



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

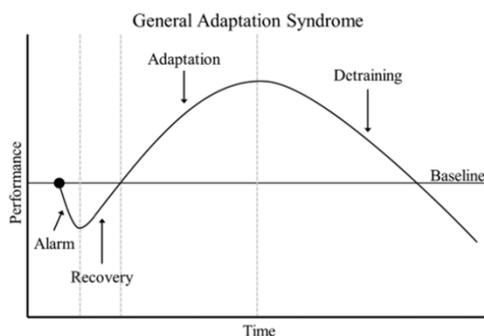


FRESHNESS VS. FATIGUE

- 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



FRESHNESS VS. FATIGUE



- Physiologic adaption in response to stressors
- Seyle 1956- GAS¹
- Banister 80's-90's - Fitness-Fatigue²
- 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

READINESS BREAKDOWN

43

Decrease of 27
02-23-2017

Fatigue	-1
Soreness	-2
Mood	0
Stress	-2
Sleep Quality	-2

TRAINING LOA

610

5.5 rpe, 1

- 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

READINESS BREAKDOWN

85

Decrease of 11
04-12-2017

Fatigue	+1
Soreness	+2
Mood	+2
Stress	+2
Sleep Quality	-1

TRAINING LOA

0

0.0 rpe, 0 min
None submitted

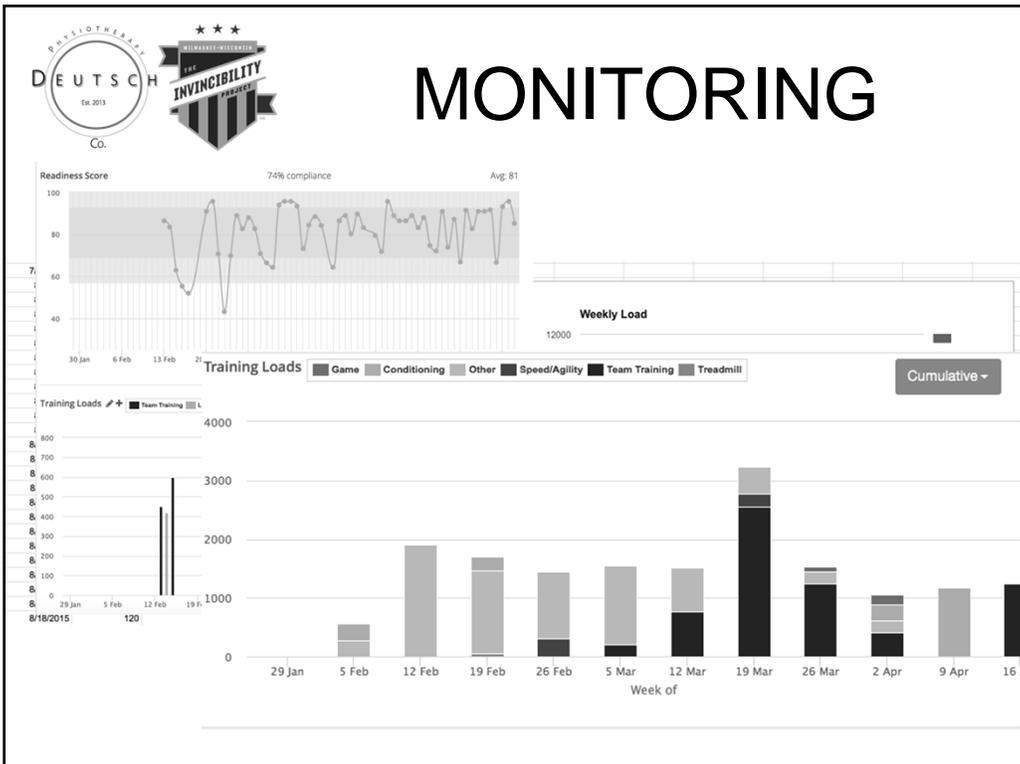
Overview Weekly TL Soreness Sites from 3/16/2017 to 4/12/2017

