



NYU-Hospital for Joint Diseases
Department of Orthopaedic Surgery

Laith M. Jazrawi, M.D.
Orthopaedic Surgery
Sports Medicine
Tel: (212) 598-ORTHO (6784) / Fax: (212) 598- 6771
www.newyorkortho.com

Interval Throwing Program for Baseball Players – Phase I

The Interval Throwing Program (ITP) is designed to gradually return motion, strength and confidence in the throwing arm after injury or surgery by slowly progressing through graduated throwing distances. The ITP is initiated upon clearance by the athlete's physician to resume throwing, and performed under the supervision of the rehabilitation team, (physician, physical therapist and athletic trainer).

The program is set up to minimize the chance of re-injury and emphasize pre-throwing warm-up and stretching. In development of the interval throwing program, the following factors are considered most important.

1. The act of throwing the baseball involves the transfer of energy from the feet through the legs, pelvis, trunk, and out the shoulder through the elbow and hand. Therefore, any return to throwing after injury must include attention to the entire body.
2. The chance for re-injury is lessened by a graduate progression of interval throwing.
3. Proper warm-up is essential.
4. Most injuries occur as the result of fatigue.
5. Proper throwing mechanics lessen the incidence of re-injury.
6. Baseline requirements for throwing include:
 - Pain-free range of motion
 - Adequate muscle power
 - Adequate muscle resistance to fatigue

Because there is an individual variability in all throwing athletes, there is no set timetable for completion of the program. Most athletes, by nature, are highly competitive individuals and wish to return to competition at the earliest possible moment. While this is a necessary quality of all athletes, the proper channeling of the athlete's energies into a rigidly controlled throwing program is essential to lessen the chance of re-injury during the rehabilitation period. The athlete may have the tendency to want to increase the intensity of the throwing program. This will increase the incidence of re-injury and may greatly retard the rehabilitation process. It is recommended to follow the program rigidly as this will be the safest route to return to competition.

During the recovery process the athlete will probably experience soreness and a dull, diffuse aching sensation in the muscles and tendons. If the athlete experiences sharp pain, particularly in the joint, stop all throwing activity until this pain ceases. If continued pain, contact your physician.

Weight Training: The athlete should supplement the ITP with a high repetition, low weight exercise program. Strengthening should address a good balance between anterior and posterior musculature so that the shoulder will not be predisposed to injury. Special emphasis must be given to posterior rotator cuff musculature for any strengthening program. Weight training will not increase throwing velocity, but will increase the resistance of the arm to fatigue and injury. Weight training should be done the same day as you throw; however, it should be after your throwing is completed, using the day in between for flexibility exercises and a recovery period. A weight training pattern or routine should be stressed at this point as a "maintenance program." This pattern can and should accompany the athlete into and throughout the season as a deterrent to further injury. It must be stressed that weight training is of no benefit unless accompanied by a sound flexibility program.

Individual Variability: The ITP is designed so that each level is achieved without pain or complications before the next level is started. This sets up a progression that a goal is achieved prior to advancement instead of advancing to a specific timeframe. Because of this design, the ITP may be used for different levels of skills and abilities from those in high school to professional levels. The reasons for being in the ITP will vary from person to person. Example: One athlete may wish to use alternate days throwing with or without using weights in between; another athlete may have to throw every third or fourth day due to pain or swelling. "Listen to your body – it will tell you when to slow down." Again, completion of the steps of the ITP will vary from person to person. There is no set timetable in terms of days to completion.

Warm-up: Jogging increases blood flow to the muscles and joints thus increasing their flexibility and decreasing the chance of re-injury. Since the amount of warm-up will vary from person to person, the athlete should jog until developing a light sweat, then progress to the stretching phase.

Stretching: Since throwing involves all muscles in the body, all muscle groups should be stretched prior to throwing. This should be done in a systematic fashion beginning with the legs and including the trunk, back, neck and arms. Continue with capsular stretches and L-bar range of motion exercises.

Throwing Mechanics: A critical aspect of the ITP is maintenance of proper throwing mechanics throughout the advancement. The use of the Crow-Hop method simulates the throwing act, allowing emphasis of the proper body mechanics. This throwing method should be adopted from the set of the ITP. Throwing flat footed encourages improper body mechanics, placing increases stress on the throwing arm and, therefore, predisposing the arm to re-injury. The pitching coach and sports biomechanicianist (if available) may be valuable allies to the rehabilitation team with their knowledge of throwing mechanics.

Components of the Crow-Hop method are first a hop, then a skip, followed by the throw. The velocity of the throw is determined by the distance, whereas the ball should have only enough momentum to travel each designed distance.

