Musculoskeletal Injuries in Kids
A Brief Review

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Musculoskeletal Injuries in Kids
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“Children are not little adults and should not be treated as such.”

D. Kumbhare, MD
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A Brief Review

- Differences in...
  - Injury Patterns
  - Healing Patterns
- Why?
  - The “Physis” – The Weakest Link in the Bone-Ligament Complex, The Ligament is Stronger
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- Stress and Strain Behavior
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- Unique Anatomic Features
  - Physis
  - Epiphysis
  - Apophysis
  - Metaphysis
  - Diaphysis
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- Fractures
- Dislocations
- Sprains and Strains

What Will You Mostly See?
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Fractures

- Quadriceps tendon
- Sleeve of bone
- Patellar tendon
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- Dislocations
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❖ Sprains and Strains
❖ Sprains – Ligaments
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- Sprains and Strains
  - Strains – Musculotendinous Unit
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¿ When is a Sprain Not a Sprain?
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♫ When is a Sprain Not a Sprain?
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❖ Salter – Harris Classification
(SALTcompression)
❖ Type I – Separation of the Epiphysis
❖ Type II – Separation of the Epiphysis with Characteristic Triangular Fracture (Most Common)
❖ Type III – Articular Surface with Separation of Epiphysial Fragment
❖ Type IV – Fracture of the Articular Surface with Extension Across the Growth Plate into the Metaphysis
❖ Type V – Compression Fracture Involving Part or All of the Growth Plate
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➢ Salter – Harris Classification
   ➢ Type I - S
   ➢ Type II - A
   ➢ Type III - L
   ➢ Type IV - T
   ➢ Type V - cR
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What Salter – Harris Type Fracture?
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- Complications
  - Premature Fusion of Growth Plate
    - Angulation
    - Shortening
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Fracture Healing in Kids
- Rapid Remodeling by Physis
- Remodeling Potential is Greatest at the Ends of Bones
- Angular Deformities Remodel
- Rotational Deformities Do Not Remodel
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A Brief Review

☞ When is a Sprain Not a Sprain?
☞ Stability Test ... but
☞ Palpate the Physis!
PATELLOFEMORAL PAIN SYNDROME IN THE YOUNG ATHLETE

Betty A. McNeff, PT, DPT, PCS
University of South Florida
School of Physical Therapy and Rehabilitation Sciences
“PFPS”

- c/o “anterior knee pain”
- Typically no history of trauma
- overuse/sudden increase in activity
- mostly during stairs, squatting, running, sitting for prolonged periods
- diagnosis of exclusion”
  - intraarticular pathology, plica syndromes, Osgood-Schlatter, neuroma, tendonitis/bursitis, Sinding-Larson-Johansson, etc...
Prevalence in Children

- nearly 18.5-31% adolescents report knee pain
- 50% due to PFPS
- females 1.5-3X more prevalence in athletic population
- 70% of those diagnosed with PFPS were between ages of 16 and 25 years
- Nearly 10% of all sports injury clinic visits by physically active individuals are attributed to PFPS
Concern over the long term consequences of anterior knee pain in adolescent/young adulthood includes predisposition to patellofemoral osteoarthritis in later life.

Goal of sports physical therapists should be to keep athletes and patients healthy, pain free, and able to enjoy their sport and physical activity for years to come.

Good news: more than 2/3 patients with PFPS successfully treated through rehabilitation protocols.
Onset timing of vasti muscles
  - VMO before VL 80% controls, 42.3% PFPS ??

Structural/Postural:
  - navicular drop/rearfoot eversion
  - medial tibial intercondylar distance
  - excess lateral patellar tilt (>20 degrees with full ext)
  - Q-angle??
Risk Factors (cont.)

- **Strength deficits:**
  - concentric quadriceps

- **Flexibility/ROM:**
  - joint laxity $\rightarrow$ PFPS
  - decreased quadriceps and gastroc $\rightarrow$ PFPS

- **Kinematics:**
  - Gait (rearfoot eversion/forefoot pronation)
Risk Factors (cont.)

