ATHLETE SPORT SPECIALIZATION AND OPTIMIZATION

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• Doctor of Physical Therapy
• Board Certified Sports Clinical Specialist
• Member US Olympic Committee’s Physical Therapy Database
• Certified Strength and Conditioning Specialist, Former MU Men’s Soccer Performance Coach
• Deutsch Physiotherapy Co.- direct pay PT practice in Wauwatosa
• The Invincibility Project- consult various schools, clubs, teams and individuals to optimize performance and reduce injury risk
FINANCIAL OR PHARMACEUTICAL AFFILIATIONS

• None

OBJECTIVES

• Develop a deeper understanding of the freshness vs. fatigue paradox

• Understand application of fundamental tissue/cellular principles in context of athlete optimization

• Understand basic principles and implementation tools of periodization

• Improve effectiveness of patient interaction
Optimal athletic performance and injury risk hang in the balance of freshness and fatigue.

An athlete’s readiness to train is dependent on their level of freshness vs. level of fatigue.

In order to increase what the athlete is capable of doing they will need to get to 101% or overload their system.

The athlete cannot safely get to an overloaded state if they are not ready to handle the stimulus.

Athletes require periods of recovery/regeneration after periods of training.

Physiologic adaption in response to stressors.

Seyle 1956 - GAS\(^1\)

Banister 80’s-90’s - Fitness-Fatigue\(^2\)

Stressors need to be timed appropriately to elicit the desired response.
**FRESHNESS VS. FATIGUE**

- KEY POINT- Whatever the model is the main point is to stress the system, allow it to adapt/respond and then stress it again

- IF the system is stressed too often and not allowed to adapt/respond, THEN the system will break down

- IF the system is stressed appropriately THEN we achieve optimal results IE; Happy, Healthy, High performing athlete

**MONITORING**

- Current Sports Science allows for relative monitoring of athletes and ultimate determination of ‘readiness to train’ status

- In theory, this creates the opportunity to achieve higher levels of performance and reduce injury risk
• RPE (Rating of Perceived Exertion) / Intensity
• Duration
• Simple and effective way to capture information
• Ratios can be formed from increase from week-week or acute-chronic to determine a Training Stress Balance
MONITORING

Figure 1 — The relationship between the acute:chronic workload ratio and injury risk. Reprinted from Blanch F, Garbett TJ. Has the athlete trained enough to return to play safely?: the acute:chronic workload ratio permits clinicians to quantify a player’s risk of subsequent injury. Br J Sports Med 2016;50(8):471–475.
MONITORING

**TSB = 2.43**

- **KEY POINT-** Follow simple training (progression) principles to allow for optimal results and reduced injury risk

- Under and Over training may elevate injury risk

- **Even more important in post-concussive patients as musculoskeletal injury risk may be higher than normal**

  “For every previous concussion, the odds of sustaining a subsequent time-loss lower extremity injury increased 34%” Lynall, et al, J. AthTraining 2017  

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• Numerous studies demonstrate evidence to support multi-sport participation in youth\textsuperscript{5}

• Year round single-sport training often doesn’t allow for appropriate recovery/regeneration phases

• Year round multi-sport training may/may not allow for appropriate recovery/regeneration phases

SPORT SPECIALIZATION

• Practical Example
  • Single Sport Specialization
    • Comp season Aug-Dec
    • Jan off
    • Comp season Mar-June
    • July off
  • Coach instructs players to be on the ball and run 3x/wk in January and opens training in Aug with fitness test
MULTI-SPORT

• Practical Example
  • Volleyball-Basketball-Baseball-(Track)
    • Aug-Nov= Volleyball
    • Nov-March=Basketball
    • April-July=Baseball
    • Dec-April=Baseball Hitting and Pitching training
    • March-June=Track

SO WHAT IS BEST

• Many studies connect non-specialization in sports with a lowered injury risk, improved cognitive-behavioral association with sports, longevity of career, etc and then often conclude with, “further research needed to determine causation,” or similar.

• All relative to Intensity- physiologic, psycho-social, cognitive, emotional, etc.

• Rarely is the nature of an athlete’s sport-participation in a year assessed, ie; months of passive/active rest, training load monitoring, application of training principles by the coach, etc and is mainly quantified by months/year of participation
KEY POINTS

• Whatever the model is, the main point is to stress the system, allow it to adapt/respond and then stress it again.

• Follow simple training (progression) principles to allow for optimal results and reduced injury risk.

• Withholding players from participation may increase risk of injury upon return as a result of inadequate training load ie; not prepared.

• Players & Parents want to know that you are on their side and want them to participate in as much as possible to achieve their goals.

REFERENCES


