Role of the Superior Glenoid Humeral Ligament in Superior Labrum Anterior-Posterior Lesions and Subtype Classification Based on Arthroscopic Views: A Multiple-Center Retrospective Study

Ye Peng, Qiang Zhang

Department of Orthopedic Surgery, General Hospital of Chinese People's Liberation Army. Beijing, China.

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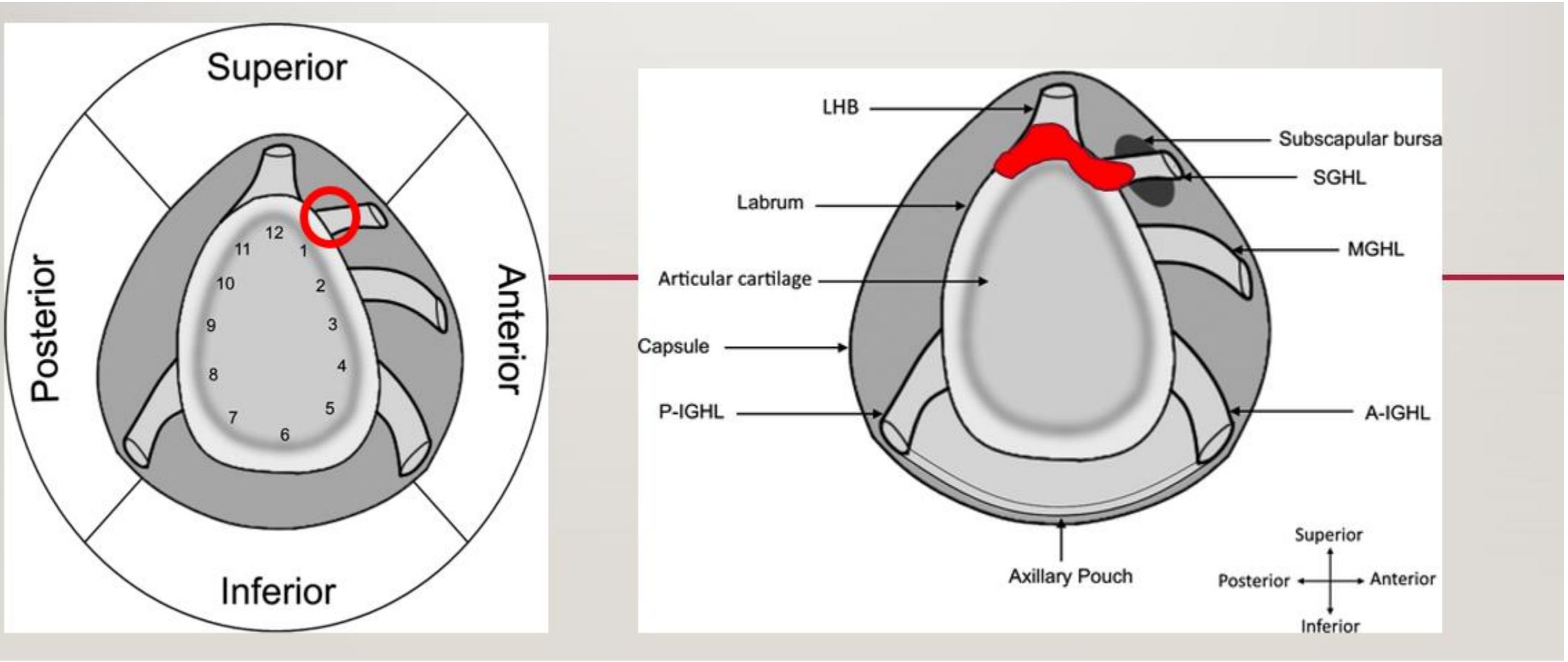
Disclosure

- No **disclosure**

- **Background**: Superior labrum anterior-posterior (SLAP) lesions are common shoulder injuries. The 10-type classification system has been widely used to diagnose SLAP lesions since it was proposed. However, growing evidence from arthroscopic studies indicates the existence of many SLAP lesions, especially those associated with superior glenoid humeral ligament (SGHL) injuries, that were not included in the initial classification.



Purpose: To introduce a SLAP classification associated with SGHL injury based on arthroscopic views and discuss the injury mechanism and corresponding treatment options.

