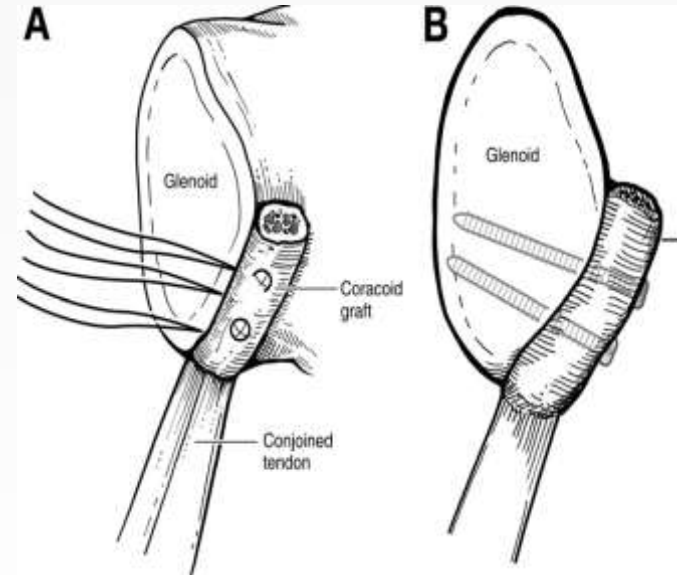
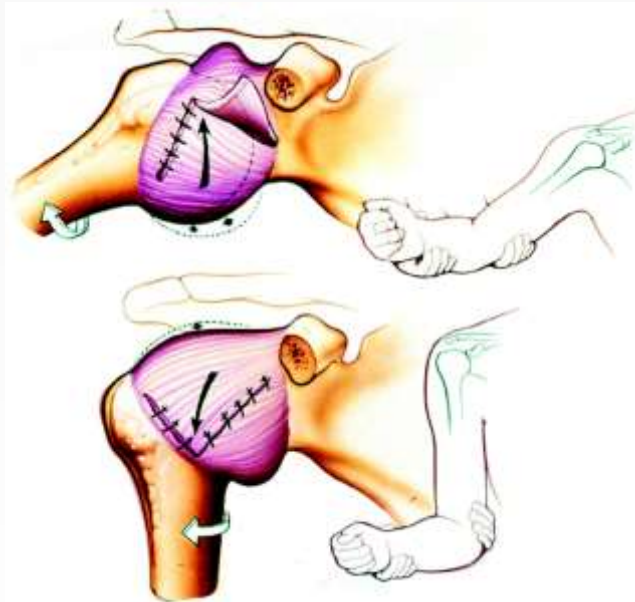


Anterior Shoulder Instability: indications and surgical techniques for open stabilization



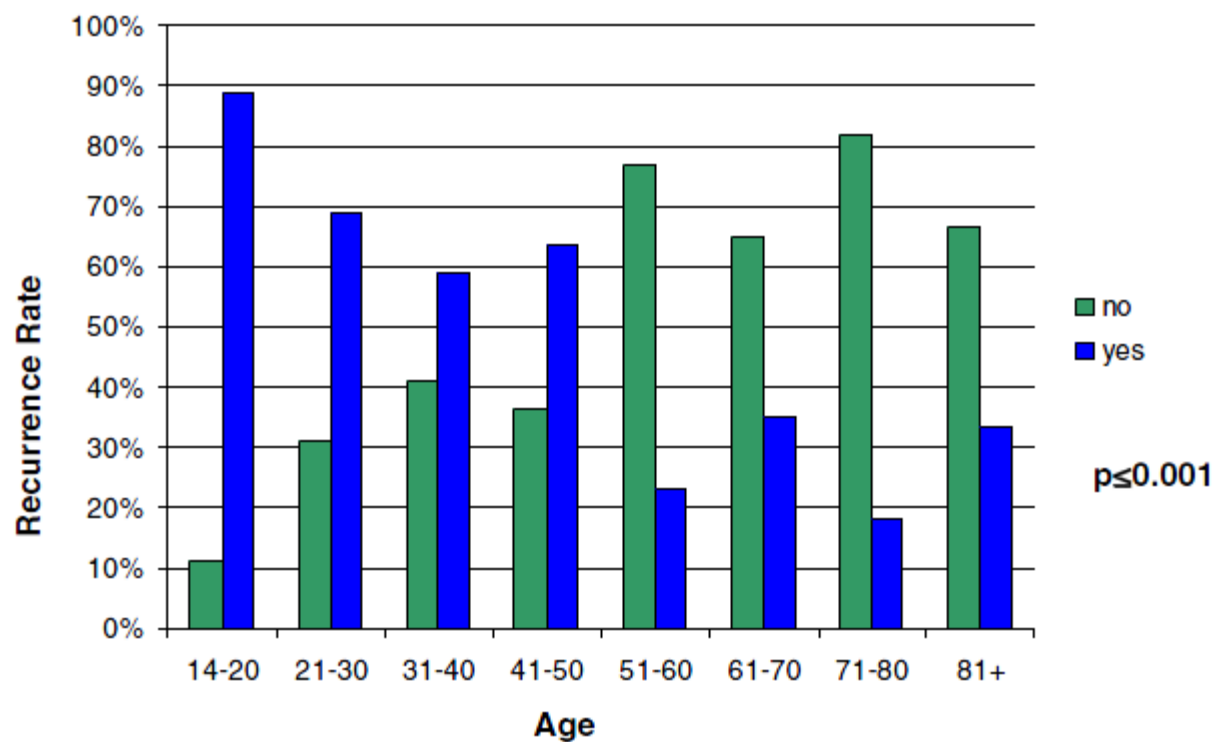
Andreas Panagopoulos, MD, Ph.D.

