

Rise of overuse injuries in school-age athletes

The Problem

45 million children and adolescents in the U.S. participate in organized youth athletics (Source: Safe Kids USA)

More than 7.3 million high-school athletes (>50% of the U.S. high-school population) participated in sports (2006-2007 school year) (Source: *National Federation of State High School Associations*)

Increased involvement in athletics and the demands of sports on teenagers have been accompanied by a rise in injuries

Rise in Injuries

- 2.5 million ER visits
- 20% of primary care visits
- 2.51 injuries:1000 athletes in high school
- (National Electronic Injury Surveillance System of the US Consumer Product Safety Comm)

The Problem

High-school athletes

- sustain an estimated 2 million injuries annually
- approximately 500,000 physician visits
- 30,000 hospitalizations each year (Source: CDC)

CDC estimates that >50% injuries are preventable

The Problem

Young athletes are specializing in sports (and positions) at an earlier age
18th consecutive year in which participation had increased

- Little League Baseball recorded > 2.6 million participants in 2007
- Pop Warner Football tallied 380,000 participants

Overuse injuries account for **half of all sports injuries in** middle school and high school.
(Source: *Safe Kids USA*)

Sports-related injuries involving children ages 5 through 14 years includes:

- Football: 448,200
Basketball: 574,000
Baseball: 252,665
Soccer: 227,100
Hockey: 80,700
Gymnastics: 75,000
Volleyball: 50,100

The Lasting Problem

A child's history of injury is:

A risk factor for future injury during both their youth and adulthood.

A contributor to long term degenerative diseases, such as osteoarthritis.

The Lasting Problem

70% of kids participating in sports drop out by the age of 13 because of:

— Adults, Coaches, Parents

— Injury

These children lose the benefits of exercise, teamwork and healthy competition!

Youth Sports

- Participation in athletics improves physical fitness, coordination, and self-discipline, and gives children valuable opportunities to learn teamwork
- Childhood obesity is a recurring problem with inactivity as a primary issue
- Children who play sports such as football, basketball, and soccer have a growing risk of incurring stress fractures, tendinitis, and a host of other overuse injuries

What is overuse?

Excessive and repeated use that results in injury to the bones, muscles or tendons involved in the action

Not all injuries are caused by single, sudden twist, fall, or collision

Series of small injuries to an immature body can cause stress fractures, muscle tears, or progressive bone deformities

Why is it on the rise?

Immature bones

Growing bones

Insufficient rest after an injury

Poor training or conditioning

Specialization in just one sport

Year-round participation

At risk

Children and adolescents at particular risk

- Improper technique
- Poorly fitting protective equipment
- Training errors
- Muscle weakness and imbalance

Skeletally Immature Athletes

Vulnerable to sports-related injury

- growing: lengthening bones and muscles
 - Imbalance between strength and flexibility
- Open physes susceptible to trauma and overuse
 - Less resistant to compressive and shear force than adjacent bone

Societal and Environmental Factors

- Younger age of first participation
- Year round specialized participation
- Scholarships, TV contracts, money made
 - Little league baseball revenue 2009 > \$21 million
 - Net assets of little league: \$70 million

Skeletally Immature Athletes

Startling increase in incidence of repetitive overuse injuries

- Longer seasons, year round play

Startling increase in more violent acute injuries at young age

- Extreme sports
- More aggressive play

Reasons for concern

- ***Children are Still Growing***
- Not small adults
 - Bones, muscles, tendons, and ligaments are still growing
 - More susceptible to injury
- ***Growth Plate Injuries***
 - Growth plates are weaker than the nearby ligaments and tendons
 - An injury that causes a bruise or sprain in an adult can be potentially serious growth plate injury in a young athlete
- ***Children Vary in Size and Maturity***
- Young athletes of the same age can differ greatly in size and physical maturity
 - physically less mature than their peers
 - try to perform at levels for which they are not ready
- Group youngsters
 - skill level and size, not chronological age
 - particularly during contact sports
- If this is not practical
 - modify the sport to accommodate the needs of children with varying skill levels

- Proper Training
- Young athletes need proper training for sports
 - encouraged to train for the sport rather than expecting the sport to do so
 - a regular conditioning program with incorporated exercises designed specifically for their chosen sport can aid in prevention
- Well-structured, closely supervised weight-training regimen
 - modestly help youngsters prepare for athletic activities
- Young athletes should have coaches help
 - conditioning program suited to their needs
 - Proper techniques
- Qualified Coaches
- Parents should be aware of coaches' qualifications to supervise a particular sport
 - provide well-maintained safety equipment
 - help with proper conditioning for the sport
- Coaches aren't required to be credentialed
 - aware that the coach may not know about injury occurrence and prevention
- What can we do for prevention?

