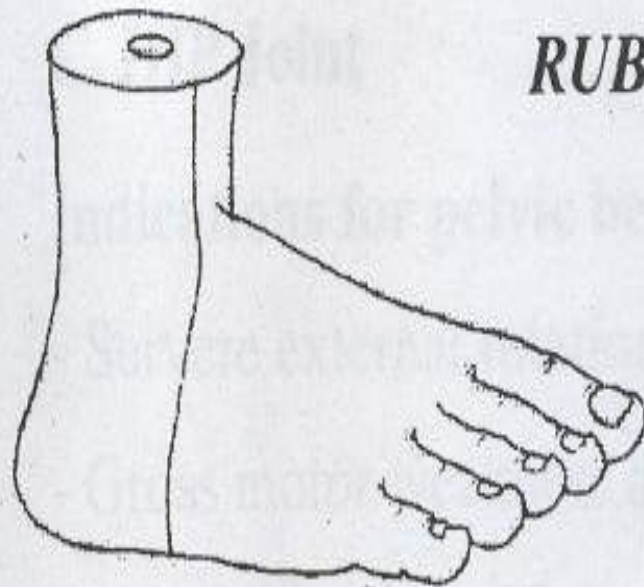


Foot

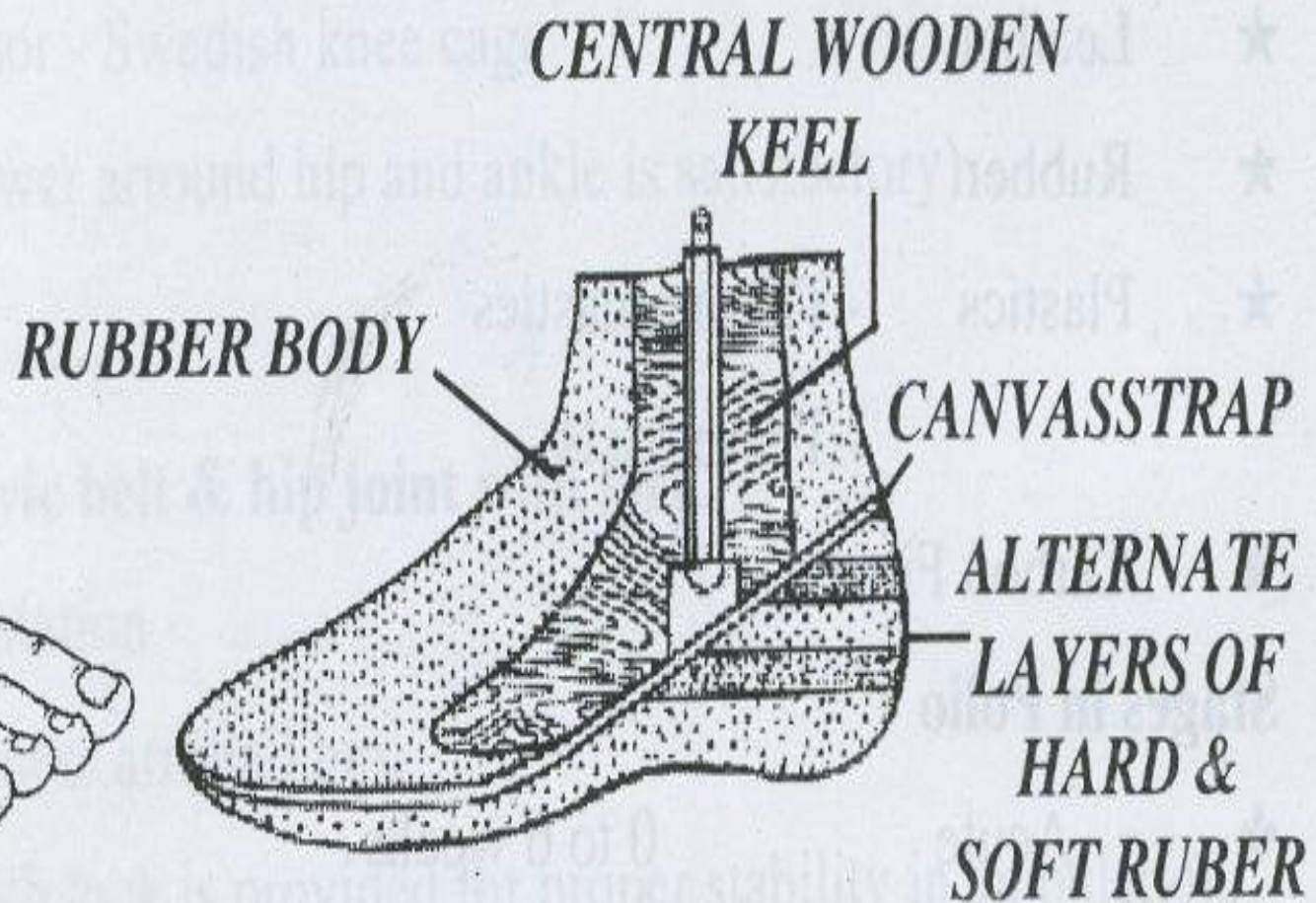
Jaipur foot

Sach foot





JAIPUR FOOT



SACH FOOT
(Solid Ankle Cushion Heel)

Type of Lower Limb Stumps

- End Bearing stump
- Side bearing or Total Contact

B.K. Prosthesis

Components

- Suspension
- Socket
- Shank/Shin piece
- Ankle and foot Assembly



Suspension

- **Flexible Cuff**
 - A. Supracondylar
 - B. Sleeve
 - C. Suction
- **Brim Contour**
 - A. Supracondylar
 - B. Supra Pateller
- **Thigh corset consists of**
 - 2 Metal Bars with knee joints
 - Corset- Leather/Plastic