Lecturer in Orthopedics, Medical School, Patras University

Sports Medicine & Upper Limb Surgeon, Patras University Hospital

Has the management of shoulder dislocation changed over time?

Byron Chalidis · Nick Sachinis · Christos Dimitriou ·
Pericles Papadopoulos · Efthimios Samoladas ·
John Pournaras



Primary anterior shoulder dislocation in young athletes: fix them!

Pietro Randelli · Ettore Taverna

Surgery was proved to reduce the recurrence rate after a first-time anterior shoulder dislocation. The recurrence rate in the group of conservatively treated patients ranged between 60 and 75%. In surgically treated groups, the recurrence was between 11 and 20% [2, 11]. Even in a long-term follow-up [10], surgical stabilization gave better results, with approximately 10% recurrence rate compared to 58% recurrence in the conservative group.

Anatomy & Biomechanics

Factors maintaining shoulder stability

Static Factors

Articular version-conformity
Glenoid labrum
Capsule and ligaments
Adhesion–cohesion & suction cup
Negative intraarticular pressure
Rotator cuff (static contribution)

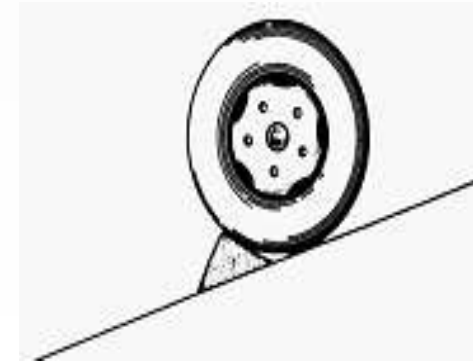
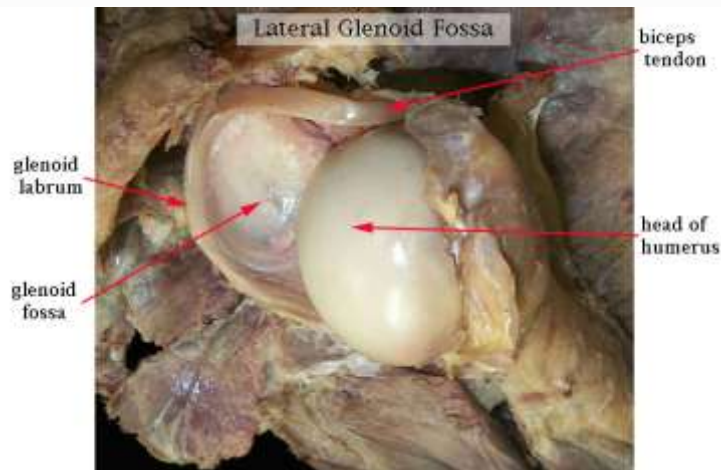
Dynamic Factors

Rotator cuff
Coracoacromial arc
Biceps brachii
Proprioception

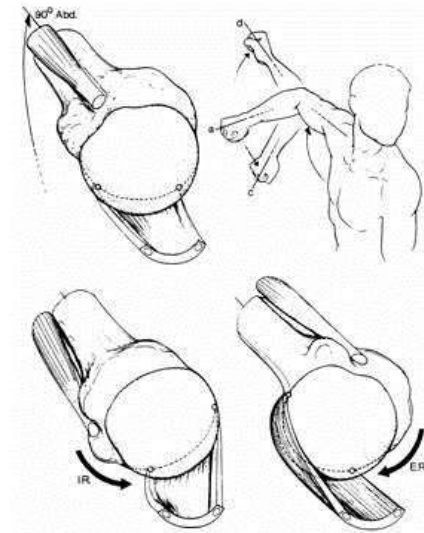
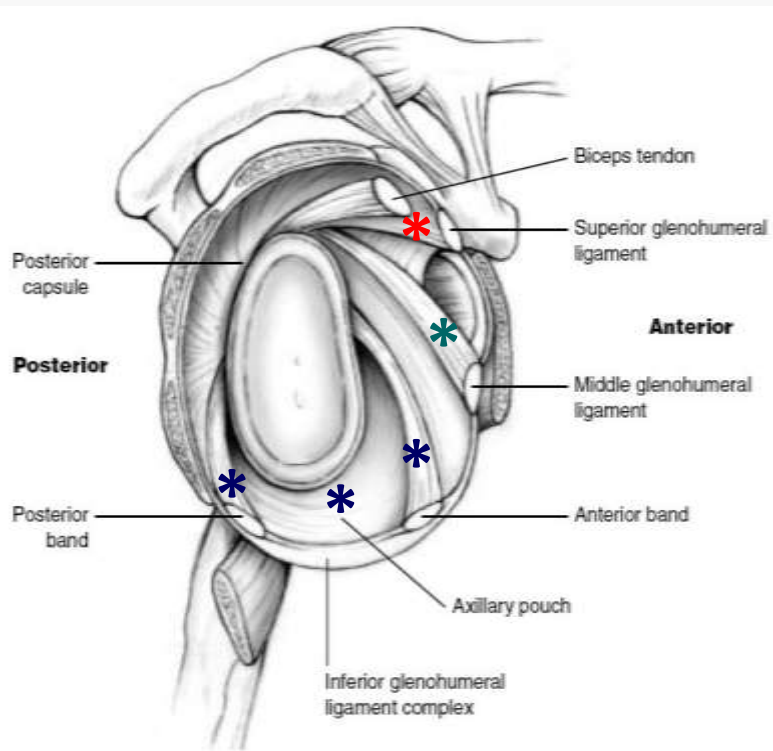
**no single factor is responsible for glenohumeral joint stability
and no single lesion is responsible for clinical instability**

