Rehabilitation of the Throwing Athlete

Where We Are in 2014

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KEYWORDS

• Overhead athlete • Rehabilitation • Shoulder

KEY POINTS

- The rehabilitation program is divided into 4 phases and the progression of an athlete depends on the successful completion of each phase.
- The systematic implementation of incorporating applied stresses and forces via functional and sport-specific drills effectively allows a return to activity.
- An effective evaluation aids in the development of an optimal rehabilitation program to address the causative factors of an athlete's pathology.
- The postoperative range-of-motion (ROM) progression is based on an assessment of an athlete's quality of end feel, with an accelerated restoration warranted with a firm end feel and a slower restoration with a soft end feel.

The shoulder joint is a common site of pathology in overhead athletes. Injuries to the shoulder joint region frequently occur in the overhead thrower. Conte and colleagues[1] reported that shoulder injuries represented 27.8% of all disabled days (DLs) in professional baseball players. Based on DLs, Posner and coworkers[2] noted that pitchers experienced a 34% higher incidence injury rate compared with fielders in Major League Baseball, and when pitchers were placed on DLs for injuries to the upper extremity they remained so for a longer length of time (74.25 days vs 54.15 days). According to the National Collegiate Athletic Association Injury Surveillance System, for all injuries that required 10 plus days' time loss from 1998 to 2004, shoulder strains/tendinitis injuries equated to 8.2% of all injuries occurring during games and 16.7% of injuries during practice.[3] The shoulder has also been reported the most

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common injury region in high school baseball players, representing 34.2% of all injuries in pitchers and 24.9% in catchers with an overall prevalence of 17.6% for all positions.[4]

Shoulder injuries are common due to the repetitive nature of overhead throwing. There are tremendous forces placed on the glenohumeral joint as angular velocities reach 7250°/s and anterior shear forces approach 50% body weight during the throwing motion.[5–7] Athletes also generate high levels of muscular activity during the throwing motion, with forces reaching 120% maximal volitional isometric contraction.[8] Although an inherent degree of mobility is needed during the throwing motion, athletes depend on dynamic stability during the throwing motion to minimize the potential for injury. Therefore, an essential balance is needed between the extreme mobility generated during the throwing motion and the required stability to maintain joint integrity that can present as a significant challenge.

The rehabilitation program described in this article for the treatment of overhead athletes is a multiphased approach focused on a return to prior level of function via a systematic process. This program is divided into 4 phases that are designed to allow a gradual progression of exercises and implied stresses that methodically increase and build on the previous exercises to focus on restoring strength, increasing dynamic stability, and developing neuromuscular control for overhead athletes. The keys to an effective and successful restoration of function are identification of each athlete's pathologic causative factor and providing a specific treatment program to address this condition. This article describes the nonoperative rehabilitation for overhead athletes and outlines the postoperative treatment after both a superior labrum from anterior to posterior (SLAP) repair and a capsular plication procedure.

NONOPERATIVE REHABILITATION

The nonoperative rehabilitation program is designed based on the examination findings from each athlete's presentation. The program, outlined in this article, is criteria based; therefore, it is adaptable and applicable to both traumatic and nontraumatic injuries by allowing a clinician to progress each athlete throughout the rehabilitation program based on both clinical assessment and successful completion of each phase of treatment. The program is tailored to address the causative factors for each athlete based on clinical findings and is divided into 4 phases.

PHASE 1—ACUTE PHASE

The goals in this initial phase, phase 1, of the rehabilitation program are to diminish pain and inflammation, normalize motion, correct postural adaptations, normalize muscle balance, and re-establish baseline dynamic joint stability. During the acute phase of treatment, an athlete may be prescribed nonsteroidal anti-inflammatory drugs and/or local injection; however; clinically, local therapeutic modalities are used to diminish pain and inflammation, such as ice, iontophoresis, phonophoresis, and electrical stimulation. Athletes are educated on activity modification/avoidance (such as throwing, strenuous activities, and exercises) as well as sitting and standing postural education to increase subacromial space.[9]

After the abating of the acute inflammation, a rehabilitation specialist may implement the use of moist heat, warm whirlpool, and/or ultrasound aimed to increase local circulation/soft tissue extensibility to improve extensibility of the joint capsule and musculotendinous tissues along with ROM and joint mobilization techniques. Decreased electromyography (EMG) activity of 23% with a corresponding reduction of 32% external rotation (ER) force production has been documented in a painful