

MARY PACK ARTHRITIS PROGRAM

Occupational therapy Department

Foot Orthoses Approach

PURPOSE OF ORTHOSES:

- ❑ Control the hindfoot and support the medial longitudinal arch to reduce excessive pronation.
- ❑ Support the transverse metatarsal arch to alter the weight bearing forces at the MTP joints.
- ❑ Decrease excessive, aggravating inter-articular movement during weight bearing.
- ❑ Support biomechanical malalignment and reduce associated abnormal compensatory movements.
- ❑ Provide cushioning and improve shock absorption during weight bearing.

INDICATIONS:

Forefoot Pain:

MTP synovitis / subluxation
hallux valgus
plantar callouses
Morton's neuroma
Hammer / claw toes

Medial Longitudinal Arch Pain:

subtalar synovitis / subluxation
posterior tibial tendinitis
midtarsal synovitis / subluxation
osteoarthritis in midtarsal joints

Hindfoot / Heel Pain:

hindfoot valgus
fat pad displacement
plantar fasciitis / calcaneal spurs
Achilles tendon enthesitis
incomplete arthrodesis

Other Conditions:

*knee pain
tarsal tunnel syndrome
*back pain

*Made worse by poor foot function

PARTS OF AN ORTHOSIS:

Main Component:

- ❑ key point of control is the calcaneal-talar-navicular area, therefore the medial border must conform to and support the longitudinal arch of the foot
- ❑ distal edge of orthosis follows the line of metatarsal -phalangeal joints, and ends just proximal to the metatarsal heads.
- ❑ heel cup should help to control calcaneal fat pad
- ❑ an orthosis should conform to the size and shape of a shoe, not spreading it.

Materials: subortholen (3mm), polypropylene (3mm), aliplast (3/8"), cloud (1/2 or 3/8"), combination of polypropylene (1mm) and cloud

Hindfoot Posting:

- ❑ provides control by stabilizing orthoses
- ❑ plantar surface of hindfoot post should be sanded off to the insole material, ensuring no added heel lift
- ❑ all the edges of the hindfoot post should be sanded at an angle
- ❑ hindfoot post should end proximal to heel / arch junction

Materials: nicleplast extra firm (1/4") for subortholen and polypropylene Posting incorporated into the thickness of Aliplast and Cloud orthoses

Forefoot extension:

- used to provide cushioning to MTP joints and toes

Materials: Spenco, PPT, plastazote, poron, Alinickle, p-cell

Covers / Linings:

- provides extra cushioning
- provides attachment and protection for forefoot extension and metatarsal pad
- prevents forward slippage of foot on orthoses
- increases comfort by softening edges of orthosis

Materials: leather, spenco, lined PPT, Alicover, Orthoactive liner, Ortholite,

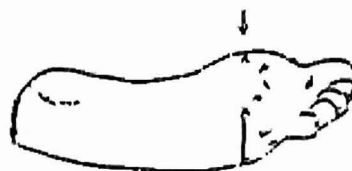
FABRICATION OF CUSTOM ORTHOSES:

Casting:

- Cast feet, using NWB method, in prone or supine lying. Refer to O.T.IIB-2.
- Reinforce felt pen markings on cast with indelible marker (calcaneal bisection and MT heads)
- Coat inside of cast with thin layer of liquid soap. Fill casts with a mixture of Plaster of Paris and water, (3 cups water to 5 cups of plaster). Leave to set for a minimum 1 hour.
- Strip cast from positive mould. Soak in water for 2-3 minutes. Prepare a bowl of plaster "slip" for cast modifications, using colour additive (laundry bluing).

To modify cast for semi-rigid insoles (Subortholen, Polypropylene):

- Draw a line from the 1st and 2nd MT head to the medial border of cast, and extend line approximately 1" up the side of cast.
- Draw a line from the 5th MT head to lateral border, and extend 1" up side of cast.
- Hammer a small nail into cast in the approximate centre of the 1st MTP joint, flush with the plantar surface. If a rigid forefoot varus or valgus is present, the cast is prepared for an intrinsic post, by positioning the nail(s) to hold the hindfoot in a vertical (neutral) position.



- Mix a small quantity of plaster and water, and place a thick layer (approximately ½" x 2" x 5") on wax paper. Place metatarsal area of cast into the plaster (from ¼" proximal to MT heads to the sulcus of toes).
- Allow plaster to set for approximately 3-4 minutes, then gently remove wax paper and scrape away any excess plaster, forming an anterior platform, approximately ¼" wide, proximal to the MTP joints.
- Square the medial and lateral borders by adding plaster to the plantar rim from the 1st and 5th MTPs to the heel.

- Add plaster to the medial plantar surface to create a smooth transition from forefoot platform through the arch area to the heel. This will create a “cutting line” and form the medial edge of the orthosis.
- Add plaster around the posterior and lateral sections of the plantar rim of the heel
- to allow room for the fat pad to disburse during weight bearing.