- **Protective role:**
  - increased sports participation (hours spent)

- **Gender:**
  - female
    - 1.5-3X in athletic population
    - Body composition in female adolescents?
      - Barber Foss et al. (2012)
Factors Affecting Outcomes of PT

- long symptom duration
- higher age
- greater pain severity at baseline
Prehabilitation?

- Overuse stress ➔ Prehabilitation may be right direction.
- The Pre-participation Exam (PPE) offers an opportune time to make a pre-diagnosis and initiate a prehabilitation program
- Limitations in children:
  - skeletal immaturity: bone growth changes the lower leg moment of inertia in children
Prehabilitation Research

Early intervention for adolescents with Patellofemoral Pain Syndrome - a pragmatic cluster randomised controlled trial (Rathleff et al., 2011).

-Researchers designed a randomized controlled trial to study the efficacy of an EI protocol for adolescents with PFPS.
  - Recruited from schools
Rehabilitation Program

- Stretching
  - avoid ballistic
  - include static/dynamic/isolated/multijoint)
  - IT band, hamstrings, quads, hip flexors, hip abd/add, hip ER/IR, gastrocsoleus.

- Strengthening:
  - Closed Kinetic Chain (CKC)
    - squats/leg press (superior to OKC due to functional characteristics)
  - Open Kinetic Chain (OKC)
    - leg extensions, SLR

Granger, J. (2011)
Rehabilitation Program (cont.)

- VMO training:
  - Eccentric loading with hip in ER 30-45 degrees, i.e. SL squat

- Total Hip strengthening/stretching:
  - Isometric/eccentric loading

- Power exercises
  - Box jumps
  - Resisted squat jumps
Taping?:
  - may be due to stimulation of cutaneous afferents leading to change in mm. activity:
  - lateral stretch over the skin results in increased VMO activity.
TAPING TECHNIQUE
Dolak et. al. (2011)
References


References (cont.)


POST-OPERATIVE MANAGEMENT OF ACL TEARS IN THE YOUNG ATHLETE
Why Talk about the ACL?

- The Anterior Cruciate Ligament (ACL) is one of the most common injuries during sports participation, especially those that involve cutting, pivoting, jumping.
- Annual ACL reconstruction procedures in the US: 100,000.
- An athlete’s (and/or parent’s) desire to return to sports is a major indicator for operative management of any sports-related injury.
ACL Review

ACL FUNCTION/TENSION

- Primary: Restrains anterior translation of the tibia and the femur
- Secondary: Restrains varus and valgus angulation
- Forces walking: 154 N
- Peak forces: 30-45 degrees knee extension
- No anterior tension during squat/leg press.
- Seated knee extension anterior tension: 142 N
Youth Considerations

- Knee accounts for 2/3 growth of the leg
- Any injury to the knee in the early years is likely to result in severe shortening.
- Operative management of the ACL:
  - Risk damaging the growth plate if procedure includes drilling through the growth plate.
  - May lead to LLD or shortening
- If you don’t perform surgery in the athlete, you risk future meniscal tears.
Complete ACL Tear
Skeletally Immature Patient

Prepubescent
Tanner Stage 1 or 2
Males: ≤ 12 years old
Females: ≤ 11 years old

Adolescent with Growth Remaining
Tanner Stage 3 or 4
Males: 13-16 years old
Females: 12-14 years old

Older Adolescent with Closing Physes
Tanner Stage 5
Males: >16 years old
Females > 14 years old

Rehabilitation Activity Limits
Functional Brace

Transphyseal Reconstruction with Hamstrings and Metaphyseal Fixation

Adult ACL Reconstruction with Interference Screw Fixation
(Patellar Tendon or Hamstrings)

Physeal-Sparing Combined Intra/Extra-articular Reconstruction with Iliotibial Band

Taken from Warnick, D. (2011)
Outcomes Research

- Unfortunately, ACL failure rates and re-injury rates have been high with studies reporting up to 15% (contralateral leg), 24%, up to 29.2%.
- Research has shown that most failures happen between 3 and 9 months post-surgically.
- Recent research reports that less than 50% of players returned to sports at their pre-injury level 2-7 years post-ACL reconstruction.
Rehabilitation following an ACL reconstruction has been shown to play a vital role to recovery and successful outcomes.