Glenoid labrum

1. Anchor point
2. Deepens the concavity
3. Increase the surface area of contact for the humeral head
4. Analogous to a chock-block



Capsule/Glenohumeral Ligaments

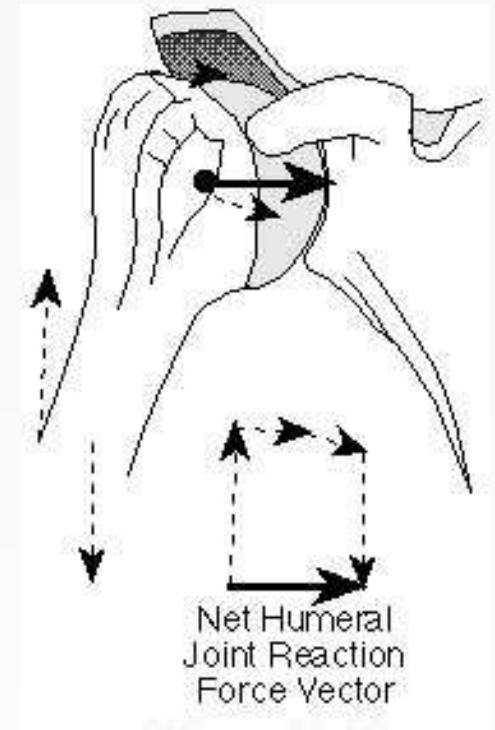


IGHL complex acts like a hammock in preventing increased translation of the humeral head on the glenoid.

- **abduction** moves beneath the humeral head and becomes taut
- **internal rotation** moves posteriorly and limits posterior translation
- **external rotation** moves anteriorly and limits anterior translation

1st law of glenohumeral stability

The GH joint will not dislocate as long as the **net humeral joint reaction force** is directed within the effective glenoid arc



This force is the resultant of all muscular, ligamentous, inertial, gravitational, and other external forces applied to the head

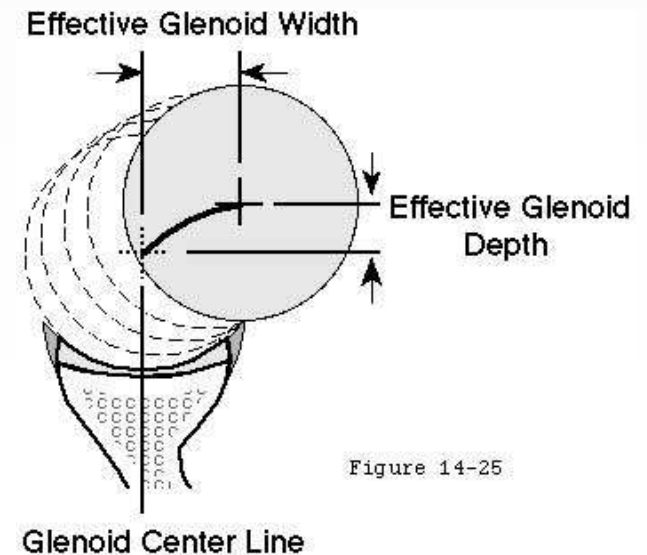
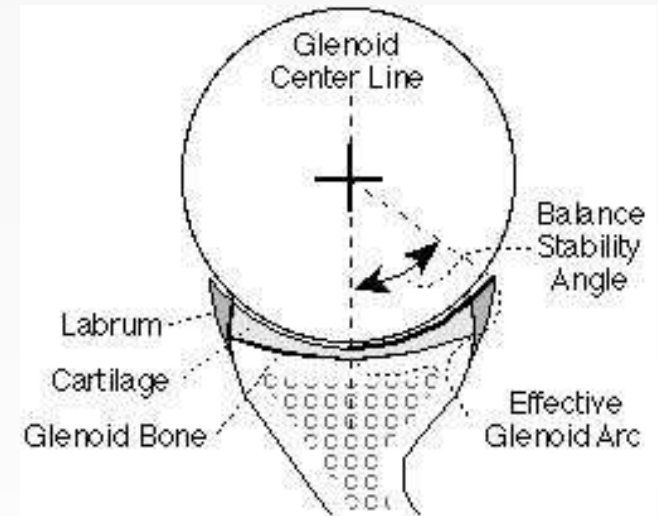