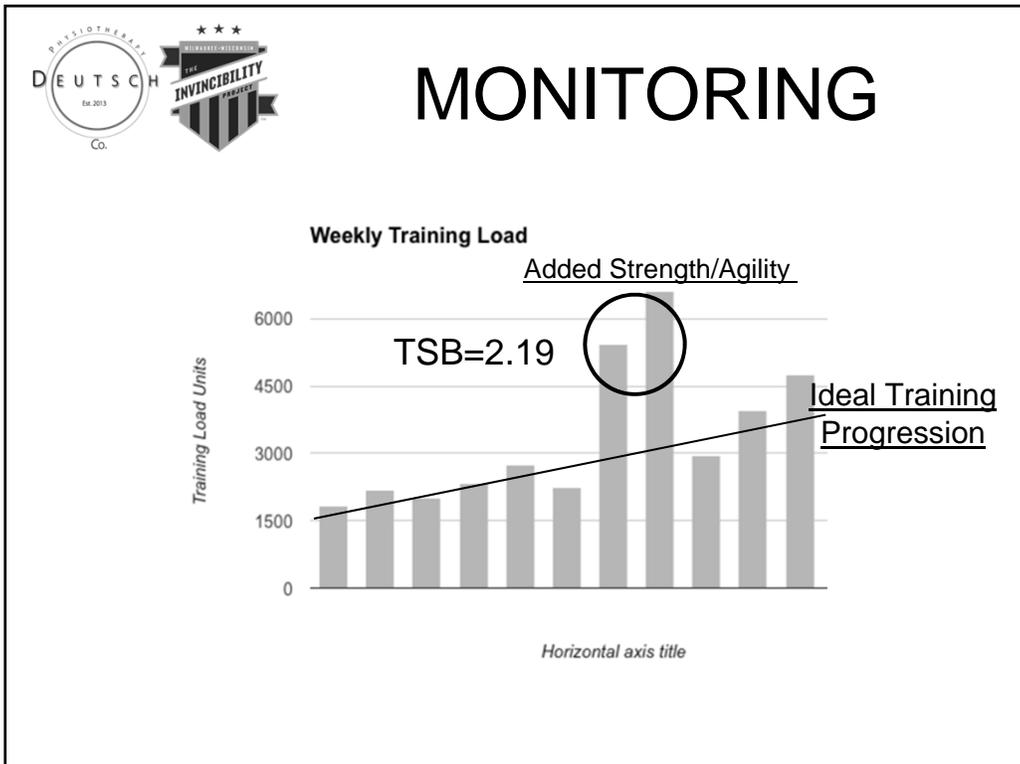
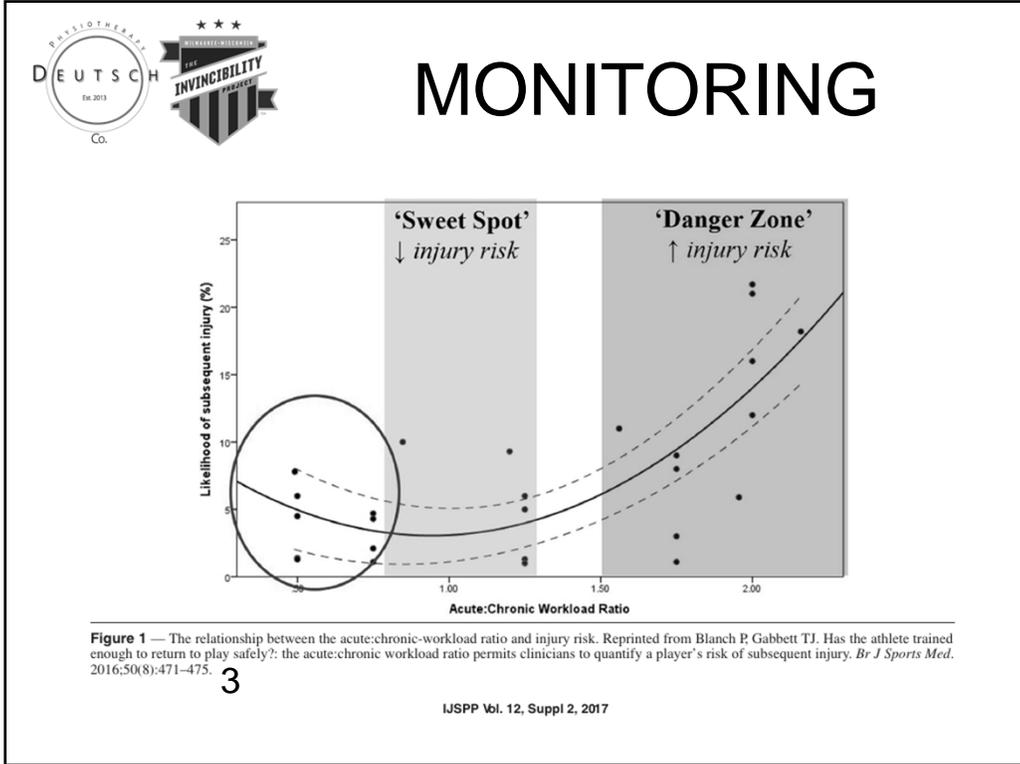
Readiness Score Compliance: 96%

