Footwear for the Running Athlete

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Today’s Goals:
• Parts of the Shoe
• Foot Types
• Conventional Running Shoes
• Minimalist Running Shoes
• What is better Conventional or minimalist/barefoot?
• Minimalist Training Protocols
• Case Presentations
• Shoe Modifications

• 37-56% of runners are injured annually.
• 2.5 to 12 injuries occur every 1000 hours of running.
• 75% of runners make initial contact with the ground using a rearfoot strike pattern.
• Shod running: Running in any shoe with more than 4mm thickness, has a positive heel to forefoot differential, alters the gait and has a significant reduction to the plantar mechanoreceptor feedback.

Parts of the shoe

• Outsole:
  – Carbon Rubber: more durable.
  – Blown Rubber: lighter and less durable.
• Midsole:
  – EVA: Lightweight foam for cushioning
  – Dual Density EVA: Double the density in the same space to provide more support.
  – Polyurethane: More durable and stable then EVA but weighs more then EVA.

• Minimalist Running: Running in a shoe that protects the skin from injury, cold, and heat, does not change the runner’s gait, receives nearly all plantar mechanoreceptor feedback, has less than 3mm of coverage and zero heel rise
• Barefoot running: Barefoot is just that, barefoot. The runner is receiving full direct feedback by the plantar mechanoreceptors

Shoe Material
Shoe Shapes

Cushioning Shoe
• Average weight: 9 oz
• Heel-to-toe offset: 9mm
• Typically used for supinator to neutral foot type.

Stability Shoe
• Average weight: 11 oz
• Heel to toe offset: 12mm
• Used for a neutral foot to pronator

Motion Control
• Average weight 14 oz
• Used for the excessive over pronator or large runner.

Defective Shoe wear
• New Shoe: Can last 400 to 500 miles
• Old Shoe: Can last 300 to 400 miles
• Things to look for: feeling of fatigue or shin splints, soft spots in the sole, excessively worn tread, loss of symmetry.

Minimalist Shoe
• 4-6oz per shoe
• Five Fingers: 2mm thick sole
• Heel-to-toe offset: 4mm or less
• Traditionally for races or training

What does the research tell us?
Shod or Barefoot
• Gait Pattern Differences
  – Barefoot: Land on the midfoot or forefoot, shorter stride lengths, greater frequency of
    stance phases, shorter stance phase, foot contacts ground in more PF with a greater
    surface area. Vertical impact peak, vertical loading rate are decreased. Arch strain is
    greater in forefoot strikers.
  – Jenkins DW, Cauthon DJ. Barefoot running claims and controversies: a review of the literature. J Am

Which method is more energy efficient?
• Cheung Roy T.H., Davis IS. Landing Pattern Modifcation to Improve Patellofemoral Pain in Runners: A Case Series. JOSPT. 2011 Dec;12:
  914-31.
• Jenkins DW, Cauthon DJ. Barefoot running claims and controversies: a review of the literature. J Am Podiatr Med Assoc. 2011 May-
  Jun;101(3):231-46. Review.
  60.

How to start barefoot running?
Sensory Exercises:

Strength Training Program
• 3 sets, 20 reps, 5 days/week, 2 weeks
  • 1. Heel Raises  2. Toe Grip  3. Dorsi/Plantar flexion
  4. Toe spread/tap  5. Exaggerated inversion/eversion
  6. Grabbing towel on the floor pass to other foot

http://www.vibramfivefingers.com/index.htm
Training Schedule

• Weeks 1&2: Foot Strength Program and Wear Shoes 1-2 hours per day.

• Weeks 3&4: Warm up with Foot Strength Program, Run 10% of Normal Distance every other day, Cool down with stretching, sensory exercises and massage.

• Weeks 5-12: Warm up with Foot Strength Program, Increase distance no more than 10% each week, run only every other day, Cool down with stretching, sensory exercises and massage.

• Weeks 13 on: Experiment with distance, frequency and speed. Remember to listen to your body and adjust accordingly.

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Case 1

Case 2: Old Stability Shoe

Case 2: New Stability Shoe
Case 2: Modified Gait

Modifications
- Metatarsal cutouts.
- Orthotics
- Taping

Case 2: High Stability/MC Shoe

Shoe Modifications
- Wide foot or lessen foot pressure
- If toe nail is turning black

References
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- Heiderscheit BC. Gait Retraining for Runners: In search of the ideal. JOSPT: 2011; 41(12): 909-910
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