Figure 14-25

2nd law of glenohumeral stability

The humeral head will remain centered

- if the glenoid and humeral joint surfaces are congruent and
- if the net humeral joint reaction force is directed within the effective glenoid arc

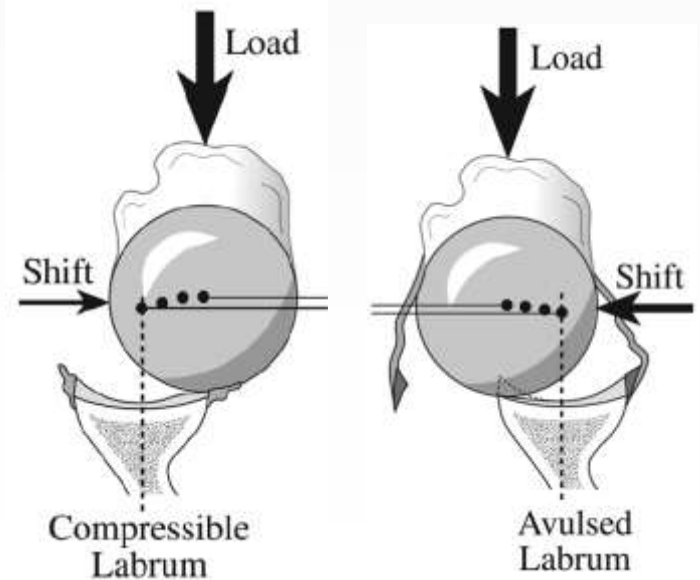
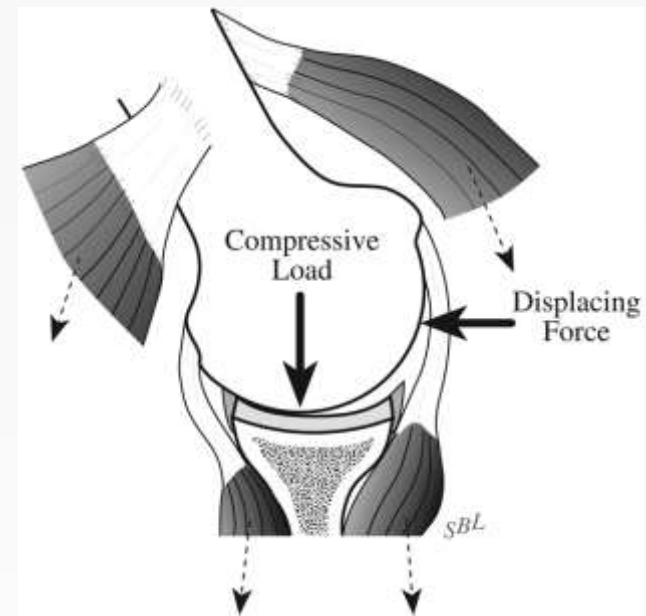


The "**effective glenoid arc**" is the arc of the glenoid available to support the humeral head under the specified loading conditions

Balance stability ratio

Is the force necessary to displace the head from the glenoid divided by the load compressing the head into the concavity.

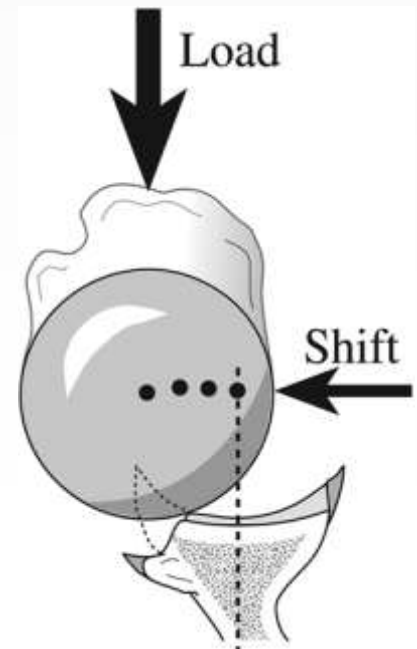
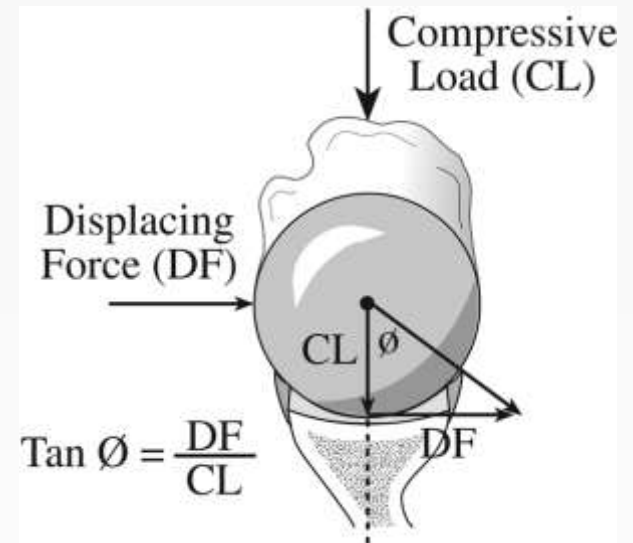
- Resection of the labrum has been shown to reduce the stability ratio by 20 per cent. (Lippitt, Vanderhooft, Harris et al, 1993)



