

# Return to Play for Adult Athletes

*Dr. Meredith Butulis, DPT, OCS, CEP, CSCS, CPT, CES, PES*

**Goal:** Be able to answer, “Can I return to \_\_\_\_\_?” with confidence & competence

## Objectives:

1. **Assess sport-specific demands** for return to play.
2. **Identify assessments to participate.**
3. **Discuss** how **age-related** changes **and co-morbidities impact** decision making.

## Step 1 Analyze the Game

1. Movement patterns
2. Cardiovascular demand
3. Muscular demand
4. Skill
5. Landscape
6. Injury prevalence

### Movement patterns:

Lower body	Upper body
Squat	Push
Bend to extend	Pull
Lunge	Hang
Step	Carry
Gait	Crawl
Landing	

- Speed, load, frequency, plane of motion, complexity
- Kinetic chain checkpoints: Head, shoulders, hips, knees, toes

### Cardiovascular demand:

- **Intensity:** MET, Karvonen, %HRR, %HRMax, Maffetone, RPE
- **Duration:** ATP-PC → Anaerobic → Aerobic
- **Work to rest ratios:** Based on ATP recovery & experience

### Muscular demand:

- Endurance
- Hypertrophy
- Strength
- Power

[Mbutulis@gmail.com](mailto:Mbutulis@gmail.com)

Linked In /Facebook: Meredith Butulis

IG: @Dr.MeredithButulis

**Video analysis:**

<https://youtu.be/jXsv5RDoKlc>

<b>Movement pattern</b>	<b>Time or reps</b>	<b>Notes</b>

<b>Intensity</b>	
<b>Duration</b>	
<b>Work: rest ratio</b>	

**Injury prevalence evidence:**

Injury \_\_\_\_\_ in \_\_\_\_\_

- First blank: Incidence, prevalence, risk, prevention
- Second blank: Sport, game, method
- Filter: Age, gender, country

[Mbutulis@gmail.com](mailto:Mbutulis@gmail.com)

Linked In /Facebook: Meredith Butulis

IG: @Dr.MeredithButulis

## Step 2: Athlete Participation Assessments

1. Movement
2. Stability
3. Cardiovascular, speed, agility
4. Muscular
5. Skill

### **Movement**

- Specific to your player's level and position in the game
- Plane, speed, load, frequency specificity

### **Stability**

- Y balance
- SEBT
- Modified upper quarter balance test
- Closed kinetic chain upper extremity stability test
- BESTest
- BESS

### **Aerobic capacity**

- 12 minute walk run
- Step tests
- Yo yo/Beep

### **Anaerobic capacity**

- 300 yard shuttle

### **Speed**

- Sprint: 10, 20, 37, 40 m

### **Agility**

- Pro agility
- 5-10-5
- T drill

### **Muscle endurance**

- Push up
- YMCA bench press
- Curl up
- Planks

### **Muscle strength**

- 1 RM or 10 RM
- Grip dynamometer

[Mbutulis@gmail.com](mailto:Mbutulis@gmail.com)

Linked In /Facebook: Meredith Butulis

IG: @Dr.MeredithButulis

### **Muscle power**

- Long jump
- Vertical jump
- Single leg hop
- Single leg crossover triple hop
- Medball throw

### **Landing**

- Landing error scoring system

## **Step 3: Physiological Constraints**

### **Components**

1. PT evaluation
2. Condition side effects, chronic impact, medications
3. Age-related A&P
4. Baseline: PAR-Q & risk stratification
5. Patient motivations

### **Age-related decline per decade**

- 3% nervous system
- 6% cardiovascular, bone, muscle, mobility
- 10% endocrine
- 12% VO<sub>2</sub>

### **Cardiopulmonary**

- 220-age = HRM. Use age adjusted norms to interpret aerobic and anaerobic test results
- BP > 200/115 do not start; chronic HTN avoid head below heart activity
- If on beta blockers assess RPE (not only HR)
- Early fatigue from statins or beta blockers may have irreversibility – adjust stamina expectations
- VO<sub>2</sub> heavily posture dependent; assess posture and breathing
- HITT/anaerobic CV assessments and training are not contra-indicated for older adults or special populations BUT PAR-Q first!

### **Muscular**

- Muscle atrophy—type IIx atrophies faster
- Speed, power, landing safety
- Velocity meters/pitch speed/sprint speed/anaerobic power—age adjusted norms

### **Nervous system**

- Vestibular + somatosensation + vision + processing

[Mbutulis@gmail.com](mailto:Mbutulis@gmail.com)

Linked In /Facebook: Meredith Butulis

IG: @Dr.MeredithButulis

- Decide if your balance tests need to assess static balance, differentiate systems, or dynamic balance
- Older adults typically need explicit instruction: Is this in a sequence, or is this a dual task. What do we focus on?

### **Bone**

- Osteoporosis: avoid bending/twisting spine i.e. crunches are not appropriate
- Avoid jumping if the T score is above 3
- Bony blocks on ROM; reference age adjusted norms

### **Joint/Myofascial mobility**

- Multi factorial: Inert, rigid, neurological, extensible
- Reversibility: 20-50% improvement from starting point with daily ROM and stretching

## Summary

**Athlete: Can I \_\_\_\_\_ ?**

### **Answer with:**

1. Bring me a video, let's analyze together
2. Create an individual test battery
3. Identify confounding physiological changes to refine assessment battery and create open honest communication on outcomes

**Empower your patient:** Together, we will make your yes/no list for participation, play, and /or competition each step of the way.

