Sport Specialization & Apophyseal Injury

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Disclosure

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Objectives

- Recognize the signs, symptoms, and common misconceptions of pediatric apophyseal injuries in athletes
- Discuss the current recommendations for treatment of overuse/apophyseal injuries in pediatric sports medicine
- Discuss how sport specialization impacts the adolescent

History

- Change over a generation
- “Pick-up” games
- Multi-sport athletes – less common
- Pressure to participate in 1 sport early
  - Participate at a high level
  - Often year-round
  - Multiple teams
- Increased overuse injuries, overtraining, burnout
Benefits

- Lifelong physical activity
- Socializing with peers
- Teamwork
- Sportsmanship
- Improved self-esteem
- Fun

Epidemiology

- ~60 million youth- organized sports/ year
- 2/3 male vs. 1/3 female
- 27% in 1 sport
- 70% drop out by 13 y/o
- NFHS
  - 7.8 million/ year
  - NFHS sports only
- ~50% overuse injuries total
  - 8% overuse in high school
Sport Specialization

- Focus on 1 sport at exclusion of others
  - Often year round
- Aspiration for college scholarship
  - 3-11% compete
  - 1% scholarship
- Olympic/ professional status
  - 0.03-0.5%
- Identify as talented by coaches, media, society, etc.

Sport Specialization

- NCAA Division 1
  - Played multiple sports
  - First organized sport was different from current
- NFL
  - 87% Played multiple sports
  - 13% Only played football
- Most sports
  - Early diversification/ late specialization; elite status more likely
  - Early specialization = shorter athletic careers
  - 10,000 hours
  - Specialization before puberty, likely detrimental
Early Specialization

- Risks
  - Physical, emotional, social
  - Peer isolation
  - Altered relationships w/ family
  - Overdependence on others
  - Loss of control of their lives
  - Arrested behavioral development
  - Socially maladaptive behaviors

- Injury
  - Burnout
  - Anxiety
  - Depression
  - Attrition

Long Term Athlete Development

- Canada, Europe
- ABCs
  - Agility, Balance, Coordination, Speed
- 5 Stages
  - FUNdamental (6-10 y/o)
  - Training to Train; 3:1 train to competition (10-14 y/o)
  - Training to Compete 1:1 technical & competition training(13-18 y/o)
  - Training to Win 75% competition/ training for competition (>17 y/o)
  - Retirement/ Retraining (officiating, admin, coaching)
Long Term Athlete Development

- USOC/ NGBs
- 5 Stages
  - Discover, Learn, Play (0-12 y/o)
  - Develop & Challenge (10-16 y/o)
  - Train & Compete (13-19 y/o)
  - Excel/ Participate to Succeed (> 14 y/o)
  - Mentor & Thrive (for life)

- Delaying specialization until 15-16 y/o
  - Minimize risk
  - Higher likelihood of success

Sports Specialization

- Exceptions (peak performance prior to physical maturation)
  - Figure Skating
  - Gymnastics
  - Rhythmic gymnastics
  - Diving
- Training in these sports does not affect
  - Pubertal growth
  - Maturation
  - Adult height
Sport Enhancement Programs

- Sport technique/conditioning programs
  - No data to show:
    - Greater chance of success
  - Balance time & financial investment

Guidance

- Fun/life long physical activity skills
- Multiple sports (until puberty) decreases injury/burnout
- Late specialization
  - Higher chance of achieving goals
  - Lifetime sports involvement/physical fitness
  - Possibly elite participation
- Young athletes goals vs. parents/coaches
- Parents monitor training/coaching environment
- Monitor physical, psychological maturation & nutritional status
- Minimum 3 months off/year
- 1-2 days off/week
Overuse Injuries

- Imbalance between training/ tissue load & recovery time
  - Stress/ load can produce adaptive changes
    - Adequate recovery time
  - Cellular damage not completely repaired
    - Progressive activity-related MSK pain

Little League Shoulder: Proximal Humeral Epiphysiodesis

- Repetitive rotational torque/ distraction forces
- Immature physis/ overhead throwing athletes
  - Baseball pitchers
- 12-15 y/o
- Risk Factors
  - Joint laxity
  - Underdeveloped mms
  - Excessive throwing
    - High pitch counts
    - Year-round throwing
    - Throwing through fatigue
Little League Shoulder: Proximal Humeral Epiphysiolyis

- Pain with throwing
- Pain with abduction/ER
- No pain with batting, fielding & ADLs
- Physis
  - Wide
  - Lateral fragmentation
  - Sclerosis

Little League Shoulder: Proximal Humeral Epiphysiolyis

- 2-3 months rest
- Sling
- NSAIDs
- Non-painful activities permitted
- PT
- Progressive throwing program
- Proper mechanics
- 1st or 2nd Base
Little League Elbow: Medial Epicondyle Apophysitis

