APTA’s Combined Sections Meeting, 2019
Science Meets Practice: Do We Need to Fail to Succeed?

Speakers:

Scot Morrison, PT, DPT
Board Certified Orthopaedic Clinical Specialist
Certified Strength & Conditioning Specialist
Owner/Operator, Physio Praxis, Portland, OR

Daniel W. Safford, PT, DPT, MAT
Board Certified Orthopaedic Clinical Specialist
Certified Strength & Conditioning Specialist
Lead Therapist, Good Shepherd Penn Partners, Glenside, PA
Research Physical Therapist, Arcadia University Shoulder Research Center, Glenside, PA

Moderator:

Marisa Pontillo, PT, PhD, DPT
Board Certified Sports Clinical Specialist
Sports Team Leader, GSPP Penn Therapy at Penn Sports Medicine Center, Philadelphia, PA
Scientific Consultant, Penn Orthopedics/University of Pennsylvania Athletics, Philadelphia, PA
Chair of the Shoulder SIG of the American Academy of Sports Physical Therapy

Outline:
High intensity training regimes that emphasize loading to failure as necessary to maximize adaptation and lower opportunity cost are supported by a compelling body of evidence. However, arguments against the necessity of training to failure raise concerns about sub-optimal performance outcomes and unwanted side effects such as extended recovery. Loading without failure may be a more advantageous approach to training and rehabilitating athletes. Evidence regarding these two loading schemes will be examined and debated through a clinical lens to determine which approach should be used to achieve desired clinical and performance outcomes. A focus of this session will be the consideration of physiological responses and the optimal application of these approaches in the athletic population.

Objectives:
Following this session, attendees will be able to:
1. Discuss the current state of the evidence on training to failure versus non-failure.
2. Accurately identify the exercise parameters necessary for optimal outcomes for both loading approaches.
3. Understand the physiological effects and benefits of training to failure versus non-failure in the athletic population.
4. Critically evaluate the clinical feasibility of failure and non-failure training, and conceptually apply these schemes to improve rehabilitation and performance in athletes.

**Timetable:**
00:00 - 00:05 Overview of session format  
00:06 - 00:30 Platforms  
00:30 – 00:50 Moderator led Q&A; cases  
00:50 - 01:15 Dialogue #1: The case for non-failure training in athletes  
01:15 - 01:45 Dialogue #2: The case for failure training in athletes  
01:45 - 02:00 Moderator led Q&A/Summary of session
Fail to Succeed: The case for non-failure training in athletes
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1. Variability and clarification of failure-related terms
   a. Repetition failure, momentary failure, fatigue, non-failure

2. Strength & performance outcomes of non-failure training in comparison to failure
   a. Relatively equivocal

3. Possible mechanisms of action for adaptation in non-failure training
   a. Neural
      i. Recruitment patterns
   b. Hormonal
   c. Tissue stress

4. Physiological effects of non-failure training
   a. Positive muscle protein synthesis
   b. Decreased hormonal response
   c. Decreased tissue damage

5. Recovery required for non-failure training
   a. Less than failure training
   b. Allows for increased training volume & higher intensity training
      i. May allow for indirectly improved outcomes

6. Implications for injury
   a. May reduce overuse or overtraining injuries

7. Parameters for application
   a. Type of exercise and contraction
   b. Intensity
   c. Frequency
   d. Volume and rest

8. Considerations within athlete macrocycle periodization

9. Summary, conclusions, and questions

References:


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1. Underloading: a current issue in rehabilitation
2. ExRx History
   a. Early Pioneers
   b. Strength & Conditioning
   c. Bodybuilding & Mike Mentzer
3. An argument for a consistent anchor
4. Review of current body of literature on training to failure
   a. Intensity based
   b. Volume based
5. Rating of perceived exertion and discomfort
   a. Optimal loading
   b. Heuristics & decision making
   c. Optimal, sloptimal and satificing
   d.
7. Practical responses to theoretical issues
   b. Injury. Looking at the bigger picture.
8. Practical conclusions
   a. When to include training to failure
   b. How to include training to failure
9. Summary, conclusions & questions

References:


