DELAWARE ACADEMY OF FAMILY PHYSICIANS

Sports Therapy Approaches:
Managing Overuse Injuries and the Growing Trend of Early Sport Specialization

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DISCLOSURE

- No disclosures

LEARNING OBJECTIVES

At the conclusion of this presentation the learner will be able to:

1. Acknowledge the narrative and data surrounding sports specialization, and correlation with overuse injury epidemiology.
2. Recognize key aspects of examination/evaluation pediatric/adolescent sports injuries
3. Summarize therapeutic progression, acknowledging the unique components of caring for the young athlete
4. Provide an understanding of balancing both recovery time and patient presentation in determining patient readiness for return to play progression.

Youth Sports Trends

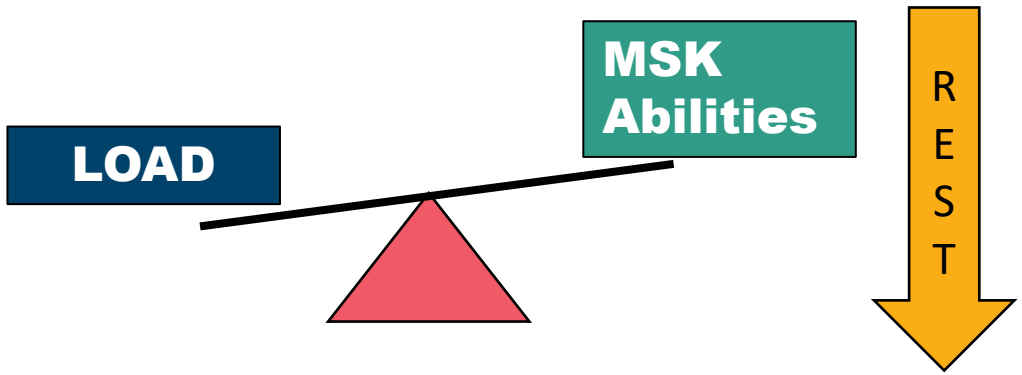
- Roughly 60 million kids (age 6-18) participate in organized youth sports according to the AAP.
- Increasing rates of overuse injuries in youth athletics.
- Primary focus has shifted from participation, fun and fitness to one increasingly centered on training and performance (Kliethermes, 2021).

Overuse vs Concussion – Which is the "epidemic"?

- High School sports overall injury rate = 1.71 injuries per 1000 AE
- About half of pediatric/adolescent sports injuries are due to overuse (DiFiori, *2014*), Giving a estimate of 0.85/1000 AE
  - Likely underreported and difficult to study
  - Variation per sport
- 2011-12 HS Concussion rate 0.51 per 1000 AE (Rosenthal, *2014*)

