**Supplemental Table 1a: Thrower’s Ten Exercise Program.**130,132

**Modified from:** Wilk KE, Andrews JR, Arrigo CA. *Preventive and Rehabilitative Exercises for the Shoulder and Elbow.* American Sports Medicine Institute. 5th ed. Birmingham, AL; 2001. and Wilk KE, Arrigo CA. A standardized isokinetic testing protocol for the throwing shoulder: the throwers’ series. *Isokinet Exerc Sci*. 1991;1:5.

**Tools: Rubber tubing, exam table or workout bench, 2-5 pound dumbbell**

**Workload: Two to three sets of 10**

|  |  |
| --- | --- |
| **1a) Diagonal pattern D2 extension** | Grip tubing handle with dominant hand overhead and out to the side. Pull tubing down and across the body to the opposite side of leg. During the motion, lead with your thumb. |
| **1b) Diagonal pattern D2 flexion** | Grip tubing handle in dominant hand, begin with arm out from side 45 degrees and palm facing backward. After turning palm forward, proceed to flex elbow and bring arm up and over the nondominant shoulder. Turn palm down and reverse to take arm back to starting position.  |
| **2a) ER at 0 degrees abduction** | Stand with involved elbow fixed at side, elbow at 90 degrees and involved arm across front of body. Grip tubing handle while the other end of the tubing is fixed to a stationary object. Pull out with arm, keeping elbow at side.  |
| **2b) IR at 0 degrees abduction** | Standing with elbow at side, fixed at 90 degrees and should rotated out. Grip tubing handle while other end of tubing is fixed to a stationary object. Pull arm across body, keeping elbow at side.  |
| **2c) ER at 90 degrees abduction** | Stand with shoulder abducted 90 degrees and elbow flexed 90 flexed. Grip tubing handle while the other end is fixed straight ahead, slightly lower than the shoulder. Keeping shoulder abducted, rotate the shoulder back, keeping elbow at 90 degrees.  |
| **2d) IR at 90 degrees abduction** | Stand with shoulder abducted to 90 degrees, externally rotated 90 degrees and elbow bent 90 degrees. Keeping shoulder abducted, rotate shoulder forward, keeping elbow bent at 90 degrees.  |
| **3) Shoulder abduction to 90°**  | Stand with arm at side, elbow straight, and palm against side. Raise arm to the side, palm down, until arm reaches 90 degrees to shoulder level.  |
| **4) Scaption in IR** | Stand with elbow straight and thumb up. Raise arm to shoulder level at 30 degree angle in front of body to shoulder height.  |
| **5) Prone horizontal abduction**  | Lie on table, face down, with involved arm hanging straight to the floor, palm facing down. Raise arm out to side, parallel to floor. Hold one to two seconds and lower slowly. |
| **6a) Prone Horizontal Abduction**  | Lie on table, face down, with involved arm hanging straight to the floor, thumb rotated up (like a hitchhiker). Raise arm out to the side slightly in front of shoulder, parallel to the floor.  |
| **6b) 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.  |
| **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.  |
| **8) Push-Ups** | Start in the down position with hands no more than shoulder width apart. Push up as high as possible, rolling shoulders forward after elbows are straight.  |
| **9a) Bicep Curls** | Standing with arm against side and palm facing inward, bend elbow upward turning palm up as you progress.  |
| **9b) Triceps Extension** | Raise involved arm overhead. Provide support at elbow from uninvolved hand. Straighten arm overhead. |
| **10a-d) Wrist Extension, Flexion, Supination and Pronation** | Wrist Extension: Supporting the forearm and with palm facing downward, raise weight in hand as far as possible. 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.Wrist Supination: Forearm supported on table with wrist in neutral position. Using a weight or hammer, roll wrist taking palm up.Wrist Pronation: Forearm should be supported on a table with wrist in neutral position. Using a weight or hammer, roll wrist taking palm down. |

*ER = External Rotation; IR = Internal Rotation*

\*Hold the position in each exercise for one to two seconds before slowly returning to starting position\*