The Evidence for Orthotics

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Types of orthosis

- Prefabricated / off the shelf
- Custom Made
- Functional
- Accommodative
Anatomy of orthosis
Anatomy of Orthoses

[Diagram of an orthosis with labeled parts such as Heel cup, Eversion lock, Apex of longitudinal arch, Anterior edge, Rearfoot posting protector, Calcaneal pitch, Forefoot posting protector, Shell, Corrective and compensative elements, Stimulative and accommodative elements, Cuboid button, Sub-cuboidal block, Lateral flange (Withman), Posterior heel aperture, Calcaneal aperture, Rearfoot post, Kirby skive, External arch, Internal arch, Transverse arch, Longitudinal arch reinforcement (Denton), Metatarsal elevation, Anterior edge, First metatarsal exclusion, Morton's extension (M1), M4-M5 extension, Medial buttress, Forefoot post, Inter metatarsal elevation.]
A formed orthotic shell cooling.
The prescribed top cover material is then laminated to the custom orthotic shells.
Prefabricated
Foot Orthosis Considerations

- Normal lower extremity function
- The origin of the biomechanical dysfunction
- The influence on the proximal limb of the foot
- The role of footwear in relation to the intended orthosis
- The psychological requirement of the patient

Clinical skills in treating the foot

Tollafield & Merriman
Footwear Advice
Orthosis ?
FLAT FEET ARE BAD !!
Flatfoot: The good & The Bad

• Flatfoot may be classified as pathologic or physiologic.

• Pathologic flatfoot is often characterized by stiffness of the foot, causes disability, and requires treatment.

• Physiologic flatfoot is a normal variation; it causes no disability and tends to improve with time. Physiologic flatfoot is most common in individuals who are loose-jointed, are obese, or usually wore shoes during childhood.

• Treatment of children with physiologic flatfoot or shoe modifications not only is ineffective but is uncomfortable and embarrassing for the child and is associated with lowered self-esteem in adult life.

Natural History of the Arch
History

- Royal Canadian Army foot study.
- Investigation of foot ailments in Canadian soldiers in 1930’s.
- Colonel R. I. HARRIS, MC., R.C.A.M.C. & Major T. BEATH, R.C.A.M.C.
- Examined 3619 Recruits
History

- Overall 22.5% of the men had flatfoot
- 8% of men had flatfoot with a reduced range of movement
- 1/3 who had reduced range of motion could not complete basic training and were medically downgraded.
- Flexible flatfoot was seen in 14.5% of men with varying degrees of lowering of the arch. Harris and Beath regarded these as variations of normal which were stable with very little in the way of serious dysfunction
- Of these, only 13% developed symptoms and only 4% had serious symptoms preventing completion of training
Overall, 131 triathletes sustained 155 injuries during the study. Generally, foot type was not a major risk factor for injury; however, there was a fourfold increased risk of overuse injury during the competition season in athletes with a supinated foot type. The results of this study show that triathletes with a supinated foot type are more likely to sustain an overuse injury.

Foot Type and Overuse Injury in Triathletes. Burns J, Keenan AM, Redmond A
Cowan et al. followed 246 army recruits with no history of injury and found that those with cavus feet had a higher injury risk than those with normal or planus feet (odds ratio [OR] = 6.12).

In a prospective study of 295 male military recruits, Giladi et al measured the arch non-weight bearing and classified it as low, average, or high; however, the criteria for the assessment were not presented. Those with high arches were found to have a greater incidence of stress fractures of the tibia, femur, and foot compared with those with low arches.

Several studies found no association between foot morphology and injury.

Five studies have reported an association between foot morphology and injury, whereas four have shown no association. This discrepancy may be due in part to a lack of consistency in quantifying foot morphology.

Risk factors for lower extremity injury: a review of the literature
D F Murphy, D A J Connolly, B D Beynnon
Foot Morphology

A. Medially deviated STJ axis
B. Normally positioned STJ axis
C. Laterally deviated STJ axis
BUNIONS?
Are bunions making your life a misery?
Do you spend all day hobbiling around your home?
Banish the pain in seconds with miracle

Bunion Blasters*!!!!
Used by 30 million people in 6,000 countries

Also completely relieves symptoms of:
* backache * hearing loss
* haemorrhoids * flatulence
* bunions * erectile dysfunction

Also available in minty peppermint flavour for extra great results!

For guarantee of pain relief, if you inhale spray seek real medical advice immediately
In a survey of 6000 children between 9 and 10 years of age, 122 were found to have unilateral or bilateral hallux valgus. These children were randomly assigned to no treatment or to the use of a foot orthosis. Three years later 93 again had radiography. The metatarsophalangeal joint angle had increased in both groups but more so in the treated group. During the study, hallux valgus developed in the unaffected feet of children with unilateral deformity, despite the use of the orthosis.
Hallux Valgus

- Nonoperative management cannot reverse hallux valgus deformity

- A randomized controlled trial of 209 consecutive patients with symptomatic hallux valgus treated in four Finnish general community hospitals demonstrated that while orthoses provided short-term symptomatic relief, operative management of hallux valgus led to superior functional outcome and patient satisfaction compared to orthotic management at a minimum follow-up of 12 months.

• The use of bunion night splints and exercises and noted a 50% improvement in hallux valgus deformities in a 7-year study of juvenile patients

• From the evidence to date, it seems that foot orthoses do have a role in the management of plantar fasciitis and that prefabricated orthoses are a worthwhile initial management strategy.
• At this time, however, it is not possible to recommend either prefabricated or customized orthoses as being better, and it cannot be inferred that customized orthoses are more effective over time and therefore have a cost advantage.