Socket

- Hard socket for ideal B.K. Stump
- Hard Socket with inner lining

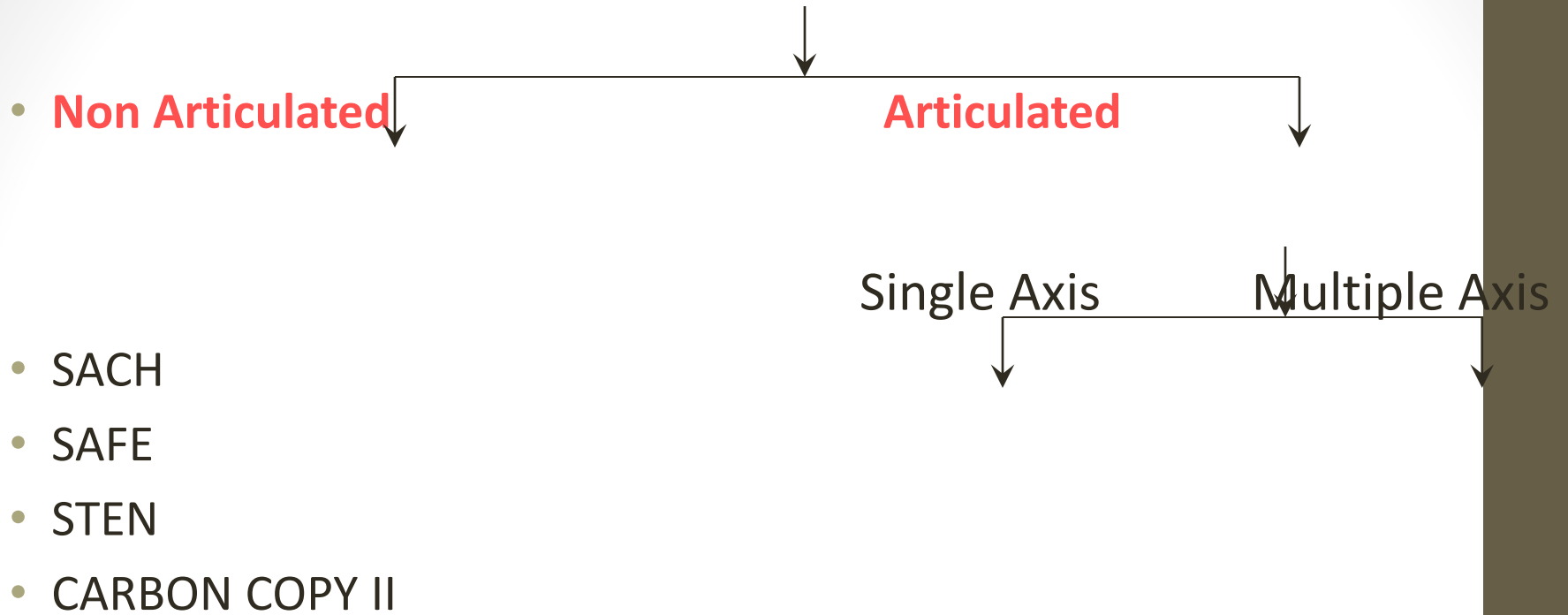
Weight Bearing

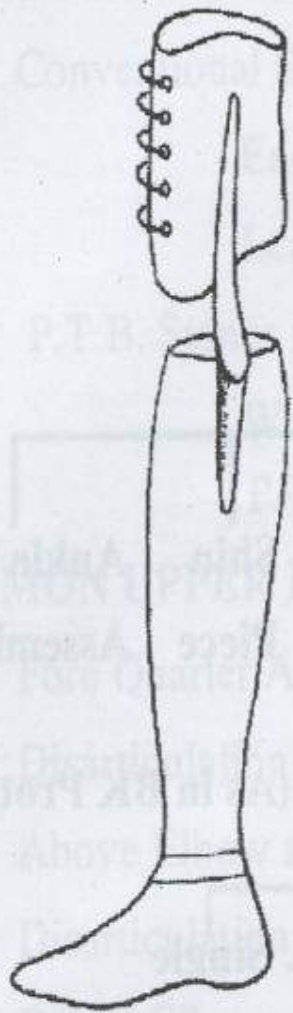
- Anteriorly
 - Lower 3rd of patella
 - Ligamentum patellae, tibial tuberosity
- Posteriorly
 - Pop. Fosa
- Laterally
 - Lat. condyle of tibia and head of fibula
- Medially
 - Med. condyle of tibia

Shank/Shin Piece

- **Exoskeleton** - Plastic resin and wood