Balance stability angle

Is the maximal angle between the glenoid center line and the net humeral joint reaction force before the humeral head dislocates from the glenoid

- A 3 mm anterior glenoid defect has been shown to reduce the balance stability angle over 25 per cent. (Matsen, Lippitt, Sidles et al, 1994)



Classification (Matsen)

TUBS or “Torn Loose”

- Traumatic etiology
- Unidirectional instability
- Bankart lesion
- Surgery is required



AMBRI or “Born Loose”

- Atraumatic: minor trauma
- Multidirectional instability may be present
- Bilateral: asymptomatic shoulder is also loose
- Rehabilitation is the treatment of choice
- Inferior capsular shift: surgery may needed





PRINCIPLES FOR THE EVALUATION AND MANAGEMENT OF SHOULDER INSTABILITY

BY FREDERICK A. MATSEN III, MD, CAROLINE CHEBLI, MD, AND STEVEN LIPPITT, MD

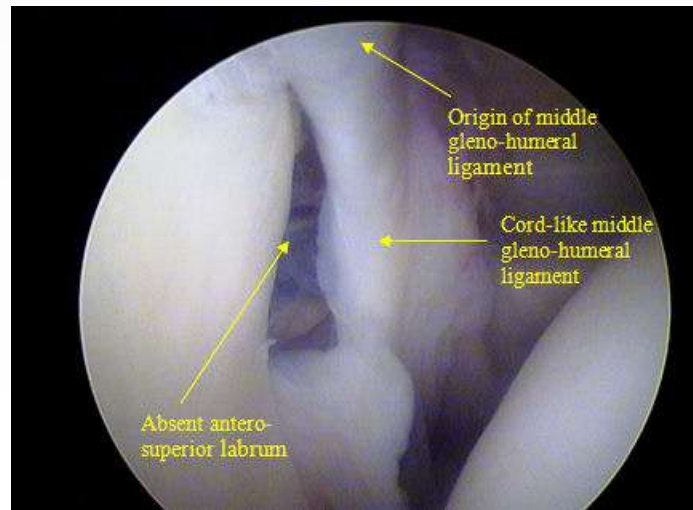
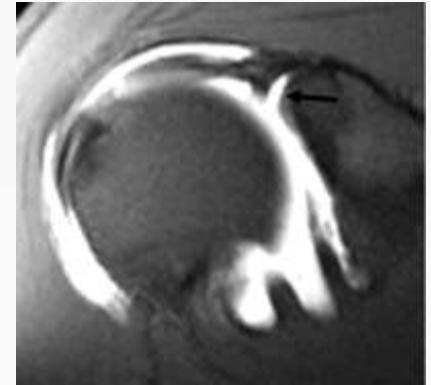
An Instructional Course Lecture, American Academy of Orthopaedic Surgeons

“ In the past, the mechanisms providing stability have been categorized as “static” and “dynamic” or as “active” and “passive.” We now recognize that the entire system functions as an **integrated whole**”