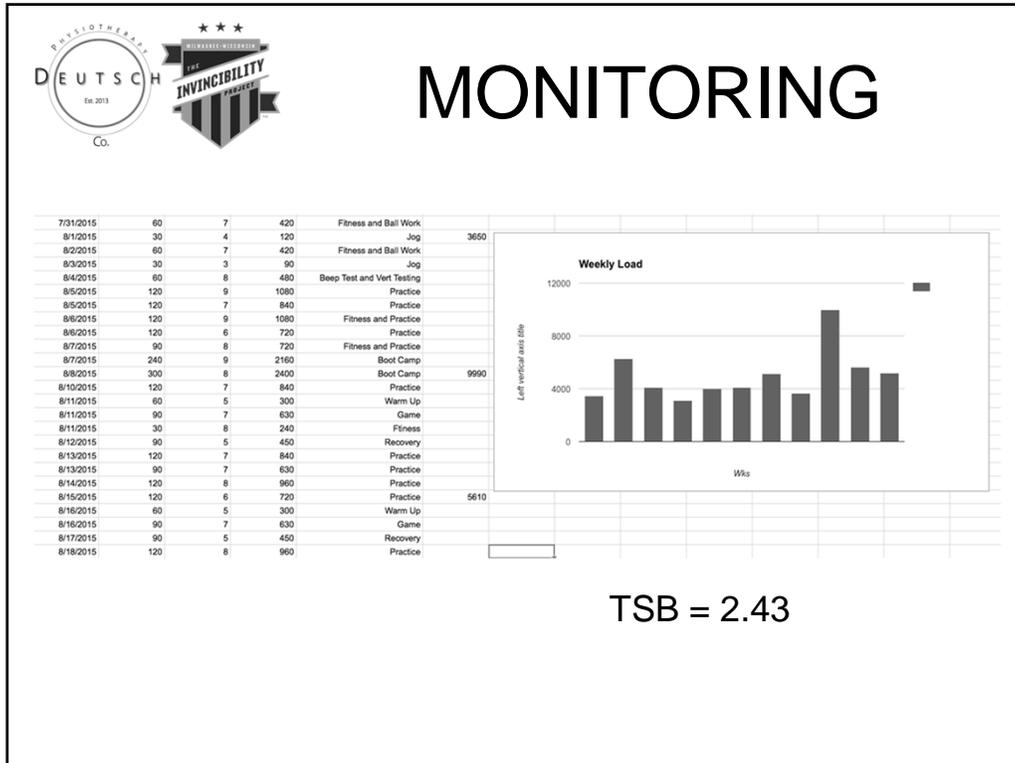


MONITORING

- 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







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- 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 ⁴



SPORT SPECIALIZATION

- Numerous studies demonstrate evidence to support multi-sport participation in youth⁵
- 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, etc⁵. 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

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4. Lynall R, Mauntel T, et al. *J Athl Train*. 2017 Nov;52(11):1028-1034. Lower Extremity Musculoskeletal Injury Risk After Concussion Recovery in High School Athletes.
5. LaPrade RF, Agel J, Baker J, et al. AOSSM Early Sport Specialization Consensus Statement. *Orthopaedic Journal of Sports Medicine*. 2016;4(4):23259671