Keep Runners Running

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Disclosures

• No relevant financial relationships exist

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Learning Objectives

1. List the most common injuries found in runners.
2. Identify the most common risk factors for injury in runners.
3. Classify appropriate interventions for runners with specific examination findings.
4. Implement appropriate interventions to running clients.
5. Identify 4 key runner specific algorithms

Not only the “Crazy Runners”

- Running is Valuable to your Health!
  - Prevent HTN, Cholesterol, Metabolic Disease
- Keeping Runners Running is a challenge
  - Time
  - Energy
  - Injury
- All Runners – especially novice runners, non competitive runners

POLL 1:
WHAT TYPE OF RUNNERS DO YOU TREAT? % OF COMPETITIVE VS NOVICE OR THOSE RUNNING FOR HEALTH ONLY

1. >50% COMPETITIVE
2. >50% RUNNING FOR HEALTH BENEFITS
Running Injuries

Let’s Keep Them Running!

Most Common Injuries in Runners

Taunton 2002

Endurance Athlete

- 80% of running injuries are overuse
- Mental fatigue causes decrease in performance
- Life stressors can negatively impact training and increase an overtraining effect
- *Chronic, overuse injuries are more prevalent than acute injuries*

(McCormick 2015, Main 2010, Anderson 2013)
Risk Factors for Lower Extremity Overuse Injury in Runners

Running Injuries

• Risk factors:
  – Previous injury
  – >25-40 miles/wk
  – Racing in >6 races/years
  – Use of an orthotic or shoe insert
  – <3 years of running

Biomechanical Risk Factors for Injury

• Increased dynamic hip internal rotation
• Increased peak tibial shock
• Increased hip adduction moments
• Rearfoot motion? Fatigue?

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HOW BREAKDOWNS IN RUNNING FORM LEAD TO INJURIES

Stress
Compensation
PAIN in the Weakest Link

Q&A PART 1

• What’s the most commonly injured body part in runners?
• What are the most common risk factors for injury?
• The Knee!

• History of Injury
• Training Errors
• Lower Extremity Movement Patterns
• Body Mass Index
• Impact Forces
Now We Know the “What” and the “Where”

POLL 2: WHAT DO YOU RECOMMEND TO YOUR RUNNERS FOR INJURY PREVENTION?

1. TIME OFF FROM RUNNING
2. STRENGTH TRAINING
3. STRETCHING
4. CROSS TRAINING

Causes of Injuries

- History of Injury
- Training Errors
- Lower Extremity Movement Patterns
- Body Mass Index
- Impact Forces
Can We Stop the Injuries?!

- History of Injury
- Training Errors - Lack of Consistency in Training / Mileage
- Lower Extremity Movement Patterns
- Body Mass Index
- Impact Forces

Can We Stop the Injuries?!

- Lower Extremity Movement Patterns
  - Impact Forces
  - Address those Strength and Mobility Needs, specific for running

Why Cross Train?
Strength / Endurance / NM Control
Strengthening (hip) • Decreases Injury • Resolves ITBS, PFPS

Endurance • Movement abnormalities ↑ with fatigue

Need to get Runner Buy-In?

No Purchase Necessary • ↑ economy in distance runners • ↑ VO₂ max • Core strength program ↓ 5K time
Q&A PART 2

- What intervention helps improve running economy?
- Strengthening!
- What examples can you use with your patients for “buy-in” for strength training?
- Improved Speed and 5k time!

Choosing the Most Appropriate Intervention
POLL 3:
WHAT DYSFUNCTIONAL MOVEMENTS DO YOU USUALLY SEE WITH YOUR RUNNERS?
1. KNEE VALGUS
2. TRENDELENBERG
3. OVERPRONATION

POLL 4:
HOW DO YOU CHOOSE YOUR INTERVENTIONS FOR RUNNERS?
1. PHYSICAL EXAMINATION
2. VIDEO GAIT ANALYSIS

ALGORITHMS
Develop your own.
Use mine.
Based on primary client load.
Increased Trendelenberg in Midstance

