

Interval Throwing Protocol

Patient _____ Date _____ Position _____

Start only after physician / therapist clearance. One step per throwing day.

HOW TO USE THIS PROGRAM (FROM YOUR THERAPIST)

Takes several weeks to complete — do not rush the distances.

Typical rhythm: Day 1 (perform a step) → Day off → Day 2 (next step).

Must have no pain during or after a step before moving to the next step.

Perform only one step per throwing day, every other day unless your therapist says otherwise.

Criteria for return to throwing

- AROM and PROM of the shoulder within normal limits and non-painful.
- 5/5 manual muscle testing strength on upper-extremity assessment.
- Patient to complete established plyometric training program pain-free.
- Patient to demonstrate proper throwing mechanics within identified phases of throwing.

Rules before the interval throwing program is initiated

- Maintain appropriate throwing mechanics through the crow-hop method (hop, then skip, then throw).
- Velocity is determined by distance — the ball should have only enough momentum to travel each designated distance.
- Frequency is every other day.
- Weight training may be done the same day as throwing, but only after throwing is completed.
- Warm up with cardiovascular exercise, then stretch legs, trunk, back, neck, and arms.

What this program is for

The Interval Throwing Program (ITP) gradually returns motion, strength, and confidence in the throwing arm after injury or surgery by progressing through graduated throwing distances. It is started only after the athlete's physician clears throwing, and it is performed under the supervision of the rehabilitation team (physician, physical therapist, and athletic trainer).

There is no set number of days to finish. Soreness and a dull, diffuse ache in muscle and tendon can be expected. Sharp pain, especially in the joint, means stop all throwing until that pain is gone. If pain continues, contact your physician.

Interval Throwing Protocol

Throwing program progression

Adapted by Wilk, et al. • 15–25 throws at the listed distance

Each odd-numbered step is a “Day 1” session (two throwing bouts). Each even-numbered step is a “Day 2” session (three throwing bouts). Rest a full day between steps. Advance a distance only when the current step is pain-free during and after throwing.

45' Phase

Step 1 • Day 1
A) Warm-up throwing B) 45' (15–25 throws) C) Rest 5–10 min. D) Warm-up throwing E) 45' (15–25 throws)

60' Phase

Step 3 • Day 1
A) Warm-up throwing B) 60' (15–25 throws) C) Rest 5–10 min. D) Warm-up throwing E) 60' (15–25 throws)

90' Phase

Step 5 • Day 1
A) Warm-up throwing B) 90' (15–25 throws) C) Rest 5–10 min. D) Warm-up throwing E) 90' (15–25 throws)

120' Phase

Step 7 • Day 1
A) Warm-up throwing B) 120' (15–25 throws) C) Rest 5–10 min. D) Warm-up throwing E) 120' (15–25 throws)

Step 2 • Day 2

A) Warm-up throwing B) 45' (15–25 throws) C) Rest 5–10 min. D) Warm-up throwing E) 45' (15–25 throws) F) Rest 5–10 min. G) Warm-up throwing H) 45' (15–25 throws)
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Step 4 • Day 2

A) Warm-up throwing B) 60' (15–25 throws) C) Rest 5–10 min. D) Warm-up throwing E) 60' (15–25 throws) F) Rest 5–10 min. G) Warm-up throwing H) 60' (15–25 throws)
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Step 6 • Day 2

A) Warm-up throwing B) 90' (15–25 throws) C) Rest 5–10 min. D) Warm-up throwing E) 90' (15–25 throws) F) Rest 5–10 min. G) Warm-up throwing H) 90' (15–25 throws)
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Step 8 • Day 2

A) Warm-up throwing B) 120' (15–25 throws) C) Rest 5–10 min. D) Warm-up throwing E) 120' (15–25 throws) F) Rest 5–10 min. G) Warm-up throwing H) 120' (15–25 throws)

150' Phase

Step 9 • Day 1
A) Warm-up throwing B) 150' (15–25 throws) C) Rest 5–10 min. D) Warm-up throwing E) 150' (15–25 throws)

180' Phase

Step 11 • Day 1
A) Warm-up throwing B) 180' (15–25 throws) C) Rest 5–10 min. D) Warm-up throwing E) 180' (15–25 throws)

Step 10 • Day 2

A) Warm-up throwing B) 150' (15–25 throws) C) Rest 5–10 min. D) Warm-up throwing E) 150' (15–25 throws) F) Rest 5–10 min. G) Warm-up throwing H) 150' (15–25 throws)

Step 12 • Day 2

A) Warm-up throwing B) 180' (15–25 throws) C) Rest 5–10 min. D) Warm-up throwing E) 180' (15–25 throws) F) Rest 5–10 min. G) Warm-up throwing H) 180' (15–25 throws)

Advance

Steps 13–14
Step 13 • Day 1 A) Warm-up throwing B) 180' (15–25 throws) C) Rest 5–10 min. D) Warm-up throwing E) 180' (15–25 throws)
Step 14 Begin throwing off the mound, or return to the athlete's respective position. Then start Phase II (page 4).