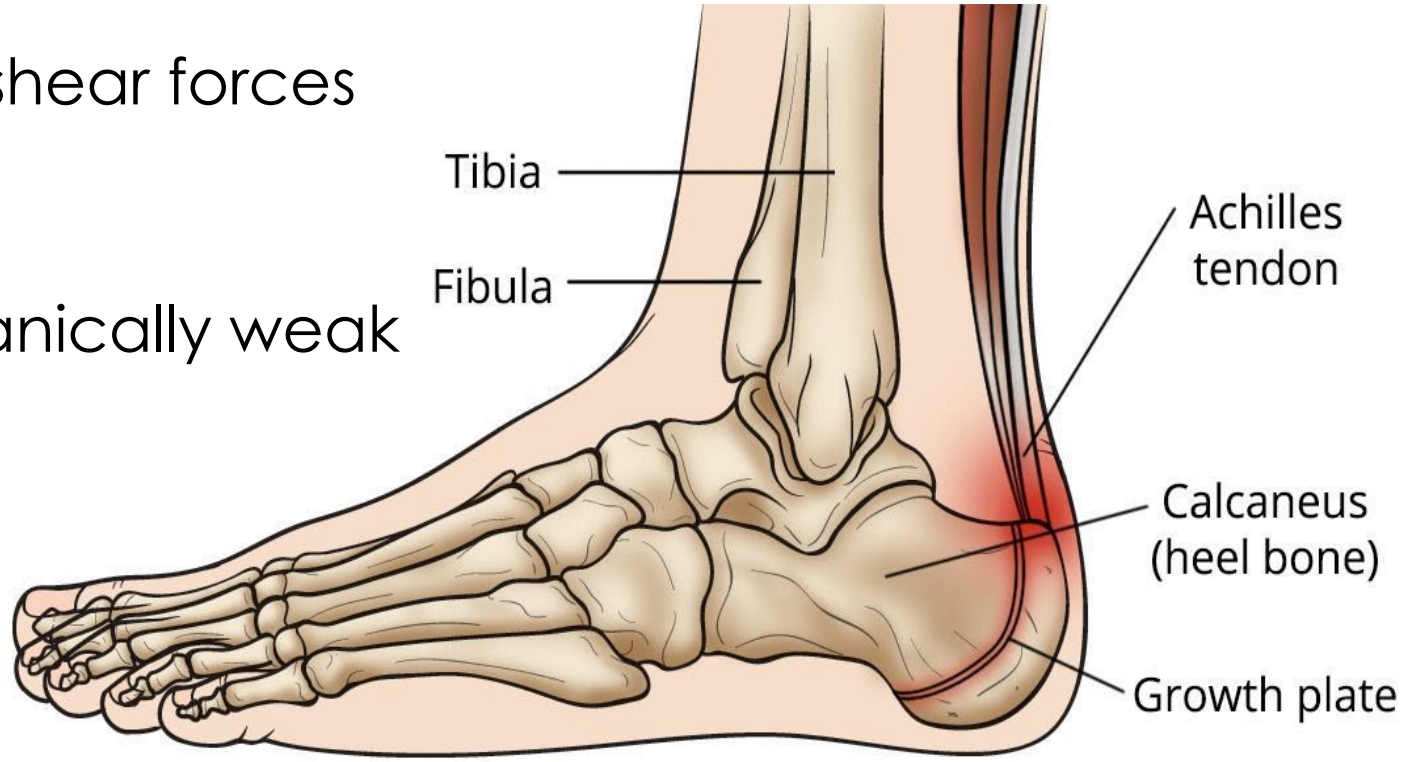
Defining Overuse

- Occurring from repetitive submaximal loading of the musculoskeletal system when rest is not adequate to allow for structural adaptation to take place.
- Rapid increases in in training with limited recovery in poorly conditioned tissue and **lack of appropriate sport training** or **oversight for their age** also puts youth athletes at risk for overuse injuries. (Emmet, 2022)



Overuse cont

- More common than Acute/traumatic
- Commonly occurs in:
  - **Physes** ->Vulnerable to shear forces
  - Joints
  - Bones
  - **Apophyses** -> Biomechanically weak point



Orthoinfo.aaos.org

Muscles not the site of injury, rather the "cause."

Karlin, 2021

Overuse Etiology: Risk Factors

Intrinsic Factors ← PT Tx

- Changes in strength and power
- Limitations in muscle length
- Varied motor coordination development, therefore varied technique

Extrinsic Factors ← Education

- **Early sport specialization**
- Increased scheduling intensity (tournaments and "offseason" training)
- Parent, coach and other pressures
- Coaches with "misplaced" goals

Early Sport Specialization: A growing trend

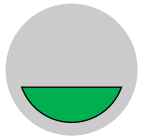
- Driven by:
  - Belief of improved performance
  - High pressure/expectations of athletic career
- Estimated between 10 and 30% of youth athletes in the USA specialize at a mean age of 12-14

(Kliethermes, 2021).

Image source: Time.com

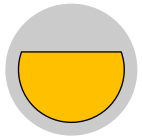
How do we define specialization?

- Generally defined as year-round intensive training at single sport
  - 3 components to quantify "specialization" (Jayanthi,2015)
    1. Year round training (>8 mo./yr.)
    2. Choosing a single main sport
    3. Quitting all other sports to focus on 1 sport



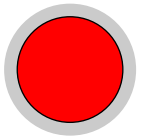
0-1 Component

Low deg of specialization



2 Components

Moderate deg of specialization



All 3 Components

High deg of specialization

Does sport specialization result in overuse injuries?