- **Endoskeleton** - Metal/PVC tube

Ankle Foot Assembly





**B.K. Conventional
Prosthesis**



P.T.B. Prosthesis



Above Knee Prosthesis

Components

- Suspension
- Socket
- Knee Joint
- Shank/Shin piece
- Ankle foot assembly

Suspension

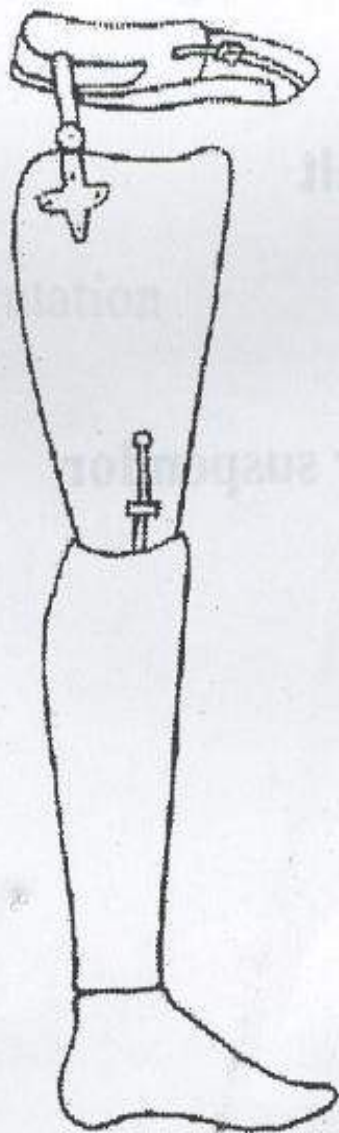
- Suction
- Silesian belt
- Pelvic belt with hip joint
- Shoulder suspensor

Socket

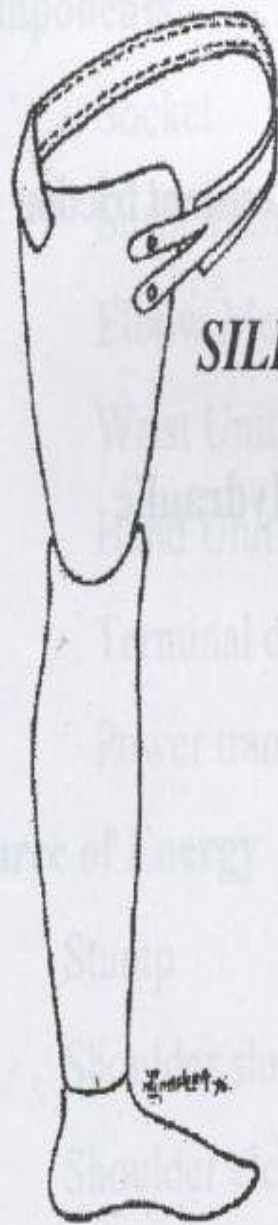
- **Quadrilateral** - Commonly used
- **Total contact**

