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Throwing Restrictions & Appropriate Progressions



Throwing exercise Program

What should you know about throwing?

Overhand throwing places extremely high stresses on the elbow and shoulder, specifically to the anatomy that keeps these joints stable. In throwing athletes, these high stresses are repeated many times and can lead to a wide range of overuse injuries.

Although throwing injuries in the elbow and shoulder most commonly occur in baseball pitchers, they can be seen in any athlete who participates in sports that require repetitive overhand motions, such as volleyball, tennis, and some track and field events.

Common injuries associated with overuse & improper throwing mechanics

- Biceps tendonopathy
- Little League Shoulder (proximal humeral epiphysiolysis)
- Little League Elbow (medial epicondyle apophysitis)
- Osteochondritis Dissecans (OCD) lesions
- Shoulder labral injuries (SLAP tear)

Signs and Symptoms

Common signs and symptoms associated with overuse injuries and improper throwing mechanics include:

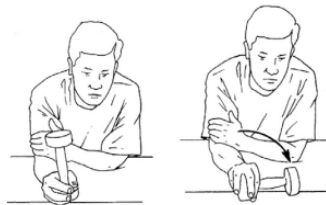
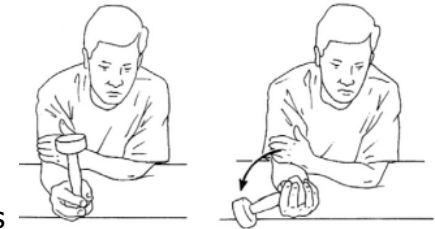
- A gradually increasing onset of pain and stiffness in the medial elbow or shoulder, particularly with throwing
- Fatigue
- Decreased ball velocity
- Decreased accuracy
- Upright trunk during pitching
- Dropped elbow during pitching, or
- Increased time between pitches



10C. Supination:

Forearm supported on table with wrist in neutral position. Using a weight or hammer, roll wrist taking palm up. Hold for 2 seconds and then return to starting position.

Perform ___ sets of ___ repetitions ___ times daily.



10D. Pronation:

Forearm should be supported on table with wrist in neutral position. Using a weight or hammer, roll wrist taking the palm down. Hold for 2 seconds, then return to starting position. Perform ___ sets of ___ repetitions ___ times daily.

Supportive Research

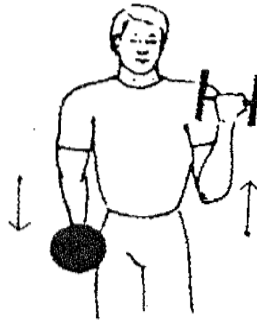
Numerous studies have found an increase in throwing velocity (1.2-2%) following completion of a 6 week resistance training program. The Thrower's Ten program is both an easy and practical program to execute given only minimum and inexpensive resistance devices are needed (tubing, dumbbells, medicine balls).

The repetitive forces and loads placed on the shoulder in combination with the excessive motion required for throwing requires challenging, dynamic, and specific rehabilitative exercises for successful functional return of the injured shoulder in the overhead throwing athlete. The exercise program should gradually increase the demands on the thrower's shoulder producing increased strength, endurance, and control that will help maintain pain-free performance through a rigorous season. The Throwers Ten Exercise Program is performed to improve the overall shoulder strength in the throwing athlete.

Thrower's Ten Essentials

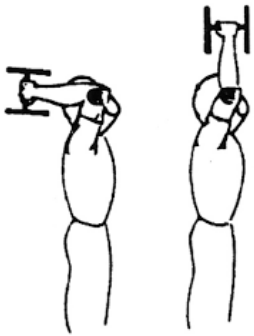
9A. Elbow Flexion:

Standing with arm against side and palm facing inward, bend elbow upward turning palm up as you progress. Hold 2 seconds and lower slowly. Perform __ sets of __ repetitions __ times daily.



9B. Elbow Extension (Abduction):

Raise involved arm overhead. Provide support at elbow from uninvolved hand. Straighten arm overhead. Hold 2 seconds and lower slowly. Perform __ sets of __ repetitions __ times daily.



10A. Wrist Extension:

Supporting the forearm and with palm facing downward, raise weight in hand as far as possible. Hold 2 seconds and lower slowly. Perform __ sets of __ repetitions __ times daily.



