DON’T THROW THE GAME...

Current concepts for injury prevention and performance enhancement in youth baseball

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According to the CDC, more than 50% of all sports injuries in children are preventable.
Since 2004, there has been a TEN FOLD increase in injuries requiring surgery.
More Shocking Statistics

• High school athletes that pitch >80 mph are ___% more likely to have a shoulder injury. (Yang et al 2014)

• Players are ?? times more likely to suffer an injury when they throw “fatigued.”

• Nearly ___% of all injuries in middle and high school occur as a result of overuse!
Throwing while fatigued?
What Do We Know?

“The best way to TREAT an injury is to PREVENT an injury”

(Dr. James Andrews)
Keys to Successful Treatment of the Thower’s Shoulder

- Accurate diagnosis
- Assess ROM
- Evaluate scapular mechanics
- Examine muscular strength
- Analyze throwing mechanics
WELL, IT'S NOT TORN. MORE LIKE SHREDDED!
HA! ... ANYHOO, I RECKON I CAN PATCH IT UP...
SO, HOW'S THE FAMILY?
Analyze Mechanics of Motion

It’s important to assess mechanics of the movement without a shirt
Poor Scapular Mechanics
Strengthening Requires a “Balanced Approach”

- Emphasize muscle groups that have to decelerate arm and maintain stability
- LE and core strength
- Proprioception
The Last Step...

Analyze Throwing Mechanics
The numbers of players that play in more than one league have increased significantly in the last 10 years

More players are playing year round—causing overuse injuries

Increased opportunities (leagues, showcase events, etc)

Coaches/parents are too casual with ASMI/USA baseball guidelines

Safety precautions are not “important” when winning is on the line
What Do We Know?

- The number one cause for shoulder/elbow injury in baseball is poor mechanics

  (Davis et al 2009, Fortenbaugh et al 2009, Fleisig et al 2001)
Mediocre Mechanics
Factors That Increase Injury Rates:

- Excessive number of innings per year (>100)
- Pitching while fatigued
- Pitching year round
  - 5 times more likely to injure if > 8 months of the year
  
  (Fleisig, Andrews et al, 2011)
More Factors...

- Throwing certain types of pitches too early

- 90% of shoulder injuries in the first 3 weeks of season and elbow injuries in the last 3 weeks of season

- Pitcher/catcher combination
  - 3x more likely to have UE injury. (Fleisig et al, 2011)
Days of Rest Required Based on Pitch Count

<table>
<thead>
<tr>
<th>Pitch Count (Ages 7-16)</th>
<th>Pitch Count (Ages 17-18)</th>
<th>Days of Rest Required After Pitching</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-20</td>
<td>1-25</td>
<td>0</td>
</tr>
<tr>
<td>21-40</td>
<td>26-50</td>
<td>1</td>
</tr>
<tr>
<td>41-60</td>
<td>51-75</td>
<td>2</td>
</tr>
<tr>
<td>61-65</td>
<td>76-more</td>
<td>3</td>
</tr>
<tr>
<td>66-more</td>
<td></td>
<td>4</td>
</tr>
</tbody>
</table>
Recommended Pitch Counts

<table>
<thead>
<tr>
<th>Age</th>
<th>Max number of pitches per start</th>
</tr>
</thead>
<tbody>
<tr>
<td>7-8</td>
<td>50</td>
</tr>
<tr>
<td>9-10</td>
<td>75</td>
</tr>
<tr>
<td>11-12</td>
<td>85</td>
</tr>
<tr>
<td>13-16</td>
<td>95</td>
</tr>
<tr>
<td>17-18</td>
<td>105</td>
</tr>
</tbody>
</table>
### Age to Start Throwing Specific Pitches

<table>
<thead>
<tr>
<th>Type of Pitch</th>
<th>Starting Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fastball</td>
<td>8 +/- 2</td>
</tr>
<tr>
<td>Change-Up</td>
<td>10 +/- 2</td>
</tr>
<tr>
<td>Curveball</td>
<td>14 +/- 2</td>
</tr>
<tr>
<td>Knuckleball</td>
<td>15 +/- 3</td>
</tr>
<tr>
<td>Forkball</td>
<td>16 +/- 2</td>
</tr>
<tr>
<td>Slider</td>
<td>16 +/- 2</td>
</tr>
<tr>
<td>Screwball</td>
<td>17 +/- 2</td>
</tr>
</tbody>
</table>
The first steps should be to learn, in order:

1) Basic Throwing
   - Show consistency with full body mechanics on a regular basis to avoid stress and injury

2) Fastball Pitching
   - Improve accuracy and placement with a fastball for best results prior to adding off-speed pitches.

3) Change-Up Pitching
It’s Important Who Your Teacher is...
Hand Break

- Low force/torque on shoulder/elbow
- Stand tall
- Knee up
- Hand break at belt
Wind up to Stride Foot Contact

- Foot contact AND 90 deg
- Stride foot should land 75-100% of player’s ht.
Arm Cocking

- Body rotates forward as the arm rotates backward
- Acceleration from hind leg starts the movement of the hips/core toward target
Late Cocking to Arm Acceleration

- Maximum ER
- IR torque = 100 Nm
  - (equivalent to 60 lbs. pulling down on the hand)
- Internal rotation velocity = 7500 degrees/second
Just How Fast IS 7500 m/sec?

- Fastest measured human joint motion

- 20 full revolutions in one second!!
Putting it all Together
Example of Solid Mechanics
Not So Solid...
NEWS FLASH:
Injury Prevention is NOT “Sexy”

- Rotator cuff and scapular stabilization exercises
  - Emphasize low weight / high reps
  - 30-50 reps with 1-3#, 3x/wk
  - Emphasize the eccentric phase
  - Train the muscles required to perform the skill then practice the skill
    - Not recommended to use weighted balls/bats

- Core strength: attack the whole body

- Lower extremity focus
Warm Up to Throw... or Throw to Warm Up?

- Dynamic full body warm ups 7-8 min (up to age 12) or 10-12 min (ages 12+)
- Stretching post game/practice
  - Save static stretching

"Call time out and walk out to the mound reeeeeeal slow. Then stall. ... We're still thawing out a reliever."
When to seek treatment...

- Pain that is persistent, worsening, and does not change with rest
- Sharp pain with activity that may or may not worsen as the activity continues
- Pain during the night or at rest
- Loss of strength or range of motion
- Decreased pitch or throwing velocity due to pain
How IAM can help...

- Well-educated staff that are experts in the science and movement of throwers
  - Thorough video analysis of joint and body mechanics specific to the athlete and their position

- Personalized exercise prescription

- Tailored long toss program progression

- Individualized injury prevention strategies
Invest in education and prevention

- ASMI website
  - www.asmi.org

- USA baseball
  - www.usabaseball.com

- 3p pitching
  - www.3psports.com

- STOP sports injuries
  - www.stopsportsinjuries.org
“It’s not necessarily the amount of time you spend at practice that counts; it’s what you put into the practice.”

~ Eric Lindros
Thank You!

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References

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