Plantar Fasciitis

- Foot orthoses and anterior night splints were effective both short-term and long-term in treating pain from plantar fasciitis. Parallel improvements in function, foot-related quality of life, and a better compliance suggest that a foot orthosis is the best choice for initial treatment plantar fasciitis.

- Foot Orthoses for the Treatment of Plantar Fasciitis, Roos, Engström, Söderberg F & AI Vol 27, No 8, Aug 2006
• The changes observed in the magnitude and location of the mean and peak pressures indicate that the UCBL orthosis and calcaneal osteotomy altered hindfoot alignment to significantly influence tibiotalar contact characteristics.

• The results further suggest that the UCBL orthosis corrected ankle malalignment better than the calcaneal osteotomy in an adult acquired flatfoot.

• The results support the conclusion that the clinical management of a pes planovalgus foot with a UCBL orthosis or a medial translational osteotomy of the calcaneus may avert the onset of pantalar disease seen with late-stage posterior tibial tendon dysfunction.

• Effects of a UCBL Orthosis and a Calcaneal Osteotomy on Tibiotalar Contact Characteristics in a Cadaver Flatfoot Model. T Havenhill et al FAI Vol 26, 8, Aug 2005
Prefab Vs Custom Made

• The more readily available prefabricated foot orthoses are similar in clinical effect to custom fabricated orthoses.

• Foot Orthoses in Lower Limb Overuse Conditions: A Systematic Review and Meta-Analysis
  • Natalie Collins, B.Phty. (Hons 1)1; Leanne Bisset, B.Phty., M.Phty (Sports and Musculoskeletal)1; Thomas McPoil, P.T., A.T.C., Ph.D2; Bill Vicenzino, B.Phty., Grad. Dip. Sports Phty., M.Sc., Ph.D1
  • Foot & Ankle International/Vol. 28, No. 3/March 2007
This prospective randomized clinical trial found that the use of relatively inexpensive prefabricated inserts, along with Achilles tendon and plantar fascia stretching, is more effective than a custom polypropylene orthosis for the initial treatment of proximal plantar fasciitis.

Comparison of Custom and Prefabricated Orthoses in the Initial Treatment of Proximal Plantar Fasciitis

Glenn Pfeffer,* M.D., Peter Bacchetti, Ph.D.,t Johnathan Deland, M.D.,a Al Lewis, M.D.,* Robert Anderson, M.D.,“ Et al

Foot & Ankle InternationallVol. 20, No. 4/April 1999
• Using both subjective and objective measures, we found that these over-the-counter foot orthoses were effective in bringing about changes in foot shape and concomitant relief of certain specific painful conditions. This study indicates that there is a scientific basis for attempting to relieve pain with orthoses.

• Scientific Assessment of Over-the-Counter Foot Orthoses to Determine Their Effects on Pain, Balance, and Foot Deformities
• Adam Landsman, DPM, PhD *, Donna DeFronzo, DPM, Julie Anderson, PTA and Thomas Roukis, DPM
Casting is dodgy

• The results of this study show that there is wide variability in the frontal plane forefoot-to-rearfoot relationship in neutral-position casting of the foot and that there is no difference between experienced and inexperienced clinicians.

• Despite this variability in casting and the wide use of functional foot orthoses made from these casts, results of outcome studies have clearly shown that functional foot orthoses are effective in providing symptomatic relief, raising the question of the necessity of an accurate cast.

• Variability of Neutral-Position Casting of the Foot
  • Chutter V, Payne C, Miller K
The results suggest that, in uninjured individuals, there are few differences in rearfoot motion control and comfort between the custom and semicustom orthotic devices used in this study.

- A Comparison of Rearfoot Motion Control and Comfort between Custom and Semicustom Foot Orthotic Devices
- Irene S. Davis, Rebecca Avrin Zifchock, and Alison T. DeLeo
Are all Prefab equal??

- All orthoses resulted in an increase in navicular height, but only three orthoses changed the calcaneal angle in the frontal plane. Resistance to supination did not predict the response to the different types of orthoses, but the Foot Posture Index score was associated with changes from using some of the orthoses.

- **Static Stance Response to Different Types of Foot Orthoses**
  - Payne C, Oates M, Noakes H
Different conditions different treatment

- In children with JIA, custom-made semirigid foot orthotics with shock-absorbing posts significantly improve pain, speed of ambulation, and self-rated activity and functional ability levels compared with prefabricated off-the-shelf shoe inserts or supportive athletic shoes worn alone.

- Efficacy of Custom Foot Orthotics in Improving Pain and Functional Status in Children with Juvenile Idiopathic Arthritis: A Randomized Trial
  - MARY POWELL, MICHAEL SEID, and ILONA S. SZER
These findings suggest that if a foot orthosis is being dispensed as prophylaxis for overuse injuries in an active, healthy population, there is little justification for prescribing semi-rigid biomechanical orthoses. Their cost is high compared to other types of orthoses, without an advantage in comfort or a reduction in stress fractures, ankle sprains, and foot problems.
In Conclusion

• Orthosis provide effective Treatment for a range of conditions

• There is little to no evidence of prophylaxis.

• They are not benign, especially in children.
ORTHOSIS NEVER COST £500
Thank You