Assess Hip Strength, Facilitation Glute Med

Side Plank

Side Plank ABD, DL up

Side Plank ABD, DL down

Unilateral standing balance

Increased Symmetry

Borne

Lateral Step Up

Forward and transverse Lunges

Assess LE Control with Dynamic Mvt

Double Leg Hop

Single Leg Hopping (Multiple directions)

Single leg hopping unstable

Boren, et al. 2011
Knee valgus during stance

Assess hip strength
See trendelenberg flow chart
See decreased hip ext flow chart

Assessment of hip mobility

Flexibility exercises for hip musculature
Hip mobilizations with belt

Dynamic Control
Double Leg Squat with band at knees
Double Leg Squat
Single Leg Squat with feedback
Single Leg Squat
3 way touchdowns
Double Leg Jumps
Single Leg Jump
Lunges
Multiple directional lunges

Gait Retraining
Mirror, Auditory
Gradually reduced feedback
Assess foot pronation
See increased pronation chart

POLL 5:
DO YOU USE GAIT RETRAINING?

1. YES
2. NO
Gait Retraining

• Takes 6 weeks to feel natural
• Position of leg at initial contact is crucial to what will happen during stance
  – Need to change initial contact during gait retraining

(Crowell 2011, Willy 2014)
Your Words Matter

- Same Goal with all intervention
  - Reduce impact loads
  - Reduced pain
  - Improved body control
  - Improved efficiency and economy

INTERNAL CUES

“Fire your glutes”
“Land on the middle of your foot”
“Use your core”
Manipulate a body part

EXTERNAL CUES – ENHANCE MOTOR LEARNING

“Keep the dots level”
“Keep your knee caps pointed forward”
Visual and Auditory cuing
Using a metronome
SUBJECT CHOSEN CUES

Let them see what works best with the main outcome.

“try to keep the hips level any way you can” with video feedback

Graded feedback or cuing

Gait Retraining

Visual and Auditory FB

- Reduced pain
- Improved mechanics
- Gradually reduced FB

Impact

- Cadence (5-10%)
- “Hip Flexion Drive”

Gait Retraining – ITBS

- “keep the knee pointing forward”
- “reduce the arm swing”
- “keep the foot pointing forward”

Gait Retraining – Ant Knee

- “Knees Out”
- “Knee caps pointed straight ahead”
- “Squeeze buttocks”

- Glute Run! Try It

Increased calcaneal eversion at midstance
Assess strength of ankle and posterior tibialis
Posterior Tibialis, Peroneus Longus Weakness
Posterior Tibialis strengthening with theraband
Arch Doming with SLB/WB
Intrinsics NM
Assess mobility and range of motion of foot
Joint mobilizations
Subtalar and Talocrural Joint
Grades, NM for toes (2nd phalanx)
Gradually reduce feedback

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Decreased Hip Extension in Pre-swing/Initial Swing

Assess Hip Range of Motion and Joint Mobility

- Hip Flexor Stretch
- Hip Flexor Stretch with Rotation
- Hip Mobilizations with belt
- Foam Rolling

Assess Glute (Max) Strength

- Core Exercises Quadruped opposite arm and leg
- Quadruped opposite arm and leg on BOSU
- Single leg bridge
- Monster Walks
- Glute Grabbers
- Assisted Squats
- Squats

**Dynamic Control**

- Unilateral Deadlift
- Unilateral Deadlift with rotation
- Touchdowns 3-way
- Touchdowns off box
- **Single Leg Squats**
- Retro Step Up
- Lunges

Plyometrics

- Double Leg Jumps
- Single Leg Jumps

Distefano 2009; Ayotte 2007
Not “only” Strength

- Must also address
  - Neuromuscular Control
  - Proprioception
  - Gait Retraining

Zech 2009, 2011; Noehren 2011; Willy 2011

ALGORITHM SUMMARY

Runners get injured. A lot.
Intervention based on gait analysis
Best running – specific ex with max MVIC

FORMAL MINUTE Q&A
Today You Learned:
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4. Implement appropriate interventions to running clients.
5. Identify 4 key runner specific algorithms.

Not only the “Crazy Runners”
• This information is valuable for all runners, not just the competitive ones.

Thank you!
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REFERENCES


Endurance Athletes Physical Therapy and Sport Performance
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