10B. Wrist Flexion:

Supporting the forearm and with palm facing upward, lower a weight in hand as far as possible and then curl it up as high as possible. Hold for 2 seconds and lower slowly. Perform __ sets of __ repetitions __ times daily.



Risk Factors for Overuse Upper Extremity Injuries

Overuse arm injuries are common in throwing athletes. There are numerous risk factors hypothesized to predispose throwers to arm injury and these factors can be classified as non-modifiable (unchangeable) or modifiable (changeable).

Non-modifiable risk factors include age, body mass index, height, coaching habits, and pitching performance satisfaction.

Modifiable risk factors include pitching mechanics, frequency and volume as well as physical factors such as altered shoulder rotational ROM, decreased posterior shoulder flexibility, rotator cuff weakness and imbalance, and poor neuromuscular control of scapular, core, and lower extremity musculature.

- Modifiable factors are important, as these factors should be the emphasis of treatment and prevention programs.

How to prevent throwing overuse injuries

- Make sure to have an off season.
 - No overhead throwing of any kind for 4 months a year.
 - No competitive baseball pitching for at least 4 months per year.
- Do not pitch more than 100 innings in games in any calendar year.
 - Follow limits for pitch counts and days rest.
- Avoid pitching on multiple teams with overlapping seasons.
- Learn good throwing mechanics as soon as possible.
 - The first steps should be basic throwing, fastball pitching and changeup pitching.
- Avoid using radar guns.
- A pitcher should not also be a catcher for his team.
 - The pitcher-catcher combination results in many throws and may increase the risk of injury.
- If a player complains of pain in their elbow or shoulder, discontinue pitching until evaluated by a sports medicine physician.
- Inspire youth player to have fun playing baseball and other sports.

Baseball and Softball Exercise Program

Recommended Ages for Learning Various Pitches

Pitch	Age (Years)
Fastball	8 ± 2
Change-Up	10 ± 3
Curveball	14 ± 2
Knuckleball	15 ± 3
Slider	16 ± 2
Forkball	16 ± 2
Screwball	17 ± 2

The neuromuscular memory of throwing mechanics is developed at a young age. When proper techniques are learned at this age, they will likely continue through adolescence and beyond. **Instructing youth pitchers on proper mechanics when they are developing their throwing motion is key.** Poor mechanics lead to increased forces on joints, bones, and ligaments without increased velocity.

Maximum Number of Pitches Recommended

Age (years)	Max pitches/ game	Max games/ week	Max pitches/ week	Max pitches/season
8 to 10	50	2	75	1000
11 to 12	75	2	100	1000
13 to 14	75	2	125	1000
15 to 16	90	2	-	-
17 to 18	105	2	-	-

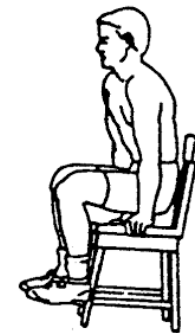
6D. Prone Rowing into External Rotation:

Lying on your stomach with your involved arm hanging over the side of the table, dumbbell in hand and elbow straight. Slowly raise the arm, bending elbow, up to the level of the table. Pause one second.



Then, rotate shoulder upward until dumbbell is even with the table, keeping elbow at 90°. Hold at the top for 2 seconds, then slowly lower, taking 2-3 seconds.

Perform ___ sets of ___ repetitions ___ times daily.



7. Press-ups:

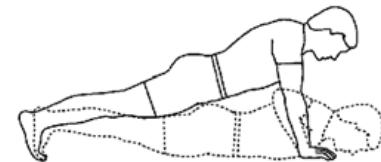
Seated on a chair or table, place both hands firmly on the sides of the chair or table, palm down and fingers pointed outward. Hands should be placed equal with shoulders. Slowly push downward through the hands to elevate your body. Hold the elevated position for 2 seconds and lower body slowly.

Perform ___ sets of ___ repetitions ___ times daily.

8. Push-ups:

Start in the down position with arms in a comfortable position. Place hands no more than shoulder width apart. Push up as high as possible, rolling shoulders forward after elbows are straight. Start with a push-up into a wall. Gradually progress to table top and eventually to the floor as tolerable.

