Shoes and Orthotics

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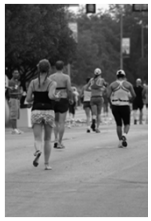
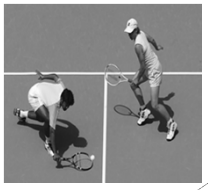
I have no conflict of interest in any products mentioned in this presentation.

DO WE NEED SHOES? YES!

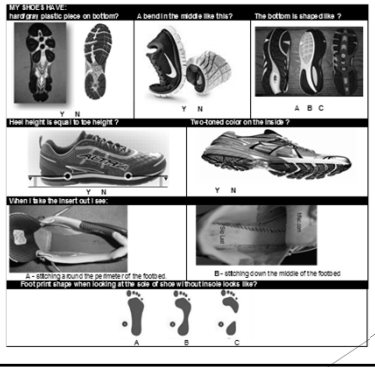


SURFACES & SPORT DICTATE SHOES



4 CATAGORIES OF RUNNING SHOES:

- STABILITY (over pronator)
- NEUTRAL (neutral foot)
- PERFORMANCE (short races, neutral foot)
- MINIMALISTIC (high arch foot)



STABILITY

- 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

- 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

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.

EVOLUTION OF SHOES

NEUTRAL TO MOTION CONTROL

RACING FLATS TO SOCCER CLEATS

- RACING FLATS

- SOCCER CLEATS

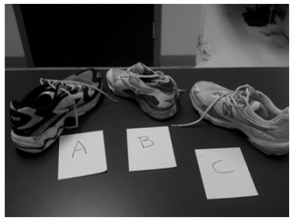
COURT SHOE & NEWEST RUNNING FAD SHOE

- TENNIS COURT SHOE

- HOKA RUNNING SHOE

JAPANESE ROCKER SHOE

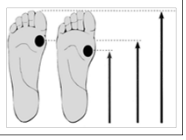
WHICH ONE IS A STABILITY SHOE & WHY?



MEASURE THE FOOT & ORTHOTIC SHELL LENGTH

- Brannock Measuring Device

Foot Orthotics to MET heads, sulcus or full length



NEW BALANCE WITH OTC ORTHOTIC

NEW BALANCE SHOE WITH CUSTOM ORTHOTIC

NEWTONS WITH FOREFOOT STRIKE

Orthotics

Prevention of Running Injuries	**Orthotics can significantly reduce pain associated with pes cavus foot structure. (cited by 2 Cochran reviews.)** **Orthotic help prevent the occurrence of stress factures.**
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

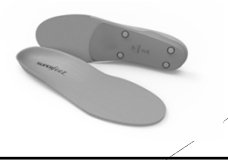
- FULL LENGTH
- MEMORY FOAM
- COMPLIANCE : HIGH
- AFFORDABLE
- CONTROL AND CUSHION!

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 surgeries
  - Major foot trauma (fxs)

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 orthoptist can make/modify
  - Key is what to order: materials, features, customization for dysfunctions
- Walking or static scan of feet:
- Foam pad box

