Foot Orthotic Prescriptions and Modifications for Specific Sports:
Cleat Sports and Downhill Skiing

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Disclosure

I disclose the following financial relationships with commercial entities that produce health care related products and services relevant to the content of this lecture:

- Employee (Consultant) of ProLab Orthotics, manufacturer of foot orthoses discussed in this talk

Plan

- Tension
- Compression
- Shear

Orthotic Therapy Goals

- Identify the structure which is injured or symptomatic
- Determine the most likely type of abnormal tissue stress which is causing the pathology
- Prescribe a specific orthosis to reduce abnormal tissue stress

Tissue Stress Model

- Tension
- Compression
- Shear

Tenets of Tissue Stress


Cleats:
- Baseball
- Soccer
- Ultimate
- Lacrosse

- 15 year old elite baseball player
- Capsulitis / Metatarsalgia
- Cavus foot
- Multiple shoes / OTC supports

Orthotic Goals for Metatarsalgia
- Reduce forefoot pressure

Use Non-Deforming Materials
- Non-deforming materials improve pressure redistribution
  - Polypropylene
  - Graphite

Chalmers, 2000

Use Non-Deforming Materials
- Semi-rigid orthoses had significant effect on pain.
- Soft orthoses or shoes only did not. Chalmers, 2000

Conform Close to Arch
- Total contact insert reduces excessive pressures at the metatarsal heads by increasing the contact area of forces. Mueller 2006

Mueller MJ.: Efficacy and mechanism of orthotic devices to unload metatarsal heads in people with diabetes and a history of plantar ulcers, Phys Ther, 2006

Conform Close to Arch
- Proper casting position
  - STJ neutral / MTJ locked
  - Plantarflex 1st ray
- Prescribe minimum fill
  - Ensure that the lab does not overfill the medial arch
  - Excess plaster expansion in the arch reduces effectiveness
- Invert the positive cast
Conform Close to Arch

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Use Metatarsal Pads and Bars

- Metatarsal Bar
- Metatarsal Pad

Use Forefoot Cushioning

- Poron extension to Sulcus
- 19% decrease in MPP (Landorf 2014)

Metatarsal Pad Placement

- Determine Optimum Forefoot Pad Placement – Landorf 2014:
  - No padding (control)
  - Metatarsal pad 10 mm proximal to the metatarsal head
  - Metatarsal pad 5 mm distal to the metatarsal head
  - Metatarsal bar
  - Plantar cover (cushioning)
Cleats

Cleat Specific Modifications

- Strip post
- “Thin heel contact”
- “Fit to shoe”
Cleats – Orthosis Prescription

- Focus on reducing the stresses that lead to the pathology and then adapt to shoe
- Send shoe to lab and / or adjust in clinic
- Wide and deep as possible
- Strip post
- Thin heel contact
- Thin cover in toebox
- Best orthosis may not fit into current cleats