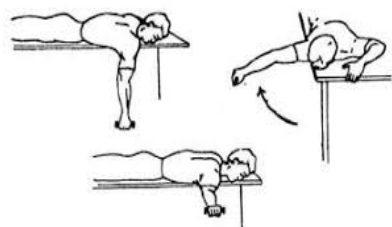
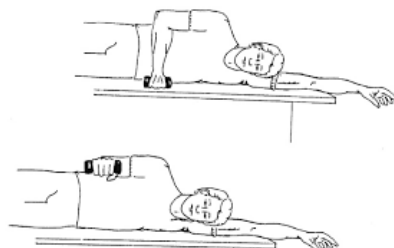
Perform ___ sets of ___ repetitions ___ times daily.



Thrower's Ten E Pitching Restrictions

5. Sidelying External Rotation:

Lie on uninvolved side, with involved arm at side of body and elbow bent to 90°. Keeping the elbow of involved arm fixed to side, raise arm. Hold 2 seconds and lower slowly. Perform ___ sets of ___ repetitions ___ times daily.

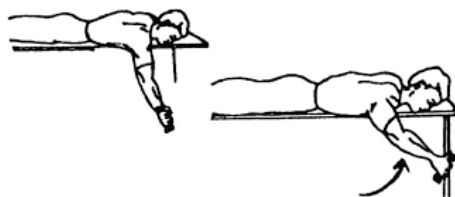


6A. Prone Horizontal Abduction (Neutral):

Lie on table, face down, with involved arm hanging straight to the floor, and palm facing down. Raise arm out to the side, parallel to the floor. Hold 2 seconds and lower slowly. Perform ___ sets of ___ repetitions ___ times daily.

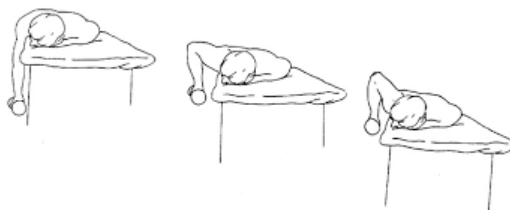
6B. Prone Horizontal Abduction (Full ER, 100° ABD):

Lie on table face down with involved arm hanging straight to the floor and thumb rotated up (hitchhiker). Raise arm out to side with arm slightly in front of shoulder, parallel to the floor. Hold 2 seconds and lower slowly. Perform ___ sets of ___ repetitions ___ times daily.



6C. Prone Rowing:

Lying on your stomach with your involved arm hanging over the side of the table, dumbbell in hand and elbow straight. Slowly raise arm, bending elbow, and bring dumbbell as high as possible. Hold at the top for 2 seconds, then slowly lower. Perform ___ sets of ___ repetitions ___ times daily.



Adapted Pitch Recommendations and Rest Requirements for Pitchers Age 16 and Younger

Pitches in a day	Rest
61	5 calendar days of rest, and a game, must be observed
41 to 60	4 calendar days of rest, and a game, must be observed
21 to 40	3 calendar days of rest must be observed
1 to 20	1 calendar day of rest is required

**5 pitches maximum between innings; 12-15 before game*

The risk of overuse injuries increases during the adolescent growth spurt, and **extra caution** should be used with pitchers of this age. In an attempt to compensate for poor lower body mechanics, a young pitcher may subject the upper extremity to added stress and increased risk of injury. Young pitchers do a better job of using their whole body as they age. Whether this is due to improved flexibility, confidence, experience, coaching, or other influences is widely debated.

Changes in body mechanics occur during the first few years of a youth pitcher's experience, particularly from ages 9 to 13 years. Forces and torques applied to the throwing shoulder and elbow increase with age, even when adjusted for height and weight, especially after 13 years of age. This is likely as a result to strength changes after puberty.

Prepubescent pitchers may work with their coaches to improve the motions and flexibility of the players' bodies, as well as the paths of their arms. Once proper mechanics are developed, older adolescent pitchers can focus more on improved strength and power.

Thrower's Ten Exercise Program

Why the Thrower's Ten?

The Thrower's Ten Program is designed to exercise the major muscles necessary for throwing. The Program's goal is to be an organized and concise exercise program. In addition, all exercises included are specific to the thrower and are designed to improve strength, power and endurance of the shoulder complex musculature.

