

Editorial Commentary for In Throwers with Posterior Instability, Rotator Cuff Tears are Common but Do Not Affect Surgical Outcomes

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Editorial Commentary

Superior labral pathology is an exceedingly common entity among throwers, and in recent years, a number of reports have elucidated the prevalence of posterior glenohumeral instability among overhead athletes (baseball, softball, volleyball.) However, within this unique patient population, these conditions should not be viewed as separate clinical entities, but, rather as findings that exist on a single pathomechanic spectrum. In 2020, we now know that the complexity of the symptomatic thrower's shoulder is a consequence of the complex anatomic relationships between the biceps tendon, capsulolabral tissues, posterosuperior rotator cuff, and the glenoid. In 2003, Burkhart et al. noted that diminished glenohumeral range of motion (i.e. glenohumeral internal rotation deficit "GIRD") was common among throwers with painful shoulders. These authors further described a posterior-inferior capsular contracture as the "essential lesion" in the development of diminished range of motion in conjunction with impingement of the supraspinatus tendon between the greater tuberosity and the posterior-superior labrum ("pathologic internal impingement") [1,2]. It is this internal impingement that so often manifests as partial thickness, articular sided supraspinatus tears in the throwing athlete. But these findings are now perhaps better understood as sequelae of a number of anatomic factors, including humeral retrotorsion, contractures of the coracohumeral ligament, pectoralis, and anterior deltoid, as well as dynamic muscle stiffness that can occur in response to the repetitive strains involved in overhead throwing.

The labrum does not have a consistent anatomy around the entire glenoid face, as the superior labrum is more loosely attached to the glenoid margin, and, consequently, is more mobile throughout the range of motion during overhead activities [3]. Conversely, the inferior labrum, is well attached to the glenoid margin and relatively immobile. These zone-specific, anatomic variations have important implications for glenohumeral mechanics during the throwing cycle. As long as the superior labrum is capable of maintaining its function as an adequate tension band linked to an intact inferior labrum, some degree of superior labral detachment may actually be beneficial in order to facilitate maximum cocking during the throwing cycle [4]. This fact likely explains why asymptomatic throwers are so commonly found to have SLAP lesions on MRI [5]. However, the throwing shoulder can become symptomatic when a labral tear extends from the biceps anchor into the posterior band of the inferior glenohumeral ligament (PIGHL.) Oftentimes, the progression of this pathology in an inferior direction leads to flattening of the labrum and/or an intrasubstance delamination. The result is an ensuing pathologic cascade, as the tension band becomes incompetent, decreasing both the capsulolabral bumper effect of the labrum inferior and the tension in the PIGHL. Posterior instability during overhead throwing is the end result of this process.

Despite the growing body of literature pertaining to posterior glenohumeral instability, there remains a relative paucity of results specific to overhead throwing athletes and even less has been written about the outcomes of posterior labral repairs when performed

in conjunction with partial thickness rotator cuff tears. The preponderance of current information suggests that throwers remain a difficult group of patients to treat when it comes to returning them to their *pre-injury level of performance*. Several recently published reports have suggested that throwers, particularly pitchers, undergoing posterior stabilization procedures are able to return to sport, although return to their pre-injury level of performance is less commonly observed. McClincy et al. performed a review of 48 overhead throwing athletes (18 pitchers, 38%), matching this cohort to non-throwing athletes that underwent arthroscopic posterior labral repair. These authors observed no significant differences in patient reported outcomes between groups were observed at a mean follow-up of 37 months (range: 12 to 97 months.) However, only 60% of throwers were able to return to their pre-injury level of competitive throwing, with only 50% of pitchers were able to return to their pre-injury level of competitive throwing [6]. Fourman et al. published the largest series to date related to clinical outcomes following arthroscopic Type VIII SLAP (superior labrum anterior posterior tears extending inferiorly into the PIGHL) repair in 46 patients (27 throwers, 19 non-throwers), noting significant improvements in functional outcomes were observed throughout the entire cohort (mean age: 24.2 ± 9.2 years.) Once again, however, throwers reported more pain, decreased range of motion, and lower Kerlan Jobe Orthopaedic Clinic (KJOC) scores when compared to non-throwers [7]. Most recently, Kercher et al. reported on 32 baseball players with a mean follow-up of 41.6 months (range: 24-92 months.) These authors noted that 94% of players were able to return to sport, but again, only 61% of players were able to return to the previous level of play [8]. Taken together, these studies illustrate two important points. First, posterior instability is a commonly observed in the setting of superior labral pathology, and when evaluating these patients, consideration should always be paid to the possibility (and likelihood) of combined superior and posterior labral lesions. Second, when treating these athletes surgically, one must differentiate return to play from pre-injury level of performance. The former is generally achieved, while the latter is less reliably achieved. This is a critical distinction that should be made and used in order to temper athletes' expectations regarding the implications of surgical intervention on future performance.

The spectrum of these injuries commonly involves partial thickness, articular sided rotator cuff tears, however, we are aware of only one series published specifically on the surgical outcomes associated with posterior instability and concomitant rotator cuff tears. In 2018, Arner et al. reported on the clinical outcomes of 56 throwing athletes undergoing posterior labral repair [9]. Twenty-

four athletes were noted to have concomitant rotator cuff pathology, while 32 athletes were found to have isolated posterior labral tears. All rotator cuff tears were found to encompass less than 50% tendon thickness, and all rotator cuff tears were treated with debridement alone. Mean postoperative American Shoulder Elbow Society (ASES) scores improved significantly in both groups. Similarly, post-operative pain, instability, and functional scores all improved in both groups. Additionally, these authors did not observe significant differences between those athletes with and without rotator cuff pathology in any of the reported outcome measures. However, similar to the previously reviewed studies, the authors noted a substantial discrepancy between return to play and return to pre-injury level of performance in the cohort with combined posterior instability and partial articular sided rotator cuff tears: 22 of 24 (92%) athletes returning to sport, but only 16/24 (67%) returning to their same level of performance. And while the rotator cuff tears in this series were treated with a limited debridement, a recently published systematic review on return to sport rates among competitive athletes undergoing rotator cuff repair underscores the more general challenges associated with treating this unique patient population. Among the 15 studies including 347 overhead athletes (81 competitive and 266 recreational), 61.5% of competitive athletes were able to return to their same level of play or higher [10].

Intra-articular lesions commonly observed in the thrower's shoulder with posterior instability exist on a spectrum, and effective surgical management necessitates an understanding of a well-described pathomechanic process. Partial articular sided rotator cuff tears are frequently observed, and a limited debridement of these lesions remains the mainstay of treatment. Returning these athletes to their pre-injury level of play remains a challenging proposition. Surgeons must acknowledge these facts and beware of their implications on athletic performance among this unique patient population. Future efforts should be devoted towards improving diagnostic modalities and expanding clinical studies focused on examining the efficacy of biologic adjuncts in the treatment of posterior glenohumeral instability.

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