PHYSICAL THERAPY MANAGEMENT OF THE ENDURANCE ATHLETE: TREATING A DIFFERENT BREED

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“Sprinters are born but marathoners are made.”
Demographics

Triathletes
- Average Age = 38 years old
- White-Collar Jobs = 49%, Professional Jobs = 19%
- Mean Household Income = $126,000
- Hours/Week (for those participating in 3-4 races/year) = 10.5 hours

http://www.usatriathlon.org/about-multisport/demographics.aspx

Runners
- Average Age: Male = 43.8, Female = 39.3
- College Educated = 75.8% (US adults = 30.4%)
- Median Household Income = $75,000 (US = $52,700)
- Hours/Week: Male = 72.4% > 4 hr/week, Female = 66.8% > 4 hr/week

http://www.runningusa.org/national-runner-survey
Smart, Successful, Motivated
They are doing these sports because they *want* to do these sports.
They have researched their problem and have expectations for treatment.
Their friends have already told them a few other names of people they should go see.
You may be evaluating them, but they are interviewing you.
Treating Endurance Athletes

Assessment of function is vital.
Minimize time to return to sport.
Their time is very limited.
They don’t really want to do anything other than their sport.
Injury Prevalence: 37-45%
Most Common Injuries:
Shoulder > Knee > Back/Neck
  Knee more common in younger athletes
Risk Factors
  History of Injury
  Training
Special Considerations:
  Glenohumeral Internal Rotation Deficit (GIRD)
  Core Strength
Cycling (overuse injuries)

- Injury Prevalence (top-level): 84%
  - Traumatic: 48%
  - Overuse: 51%
- Most Common Injuries: Knee > Neck > Back
- Risk Factors: No clear evidence
- Special Considerations
  - Orthotics

Running

Injury Prevalence: 19-79%
Most Common: Knee>Foot/Lower Leg>Upper Leg>Lower Back>Ankle>Hip

Risk Factors:
  Training
  History of injury

Special Considerations:
  Footwear
History Keys

- Weekly mileage and intensity
- Experience
- Goals
- Motivation
- Injury History
- Patient Specific Functional Scale (PSFS)
- Pain in last 24 hours
# The Ideal Patient

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<th>Date</th>
<th>Type</th>
<th>Title</th>
<th>Distance (mi)</th>
<th>Duration</th>
<th>Pace</th>
<th>Calories</th>
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Exam Keys

Palpation
Static Alignment
Strength and Flexibility
Dynamic Assessment
  Functional Movement Screen
  Single Leg Squat
Video Assessment of Sport

Swimming: have friend video at practice
If possible above and below water.
Key Metrics:
- Hip Drive
- Shoulder Position at Catch
- Roll
Video Assessment of Sport

Cycling: video at home on trainer

Assessment of both rider and bike set-up in frontal and sagittal planes

Key Metrics:

- Frontal Knee Movement
- Knee Flexion (25-30°)
- Cleat Position
- Lumbar Spine Position
- RPM
Video Assessment of Sport

Running: on a Treadmill in clinic
  Frontal and sagittal planes

Key Metrics:
  ■ Forward Trunk Lean
  ■ Vertical Excursion
  ■ Sagittal Knee Motion
  ■ Cadence (BPM)
Specifics of Running Assessment

**FIGURE 1.** Sagittal plane kinematic measures used to estimate ground reaction forces and joint kinetics during running. Running step-rate condition and sex were also considered in the models. Abbreviations: COM, center of mass; IC, initial contact.
Case Study #1

35 y/o male Triathlete

**Primary Complaint:**

- Has right 3\textsuperscript{rd} toe numbness and pain that increases after about ½ mile of running
- No pain with swimming or cycling
- This pain does not decrease until he stops running
- Began after a training trip where he increased his recent running and cycling mileage
Case Study #1

Differential Diagnosis:
- Plantar Fasciitis
- Tarsal Tunnel Syndrome
- L5 Radiculopathy
- Tibial Nerve Entrapment
- Morton’s Neuroma
- Metatarsalgia
Case Study #1

**Weekly Mileage:**
- Swimming = 10,000 yards
- Cycling = 200 miles
- Running = 40 miles

**Experience:** First seen 10 days before his 6th full Ironman-Distance Triathlon

**Goals:** Qualify for Ironman World Championships in Kona, HI

**Motivation:** Competition > Fitness

**Injury History:** Lumbar Spine Pain, IT-Band Tightness, History of Left Foot Surgery

**PSFS:** Running > 1 mile: 2/10

**Pain in last 24 hours:** Best = 0/10, Worst = 8/10
Case Study #1

Static Alignment:
- FPI: +1 Bilaterally
- Pelvic Alignment: symmetrical

Strength and Flexibility:
- Gluteus Medius: Right= 4-/5, Left= 4/5
- Gluteus Maximus: Right= 4-/5, Left= 4/5
- Toe Flexors/Extensors: Bilateral= 5/5

Palpation: tenderness at plantar 3rd and 4th toe web spacing, (+) Mulder’s Sign
Case Study #1

Running analysis:

Heel Strike >10° bilaterally
Knee Flexion at Foot Strike >165° bilaterally
Assessment:

Signs and symptoms consistent with right 3rd digital nerve neuroma. This appears to be exclusively associated with running. Intensity of pain prevents him from running >1/2 mile. Preparing to run 26.2 miles in 10 days.

