Shoes and Orthotics

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I have no conflict of interest in any products mentioned in this presentation.

DO WE NEED SHOES? YES!

SURFACES & SPORT DICTATE SHOES

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4 CATEGORIES OF RUNNING SHOES:

- **STABILITY** (over pronator)
  - Heavier, (10-13 oz.) because of rigid heel counter, dual density sole, board last on inside of shoe
  - More expensive because of more materials to make it stable
  - INDICATIONS: flexible, pronated, mobile foot in need of control, > 180 lb. person

- **NEUTRAL** (neutral foot)
  - Lighter, (8-11 oz.), but not the lightest shoe, lighter weight materials in sole, no dual sole, (no dark grey arch material).
  - Less expensive because less material used to reinforce the heel and arch
  - INDICATIONS: neutral foot, normal body weight person

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**PERFORMANCE**

- Lighter weight than neutral shoe. Usually used as racing flat or short sprint runs. Some light, elite runners use this in marathons.
- **INDICATIONS:** sprints, elite, light weight runners for distance events

**MINAMILISTIC**

- Light weight, (7-9 oz.), similar to performance weight shoes. Latest trend with a lower heel, free motion, accommodative not controlling.
- Expensive probably because of demand not expense of materials used.
- **INDICATIONS:** neutral feet, light body weight. Some walkers/runners experimenting to allow more normal foot mechanics with goal to strengthen foot/ankle muscles. Running form usually changes from rearfoot striker to either midfoot or forefoot striker.

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**EVOLUTION OF SHOES**

**NEUTRAL TO MOTION CONTROL**

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RACING FLATS TO SOCCER CLEATS

- RACING FLATS
- SOCCER CLEATS

COURT SHOE & NEWEST RUNNING FAD SHOE

- TENNIS COURT SHOE
- HOKA RUNNING SHOE

JAPANESE ROCKER SHOE

WHICH ONE IS A STABILITY SHOE & WHY?

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MEASURE THE FOOT & ORTHOTIC SHELL LENGTH

- Brannock Measuring Device

Foot Orthotics to MET head, sidewall or full length

NEW BALANCE WITH OTC ORTHOTIC
Orthotics can significantly reduce pain associated with pes cavus foot structure. (cited by 2 Cochran reviews.) Orthotic help prevent the occurrence of stress fractures.

Clinical effectiveness of customized sport shoe orthoses for overuse injuries in runners: a randomized controlled study.

Customized running shoe orthoses are an effective conservative therapy strategy for chronic running injuries with high comfort and acceptance of injured runners.

Foot Orthoses in the Prevention of Injury in Initial Military Training: A Randomized Controlled Trial.

Orthoses are effective in the prevention of overuse lower limb injury.
Over the Counter Orthotics

- Price point indicative of value: goal usually between $30-$50 for mid weight effective device
- Retailers recommend replacing every 6 months; in reality can last 1-2 years depending on weight of athlete and impact activities
- Available at retail stores or specialty running stores
- Usually goal is to control:
  - Calcaneal motion with a deep heel cup
  - Midfoot motion with semi-rigid material under arch
  - Cushion with durometer of material used

Over the Counter Orthotics

- New Balance Pressure Relief: with or without metatarsal pads
  - Accommodative, full length; high compliance with memory foam
  - Sole:
    - Heatable in oven, deep heel cup, semi-rigid midfoot control; less cushion
  - Superfeet:
    - 12 styles: green and blue are mid weight density materials; mild deep heel cup; plastic shell under top cover; minimal cushion

NEW BALANCE PRESSURE RELIEF

- FULL LENGTH
- MEMORY FOAM
- COMPLIANCE: HIGH
- AFFORDABLE
- CONTROL AND CUSHION!

SOLE OTC INSERTS

- FULL LENGTH
- HEATABLE/MOLDABLE IN OVEN
- GOOD CONTROL
- DEEP HEEL CUP
- SEMI RIGID MID FOOT
- NOT MUCH CUSHION
SUPERFEET
- 12 STYLES
- GREEN/BLUE = MID LEVEL SUPPORT
- MINIMAL CUSHION
- PLASTIC SHELL

Custom Orthotics
- Goal is more prescriptive control over more involved dysfunctions
  - Hallux rigidus or hallux limitus
  - Recalcitrant plantar fasciitis/fasciosis
  - Functional not structural pes planus grade III with symptoms aggravated by dysfunctional foot dynamic biomechanics
- Price point $300-$500
- Longevity: > 20 years in my experience
- Change if extreme patient weight change +/- 30 lbs.
- Foot surgeons
- Major foot trauma (fractures)

FABRICATION OF CUSTOM ORTHOTICS
- Gold standard: neutral casting supine or prone
  - Neutral cast used to make positive cast to make custom orthotics
  - Various labs or orthotist can make/modify
  - Key is what to order: materials, features, customization for dysfunctions
  - Walking or static scan of feet:
  - Foam cast box

CUSTOM ORTHOTIC FABRICATION
- Rigid sport Langer
CUSTOM ORTHOTIC FABRICATION: SCAN

- Dynamic Scan of Feet
- Interpret Scan Using Normative Data Sheet
- Order Orthotic with Form
FILL OUT FORM WITH PRESCRIPTION PREFERENCES

COMMON DYSFUNCTIONS AND CUSTOM FEATURES TO TREAT
- Hallux rigidus
- Hallux limitus
- Recalcitrant plantar fasciitis/fasciosis
- Functional grade III pes planus
- Leg length discrepancy: < ¼"

- Morton’s extension
- First ray cut out
- Heel plug with PPT material
- Deep heel cups; additional medial flange; 2-4 degrees of rearfoot posting
- Heel lifts

HALLUX RIGIDUS
- BLOCKS 1st MTP FOR PROTECTION

HALLUX LIMITUS
- FIRST RAY CUT OUT

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CHRONIC PLANTAR FASCIITIS/FASCIOSIS

- Heel plug: cut out in custom shell with a soft gel or PPT fill material.

FUNCTIONAL GRADE III PES PLANUS

- Deep heel cups
- Additional medial flange
- 2-4 degrees of rearfoot posting

PRECAUTIONS WITH SHOES & ORTHOTICS

- Leg length discrepancy (LLD): > ¼”
  - Heel lifts for LLD

- Stability shoe with rigid custom orthotic can be over-correction
- Try more neutral shoe if they already have custom orthotics or
- Wore stability shoe with over-the-counter orthotic
- Forefoot extrinsic posting on custom orthotics
- Theoretically sound but realistically poor compliance with athletes
- Heavy weight custom orthotics in an elite speed athlete: use lighter weight materials or will not use device
- Inserts used with shoe original sock liner: usually remove as orthotic typically has a top cover; don’t use both
- Top covers require maintenance to refurbish every 2 years as they crack at pivot point at end of shell. Cost usually around $50-$60

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REFERENCES:

- Website: http://www.barefootrunning.fas.harvard.edu/index.html

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