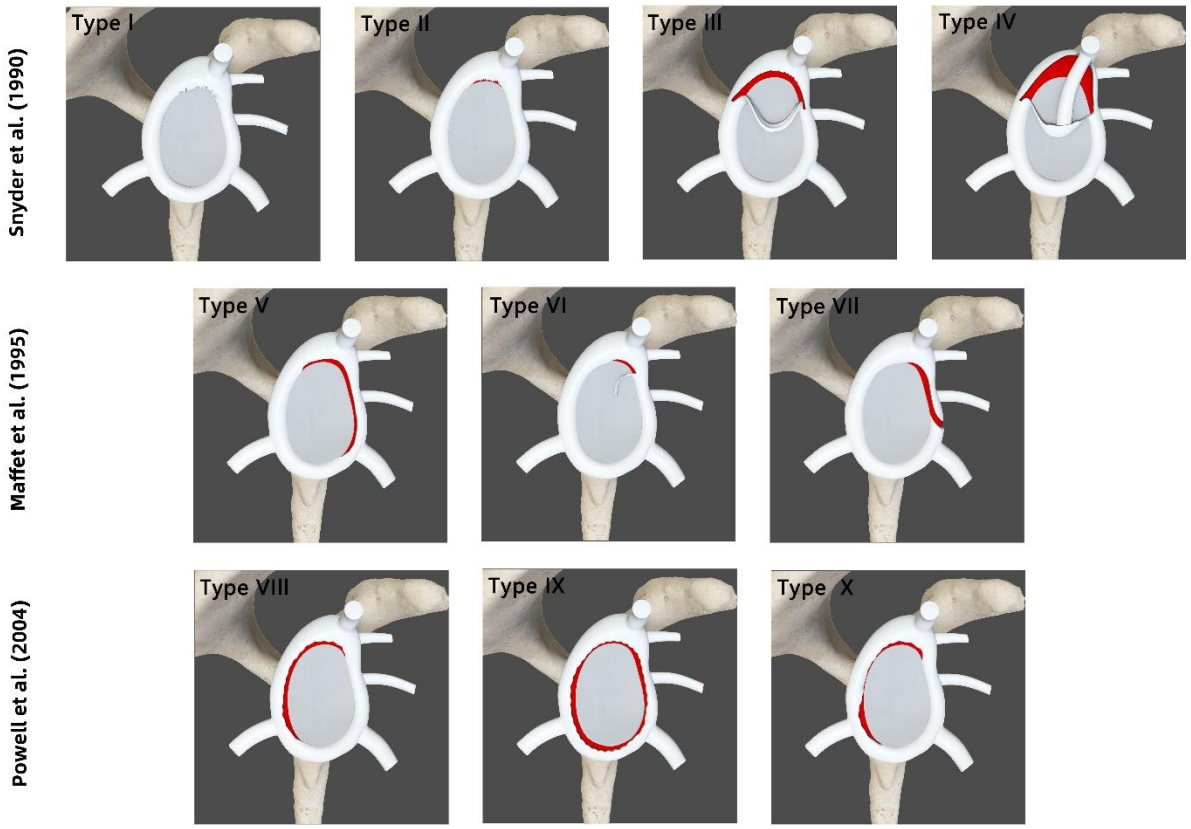
- **Study Design**: Case series study

Methods:

- This study evaluated 828 patients with superior labrum anterior-posterior (SLAP) lesions who underwent arthroscopic surgery at multiple centers.A detailed physical examination and arthroscopic examination were performed, and the SLAP injury conditions of the patients were recorded.
- The relationship between SLAP injuries and superior glenohumeral ligament (SGHL) injuries was observed, and the relevant SLAP classification methods were summarized. Moreover, the inter- and intra-observer agreement (kappa coefficient, κ) was evaluated.
- Patients treated conservatively and those with other injuries were excluded.
- The SLAP classification of the patients was based on Snyder (types I, II, III, and IV), Maffet (types V, VI, and VII), and Powell (types VIII, IX, and X).

Physical Examination

- The physical examination covered three aspects: biceps, labrum, and anterior stability of the glenohumeral joint.
- Yergason's test, Bicep's palpation, the biceps tension test, and Load test II.
- the O'Brien test, compression rotation, O'Driscoll's test.
- anterior drawer test and the surprise/release test



Snyder et al. (1990)	I	Fraying of the superior labral attachment with intact biceps and labral attachment
	II	Non-variational detachment of the superior labrum along with the long head biceps tendon
	III	A detached proximal superior labrum displaced into the articular surface. Also referred to as 'bucket handle'
	IV	A 'bucket handle' tear of the whole labrum with partial displacement of the biceps tendon into the articular surface
Maffet et al. (1995)	V	An anterior-inferior lesion (Bankart) that extends superiorly reaching the biceps tendon
	VI	An unstable labral attachment with biceps tendon anchor release
	VII	Superior labral tear that extends to the middle glenohumeral ligament
Powell et al. (2004)	VIII	Superior labral lesion extending posteriorly and reaching the 6 'o'clock' position
	IX	A 'pan-labral' tear involving the whole circumference
	X	A reverse Bankart tear reaching the superior labrum

