Preventing Overuse Injuries in Youth Baseball Players

Jeff Webb, MD
Youth Participation in Sports

• 30-40 Million Kids in U.S. play organized sports each year
  – 20% in school programs
  – Club participation has increased while school sports participation has decreased
    • 2-4 million coaches, less than 20% have received any type of training

• Number one reason given for participation- “To Have Fun”
  – “Winning” was last reason given
Tempering Expectations

- Odds of a HS football player making it to the NFL = 1 in 6,000
- Odds of a HS basketball player making it to the NBA = 1 in 10,000
- Odds of a baseball player on a travel/tournament team making it to MLB = 1 in 1,000
  - In a recent survey, 10% of parents of these kids expect their sons to play in MLB
Tempering Expectations

• Best predictor of playing sports at a college or professional level is family
  – 2014 Study from DiFiori interviewed UCLA athletes on teams vs. other students who were active, but not on college teams
    • 43% of athletes had parents who played at college or higher level (compared to 8% of other active)
    • 28% of athletes had siblings who played in college (compared to 5% of other active students)
Single Sport Specialization

• “Year-round intensive training in a single sport at the exclusion of other sports”

• Multiple reports have shown that children are trending towards earlier sport specialization and year-round training
Single Sport Specialization

- Many believe that early specialization leads to better performance and increased success later, but studies do not agree
  - Often based on the examples of famous athletes like Tiger Woods, the Williams sisters, and Eastern Bloc athletes

- A survey of 376 college athletes found that the majority had participated in other sports when they were younger (only 17% specialized in their current sport)

- Diversification of sports may have physical, cognitive and psychosocial advantages, and promote motivation
Single Sport Specialization

- 2014 US Olympic Committee surveyed Olympians
Single Sport Specialization

• Potential Adverse Effects
  – Increased risk for Burnout, Stress, Psychological Effects
  – Increased cost
  – One study even showed that kids who specialized in sports at a young age had higher levels of adult physical inactivity
  – Many college and pro coaches are starting to shy away from athletes who only play one sport
  – Injury...
Sports-Specialized Intensive Training and the Risk of Injury in Young Athletes

- Athletes who were single sports specialized were 1.27 times more likely to have an overuse injury, and 1.36 times more likely to have serious overuse injuries.
  - This was independent of number of amount of hours in sports per week.
  - The more specialized the athlete, the worse the numbers are (most specialized athletes 2.25 times the odds of serious overuse injury).
Sports Specialization Injury Risk

- Young athletes participating in more hours of sports per week than their age in years were 2.07 times more likely to have overuse injury.
- Young athletes whose ratio of organized sports to free play time was >2:1 were 1.87 times more likely to have serious overuse injury.
- No increased risk for acute injuries in specialized athletes.
Sports Specialization Injury Risk

• Why?
  – Increased pressure from coaches, parents, trainers, teammates
  – Play through pain
  – Burnout
Burnout

• Also known as Overtraining Syndrome
  – Youth athletes more susceptible than adults, fewer coping mechanisms
• Described as “a series of psychological, physiologic, and hormonal changes that result in decreased sports performance”
  – Chronic muscle or joint pain
  – Personality changes
  – Elevated resting HR
  – Decreased performance
  – Fatigue, lack of enthusiasm
  – Quitting sport
Burnout

• Kids quit sports because:
  – Lose interest
  – Quit having fun
  – Too much pressure
  – Emphasis on winning
  – Not enough time
  – Don’t like coaches/teammates
AAP Recommendations on Burnout

- Encourage Athletes to have at least 1 to 2 days off per week from competitive sports and practice for physical and psychological recovery.
- Increase training time/mileage by no more than 10% per week.
- Take at least 2-3 months away from a specific sport during the year.
- Emphasize that sports should be about fun, skill acquisition, safety, and sportsmanship.
- Participate on only 1 team during a season.
- Use special caution with multievent weekend tournaments.
- If athlete complains of muscle/joint pains, fatigue, poor academic performance be alert for burnout.
- Encourage education of athletes, parents, coaches on nutrition, fluid, safety, overtraining.
Shoulder Injury

- Young athletes have open growth plates
- Repetitive throwing leads to stress on the arm, Little Leaguer’s Shoulder

X-rays showing a normal humeral growth plate (red arrow) and a widened growth plate consistent with Little League Shoulder (blue arrow).
Elbow

- Young athletes at risk for Little Leaguer’s Elbow - stress on growth plate
- And Osteochondral defects
Overuse in Baseball