- Consistent evidence suggesting high level sport specialization is associated with greater risk of overuse injury development. (Bell, 2018)
  - 81% more likely compared to low specialization
- Lack of consistent definition across studies makes if difficult to draw conclusions and more robust, specific and prospective studies are needed. (Emmet, 2022)
- The sex of an athlete and choice of sport may influence risk of overuse injury associate with sport specialization. (Post, 2020)
- School size plays a role in degree of specialization. (Bell, 2016)

Concerns with early specialization

- Reduced likelihood of lifelong athletic participation
  - Via burnout or injury
  - Aspen Institute 2018 State of Play report: Avg. Child spends < 3 yrs. playing a sport, most quit by age 11
- Reduced overall skill development and diversification
  - "Physical literacy"-> The ABCs
    - (**A**gility, **B**alance, **C**oordination and **S**peed)
- Sport-specialized athletes exhibited altered biomechanics compared to multi-sport athletes (DiCesare, 2019)

Image courtesy of Nemours

Exceptions to multi-sport benefits

Sports where high-level success occurs at a young age

- Gymnastics
- Diving
- Figure skating

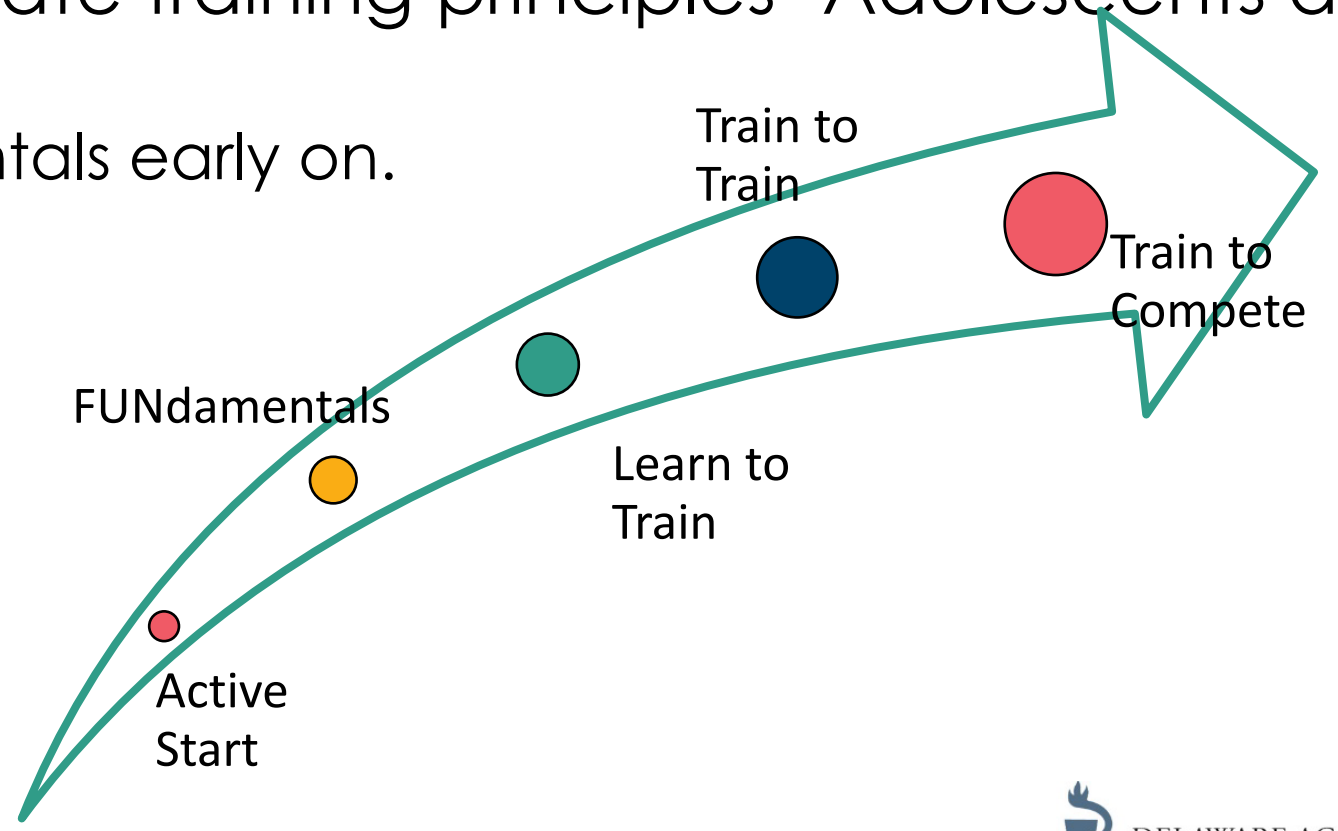
Image source: The New York Times

Are we trying to promote LTAD or early sports success?

What can we do to minimize overuse injuries?

Key to prevention is… Education

- Warm-up/cool down
  - Decrease injury (Ding, 2022), Improve performance (Silva, 2018)
- Utilize age-appropriate training principles- Adolescents are not mini Adults!
  - Focus on fundamentals early on.