Knee Joint Assembly

- **Conventional single axis knee - commonly used**
- **Polycentric knee joint**
- **Constant friction knee**
- **Constant friction with friction lock**

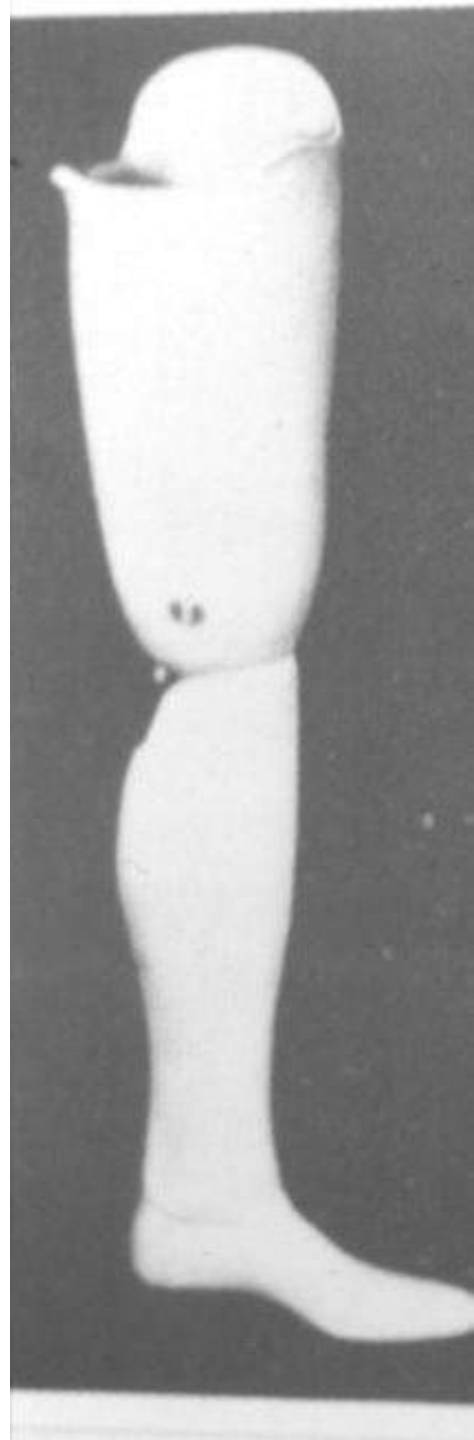


**A.K. Prosthesis with Hip
joint & Pelvic band**



SILESIAN BAND

A.K. Prosthesis







Syme Prosthesis

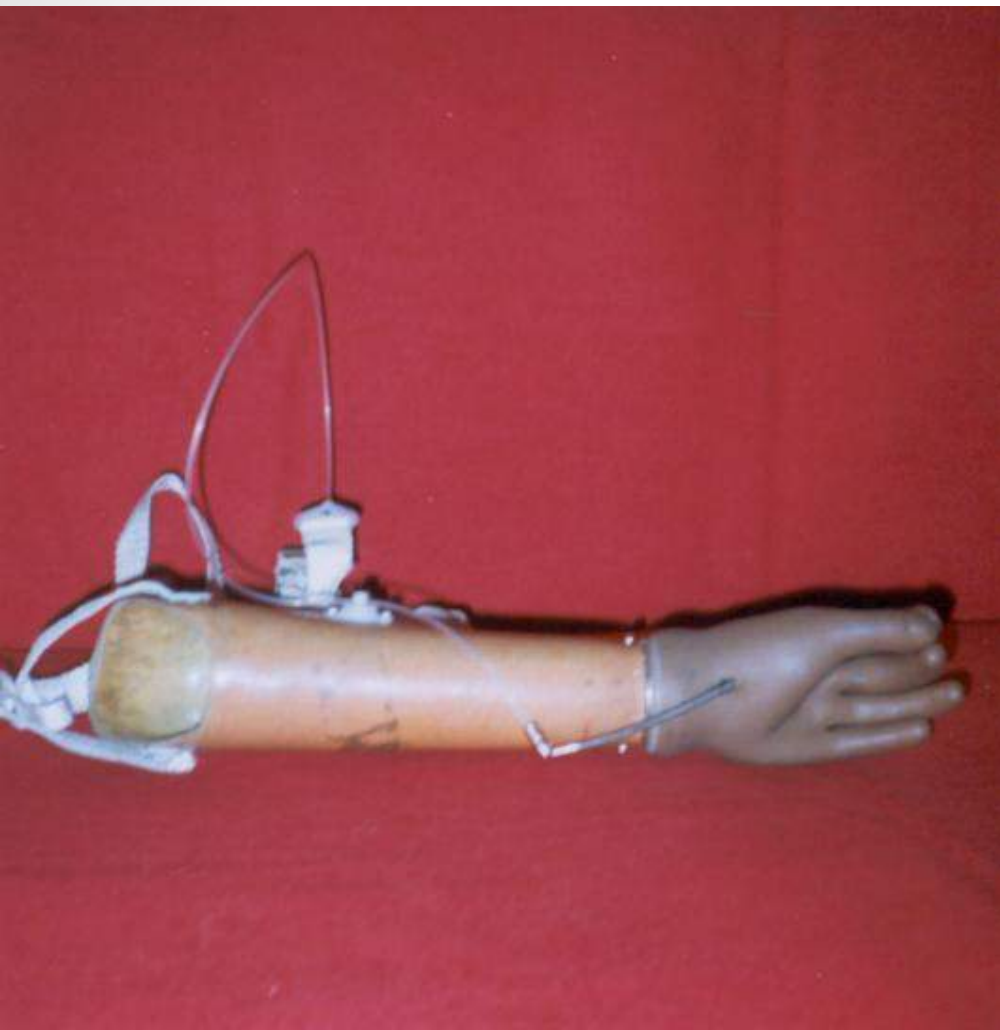
- **Conventional End weight bearing** : - Leather/plastic socket attached to SACH foot
- **P.T.B. Syme prosthesis** : - When heel pad is not sufficient for weight bearing than P.T.B. type Syme prosthesis is given.