Fig. 1 Existing SLAP classification

Patient Characteristics and Physical Examinations[a]

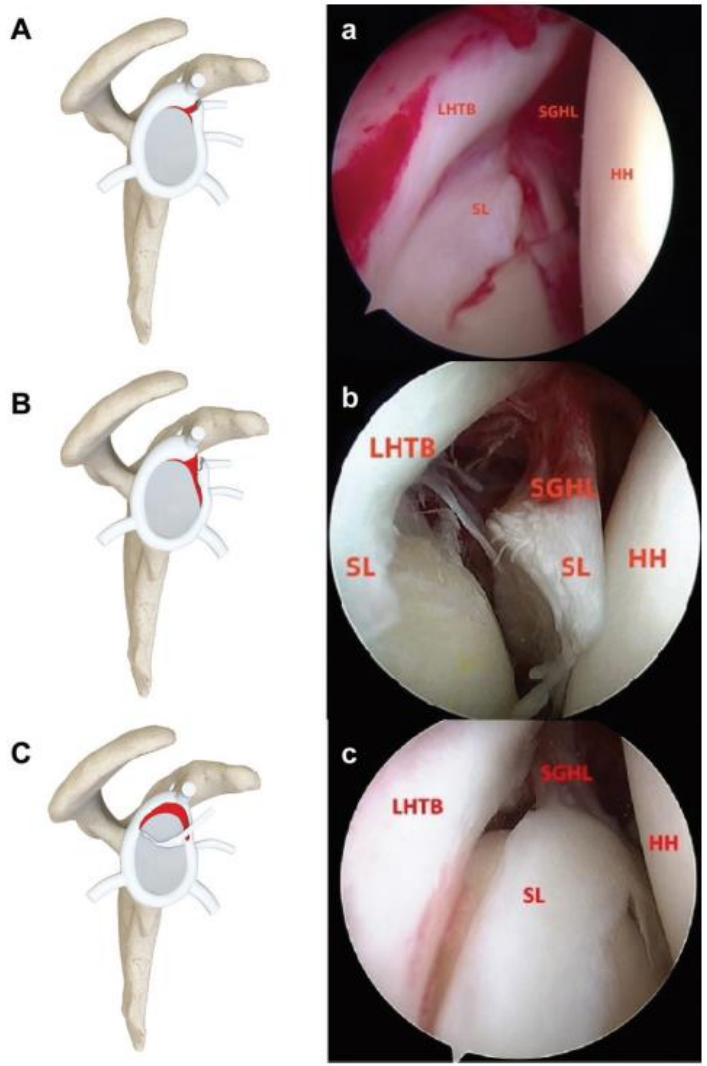
Patient No.	Sex	Age, y	Subtype	Injury Mechanism	Physical Examination								
					Yergason Test	Biceps Palpation	Biceps Tension	Load Test 2	O'Brien Test	Compression Rotation	O'Driscoll Test	Anterior Drawer Test	Surprise/ Release Test
1	M	30	A	Throwing					+	+	+		
2	F	29	A	Pull-up					+	+	+		
3	M	33	A	Throwing	+	+	+	+	+	+			
4	F	26	A	Crawling	+		+	+					
5	M	43	A	Horizontal bar	+		+	+	+	+	+		
6	M	27	A	Throwing	+	+		+	+	+	+		
7	F	45	A	Pull-up	+		+	+					
8	F	33	A	Horizontal bar					+	+	+		
9	M	41	A	Throwing	+			+	+	+			
10	M	44	A	Throwing	+		+	+	+	+	+		
11	F	24	A	Pull-up	+		+	+					
12	M	29	A	Pull-up		+	+	+		+			
13	M	45	B	Throwing	+		+	+	+	+	+		
14	F	27	B	Throwing	+		+	+	+	+	+	+	+
15	M	24	B	Crawling		+	+		+	+	+		+
16	F	21	B	Throwing	+		+	+	+		+	+	+
17	M	27	B	Throwing	+	+	+				+	+	+
18	M	41	B	Pull-up	+	+		+		+		+	+
19	M	35	B	Throwing				+	+	+	+		
20	F	28	B	Throwing	+	+	+	+	+	+		+	+
21	M	44	B	Throwing					+	+	+		+
22	M	28	B	Rings	+		+	+		+	+	+	+
23	M	33	B	Throwing	+			+	+	+			+
24	M	18	B	Throwing	+	+	+		+		+	+	+
25	F	33	B	Throwing	+	+		+		+	+		+
26	F	24	B	Horizontal bar	+		+		+	+	+	+	+
27	M	40	B	Throwing	+	+	+	+	+	+	+	+	
28	M	39	B	Rings				+	+		+		+
29	F	46	B	Pull-up	+	+	+		+	+	+	+	+
30	M	33	B	Horizontal bar	+			+		+			
31	M	37	B	Throwing	+	+	+		+		+	+	+
32	F	28	B	Throwing		+		+		+	+		
33	M	19	B	Crawling	+		+		+	+	+	+	+
34	M	33	C	Throwing	+	+		+		+			
35	M	40	C	Throwing			+		+	+	+		
36	M	32	C	Throwing	+			+	+	+	+		
37	M	30	C	Rings		+			+		+		
38	M	36	C	Throwing				+	+		+		
39	M	23	C	Horizontal bar	+	+	+		+	+	+		
40	F	29	C	Throwing				+		+		+	
41	F	23	C	Throwing	+	+	+		+	+	+	+	+
42	M	30	C	Pull-up		+		+		+			
43	F	33	C	Pull-up	+		+		+	+	+	+	+
44	F	31	C	Throwing		+			+				

