



## Predicting “Return to Play” in Collegiate Athletes With Shoulder Instabilities

Written by Jill Shuman

Young collegiate athletes often experience glenohumeral instability. A review of the National Collegiate Athletic Association Injury Surveillance System demonstrated a shoulder instability injury rate of .12 per 1000 exposures, with the highest rates in contact sports [Owens BD et al. *Am J Sport Med* 2009]. However, there is still no consensus as to the optimal treatment of the in-season athlete with shoulder instability.

According to Jonathan Dickens, MD, John A. Feagin Jr. Sports Medicine Fellowship and Keller Army Hospital, West Point, New York, USA, in-season intercollegiate athletes often do not want to accept the time lost from sport as they seek immediate and safe return to play (RTP) within the competitive season. There is a paucity of data regarding the safety of in-season return to sports after a shoulder instability episode; therefore, Dr. Dickens and his colleagues at 3 US military academies designed a prospective multicenter observational study to determine the likelihood of return to sport and recurrence following an in-season anterior shoulder instability event. Athletes were categorized according to the type of instability (subluxation vs dislocation); the researchers then evaluated the injury factors and baseline patient-reported outcomes that predicted successful RTP.

The study enrolled 53 intercollegiate athletes with a total of 45 anterior shoulder instability events. Two-thirds of the athletes had sustained their injuries playing football. All patients underwent a standardized accelerated rehabilitation program without immobilization. A brace was used at the discretion of the treating physician and the athlete’s ability to perform sport-specific tasks with the brace. Shoulder-specific patient-reported outcomes were completed at the time of injury and included 4 shoulder assessment tools.

Dr. Dickens then reviewed the results of the trial. The median time to RTP was 5 days; 73% of athletes attempted a return to sport for all or part of the season. Among the 27% of athletes not able to return to sport by the end of the season, 59% had insufficient return of function, and 33% incurred the injuries at the end of the season. Athletes with subluxations were 5 times more likely to return to sport during the season than are those with dislocations.

Significant predictors of RTP included higher baseline scores at the time of the injury on the Western Ontario Shoulder Instability Index (WOSI;  $p < .037$ ) and the Simple Shoulder Test (SST;  $p < .044$ ). For every 1-point

increase in the WOSI score at baseline, an athlete was 5% more likely to return to sport in the same season ( $p = .037$ ). The study also found that scores on the WOSI, SST, and American Shoulder Surgeons Standardized Shoulder Assessment Form at the time of injury were all predictive of faster RTP. For every 10-point increase on the SST, an athlete returned to play 1.2 days sooner.

The authors defined successful RTP as returning to midseason competition without further recurrent instability events; only 36% of the athletes in this study were successful. There was no significant difference in recurrent instability between subluxation and dislocation cohorts, and recurrent instability following return to sport was not associated with failure to complete the season.

Dr. Dickens concluded that according to the present study, athletes can expect to return to sport within 1 week of nonoperative treatment of glenohumeral instability, with the return being sooner if patient had a subluxation rather than a dislocation.

## Redefining Critical Bone Loss in Shoulder Instability

Written by Jill Shuman

Glenoid bone deficiency has been implicated as a significant risk factor for failure after arthroscopic stabilization, with data suggesting that 20% to 25% glenoid loss is a “critical level” at which this risk increases [Boileau P et al. *J Bone Joint Surg Am* 2006; Boileau P et al. *Clin Orthop Relat Res* 2014]. However, there is a paucity of data available to indicate whether a lesser degree of bone loss results in better arthroscopic outcomes.

John Tokish, MD, Tripler Army Medical Center, Hickam AFB, Hawaii, described his group’s study to examine whether glenoid bone loss below “critical” levels would affect redislocation and functional outcomes following arthroscopic repair. Data were obtained from an ongoing quality improvement program at Tripler Army Medical Center and included 72 military personnel who underwent isolated anterior Bankart repairs from June 2009 to September 2011 without having undergone concomitant procedures or having extended labral pathology. The study included 68 men and 4 women with an average age of 26.3 years.