**Pathoanatomy, diagnostic imaging
and related lesions**

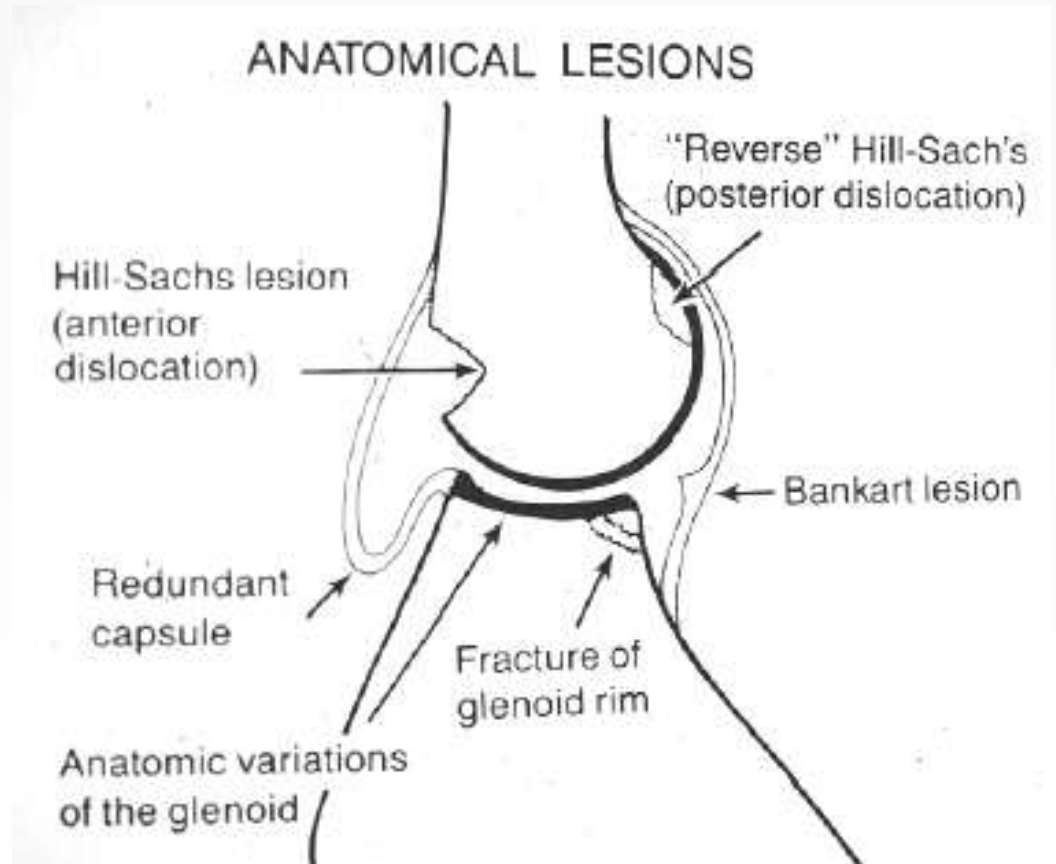
Normal labral variations (13.5-25%)

- a. A cord-like middle glenohumeral ligament (MGHL)
- b. **Sublabral foramen** in the anterosuperior quadrant of the shoulder.
- c. The **Buford complex** (cord-like MGHL in conjunction with an absent anterosuperior labrum complex)

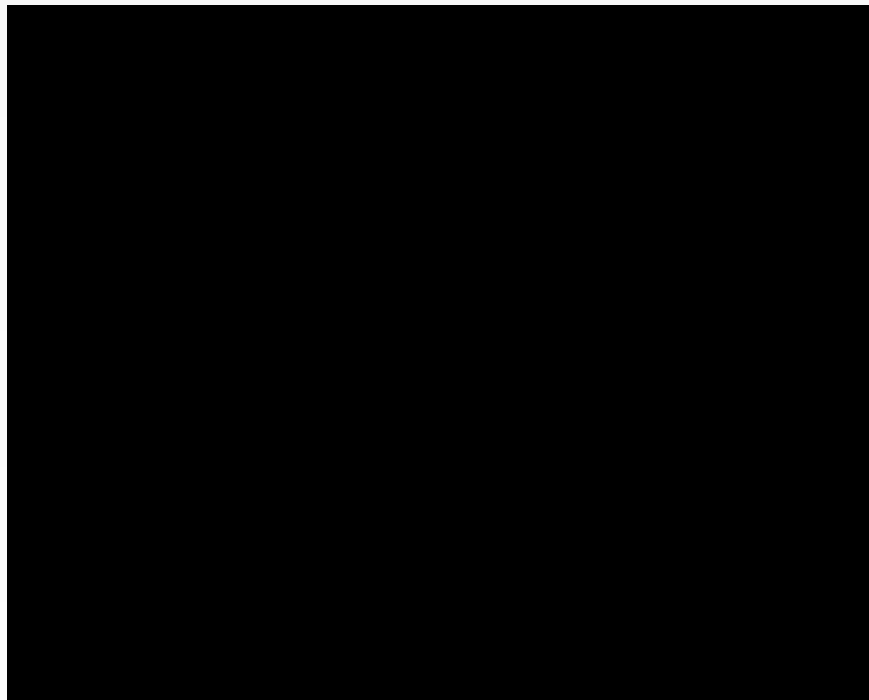
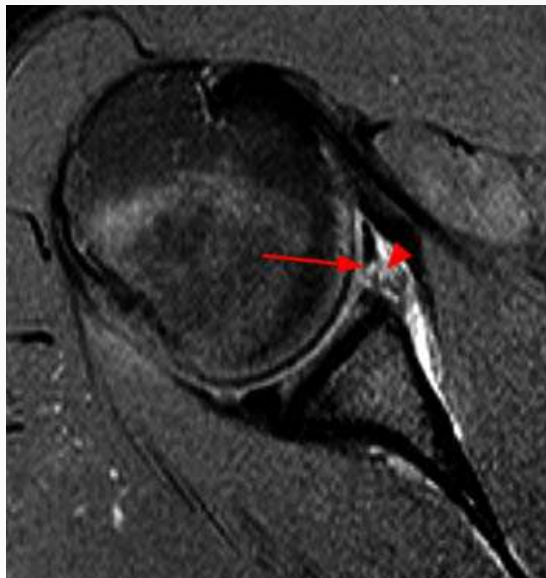