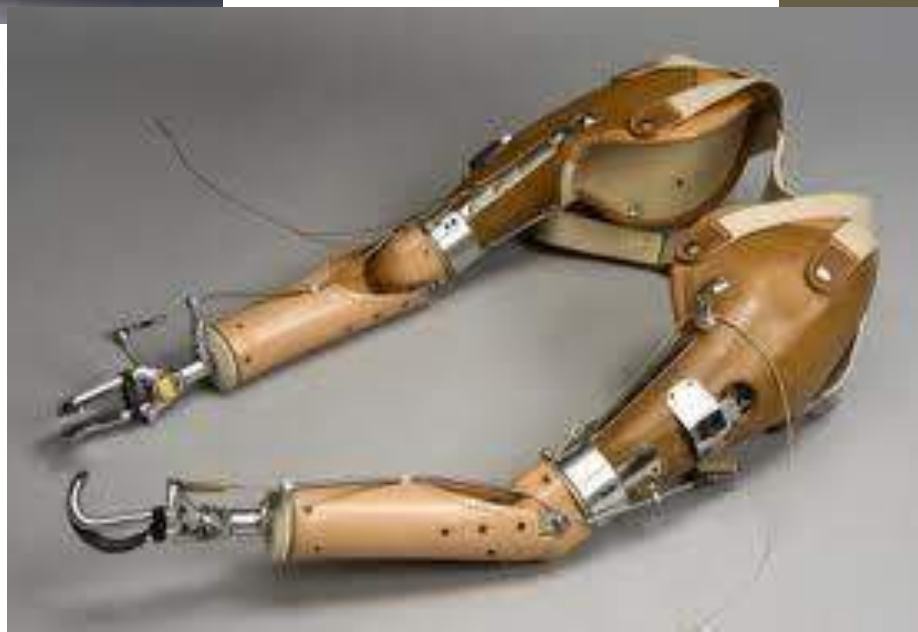
Upper Limb Prosthesis

- **Components**
 - Socket
 - Suspension system
 - Elbow mechanism for A.E.
 - Forearm
 - Wrist Unit
 - Hand
 - Terminal device
 - Power transmission system

- **Source of Energy**
 - Stump
 - Shoulder shrug
 - Shoulder elevation
- **External Energy Sources**
 - Pneumatic
 - Electrical
 - Electronic
 - Myoelectric prosthesis
(BIONIC HAND)



Utah Arm



Ideal Orthosis / Prosthesis

Functional

Fits well

Light in weight

Easy to use

Cosmetically acceptable

Easily maintained/repaired

Ideally locally manufactured