Manage Workload Appropriately

- Overload is a key principle of training as load must exceed capacity to improve performance. (Gabbett, 2020)
- Attempt to individualize as mush as possible
  - Consider monitoring anthropometric and growth-related risk factors (i.e. Bio-banding) (Jayanthi, 2022)
- Strategies for load monitoring
  - Periodization
  - Use of scales: RPE, Etc.
  - ACWR

Image source: www.sportsmith.co/articles/goldilocks-and-the-three-training-load-monitoring-bears/

Acute:Chronic Workload Ratio (ACWR)

ACWR can be defined as:

$$\frac{\text{Avg. Workload of 1 wk}}{\text{Avg. Workload of 4 wk}}$$

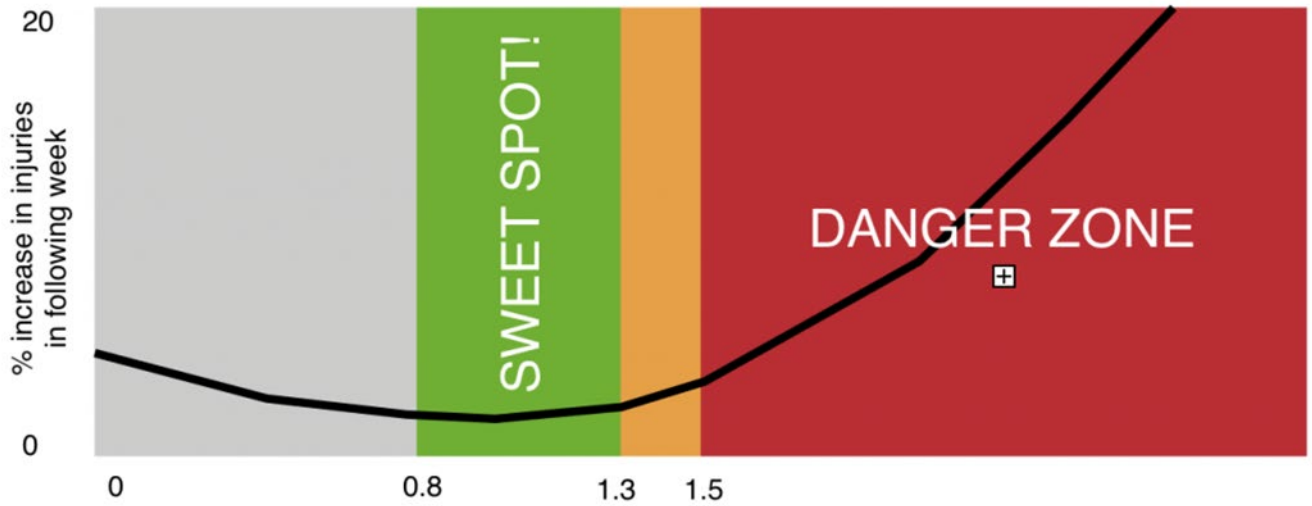


Image source: https://physioworkshsv.com/

- ACWR > 1.27 = 14.9x more likely to be injured. (Mehta, 2019)

Promote Sport Sampling/Delay Specialization

Position Statements:

- NATA:
  - One team at a time
  - < 8 months per year
  - No more hours/week than years of age
- AOSSM, AMSSM
  - Sport sampling
  - 2 days rest per week