Unfortunately, many young athletes are discharged from PT too early and returning to sports (the time when most failures occur, 3-9 months post-op).

Answer?: Extended post-operative rehabilitation protocols and education.
Pre-Operative Management

PT frequency: 1 visit only prior to surgery to teach program.

**We need full ROM and strength of injured knee prior to ACL reconstruction.**

Bracing: none (wean from knee immobilizer or brace if pt is wearing a brace)
Weight bearing: WBAT
Pain management: teach home modalities (ice, elevation, oral pain medication, etc.)

Home exercise program:
- ROM
  - Passive and active knee ROM exercises
  - Stationary bike for ROM
  - Heel slides/wall slides/etc.

- STRETCHING
  - Gastroch/soleus, hamstring, quadriceps stretching

- STRENGTHENING
  - Calf raises
  - Quad sets
  - Hamstring sets
  - Glute sets
  - SLR series with and without weight (goal: no extension lag)
  - Mini-Squats
  - Front step ups
  - Core strengthening

- PROPRIOCEPTION
  - S/L stance on a stable surface with eyes open

(Children’s Orthopaedic & Scoliosis Surgery Associates, LLP)
**WEEK 1**

PT frequency: 1-2 x wk
Bracing: knee immobilizer (KI)

Weight bearing: WBAT with crutches; may wean from crutches 3-7 days; cont KI

Pain management: modalities (ice, e-stim, etc.)

**Home exercise program (out of brace):**
- Passive and active knee extension exercises to 0°
- Heel slides/wall slides/short sitting active assisted
- 4 direction patellar mobilizations
- Quad sets
- Glute sets
- SLR series (goal: no extension lag)
- Ankle pumps

* Scar massage to incisions after day 10
* May use EMS or biofeedback with active exercise for muscle re-education
Week 2-4

PT frequency: 1-2 x wk
Bracing: continue KI
Criteria to wean from KI:

- 5# SLR without extension lag or 5% of body weight if less than 100 lbs.
- Non-antalgic gait

**Exercise options to add:**
- Add weight to SLR series (if no extension lag)
- Stationary bike for ROM
- Mini-squats / wall sits with gym ball (0-40°, knee not past toes)
- Leg press (begin at wk 3; 0-90°)
- Multiple angle isometrics (40°, 60°, 90°) flex and ext
- Proprioception: S/L stance on a stable surface eyes open (once 30 sec progress to eyes closed, airex pad, rocker board and plyotoss)
- Calf raises
- Core strengthening
- Hip strengthening
- Cardio: UBE

*May continue to use EMS, biofeedback with active exercise for muscle re-education

**Open chain exercise resistance not to exceed 10-15 lbs
Week 5-6

PT frequency: 1-2 x wk

Pain management: modalities PRN

- Exercise options to add:
  - Gastroch/soleus and hamstring stretching
  - Front, lateral step-ups
  - Lateral step-overs
  - Front, lateral lunges
  - Leg press single leg and eccentric
  - *Hamstring curls (t-ball, standing, prone)
  - Retrowalking with tubing

Cardio: UBE, walking program, pool running (fwd, bkwd), stair stepper
Week 6-8

MD typically decides about use of functional brace at 6-week follow up appointment.

PT frequency: 1-2 x wk; at least 2 x wk self-directed gym

- **Exercises Options to add:**
  - Long strides with plyocord
  - Slide board

Cardio: stepper, walking; elliptical
  - Biking and Swimming (flutter kicks only) for cardiovascular endurance
Week 8+

- Isokinetic test when ready. Progress with functional activities if test passed at $\geq 75\%$.