[a]F, female; M, male; + means the test result is positive.

Physical Examination

Sub-type	positive rate								
	biceps				labrum			anterior instability	
	Yergason's test	Biceps Palpation	Biceps Tension	Load test II	O'Brien's test	Compression Rotation	O'Driscoll's test	Anterior Drawer test	Surprise Release test
A	67%	25%	58%	**75%**	67%	**75%**	50%	0	0
B	**76%**	48%	62%	62%	71%	76%	**81%**	57%	**76%**
C	45%	**55%**	36%	45%	73%	73%	64%	27%	18%

- **Results:** A total of 61 patients (7.3%) could not be classified by the 10-type traditional classification. Forty-four patients (5.3%) had SGHL lesions. A novel classification for 3 subtypes of SLAP with SGHL lesions was introduced. The mean κ value of the interobserver reliability for the classification approach was 0.796 (range, 0.678 to 0.854), indicating substantial agreement. The mean κ value for the intraobserver reliability was 0.883, indicating excellent agreement (range, 0.799 to 0.964).



Superior labrum anterior-posterior–superior glenohumeral ligament (SGHL) lesion subclassification with (A-C) schematics and (a-c) arthroscopic photographs as viewed from the posterior portal with the patient.

(A) Type A labrum tear between the long head of the biceps tendon (LHBT) and SGHL.

(B) Type B labral tear between the LHBT and SGHL with displacement anterior to the SGHL.

(C) Type C labrum bucket-handle tear along the SGHL. HH, humeral head; SL, superior labrum.

- We classified these lesions into 3 subtypes, A, B, and C.
- Type A (27.3%) represented labrum tears between the LHTB and SGHL. In this type, the LHBT and SGHL anchors were stable.
- Type B (47.7%) represented a labrum rupture between the LHBT and SGHL and labrum displacement anterior to the SGHL. In this type, the LHBT and SGHL anchors were both unstable; if the humerus shifted anteriorly, the labrum was displaced anteriorly.
- Type C (25%) represented labrum bucket handle tears along the SGHL. In this type, the LHBT has a stable supraglenoid tubercle, and the SGHL anchor is detached from the labrum, which is more frequently seen in a meniscus-type labrum.

- Type A will not cause instability of the labrum but will progress to type B.
- Type B may cause glenohumeral joint anterior instability because the SGHL is unstable, and anterior labrum detachment could progress to MGHL. SGHL and MGHL anchor detachment could cause glenohumeral joint anterior instability, and the labrum type would become anterior labroligamentous periosteal sleeve avulsion (ALPSA).
- Type C will cause anterior and posterior labrum detachment. If the LHBT labrum anchor was not stable and the SGHL anchor was stable, the lesion was classified as II-IV using the former system.

- **Conclusions:** The novel classification system for SLAP lesions associated with SGHL injury introduced a series of cases with characteristics that showed high inter- and intraobserver reliability. Such cases have not been reported before, and the classification correlates with surgical treatment. This classification may be used as a supplement to the traditional 10-type classification.