Plan:

Patient education on anti-inflammatory care, self taping techniques, and HEP
Consider changing footwear as possible short-term fix
Case Study #1

**Outcome:**

Patient left for Australia two days after, did not run at all prior to departure.

Six days prior to the race went for run in Brooks Cadence. **No Symptoms after 3 miles.**

Participated in and finished Ironman, missed Kona qualifier.

Since then has taken recommendation for a healthy rotation of shoes, which includes his Newton Gravity. **No issues with neuroma since.**
Case Study #1

Is it the shoes??

http://mortgagerates.social/tag/newton-running-shoes-reviews-running-shoes-guru

Case Study #1

**Take Away:**

Don’t be afraid to suggest a drastic change if the stakes are high. That is why they are coming to a professional.

Just because someone has been doing it one way for a while does not mean it cannot be the problem.
Case Study #2

42 y/o Male, avid cyclist and recreational runner

**Primary Complaint:** Long history of bilateral calf pain which was recently aggravated running.
Case Study #2

Differential Diagnosis:
- Lumbo-sacral Radiculopathy
- Tibialis Posterior Tendonitis
- Soleus Strain
- Medial Tibial Stress Syndrome (MTSS)
Case Study #2

**Weekly mileage:** Rides around 3000 miles/year, runs < 100 miles/year.

**Intensity:** rides at variable intensity including centuries and cycle cross.

**Experience:** Has been cycling at some capacity for the last 20 years.

**Goals:** Be competitive in Cat 3 races

**Motivation:** Fitness > Competition.

**Injury History:** Chronic calf tightness, recent plantar fasciitis, L5/S1 radiculopathy resulting in a discectomy in 2006.

**PSFS:** Standing on toes = 6/10, Walking after cycling = 6/10

**Pain in last 24 hours:** Best = 1/10, Worst = 6/10
Case Study #2

Static Alignment:
FPI: +2 Bilaterally
Pelvic Alignment: Asymmetrical

Strength and Flexibility:
Strength:
- Hamstring = 4/5
- Unilateral Heel Raises = >25
- Gluteus Maximus = 4/5 (difficulty with isolating this muscle)

Passive Talocrural Dorsiflexion
- Knee Straight = -10°
- Knee Bent = -5°

Palpation: tenderness and adhesions in medial soleus muscle
Case Study #2

Dynamic Assessment

Cycling Assessment:
- Filmed on trainer at home
- No obvious deficits

Walking:
- Medial Heel Whip
- Toeing out

Functional Movement Screen:
- Deficits with squat highlights hamstring and gluteal weakness
Assessment:

Bilateral soleus mm overuse/strain. This is a recurring problem that he encounters, especially when cycling. Based upon his description of his cycling technique and tendencies it does appear as though he may have been overusing his soleus mm. This hypothesis is supported by his glut max and hamstring weakness, which requires him to use his soleus mm to complete pedal stroke.

Has excellent potential for recovery in a program focused first on resolution of soleus pain and improvement of posterior thigh mm weakness. Once those deficits appear to be improving he may benefit from a bike fit/assessment to address any deficits he has on the bike.
Case Study #2

Treatment (Day 1):

Kinesiology Tape
- Muscle Strain Technique

Manual Therapy
- Soleus Release Techniques

Home Exercise Program
- Gluteal Activation
- Eccentric Heel Raises
- Windmill
- Stability Ball Hamstring Curls
- Soleus Stretch
Case Study #2

Subsequent Visits:
Focus on exercise form and gluteal activation. Exercises quickly moved to HEP if he demonstrated good retention. Addressed gait mechanics to try to minimize toeing out and heel whip. Progressed along expected course.
Case Study #2

Course of care: 6 treatments over 30 days

Outcomes:

PSFS Standing on toes = 10/10
PSFS Walking After Cycling= 8/10
Pain in last 24 hours: Best= 0/10, Worst= 2/10
Case Study #2

Take Away:
Underlying reason is not always what brings on symptoms.
Repetition is the catalyst for many endurance athletic injuries.
Questions?
References