- Criteria to take isokinetic test: S/L eccentric squat on the leg press with greater than 45 degrees of flexion and 50% of pt’s body weight.
Functional Activities

PT frequency: 1-2 wk; at least 2 x wk self-directed gym

Exercise options to add:
- Straight-line running
- Plyometric leg press
- Fitter
- Isokinetic concentric/eccentric exercise 90-40 at speed: 120-240/sec

Functional activities (in functional brace if applicable):
- Running figure 8s
- Cutting to half speed
- Closed space agility drills
- Dot hops
- Lateral shuffles
- Backward running
- Cariocas

**ROM goal: Full-pain free ROM as compared to non-involved knee**
Functional Testing

- Leg symmetry index $\geq 90$
  - Single leg hop for distance
  - Single leg hop for time
  - Single leg vertical jump

**Start sports specific activity program (SSAP)**
HOP TESTS. The single hop (A), crossover hop (B), and triple hop (C) for distance are tests that can identify strength and power deficits in athletes after ACL surgery. The researchers suggest that, before returning to sport, athletes should be able to jump on their repaired legs at least 90% of the distance they can hop on their uninjured legs.
Discharge
Criteria:
- Full pain-free ROM
- No joint effusion
- Non-antalgic gait
- Good knee stability
- Completed SSAP
- Biodex test (or equivalent): 75% of uninvolved leg; ham/quad ratio > 70%
- LSI ≥ 90%
**Cleared by physician
- Final follow up with physician: 6-12 months post-op
- Final visit with PT: ??? May extend beyond.
Patient Long Term Goals

1. Demonstrate independence with a warm-up and cool-down program for lower extremities to prevent future injury with sports participation.

2. Demonstrate correct gait mechanics all directions and on all surfaces ¾ trials, for the prevention of future injury during mobility and sports participation.

3. Report a 0/10 pain during all active and passive range of motion and strengthening activities on 2 consecutive treatment sessions.

4. Demonstrate full pain free range of motion and 5/5 strength throughout, for the prevention of future injury with sports participation.

5. Perform sports-specific and functional drills for 30 minutes demonstrating proper biomechanics and balance for improved muscle endurance with sports participation and functional activities.
Return to Sport

9-12 months
Depends not only on physical readiness but also
MENTAL readiness.

Each patient requires an individualized intervention
program based on ongoing education and support.
  -Include parents/coaches.
  -maintain open communication with physician
Preventative Exercises

Important considerations:

1. Must be done daily
2. Hard for young athletes to comply with exercises because they are boring.
3. Compliance is a problem
QUESTIONS???
References


THROWING INJURIES IN YOUTH SPORTS

By Betty A. McNeff, PT, DPT, PCS
University of South Florida
School of Physical Therapy and Rehabilitation Sciences
In 2010, more than 414,000 Americans were treated in hospitals, doctors' offices, and hospital emergency rooms, for baseball-related injuries (The U.S. Consumer Products Safety Commission)

More than 282,000 of the players treated were 18 years old or younger

25% of child and adolescent baseball players have elbow pain

Nearly 15% sustain osteochondral lesions per year

Pitchers have the highest rate of osteochondral lesions.

Causes of Throwing Injuries

1. Overuse: Too much pitching
2. Improper body mechanics/improper pitching techniques
3. Insufficient Warm Up: Jogging, Stretching, Soft Throwing

(www.pitchsoftball.com)
Biomechanics of Throwing

Warnick, D. (2011)
Common Throwing Injuries

1. Little League Shoulder
2. Little League Elbow
3. Osteochondritis Dessicans of the Elbow

http://www.choa.org/littleleagueelbow
Little League Shoulder

(Epiphysiolysis) a fracture through the proximal humeral epiphysis caused by repetitive microtrauma; high energy torque in rapidly growing young athlete.

