

Throwing Injury Prevention Program

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1. Effects of Overhead Throwing

- fastest human movement with angular velocity up to 7,500 degrees/sec (28 revs/sec)
 - 0.03 sec from maximum external rotation at cocking to ball release
 - high force loads on shoulder and elbow: distraction, compression, shear
 - 60% of kinetic energy generated by LEGS
- Incredible stress

#1 risk - over-use

2. Incidence of Shoulder and Elbow Injuries

a. Professional Baseball

- 28% of all injuries involve SHOULDER
 - 22% of all injuries involve ELBOW
 - injury rate is increasing
- } 50% of injuries

b. Youth Baseball

- 50% of 9-14 yr old players complain of shoulder or elbow pain
- Number of severe injuries (ligament tears) is increasing

3. Comparison of Youth and Professional Pitchers

a. Kinematics – patterns of motion

- no differences except elbow flexion angle increase with age

b. Kinetics – resulting forces of motion

- significant differences between all levels
- elbow and shoulder torques and forces increase with age and skill level

4. Factors Contributing to Injury - OVERUSE!!!!

a. Excessive Pitching

- Pitch number: game and season
- > 9 months pitching per year
- Pitching for multiple teams

c. Pitch Velocity

- d. Starters vs Relievers
- e. Showcase Participation
- f. Pitching with Pain/Fatigue

b. Pitch Type - breaking balls at early age

5. Prevention of Adolescent Throwing Injuries

a. Pitch Counts

- pertains to IN COMPETITION or GAME INTENSITY pitches
- includes SINGLE GAME, WEEKLY, and ANNUAL pitch count limits.
- gradual increase in limit with progressive age and level of play.

AGE	Pitches per Game	Pitches per Week	Pitches per Season
8-10	50	80-100	650
11-12	60	110-120	650
13-14	70	130-140	650
15-17	80	150	?

Number of Pitches NOT Innings Pitched!!

Threshold for over-use

b. Seasonal Participation

- limit pitching to 9 MONTHS per year with at least 3 months off from pitching.
- limit pitching to ONE TEAM per season!

At game effort (>80% max.)

c. Pitch Type

- emphasize proper mechanics of fastball/change up.
- NO breaking balls (slider, curveball) until skeletal maturity (age 14-16)

Pitch Type	Age to Throw
Fastball	8
Change Up	10
Curveball	14
Slider	16
Spilt Finger	17

Focus on Location and Change of Speed!

d. Pitch Velocity

- high velocity pitchers should be watched more carefully

pitching to radar gun

e. Mechanics and Skill Training

- youth and professional pitchers THROW the SAME.
- elbow and shoulder forces increase with age and skill level
- emphasize proper mechanics with use of legs and trunk
- NEVER pitch with pain or fatigue!

*- Soreness is OK (1-2 days)
- Pain is not OK*

f.. Strength and Conditioning

i. Muscular Strength

- pre-adolescent bodies are UNDER DEVELOPED/UNDER PREPARED
- should train to play and pitch
- strength training yields strength gains
- increase in strength WITHOUT increase in size

Age Group	Strength Training Guidelines (based on age, maturity, experience)
7 or younger	No weight resistance, body weight exercises only Emphasize technique Introduce Stretching Make it FUN!
8 – 10 yrs	Core exercises emphasizing balance, proprioception LIGHT resistance exercises Scapula program Keep it SIMPLE!
11 – 13 yrs	Progressive resistance exercises: bench, pulldowns, rows Begin focus on rotator cuff and scapula Core and lower extremity strengthening Control volume to avoid overuse!
14 – 15 yrs	Total body focus with sport-specific training Introduce plyometrics
16 or older	Advanced strengthening and flexibility Thrower's 10 program and plyometrics



ii. Flexibility

- flexibility can improve in pre-adolescent athletes

iii. Endurance

- improve lung volume, VO2 max capacity, reduce early fatigue

iv. Body Awareness (Proprioception) Drills

- improves motor control and balance, more stable core and base

g. Showcases, Traveling Teams, All-Stars Tours

- limit as much as possible!!

↳ pitch in, beyond yourself in showcase