AAP

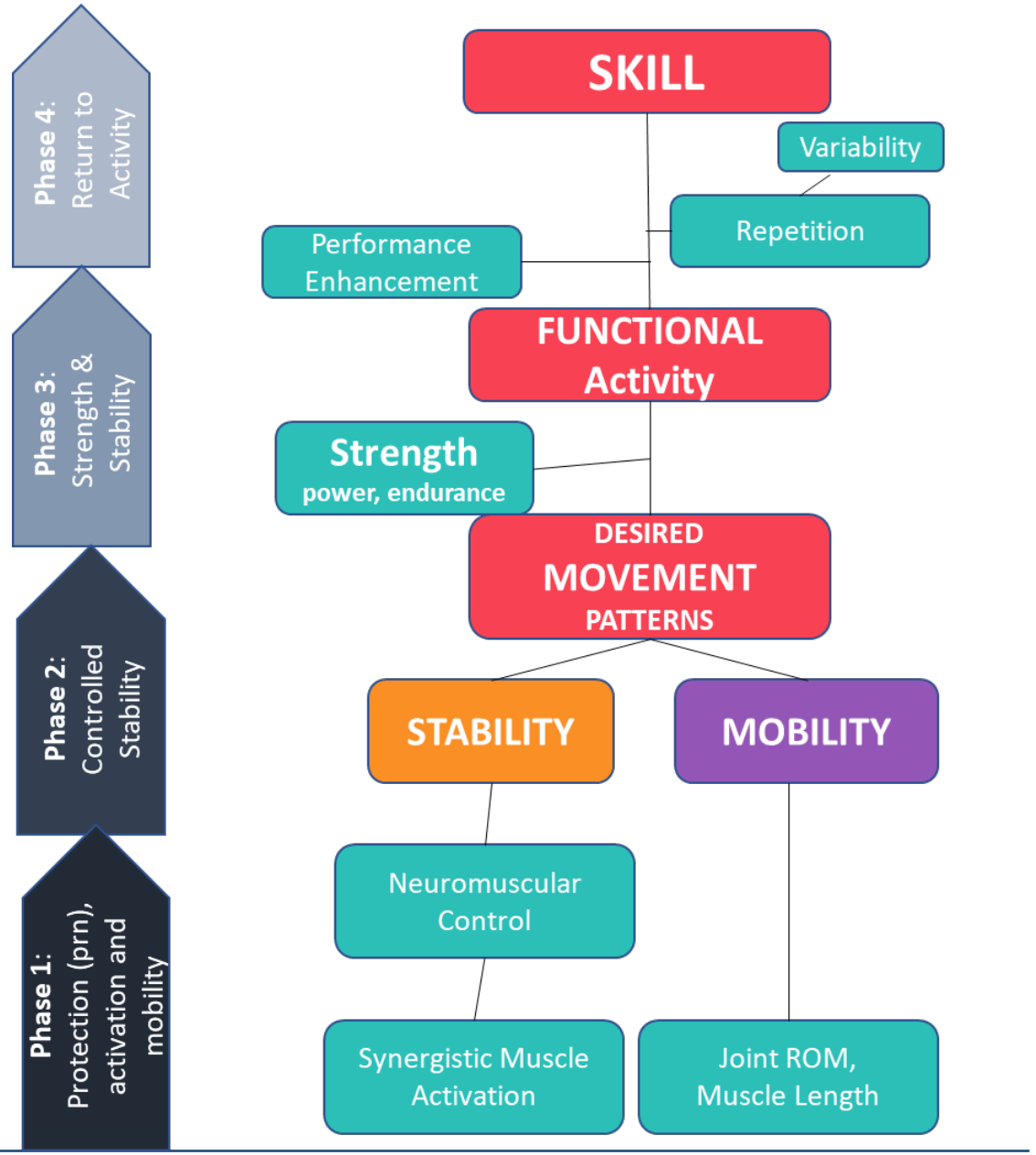
How do we ensure safe return to sport in those already injured?

Image source: Nemours

Clinical Exam

- Patient Hx:
  - When/how did it start?
    - Single MOI or gradual onset
    - What point in season
  - What does your sports schedule look like?
    - Hours, Days/wk, # of teams, sports, positions
  - Growth spurt?
- Assess coordination, ROM and Strength
  - Lateral step-down
  - Squat
  - Core assessment- Sahrmann

Nemours Sports Therapy Clinical Progression Model



Working from the ground up

Initial Interventions
- Slow/controlled
- Less repetitions
- Quality > Quantity
- More isolated activations

Secondary interventions
- Higher repetitions
- Variable surfaces/ Rhythmic stabilization
- Kinetic linking (toes to fingers)

Gradual progression is key when returning to sport following overuse injury

Return to play: Other considerations

ACL and concussion RTP guidelines well established/researched

- Guidelines for overuse injuries is more scarce

- Recommendation: Utilize multidisciplinary approach
  - Athlete, Parent, Coach, ATC
- Recommendation: Manage workload appropriately
  - Acute: Chronic Workload
- Recommendation: Discuss reasonable initial performance expectations
  - Athlete will likely need time to catch up to peers

Summary

- Overuse injuries are a growing trend in youth sports
- Early sport-sport specialization may increase risk of overuse injury development.
- Prevention strategies need to focus on education of age-appropriate training principles.
- Addressing underlying musculoskeletal imbalances and gradual progression back to sport are key components of rehabilitation of overuse injuries in youth athletes.

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QUESTIONS?

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THANK YOU!