EVALUATION:

- Pain worst at late cocking or deceleration phase;
- Pain with resisted elevation and extremes of motion;
- Tenderness with palpation over physis of proximal humerus
Little League Elbow

Medial Apophysitis
Repetitive throwing creates excess stress to the ligaments and tendons of the elbow
Failure to rest may lead to serious condition: continued pulling may tear ligaments and tendons away from bone → avulsion fractures
Disrupts normal bone growth; high risk of deformity
EVALUATION:
- Pain at medial elbow
- Locking of elbow joint
- Limited ROM

http://www.choa.org/littleleagueelbow
Osteochondritis Dissecans of the Elbow

Less common condition
Repetitive throwing ⇒ repetitive stress to elbow
Opposing muscles of the arm pushing and pulling results in joint compression
Compression forces on immature bone may loosen fragments of bone and cartilage within joint.
Symptom: Pain outside elbow
Diagnosis

- Good Communication
- Poor reporting
  - Young players cannot always describe their symptoms well
  - Young players may hide injuries for fear of being removed from game
- Vigilance
  - Parents/coaches
  - Changes in performance/behavior
“The American Academy of Orthopaedic Surgeons (AAOS) believes that parents should be informed about the risks and injuries which occur in youth baseball as a result of excessive throwing, and strongly urges compliance with the recommendations for throwing restriction in youth baseball to minimize such injuries. “ (AAOS, Revised Sept 2010)
Keys to Avoiding Overuse Injuries

- Limit the number of teams children play in one season. Kids who play on more than one team are especially at risk for overuse injuries.

- Do not allow children to play one sport year round—taking regular breaks and playing other sports is essential to skill development and injury prevention.

- Do not allow children to pitch on consecutive days and avoid pitching on multiple teams with overlapping seasons.
## Recommended Ages for Learning Pitches

<table>
<thead>
<tr>
<th>Pitch</th>
<th>Age (Years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fastball</td>
<td>8 ± 2</td>
</tr>
<tr>
<td>Change-Up</td>
<td>10 ± 3</td>
</tr>
<tr>
<td>Curveball</td>
<td>14 ± 2</td>
</tr>
<tr>
<td>Knuckleball</td>
<td>15 ± 3</td>
</tr>
<tr>
<td>Slider</td>
<td>16 ± 2</td>
</tr>
<tr>
<td>Forkball</td>
<td>16 ± 2</td>
</tr>
<tr>
<td>Screwball</td>
<td>17 ± 2</td>
</tr>
</tbody>
</table>
## Pitching Schedule

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Maximum pitches/game</th>
<th>Maximum games/week</th>
<th>Maximum pitches/week</th>
<th>Maximum pitches/season</th>
<th>Maximum pitches/year</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 to 10</td>
<td>50</td>
<td>2</td>
<td>75</td>
<td>1000</td>
<td>2000</td>
</tr>
<tr>
<td>11 to 12</td>
<td>75</td>
<td>2</td>
<td>100</td>
<td>1000</td>
<td>3000</td>
</tr>
<tr>
<td>13 to 14</td>
<td>75</td>
<td>2</td>
<td>125</td>
<td>1000</td>
<td>3000</td>
</tr>
<tr>
<td>15 to 16</td>
<td>90</td>
<td>2</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>17 to 18</td>
<td>105</td>
<td>2</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Children’s Orthopaedics and Scoliosis Associates, LLP
## Rest Recommendation for Children 16 Years and Younger

<table>
<thead>
<tr>
<th>Pitches in a day</th>
<th>Rest</th>
</tr>
</thead>
<tbody>
<tr>
<td>61</td>
<td>5 calendar days of rest, and a game, must be observed</td>
</tr>
<tr>
<td>41 to 60</td>
<td>4 calendar days of rest, and a game, must be observed</td>
</tr>
<tr>
<td>21 to 40</td>
<td>3 calendar days of rest must be observed</td>
</tr>
<tr>
<td>1 to 20</td>
<td>1 calendar day of rest is required</td>
</tr>
</tbody>
</table>

*5 Pitches maximum between innings; 12-15 before games*
Pitching Rehabilitation

1. Rest
2. Ice
3. NSAID
4. PT:
   Children’s Orthopaedics and Scoliosis Surgery Associates, LLP (2011)
# Phase 1 (1-3 weeks)