### **References:**

1. Arc-Chagnaud, et al. (2019) Reversal of age-associated frailty by controlled physical exercise: The pre-clinical and clinical evidences, *Sports Medicine and Health Science*, 1(1): 33-39.
2. Bolling, C, et al (2018) Context Matters: Revisiting the First Step of the 'Sequence of Prevention' of Sports Injuries. *Sports medicine (Auckland, N.Z.)*, 48(10), 2227–2234.
3. Chodzko-Zajko WJ, et al (2009) Exercise and physical activity for older adults. *Med Sci Sports Exerc.* 41:1510–30.
4. Clark, M, Lucett S, Sutton B (2012) *NASM Essentials of Personal Fitness Training*. Wolters Kluwer: Philadelphia.
5. Cristina-Oliveira M, et al (2020) Clinical safety of blood flow-restricted training? A comprehensive review of altered muscle metaboreflex in cardiovascular disease during ischemic exercise. *Am J Physiol Heart Circ Physiol.* 1;318(1):H90-H109.
6. Davey, A, et al (2019) Alpine Skiing Injuries. *Sports Health*, 11(1):18–26.
7. Dwyer G, Davis S. Eds. (2005) *ACSM's Health-Related Physical Fitness Assessment Manual*. Lippincott Williams &Wilkins: Philadelphia.

[Mbutulis@gmail.com](mailto:Mbutulis@gmail.com)

Linked In /Facebook: Meredith Butulis

IG: @Dr.MeredithButulis

8. Eckardt N, et al (2020). Instability Resistance Training improves Working Memory, Processing Speed and Response Inhibition in Healthy Older Adults: A Double-Blinded Randomised Controlled Trial. *Sci Rep.* 13;10(1):2506
  9. Greiner N (2019). Pickleball: Injury Considerations in an Increasingly Popular Sport. *Missouri medicine*, 116(6), 488–491.
  10. Grønfeldt BM, et al (2020) Effect of blood-flow restricted vs heavy-load strength training on muscle strength: Systematic review and meta-analysis. *Scand J Med Sci Sports*. doi: 10.1111/sms.13632. [Epub ahead of print]
  11. Haff G, Triplett T, Eds. (2016) *Essentials of Strength Training and Conditioning*. 4<sup>th</sup> Ed. Human Kinetics: Philadelphia.
  12. Katch V, McArdle W, Katch F. (2011) *Essentials of Exercise Physiology*. 4<sup>th</sup> Ed. Wolters Kluwer: Philadelphia.
  13. Maffetone, P. (2015) The 180 Formula: Heart-rate monitoring for real aerobic training. Retrieved from: <https://philmaffetone.com/180-formula/>
  14. Moore G, Durstine J, Painter P. Eds (2016) *ACSM's Exercise Management for Persons with Chronic Diseases and Disabilities*. 4<sup>th</sup> Ed. Human Kinetics: Philadelphia.
  15. Montalvo, A, et al. (2017) Retrospective Injury Epidemiology and Risk Factors for Injury in CrossFit. *Journal of sports science & medicine*, 16(1), 53–59.
  16. Padua DA, et al. (2011) Reliability of the Landing Error Scoring System-real time, a clinical assessment tool of jump-landing biomechanics. *J Sport Rehabil.* 20(2):145– 156.
  17. Rabb, H., & Coleby, J (2018) Hurt on the Hill: A Longitudinal Analysis of Obstacle Course Racing Injuries. *Orthopaedic journal of sports medicine*, 6(6), 2325967118779854.
  18. Silsupadol P, et al (2009) Effects of single-task versus dual-task training on balance performance in older adults: a double-blind, randomized controlled trial. *Arch Phys Med Rehabil.* 90(3):381-7.
  19. Tavoian, D, et al (2019) A Randomized Clinical Trial Comparing Three Different Exercise Strategies for Optimizing Aerobic Capacity and Skeletal Muscle Performance in Older Adults: Protocol for the DART Study. *Frontiers in medicine*, 6, 236.
  20. Weston KS, et al (2014) Review High-intensity interval training in patients with lifestyle-induced cardiometabolic disease: a systematic review and meta-analysis. *Br J Sports Med.* 48(16):1227-34
  21. Iverson, G. L., & Koehle, M. S. (2013). Normative data for the balance error scoring system in adults. *Rehabilitation research and practice*, 2013, 846418. <https://doi.org/10.1155/2013/846418>
  22. Hanzlíková, I., & Hébert-Losier, K. (2020). Is the Landing Error Scoring System Reliable and Valid? A Systematic Review. *Sports health*, 12(2), 181–188. <https://doi.org/10.1177/1941738119886593>.
- \*LESS “how to” [https://www.physio-pedia.com/Landing\\_Error\\_Scoring\\_System\\_\(LESS\)](https://www.physio-pedia.com/Landing_Error_Scoring_System_(LESS))

[Mbutulis@gmail.com](mailto:Mbutulis@gmail.com)

Linked In /Facebook: Meredith Butulis

IG: @Dr.MeredithButulis