Pathologic lesions in shoulder instability

- a. Bankart, bony-Bankart
- b. PERTHES
- c. ALPSA
- d. HAGL
- e. GLAD
- f. SLAP
- g. Hill - Sacks

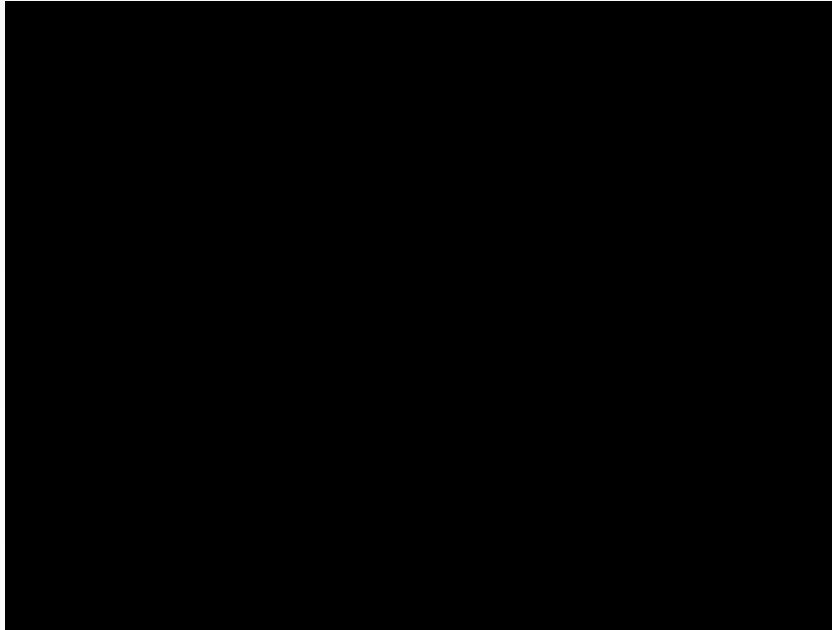


Bankart lesion



A Bankart lesion is a tear of the anteroinferior glenoid labrum with an associated tear of the anterior scapular periosteum.

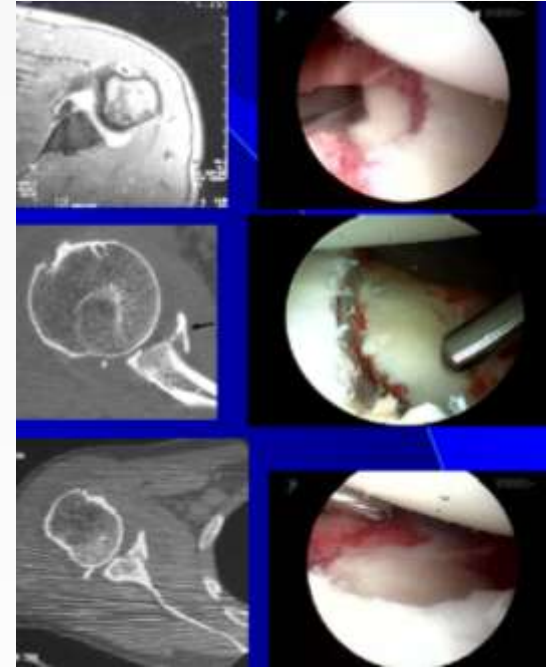
Bony - Bankart lesion



Type I: 0-12.5%

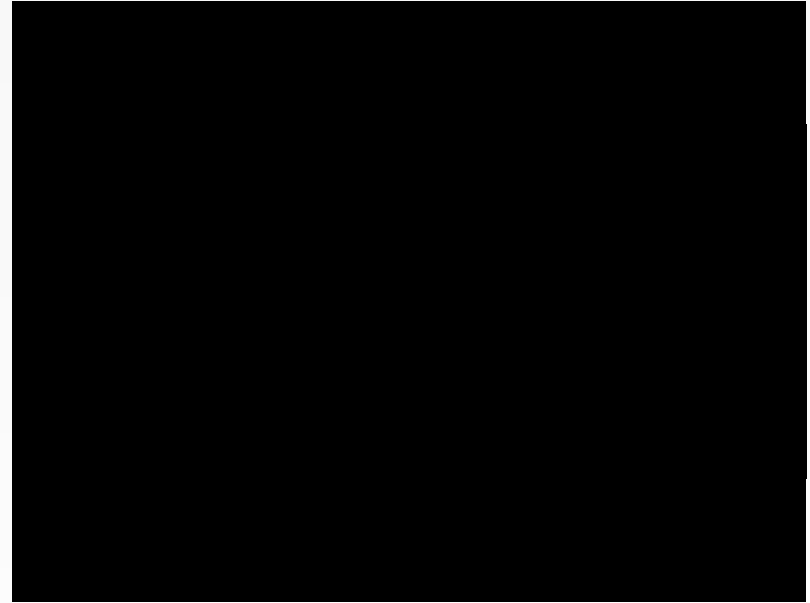
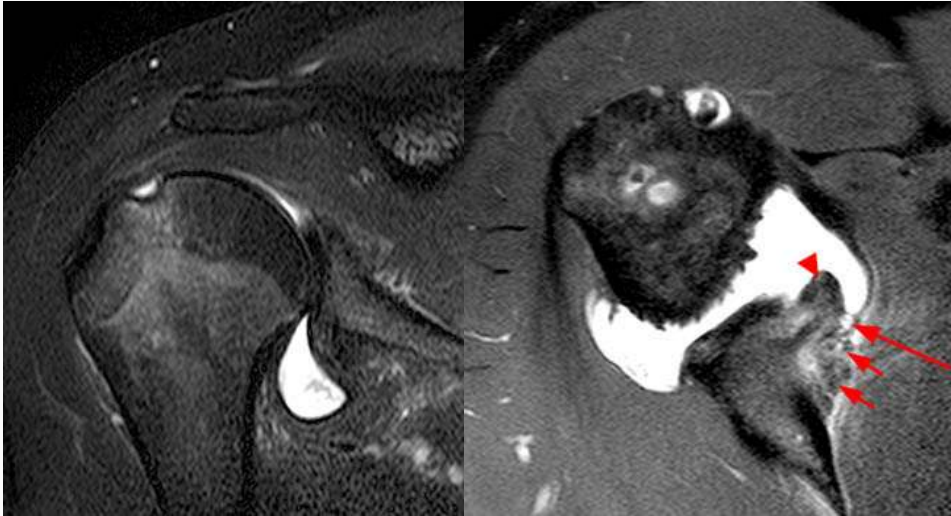
Type II: 12.5-25%