Asking a coach to observe throwing form is recommended while progressing through this protocol.

Warm-up throws are at a comfortable distance (about 30–45 ft) using the crow-hop, then move to the listed distance for that step.

Interval Throwing Protocol

Why the program is built this way

- Throwing transfers energy from the feet through the legs, pelvis, and trunk, then out the shoulder, elbow, and hand — the whole body must be trained.
- A graduated progression lessens the chance of re-injury.
- Proper warm-up is essential. Most injuries occur as the result of fatigue.
- Proper throwing mechanics lessen the incidence of re-injury.
- Baseline requirements: pain-free range of motion, adequate muscle power, and adequate resistance to fatigue.

Individual variability

Each level is achieved without pain or complication before the next level is started. There is no set timetable. Highly competitive athletes often want to increase intensity too soon; that raises the risk of re-injury and can slow rehabilitation. Follow the program as written. Listen to your body — it will tell you when to slow down. Some athletes throw every other day; others need every third or fourth day because of pain or swelling.

Weight training

Supplement the ITP with a high-repetition, low-weight program that balances anterior and posterior musculature, with special emphasis on the posterior rotator cuff. Weight training will not increase throwing velocity, but it will increase the arm's resistance to fatigue and injury. Lift on throwing days only after throwing is finished. Use the day in between for flexibility and recovery. This maintenance pattern should continue into and through the season. Weight training is of no benefit unless it is paired with a sound flexibility program.

Warm-up, stretching, and the crow-hop

Warm-up: Jog until you develop a light sweat, then stretch. Stretching: Work systematically from the legs through the trunk, back, neck, and arms. Continue with capsular stretches and L-bar range-of-motion exercises.

Mechanics: Use the crow-hop (hop, then skip, then throw) from the first step of the ITP. Throwing flat-footed encourages poor mechanics and places extra stress on the throwing arm. The pitching coach and sports biomechanist (if available) are valuable allies. The ball should have only enough momentum to travel the designated distance.

Flat-ground throwing (after the 180' phase)

Option A

- 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)

Option B

- 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, pitching mechanics (20–30 throws)
- F) Throw 60–90 ft (10–15 throws)
- G) Throw 60 ft, flat ground, pitching mechanics (20 throws)

Batting

Time of return to batting is determined by the physician. Stress on the arm and shoulder in batting is different from throwing. Return to unrestricted use of the bat should follow the same idea as throwing: dry swings, then hitting off the tee, then soft toss, then live pitching.

Interval Throwing Protocol

When Phase II starts

After Phase I is complete and the athlete can throw the prescribed distance without pain, the athlete is ready to throw off the mound or return to the respective position. Full strength and confidence should be restored in the arm. Advancement stays gradual. A pitcher first throws only fastballs at 50%, then 75%, then 100%. Breaking balls come later. Position players simulate a game situation at 50–75–100%. If joint pain increases, back the program off and re-advance as tolerated under the rehabilitation team.

COACHING RULE

All throwing off the mound should be done in the presence of your pitching coach to stress proper mechanics.

Stage one — fastballs only

- 1 Interval throwing + 15 throws off mound at 50%
- 2 Interval throwing + 30 throws off mound at 50%
- 3 Interval throwing + 45 throws off mound at 50%
- 4 Interval throwing + 60 throws off mound at 50%
- 5 Interval throwing + 70 throws off mound at 50% (use a speed gun to help control effort)
- 6 45 throws off mound at 50% + 30 throws off mound at 75%
- 7 30 throws off mound at 50% + 45 throws off mound at 75%
- 8 65 throws off mound at 75% + 10 throws off mound at 50%

Step 1 warm-up: use Interval Throwing to the 120' phase.

Stage two — fastballs only

- 9 60 throws off mound at 75% + 15 throws in batting practice
- 10 50–60 throws off mound at 75% + 30 throws in batting practice
- 11 45–50 throws off mound at 75% + 45 throws in batting practice

Stage three — breaking balls introduced

- 12 30 throws off mound at 75% (warm-up) + 15 throws off mound at 50% breaking balls + 45–60 BP fastballs
- 13 30 throws off mound at 75% + 30 breaking balls at 75% + 30 throws in batting practice
- 14 30 throws off mound at 75% + 60–90 throws in batting practice (gradually increase breaking balls)
- 15 Simulated game — progress by 15 throws per workout (pitch count)

References: Wilk KE, Meister K, Andrews JR. Current Concepts in the Rehabilitation of the Overhead Throwing Athlete. *AJSM* 2002;30(1):136–151.

Reinold MM, Wilk KE, Reed J, Crenshaw K, Andrews JR. Interval Sport Programs. *J Orthop Sports Phys Ther.* 32(6):293–298.

Clinic source adaptation: May 2012, Brad Fowler, PT & Michael Woy, PT, LAT, ATC.