The Specialized Youth Sport Athlete from a Physiological Perspective

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Outline

- Background on youth sports
- Specialization
- Effects on the body
  - Physiological
  - Biomechanical
  - Overuse
- Prevention
Youth Sports Participation

- Estimated **27 million** youth in the US between the ages of 6 and 18 participate in team sports annually
- Estimated **60 million** participate in organized athletics of any form

Benefits of Youth Sports

- Leadership
- Fun
- Self-esteem
- Teamwork
- Physical activity skills
- Peer socialization
What is Sports Specialization?

- ‘The active participation in a single sport through the developmental years with the intention of improving skills.’

- Also involves a focused, intense participation all year-round, with the exclusion of other sports.

Cote Model: 3 Stages

- Sampling Years: 6-12 (Recreational)
  - Playing multiple sports at a time; no in-depth practice of just one

- Specializing Years: 13-15
  - Balance between deliberate practice, low amount of deliberate play and one sport only

- Investment Years: 16+
  - Almost all deliberate practice, low amount of deliberate play and one sport only
Prominence of Specialization

• More than 60% of athletes between the ages of 7 and 18 were considered specialized (Jayanthi et al.)
  • Noting that they specialized before the age of 12
Physiological Effects of Sports Specialization

“Overuse or repetitive trauma injuries represent approximately 50% of all pediatric sport-related injuries” -- National Athletic Trainers’ Association

- Physiological Immaturity
  - Tissue and Bone
  - Altered Biomechanics
  - Overuse

Physiological Immaturity

- Tissues of adolescents do not mature in the same predictive manner as adults
- Injuries affecting the growth plate may have long-term physical consequences and affect normal growth and development.
  - Baseball: Repetitive throwing stresses or positioning of the lower extremity (catchers)
  - Running, soccer, tennis, baseball, and gymnastics: Lower extremity physeal injuries
Altered Biomechanics

- Can alter normal biomechanics in adolescent athletes, increasing risk of overuse injuries
- Baseball pitchers: Youth vs Adult
  - Youth pitchers tend to depend on rotator cuff musculature and trunk rotation to throw a baseball, which in combination with excessive humeral torque, underdeveloped musculature, and open epiphysial plates predisposes these athletes to rotator cuff tendinitis, shoulder instability, and humeral epiphysiolysis (Little League Shoulder).” --Gowan et al, Keeley et al, Sabick et al
Overuse

- Main cause of UCL injuries
  - Increases in year-round baseball has skyrocketed rates of injuries in kids
  - Tommy John Surgery
Overuse

- In FEMALE basketball, soccer, and volleyball players, there is an increase in patellofemoral pain in those athletes who specialized in a single sport vs multiple amongst middle and high school age groups.

- Swimming
  - Elite swimmers swim between 4-9 miles per day, 11 months per year, often beginning at the age of 10 to 12 years old.
  - Young swimmers are at a greater risk of external impingement and developing general laxity due to increased external and internal rotation.
  - In a study looking at 80 elite swimmers between the ages of 13 and 25 years old, 91% reported shoulder pain, 84% had positive impingement signs, and 70% had MRI evidence of supraspinatus tendinopathy.
Overuse

- “Stress fractures are likely the most common youth overuse injury and are often overlooked as ‘growing pains,’ bone bruises, and normal wear and tear.” --Freely et al
- Risk factors
  - Overuse
  - Decreased caloric intake
  - Overtraining

Wrap-Up

- Early sport specialization occurs nationwide, even though it has proven to be detrimental to athletes
  - Higher rates of injury
  - Nutritional & sleep inadequacies
  - Psychological stress or socialization issues
    - Burnout rates are greater, quitting sports occurs sooner
- The reality is that few athletes achieve the elite or professional level
  Less than 1% of young athletes 6 to 17 years of age achieve elite status in basketball, soccer, baseball, softball, or football
Prevention

- An estimated **50%** of overuse injuries in adolescents may be **preventable**.

- Pediatric athletes should take time off between sport seasons and **2 to 3 non-consecutive months away from a specific sport** if they participate in that sport year-round.

- Take note of recommendations and rules for safe play, ie pitch counts, mileage, training hours, etc.

What are the odds?

“For most sports, there is no evidence that intense training and specialization before puberty are necessary to achieve elite status.” --Jayanthi et al 2003

- **3-11%** of high school athletes compete at the college level.

- Only **1%** of high school athletes receive any scholarships.

- Between only **0.03-0.5%** of high school athletes reach professional level sports.
“These problems might be avoided with a balanced lifestyle and a strong support system made up of parents, friends, coaches, and health care providers.” -- National Athletic Trainers’ Association

Is It Worth It?

References