**Goals:** Increase muscular strength and endurance; correct muscular imbalance

<table>
<thead>
<tr>
<th>Exercises</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Posterior rotational shrugs</td>
<td>Facilitates strength, synergy, and coordination of periscapular musculature</td>
</tr>
<tr>
<td>Scaption in neutral rotations</td>
<td>Strengthens rotator cuff, deltoid in neutral rotation</td>
</tr>
<tr>
<td>Side-lying external rotation</td>
<td>Targets rotator cuff, especially superior and posterior</td>
</tr>
<tr>
<td>Internal and external rotation (elastic bands)</td>
<td>Strengthens rotator cuff</td>
</tr>
</tbody>
</table>
## Phase 2 (4-8 weeks)

**Goals:** Improve motor control; increase muscular endurance

<table>
<thead>
<tr>
<th>Exercises</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proprioceptive neuromuscular facilitation diagonal pattern</td>
<td>Targets rotator cuff, especially superior and posterior; simulates the deceleration of follow through at higher speeds</td>
</tr>
<tr>
<td>Prone horizontal abduction at 100°</td>
<td>Emphasizes posterior rotator cuff, deltotid, and scapula with greater activity of supraspinatus</td>
</tr>
<tr>
<td>Supine cocking</td>
<td>Eccentric control of internal rotators into terminal cocking</td>
</tr>
<tr>
<td>Scaption with body blade</td>
<td>Total arm and shoulder girdle strengthening with emphasis on serratus anterior at higher elevation angles</td>
</tr>
<tr>
<td>External rotation/internal rotation with body blade</td>
<td>Rotator cuff strengthening and muscular endurance</td>
</tr>
</tbody>
</table>
Phase 3 (8+ weeks)

Goals: Increase speed of training; continue to increase strength/endurance

Exercises
- Cocking external rotation/internal rotation with body blade

Purpose
- Strengthens rotator cuff, increases muscular endurance in throwing position. Enhances muscular endurance and motor control at more functional speeds
Thrower’s 10 Exercises

1. T-Band Diagonal Pattern D2 Flexion/Extension
2. T-Band External/Internal Rotation at Neutral
3. Shoulder Abd to 90 degrees
4. Scaption, IR
5. Prone Horizontal Abd (Neutral)/(Full ER)
6. Seated Press Ups
7. Prone Rowing
8. Push Ups
9. Elbow Flexion/Extension
10. Wrist Flexion/Extension/Pronation/Supination

http://www.safethrow.com/ExerciseThrowing/ExerciseIndex.htm
Safe Return to Play

The player must have no pain, no swelling, full range of motion, normal strength.

The player should gradually return to a throwing program, increasing the number of throws depending on the length of time away from play, and their specific team position.

Example:
http://www.safethrow.com/ExerciseThrowing/ITPindex.htm

The player must be mentally ready.
References


“The Older I get, the Better I Was!”
Youth Sports Injuries: Sports Trauma and Overuse Prevention

Keeping Kids in the Game for Life
The Problem

Nearly 50% of all injuries sustained by middle school and high school students during sports are overuse injuries.*

Every year, more than 3.5 million children aged 14 and younger are treated for sports injuries.*

For more information, visit www.STOPSportsInjuries.org


For more information, visit www.STOPSportsInjuries.org


Keeping Kids in the Game for Life
The Problem

- 30 million children participate in organized sports.
  
  *(Source: Safe Kids USA)*

- Participation in high school athletics is increasing, with more than 7.3 million high school students participating annually.
  
  *(Source: National Federation of State High School Associations)*

- High school athletics account for more than 2 million injuries annually, including:
  
  • 500,000 doctor visits
  
  • 30,000 hospitalizations
  
  *(Source: Centers for Disease Control and Prevention)*
The Problem

- Young athletes are specializing in sports (and positions) at an earlier age, with more than 3.5 million children under age 14 treated annually for sports injuries.
  
  *(Source: Safe Kids USA)*

- Immature bones, insufficient rest after injury, and poor training and conditioning contribute to overuse injuries.

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

*Keeping Kids in the Game for Life*
A child’s history of injury is.....