Again, emphasis should be placed upon proper throwing mechanics when the athlete beings phase two: "Throwing Off the Mound" or from the athlete's respective position, to decrease the chance of re-injury.

Throwing: Using the Crow-Hop method, the athlete should begin warm-up throws at a comfortable distance (approximately 30-45 ft.) and then progress to the distance indicated for that phase (refer to Table 1). The program consists of throwing at each step 2 to 3 times without pain or symptoms before progressing to the next step. The object of each phase is for the athlete to be able to throw the ball without pain the specified number of feet (45 ft., 60 ft., 90 ft., 120 ft., 150 ft., 180 ft.), 75 times at each distance. After the athlete can throw at the prescribed distance without pain they will be ready for throwing from flat ground 60ft, 6 in. in the normal pitching mechanics or return to their respective position (step 14). At this point, full strength and confidence should be restored in the athlete's arm. It is important to stress the Crow-Hop method and proper mechanics with each throw. Just as the advancement to this point has been gradual and progressive, the return to unrestricted throwing must follow the same principles. A pitcher should first throw only fast balls at 50%, progressing to 75% and 100%. At this time, he may start more stressful pitches such as breaking balls. The position player should simulate a game situation, again progressing at 50-75 -100%. Once again, if an athlete has increased pain, particularly at the joint, the throwing program should be backed off and re-advanced as tolerated, under the direction of the rehabilitation team.

Batting: Depending on the type of injury that the athlete has, the time of return to batting should be determined by the physician. It should be noted that stress placed upon the arm and should in the batting motion are very different from the throwing motion. Return to unrestricted use of the bat should also follow the same progression guidelines as seen in the training program. Begin with dry swings progressing to hitting off the tee, then soft toss and finally live pitching.

Summary: In using the Interval Throwing Program (ITP) in conjunction with a structured rehabilitation program, the athlete should be able to return to full competition status, minimizing any chance of re-injury. The program and its progression should be modified to meet the specific needs of each individual athlete. A comprehensive program consisting of a maintenance strength and flexibility program, appropriate warm-up and cool down procedures, proper pitching mechanics, and progressive throwing and batting will assist the baseball player in returning safely to competition.

<p>45' Phase</p> <p>Step 1: A) Warm-up Throwing B) 45' (25 Throws) C) Rest 5-10 min. D) Warm-up Throwing E) 45' (25 Throws)</p> <p>Step 2: A) Warm-up Throwing B) 45' (25 Throws) C) Rest 5-10 min. D) Warm-up Throwing E) 45' (25 Throws) F) Rest 5-10 min. G) Warm-up Throwing H) 45' (25 Throws)</p>	<p>60' Phase</p> <p>Step 3: A) Warm-up Throwing B) 60'(25 Throws) C) Rest 5-10 min. D) Warm-up Throwing E) 60' (25Throws)</p> <p>Step 4: A) Warm-up Throwing B) 60' (25 Throws) C) Rest 5-10 min. D) Warm-up Throwing E) 60' (25 Throws) F) Rest 5-10 min. G) Warm-up Throwing H) 60' (25 Throws)</p>	<p>90' Phase</p> <p>Step 5: A) Warm-up Throwing B) 90' (25 Throws) C) Rest 5-10 min. D) Warm-up Throwing E) 90' (25 Throws)</p> <p>Step 6: A) Warm-up Throwing B) 90' (25 Throws) C) Rest 5-10 min. D) Warm-up Throwing E) 90' (25 Throws) F) Rest 5-10 min. G) Warm-up Throwing H) 90' (25 Throws)</p>	<p>120' Phase</p> <p>Step 7: A) Warm-up Throwing B) 120' (25 Throws) C) Rest 5-10 min. D) Warm-up Throwing E) 120' (25 Throws)</p> <p>Step 8: A) Warm-up Throwing B) 120' (25 Throws) C) Rest 5-10 min. D) Warm-up Throwing E) 120' (25 Throws) F) Rest 5-10 min. G) Warm-up throwing H) 120' (25 Throws)</p>
<p>150' Phase</p> <p>Step 9: A) Warm-up Throwing B) 150' (25 Throws) C) Rest 5-10 min. D) Warm-up Throwing E) 150' (25 Throws)</p> <p>Step 10: A) Warm-up Throwing B) 150' (25 Throws) C) Rest 5-10 min. D) Warm-up Throwing E) 150' (25 Throws) F) Rest 5-10 min. G) Warm-up Throwing H) 150' (25 Throws)</p>	<p>180' Phase</p> <p>Step 11: A) Warm-up Throwing B) 180' (25 Throws) C) Rest 5-10 min. D) Warm-up Throwing E) 180' (25 Throws)</p> <p>Step 12: A) Warm-up Throwing B) 180' (25 Throws) C) Rest 5-10 min. D) Warm-up Throwing E) 180' (25 Throws) F) Rest 5-10 min. G) Warm-up Throwing H) 180' (25 Throws)</p>	<p>Step 13: A) Warm-up Throwing B) 180' (25 Throws) C) Rest 5-10 min. D) Warm-up Throwing E) 180' (25 Throws)</p> <p>Step 14: Begin Throwing off the mound or return to respective position.</p>	<p>Throwing Program should be performed every other day, unless otherwise specified by your physician or rehabilitation specialist.</p> <p>Perform each step ___ times before progressing to next step.</p>
<p>Flat Ground Throwing</p> <p>A) Warm-up Throwing B) Throw 60 ft. (10-15 throws) C) Throw 90 ft. (10 throws) D) Throw 120 ft. (10 throws) E) Throw 60 ft. (flat ground) using pitching mechanics (20-30 throws)</p>		<p>Flat Throwing</p> <p>A) Warm-up Throwing B) Throw 60 ft. (10-15 throws) C) Throw 90 ft. (10 throws) D) Throw 120 ft. (10 throws) E) Throw 60 ft. (flat ground) using pitching mechanics (20-30 throws) F) Throw 60-90 ft. (10-15 throws) G) Throw 60 ft. (flat ground) using pitching mechanics (20 throws)</p>	