Objective data used for evaluation included demographics, operative information with the number of anchors used, and advanced imaging estimates of bone loss. Subjective data included scores on the Western Ontario Shoulder Index (WOSI) and the Single Assessment Numeric Evaluation (SANE), as well as patient-reported dislocations. A minimally clinically important difference on the WOSI

Table 1. Results by Quartile\*

Quartile	n	Bone Loss					Recurrence Rate, %	WOSI		SANE
		Mean	p Value	SD	Min	Max		Mean	p Value**	Mean
Q1	18	2.8	< 0.001	2.8	0.0	7.1	5.6	383.3	0.02	62.1
Q2	19	10.4	< 0.001	1.9	7.3	13.5	5.3	594.0	0.04	65.2
Q3	18	16.1	< 0.001	2.0	13.5	19.8	11.1	839.5	0.02	52.0
Q4	18	24.5		4.6	20.0	35.5	27.8	1187.6		46.1
Total	73	13.4		8.5	0.0	35.5	12.3	756.8		57.1

SANE=Single Assessment Numeric Evaluation; WOSI=Western Ontario Shoulder Index.

Bone loss by quartile went from 2.8% (Q1) to 24.5% (Q4). Recurrence rates went up with increasing bone loss, from 6% (Q1) to 28% (Q4; yellow). WOSI scores worsened with each quartile, above mal clinically important difference when bone loss was > 13.5% (red).

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\*On November 12, 2014, the column headings in this table were edited. \*\*On November 12, 2014, these p values were changed from 0.002, 0.002, and 0.002 to 0.02, 0.04, and 0.02.

Table 2. Results by Quartile (All Recurrent Dislocations Excluded)\*

Quartile	n	Bone Loss					Max	WOSI		SANE
		Mean	p Value	SD	Min	Mean		p Value	Mean	
Q1	17	2.9	< 0.001	2.8	0.0	7.1	324.7	0.02	63.9	
Q2	18	10.7	< 0.001	1.7	7.3	13.5	542.7	0.03	67.0	
Q3	16	15.9	< 0.001	1.9	13.5	19.8	749.3	< 0.01	56.3	
Q4	13	24.8		4.9	20.0	35.5	1053.5		50.3	
Total	64	13.6		8.6	0.0	35.5	662.0		59.9	

SANE=Single Assessment Numeric Evaluation; WOSI=Western Ontario Shoulder Index.

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was set at 220; a successful WOSI score was considered to be in the range of 320 to 420.

Glenoid bone loss was established with the “perfect circle technique.” A perfect circle was drawn on a sagittal cut of the en fos glenoid. A line was drawn across the glenoid at the level of the bony defect. A separate line was drawn from the anterior lip of the glenoid to the anterior edge of the perfect circle. The lines were divided and converted to a percentage of the glenoid that was absent. Two such determinations were made by 4 independent viewers at a minimum of 2-week intervals.

Cases were divided into quartiles stratified by bone loss; recurrence rates and outcomes were then compared by quartiles. The researchers also analyzed those cases where bone loss resulted in increased recurrence without a significant increase in WOSI scores. If redislocation was excluded, the analysis was repeated to determine if stable patients had worse outcomes with increasing bone loss independent of recurrence.

Overall, average bone loss was 13.4%. Bone loss over the 4 quartiles increased from 0% to 35%, and the recurrence rate increased more than 2-fold from quartile 1 to quartile 4. WOSI scores worsened with each quartile (Table 1). When patients with recurrence (n=7) were compared to those without (n=64), bone loss and WOSI scores were twice as high. When patients with recurring dislocations were excluded from the analysis, bone loss still predicted outcomes. The WOSI score was significantly higher (p=.03) in patients with bone loss > 13.5%—well below the “critical level” cutoff of 20% to 25% currently used to predict failure following arthroscopy (Table 2).

Dr. Tokish addressed several study limitations, including its retrospective design and the lack of preinjury scores. Limitations aside, however, he encouraged clinicians to reconsider the cutoff for “critical bone loss” because of its impact on recurrence rates and functional outcomes.