- Overhead throwing motion
- Valgus force/ chronic tension
- Baseball pitchers/ catchers
- 11-14 y/o
- Risk Factors
  - Year-round play
  - Pitching for more than one team
  - Poor mechanics
  - Throwing through arm fatigue
- No pain with batting/ fielding

Little League Elbow: Medial Epicondyle Apophysitis

- Physis
  - Hypertrophy
  - Wide
  - Fragmented
- Rx
  - Rest 1-4 months
  - Ice
  - NSAIDS
  - 1st or 2nd Base
OCD of the Capitellum

- Lateral elbow pain
  - Chronic activity related
- Difficulty with extension
  - Locking/ catching
- Repetitive microtrauma/ high compressive load
  - Subchondral bone
- Gymnasts/ pitchers
- X-ray
  - MRI if X-ray is WNL & high clinical suspicion

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OCD of the Capitellum

- Young patient, small, stable lesion
  - Conservative Rx
- Mature, large, unstable
  - Operative Rx
  - Often progress
  - Trend toward operative mgmt
  - High complication rate
Gymnast’s Wrist: Distal Radius Epiphysiolyis

- Almost exclusively in gymnasts
- Vaulting/ tumbling
- Bilateral
- 12-14 y/o
- Extension/ axial load
- No tendon pain
- Physis
  - Wide
  - Sclerosis
  - Irregular
  - Reactive cysts

Gymnast’s Wrist: Distal Radius Epiphysiolyis

- Absolute Rest from weight bearing
- Immobilization to facilitate rest period
- PT for imbalance if needed
- 1 to several months
- Risk of physeal arrest
  - Ulnar overgrowth
  - Chronic pain/ dysfunction
Slipped Capital Femoral Epiphysis

- 13 y/o, obese, males, endocrine disorders, chemotherapy
- Knee pain
- Out-toeing gait, abductor lurch, limb atrophy
- Loss of medial hip rotation
- X ray: AP & frog leg lateral
- Surgical correction
- OA, AVN, chondrolysis

Osgood-Schlatter Disease: Tibial Tubercle Apophysitis

- Repetitive traction
- Growth
  - Femur > Quads
- Microavulsion
- Chronic inflammatory reaction
- Running, jumping, squatting
  - Mechanics
- Painful bump
Osgood-Schlatter Disease

- Rx
  - Relative rest
  - Quad flexibility
  - Mechanics
  - Ice
  - Cho-Pat Strap
  - Immobilization

Sinding-Larsen-Johannson

- Repetitive traction
- Microavulsion/ chronic inflammatory reaction
- Running, jumping, squatting
  - Mechanics
- Rx
  - Relative rest
  - Mechanics
  - Quad stretching
  - Ice
  - Immobilization
  - Meds not helpful
Patellofemoral Syndrome

- Spectrum
  - Lateral patellar tracking
  - Patellar subluxation
  - Patellar dislocation
- Intermittent
- Activity related
- Mechanics
- Rx
  - LE strengthening
  - Closed kinetic chain
  - Bracing/tape

Shin Splints:
Medial Tibial Stress Syndrome

- Multiple causes
  - Hyperpronation/tibialis posterior strain
  - Stress fracture
  - Chronic exertional compartment syndrome
- Risk Factors
  - Runner inexperience
  - Female gender
  - Excessive pronation
  - High BMI
  - Unfavorable alignment
- MRI if Fx suspicion is high
  - Early false Neg is 50%
Shin Splints: Medial Tibial Stress Syndrome

- Address cause
  - Orthotics
  - Immobilization
    - Cam-walker
    - Cast
  - 2-4 Months
- Ca, Vitamin D, Menstrual status

Sever Disease: Calcaneal Apophysitis

- Unilateral/ bilateral heel pain
- No trauma
- Running/ jumping
- 9-13 y/o
- Female > Male
Sever Disease: Calcaneal Apophysitis

- Rest
- Ice
- Stretch
- Limited use of lifts/ heel cups
- Immobilization
- Meds not helpful
- Activity as tolerated

Suggested Reading

EVALUATION FOR SPORTS PARTICIPATION

- AAP 4th Edition of the PPE Pre-Participation Physical Evaluation
- Details contents of PPE
- Guidelines for participation for patients with cardiac risks, febrile illness, co-morbidities (diabetes, seizures, Marfans and Down syndrome, etc).
- Disqualifying conditions/situations
- 5th Edition to be released in 2019
- NATA Position Statement on Preparticipation Physical Examination and Disqualifying Conditions
Thank you!

Questions?