Interval Throwing Program – Throwing Off the Mound – Phase II

After the completion of Phase I of the Interval Throwing Program (ITP) and the athlete can throw to the prescribed distance without pain the athlete will be ready for throwing off the mound or return to their respective position. At this point, full strength and confidence should be restored in the athlete's arm. Just as the advancement to this point has been gradual and progressive, the return to unrestricted throwing must follow the same principles. A pitcher should first throw only fast ball at 50%, progressing to 75% and 100%. At this time, the athlete may start more stressful pitches such as breaking balls. The position player should simulate a game situation, again progressing at 50-75-100%. Once again, if an athlete has increased pain, particularly at the joint, the throwing program should be backed off and re-advanced as tolerated, under the direction of the rehabilitation team.

Summary: In using the Interval Throwing Program (ITP) in conjunction with a structured rehabilitation program, the athlete should be able to return to full competition status, minimizing any chance of re-injury. The program and its progression should be modified to meet the specific needs of each individual athlete. A comprehensive program consisting of a maintenance strength and flexibility program, appropriate warm-up and cool-down procedures, proper pitching mechanics, and progressive throwing and batting will assist the baseball player in returning safely to competition.

STAGE ONE: FASTBALLS ONLY

- Step 1: Interval Throwing (Use Interval Throwing to 120' Phase as warm-up)
15 Throws off mound 50%
- Step 2: Interval Throwing
30 Throws off mound 50%
- Step 3: Interval Throwing ALL THROWING OFF THE MOUND SHOULD BE
45 Throws off mound 50% DONE IN THE PRESENCE OF YOUR PITCHING
COACH TO STRESS PROPER THROWING
MECHANICS
- Step 4: Interval Throwing
60 Throws off mound 50%
- Step 5: Interval Throwing (Use speed gun to aid in effort control)
70 Throws off mound 50%
- Step 6: 45 Throws off mound 50%
30 Throws off mound 75%
- Step 7: 30 Throws off mound 50%
45 Throws off mound 75%
- Step 8: 65 Throws off mound 75%
10 Throws off mound 50%

STAGE TWO: FASTBALLS ONLY

- Step 9: 60 Throws off mound 75%
15 Throws in Batting Practice
- Step 10: 50-60 Throws off mound 75%
30 Throws in Batting Practice
- Step 11: 45-50 Throws off mound 75%
45 Throws in Batting Practice

STAGE THREE

- Step 12: 30 Throws off mound 75% warm-up
15 Throws off mound 50% BREAKING BALLS
45-60 Throws in Batting Practice (fastball only)
- Step 13: 30 Throws off mound 75%
30 Breaking Balls 75%
30 Throws in Batting Practice
- Step 14: 30 throws off mound 75%
60-90 Throws in Batting Practice (Gradually increase breaking balls)
- Step 15: SIMULATED GAME: PROGRESSING BY 15 THROWS PER WORKOUT (Pitch Count)