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

2. A contributor to long-term degenerative diseases, such as osteoarthritis.
70% of kids participating in sports drop out by the age of 13 because of

- Adults
- Coaches
- Parents

“No Horse Ever Ran Itself To Death Until They Put a Jockey on it’s Back”

These children lose the benefits of exercise, teamwork and healthy competition!
What is Overuse?

Overuse is considered excessive and repeated use that results in injury to the bones, muscles or tendons involved in the action.
Why are Injuries on the Rise?

- Immature bones
- Insufficient rest after an injury
- Poor training or conditioning
- Specialization in just one sport
- Year-round participation
Promote injury prevention on multiple levels, including:

- Learning about the STOP Sports Injuries campaign and visiting [www.STOPSportsInjuries.org](http://www.STOPSportsInjuries.org) for resources
- Holding ongoing discussions with athletes about the importance of rest
- Mandating pre-season physicals – the PPE
- Requiring warm-up and cool-down routines
- Encouraging proper strength training routines
What Can We Do to Prevent Overuse and Trauma Injuries?

Additional tips:

• Be sure kids drink enough water based on activity and temperature levels.

• Educate athletes on proper nutrition for performance.

• Supervise equipment maintenance.

• Encourage kids to speak with a certified athletic trainer, physical therapist, coach or physician if they are having any pain.

Keeping Kids in the Game for Life
Additional Prevention Strategies

Work with local athletic governing bodies to mandate pitch counts and limit the number of matches or tournaments played.
• Encourage participation for fun and limit emphasis on winning.
• Discourage early specialization.
• Treat symptoms of problems/injury EARLY.
Proper Technique is Key

• Provide proper instruction on throwing mechanics.
  – Discourage the teaching of curve balls until high school (after puberty).
  – Ban the radar gun in youth sports.
  – Mandate a three-month “rest period” each year for throwing athletes.
Organizational Partners for STOP Sports Injuries Campaign

**Sports Medicine Organizations**
- American Orthopaedic Society for Sports Medicine
- National Athletic Trainers’ Association
- American Medical Society for Sports Medicine
- American Academy of Orthopaedic Surgeons
- American Academy of Pediatrics – Sports Section
- National Strength and Conditioning Association
- American Physical Therapy Association – Sports Physical Therapy Section

**Related Organizations**
- Youth Sports League
- Little League
- Professional Leagues
- Medical Institutions
- Cleveland Clinic
- Safe Kids USA
Campaign Focuses on 12 Sports

- Baseball
- Swimming
- Football
- Basketball
- Cheerleading
- Tennis
- Dancing
- Gymnastics
- Soccer
- Running
- Volleyball
- Softball
Educational Content

- Sports tips
  - Sport-specific information

- Video Podcasts

- Specific educational tool kits focused on various audiences
  - Parents
  - Athletes
  - Coaches
  - Healthcare Providers
Comprehensive Web site Features

- Educational resources
- Media center
- Downloadable applications
- Online survey
- Quizzes
- Blogging
- RSS feeds
- Social media interaction through Facebook and Twitter
What Does the Future Hold?

- Better prevention of injury
- Evaluation of new, less invasive surgical techniques to treat injuries
- Ongoing research to understand the injury risk and how to prevent it
- Continued rise in injury rates unless education is increased
“Most sports injuries that affect children and adolescents can be treated effectively with rehabilitation. In fact, rehabilitation is the primary treatment for injured athletes. Furthermore, rehabilitation is necessary because the effects of injury may not disappear with rest. In addition, an active rehabilitation program reduces the incidence of long-term disability and recurrent or progressive injuries. Lastly, it encourages athletes with treatable conditions to remain active during their recovery.”

S.J. Anderson, MD in

*Keeping Kids in the Game for Life*
Let’s Work Together to **STOP Sports Injuries**

*And Keep Kids in the Game for Life!*

[www.STOPSportsInjuries.org](http://www.STOPSportsInjuries.org)
Permanent sequelae in sports injuries: a population based study

Alberto G Marchi, Daniela Di Bello, Gianni Messi, Giuseppe Gazzola