- 2014 study by Bruce has shown a 10-fold increase in Tommy John surgeries in last 10 years among adolescents
  - Only 75% of 14-16yos who have surgery return to the sport
Overuse in Baseball

- Increased pitches increase youth risk for surgery
  - Olsen, Fleisig, Dunn AJSM 2006

<table>
<thead>
<tr>
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<th>Control Pitchers n=45</th>
<th>Pitchers with Reparative Surgery n=95</th>
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<tbody>
<tr>
<td>Months Pitched/Year</td>
<td>5.5±2.3</td>
<td>7.9±2.5</td>
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<tr>
<td>Games Pitched/Year</td>
<td>18.6±13.0</td>
<td>28.8±14.7</td>
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<tr>
<td>Innings Pitched/Game</td>
<td>4.3±1.7</td>
<td>5.6±1.4</td>
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<tr>
<td>Pitches/Game</td>
<td>66.2±25.3</td>
<td>87.8±21.8</td>
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<tr>
<td>Pitches/Year</td>
<td>1269±1040</td>
<td>2563±1506</td>
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</table>
Baseball

• Current regulations on pitch counts by little league baseball
  - Under 14yo
    • 66+ pitches/day, four (4) calendar days of rest
    • 51 - 65 pitches/day, three (3) calendar days of rest
    • 36 - 50 pitches/day, two (2) calendar days of rest
    • 21 - 35 pitches/day, one (1) calendar day of rest
    • 1-20 pitches/day, no (0) calendar day of rest is required
  - Rules similar but more pitches allowed for 15-18yo
Baseball Recommendations

- Additional Recommendations to prevent injury
  - Proper pitching mechanics are important early
  - Discourage from pitching for more than one team in a season
  - Pitchers should not play baseball or participate in any throwing drills for at least 3 months of the year (other overhead sports should be avoided here too)
  - Pitcher should not return to the mound in the same game after being removed
  - Players should not throw curveball until puberty/shaving
  - Be weary of radar guns and showcases
  - Never Throw Through Pain!
Softball

• It is a myth that windmill pitching motion has no risk for overuse injury
• Multiple studies looking at both biomechanics and epidemiology have shown major forces across the shoulder which lead to injury/pain
  – Repetitive violent motion with a lot of torque
  – Female athletes prone to overuse problems
  – More effort because mound not elevated
  – Motion doesn’t cause as much fatigue
Softball

• Windmill motion puts most stress on biceps and anterior shoulder
Shoulder

- Labrum at risk for tears
- Females more prone to shoulder instability
Softball Shoulder Injury Prevention

- Warm up properly by stretching, running, and easy, gradual throwing.
- Rotate playing other positions besides pitcher.
- Concentrate on age-appropriate pitching.
- Adhere to pitch count guidelines
- Avoid pitching on multiple teams with overlapping seasons.
- Flexibility of pitchers needs to be the focus during the season rather than strengthening.
- Don't pitch with pain, and see a doctor if the pain persists for a week.
Softball Shoulder Injury Prevention

- Don't pitch more than two consecutive days until age 13, and then no more than three days in a row.
- Don't play year-round.
- Radar Guns should only be used during competition for best pitch of speed vs. change up (ages 15+).
- Communicate regularly about how your arm is feeling and if there is pain or fatigue.
- Develop skills that are age appropriate.
- Emphasize control, accuracy, and good mechanics.
- Speak with a sports medicine professional or athletic trainer if you have any concerns about softball injuries or softball injury prevention strategies.
- Return to play only when clearance is granted by a health care professional.
Softball Pitch Counts

Pay Attention to Pitch Counts

<table>
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<tr>
<th>Age</th>
<th>Pitches/Game</th>
<th>Pitches/Day, Days 1 &amp; 2</th>
<th>Pitches/Day, Day 3</th>
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<tr>
<td>8-10</td>
<td>50</td>
<td>80</td>
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<td>10-12</td>
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<td>95</td>
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<td>13-14</td>
<td>80</td>
<td>115</td>
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<td>15-over</td>
<td>100</td>
<td>140</td>
<td>100</td>
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Thrower Injury Prevention

• Rotator cuff and scapular strengthening program
  – Thrower’s 10 Program
Throwing Injury Prevention

- Physical Therapy can help strengthen muscles, improve mechanics
- Dartfish analysis can help to evaluate mechanics and pick up predisposing habits
The END

Thank You!