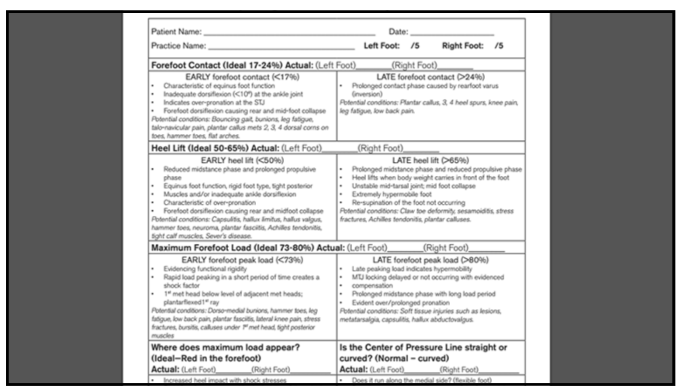
CUSTOM ORTHOTIC FABRICATION

- Rigid sport Langer

CUSTOM ORTHOTIC FABRICATION: SCAN

- DYNAMIC SCAN OF FEET

- INTERPRET SCAN USING NORMATIVE DATA SHEET
- ORDER ORTHOTIC WITH FORM



Patient Name: ____________________ Date: __________

Practice Name: ____________________ **Left Foot:** /5 **Right Foot:** /5

Forefoot Contact (Ideal 17-24%) Actual: (Left Foot)________(Right Foot)________

EARLY forefoot contact (<17%)	LATE forefoot contact (>24%)
• Characteristic of equinus foot function • Inadequate dorsiflexion (<10°) at the ankle joint • Indicates over-pronation at the STJ • Forefoot dorsiflexion causing rear and mid-foot collapse *Potential conditions: Bouncing gait, bunions, leg fatigue, talo-navicular pain, plantar callus mets 2, 3, 4 dorsal corns on toes, hammer toes, flat arches.*	• Prolonged contact phase caused by rearfoot varus (inversion) *Potential conditions: Plantar callus, 3, 4 heel spurs, knee pain, leg fatigue, low back pain.*

Heel Lift (Ideal 50-65%) Actual: (Left Foot)________(Right Foot)________

EARLY heel lift (<50%)	LATE heel lift (>65%)
• Reduced midstance phase and prolonged propulsive phase • Equinus foot function, rigid foot type, tight posterior • Muscles and/or inadequate ankle dorsiflexion • Characteristic of over-pronation • Forefoot dorsiflexion causing rear and midfoot collapse *Potential conditions: Capsulitis, hallux limitus, hallus valgus, hammer toes, neuroma, plantar fasciitis, Achilles tendonitis, tight calf muscles, Sever's disease.*	• Prolonged midstance phase and reduced propulsive phase • Heel lifts when body weight carries in front of the foot • Unstable mid-tarsal joint; mid foot collapse • Extremely hypermobile foot • Re-supination of the foot not occurring *Potential conditions: Claw toe deformity, sesamoiditis, stress fractures, Achilles tendonitis, plantar calluses.*

Maximum Forefoot Load (Ideal 73-80%) Actual: (Left Foot)________(Right Foot)________

EARLY forefoot peak load (<73%)	LATE forefoot peak load (>80%)
• Evidencing functional rigidity • Rapid load peaking in a short period of time creates a shock factor • 1st met head below level of adjacent met heads; plantarflexed1st ray *Potential conditions: Dorso-medial bunions, hammer toes, leg fatigue, low back pain, plantar fasciitis, lateral knee pain, stress fractures, bursitis, calluses under 1st met head, tight posterior muscles*	• Late peaking load indicates hypermobility • MTJ locking delayed or not occurring with evidenced • compensation • Prolonged midstance phase with long load period • Evident over/prolonged pronation *Potential conditions: Soft tissue injuries such as lesions, metatarsalgia, capsulitis, hallux abductovalgus.*

Where does maximum load appear? (Ideal–Red in the forefoot) **Actual:** (Left Foot)________(Right Foot)________	**Is the Center of Pressure Line straight or curved? (Normal – curved)** **Actual:** (Left Foot)________(Right Foot)________
• Increased heel impact with shock stresses	• Does it run along the medial side? (flexible foot)

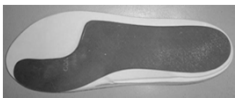
FILL OUT FORM WITH PRESCRIPTION PREFERENCES

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

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

Rearfoot Extrinsic Posting	
1-2	Degrees–Mild Correction
3-4	Degrees–Moderate Correction
4+	Degrees–Aggressive Correction

Leg length discrepancy (LLD): > ¼”

- Heel lifts for LLD

PRECAUTIONS WITH SHOES & ORTHOTICS

- Stability shoe with rigid custom orthotic can be over-correction
  - Try more neutral shoe if they already have custom orthotics or
  - More 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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