Promote injury prevention on multiple levels, including:

Learning about the STOP Sports Injuries campaign Visiting www.STOPSportsInjuries.org
for resources

Take the Pledge on the website to prevent injuries
Holding ongoing discussions about the importance of rest with athletes
Mandating pre-season physicals
Enforcing warm-up and cool down routines
Encouraging proper strength training routines

Additional Prevention Tips

Drink enough water based on activity and temperature levels
Educate athletes on proper nutrition for performance
Supervise equipment maintenance
Encourage kids to speak with an athletic trainer, coach or physician if they are having any pain or symptoms

- Do we have any control?
 - Prevention Strategies
 - Pitch count
 - Local athletic governing boards, tournament and league control
 - Encourage participation for fun and limit emphasis on winning
 - Discourage early specialization
 - Treat symptoms of problems/injuries EARLY
 - Youth Pitching Guidelines
 - Age pitches should be learned
 - Prevention
- Provide proper instruction on throwing mechanics
Discourage the teaching of curve balls until high school(puberty)
Ban the radar gun in youth sports
Mandate a 3 month rest-period each year for throwing athletes

Risks

- 14- 20 yo baseball pitchers shoulder or elbow surgery with age-matched controls
- Pitched 8 or more months per year 5X more likely to have had surgery than those who pitched less than 8 months per year
- Regularly pitched while fatigued were 36X more likely to have had surgery compared to those who never pitched while fatigued
- Elbow: Medial Epicondyle Apophysitis
 - Repetitive stress and overuse
 - Throwers, gymnasts, wrestlers, racquet sports
 - 26% youth baseball players develop elbow pain in season
- Medial side
 - valgus stress with overhead and weight bearing activities
 - Eccentric load of flexor pronator mas
 - Repetitive submaximal stress on medial side
 - UCL, ulna, medial epicondyle, distal humerus
- Acute traumatic medial epicondylar avulsion
 - Repetitive overuse and weakened apophysis
- Despite control, problem persists
- Guidelines are aimed at chronologic age and not physiologic status
- Little oversight of multiple teams and leagues
- Little information about other position players and other overhead sports (softball, tennis)

- Better understanding of the opportune time between seasons and spent away from throwing
- Gymnast's Wrist
- Dramatic repetitive stress on wrist
- 45-80% of young gymnasts
- Intense static and dynamic forces on wrist
 - 2.4 x BW during back handsprings and pommel horse
 - 200 x BW during extreme loading rates
- TFC tear, sprain, fracture
- Repetitive stress to distal radial physis
 - Incidence is 2:100 gymnast season
- No identified control
- That's not all!
- Stress fractures
- Thrower's Shoulder
- Spondylolisthesis
- Tendonitis
- Treatment Varies
- Time out of sports or at least modified activity is often needed

- Physical therapy important to help the body heal and reduce the risk of future injury
- look for imbalances
 - tight shoulder posterior capsule and an elbow flexion contracture
 - PT and can work with a coach to address technique issues
 - lack of trunk rotation or dropping the arm when throwing
- Counsel family about appropriate approach and participation
 - pitch counts and avoiding overuse
 - Rest and alternative performance for gymnasts

Overuse is not just in baseball

- Many overuse injuries occur during periods of rapid growth and relative tightness
- Other risk factors intrinsic to the athlete include alignment, laxity, strength, and body habitus
- Extrinsic risk factors may include intensity and frequency of play, playing surfaces, protective equipment, and coaching
- Intrinsic and extrinsic risk factors that may predispose patients to injury, including tightness and weakness, over-activity, psychological issues, low bone density, alignment issues, and eating disorders
- Growing Epidemic
- Preventable youth sports injuries
- Dismantling kids' athletic hopes and dreams at an early age
- Founding Collaborators of the STOP Sports Injuries Campaign

American Orthopaedic Society for Sports Medicine

American Academy of Orthopaedic Surgeons

American Academy of Pediatrics

American Medical Society for Sports Medicine

National Athletic Trainers' Association

National Strength and Conditioning Association

Pediatric Orthopaedic Society of North America

SAFE Kids USA

Sports Physical Therapy Section

More than 130 other organizations, institutions, sporting leagues and teams have joined the campaign since it launched in April 2010.

AAOS public service

- More and more, young athletes are focusing on a single sport and training for that sport year-round—a practice that's led to an increase in Overuse Injuries. Left untreated, overuse trauma to young shoulders, elbows, knees and wrists may require surgery have lifelong consequences.
- Kids want to be the best and parents and coaches want to help them reach their goals, but today more and more kids are specializing in one sport and training far too hard. Somehow this healthy bit of competition became altogether unhealthy. The injuries caused by this intense training can lead to pediatric trauma and may require surgery to their developing shoulders, knees, elbows and wrists. This can have lifelong effects on not only their game, but their health and quality of life.

- Campaign focuses on over 20 sports

Baseball

Basketball

Cheerleading

Dance

Field Hockey

Figure

Skating

Football

Golf

Gymnastics

Hockey

Lacrosse

Martial Arts

Rowing

Rugby

Running

Skiing and Snowboarding

Soccer

Softball

Swimming

Tennis

Volleyball

Wrestling

● What can we see in the future?

Better prevention of injury

New surgical techniques are being evaluated to treat injuries
less invasive

Ongoing research to understand the injury risk and how to prevent

Continued rise in injury rates unless education is increased

Let's Work Together to **STOP Sports Injuries**

And Keep Kids in the Game for Life!