1A. Diagonal Pattern D2 Extension:

Involved hand will grip tubing handle overhead and out to the side. Pull tubing down and across your body to the opposite side of leg. During the motion, lead with your thumb. Perform sets of repetitions ___ daily_



1B. Diagonal Pattern D2 Flexion:

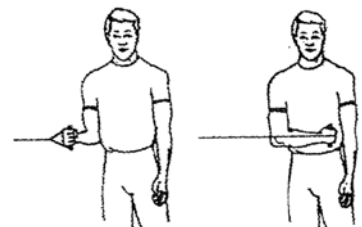
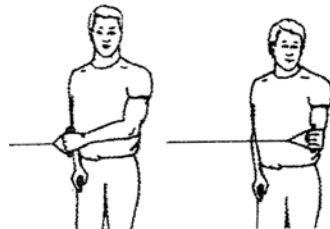
Gripping tubing handle in hand of involved arm, begin with arm out from side 45° and palm facing backward. After turning palm forward, proceed to flex elbow and bring arm up and over involved shoulder. Turn palm down and reverse to take arm to starting position.

Exercise should be performed ___ sets of ___ repetitions ___ daily.

2A. External Rotation at 0° Abduction:

Stand with involved elbow fixed at side, elbow at 90° and involved arm across front of body. Grip tubing handle while the other end of tubing is fixed. Pull out arm, keeping elbow at side. Return tubing slowly and controlled.

Perform ___ sets of ___ repetitions ___ times daily.



2B. Internal Rotation at 0° Abduction:

Standing with elbow at side fixed at 90° and shoulder rotated out. Grip tubing handle while other end of tubing is fixed. Pull arm across body keeping elbow at side. Return tubing slowly and controlled.

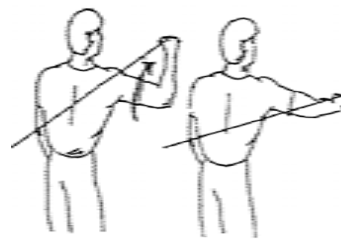
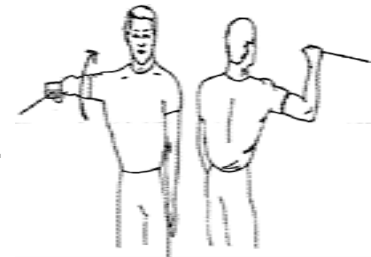
Perform ___ sets of ___ repetitions ___ times daily.

2C. (Optional) External Rotation at 90°

Abduction:

Stand with shoulder abduction to 90°. Grip tubing handle while the other end is fixed straight ahead, slightly lower than the shoulder. Keeping the shoulder abducted, rotate the shoulder back keeping elbow at 90°. Return tubing and hand to start position.

Perform ___ sets of ___ repetitions ___ times daily.



2D. (Optional) Internal Rotation at 90° Abduction:

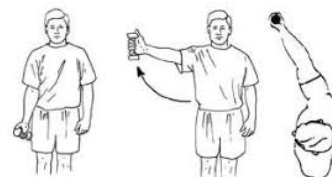
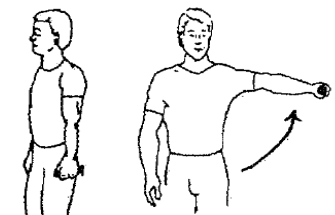
Stand with shoulder abducted to 90°, externally rotated 90°, and elbow bent at 90°. Keeping shoulder abducted, rotate shoulder forward, keeping elbow bent. Return tubing and hand to start position.

Perform ___ sets of ___ repetitions ___ times daily.

3. Shoulder Abduction to 90°:

Stand with arm at side, elbow straight, and palm against side. Raise arm to the side, palm down, until the arm reaches 90° (shoulder level).

Perform ___ sets of ___ repetitions ___ times daily.



4. Scaption, External Rotation:

Stand with elbow straight and thumb up. Raise arm to shoulder level at 30° angle in front of body. Do not go above shoulder height. Hold 2 seconds and lower slowly.

Perform ___ sets of ___ repetitions ___ times daily.