To modify cast for softer insoles (Aliplast, Cloud):

- ***Square the medial and lateral borders by adding a 1/8” - 1/4” layer of plaster at the 1st and 5th MTP’s , so that the cast sits level and does not rock from side to side.***
- ***Add plaster to medial border of the longitudinal arch to create smooth transition through arch area and a cutting line for orthosis.***
- ***If the fat pad around the calcaneous flattens with WB, add plaster around the plantar rim of the heel as above.***
- Let plaster set 1-2 hours.
- Use a rasp to remove excess plaster. For semi-rigid orthoses, plaster on the forefoot is removed to the level of the nail at the 1st MTP joint. Plaster is also removed from the talo-navicular area to ensure effective hindfoot control. Heel area should be rounded on the plantar rim.
- Using a plastic pot scrubber or wet sandpaper, smooth the medial, lateral and plantar surfaces of the cast.

Orthoses Fabrication:

- Cut material to a rectangular shape allowing 1½ “ extra material around the cast.
- Heat material on an oven tray, covered with stockinette and talcum powder, (350° for subortholen and polypropylene, 300° for aliplast and cloud). Heat subortholen until transparent, and aliplast, polypropylene and cloud until malleable.
- Using moulding jig or a vacuum press, if available, position the cast plantar surface up and drape material over it. Mould material to the cast ensuring a smooth heel cup and arch area. Remove cast and orthoses, wrap in tensor bandage until completely cooled.
- If using a hand moulding method, position cast, plantar surface up on countertop with heel extending over edge. Drape heated material over cast, smooth heel cup and arch area with gloved hands. Wrap smoothly with tensor bandage. Leave to cool completely.
- Trim material using heavy-duty shears, “5 in 1” cutter, or band saw. Heel cup should be about ½ “ deep. Trim lateral border of orthoses, tapering from heel cup to 5th MTP joints. Trim medial edge, following curved edge formed during alteration to cast at the medial arch. Trim distal edge past the MTP joint line.
- For semi-rigid orthoses, apply hindfoot posting material to shell by heating nickleplast (250°) until malleable. Using gloved hands, form material to insole. Roughen plantar surface of orthoses with sandpaper, file or rasp, and apply glue to both surfaces. Allow to dry for at least 20 minutes to maximum of 6-7 hours.
- Stick pieces together firmly. NOTE: Glue should not be applied to posting before it is placed in oven as it is extremely flammable.

- For soft orthoses, apply a semi-circular piece of cloud or aliplast to medial arch area to provide added support and prevent the arch from flattening during WB.
- Sand all edges of orthoses and posting material. Medial and lateral edges should be sanded so that they are quite thin and do not spread the shoe.

Fitting the Orthoses:

- Fit orthoses to patient's foot. Palpate MTP joints, mark with lipstick and have client stand on orthoses. Trim distal edge of orthosis ¼" proximal to MT heads. Cut and bevel distal edge. Assess support and comfort in weight bearing, asking client to assess comfort of all edges and make adjustments as needed.
- Fit orthoses to shoe. If the forefoot portion of the orthosis is wider than the insole of the shoe, it should be trimmed by cutting or sanding material from the medial side only. Make sure that the heel counter fits snugly into the back of the shoe and that the orthoses does not rock in either direction. Assess support and comfort with the patient standing and walking, and make necessary adjustments.
- If cushioning is required and the toe box depth is adequate, glue a forefoot extension to underside of orthoses, approximately ¾" proximal to the distal edge.
- Lining material should be added to increase durability of forefoot extension. Cut a full-length pattern leaving generous margins (1½" on all sides). Glue lining to orthoses being careful to avoid folds in heel cup area. Trim to fit orthosis and forefoot extension.

ALTERNATIVE/CONCURRENT TREATMENTS:

Appropriate Footwear:

Supportive shoes with firm heel counter for hindfoot control
 Extra depth shoes to accommodate forefoot deformities
 High top running shoes for ankle pain
 Jogging shoes for cushioning and hindfoot control
 Custom made shoes / Plastazote sandals

Shoe Adaptations:

Rocker bars for hallux limitus / rigidus / metatarsalgia and ankle pain
 Buttress for increased medial stability
 Heel raise for decreased dorsiflexion (equinus foot)

Shoe Inserts:

Toe props to relax hammer toes
 Heel pad to lift and cushion / Heel cups
 Hallux valgus toe traction splint for night wear
 Toe spacers to align crossed over toes
 Bunion protectors / Toe caps / Toe props
 Tongue pads to improve fit and control heel slip
 Ankle braces

Other Treatments:

Physiotherapy; foot exercises, ice, taping
 Orthopaedic surgery
 Podiatry