Type III: >25%



A Bony - Bankart lesion is a tear of the anteroinferior glenoid labrum with an associated tear of the anterior scapular periosteum, with associated fracture of the anterior inferior glenoid rim.

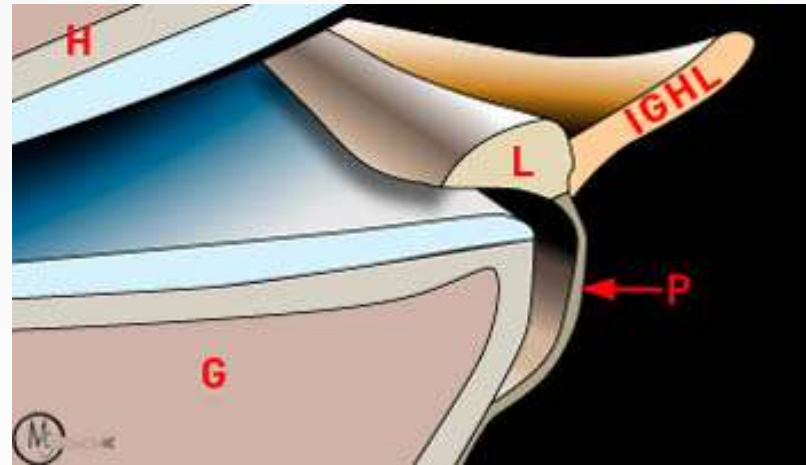
ALPSA lesion



An ALPSA lesion is an anterior labroligamentous periosteal sleeve avulsion. The anterior inferior labrum is torn and the labrum, inferior glenohumeral ligament and intact scapular periosteum are stripped and displaced medially on the glenoid neck.

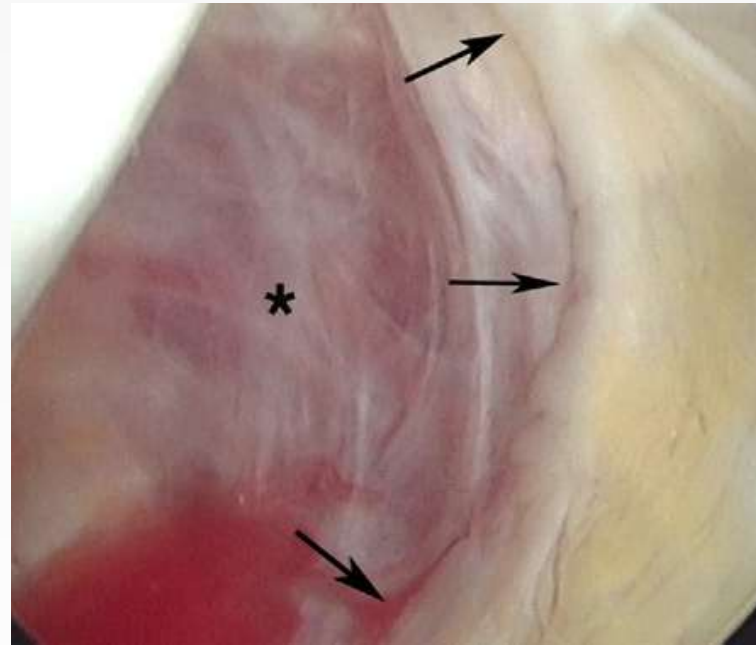
POLPSA is similar to ALPSA and is associated with posterior dislocation

Perthes lesion



An Perthes lesion is a variant of the Bankart, where the anteroinferior labrum is avulsed from the glenoid and the scapular periosteum remains intact but is stripped medially.

HAGL lesion



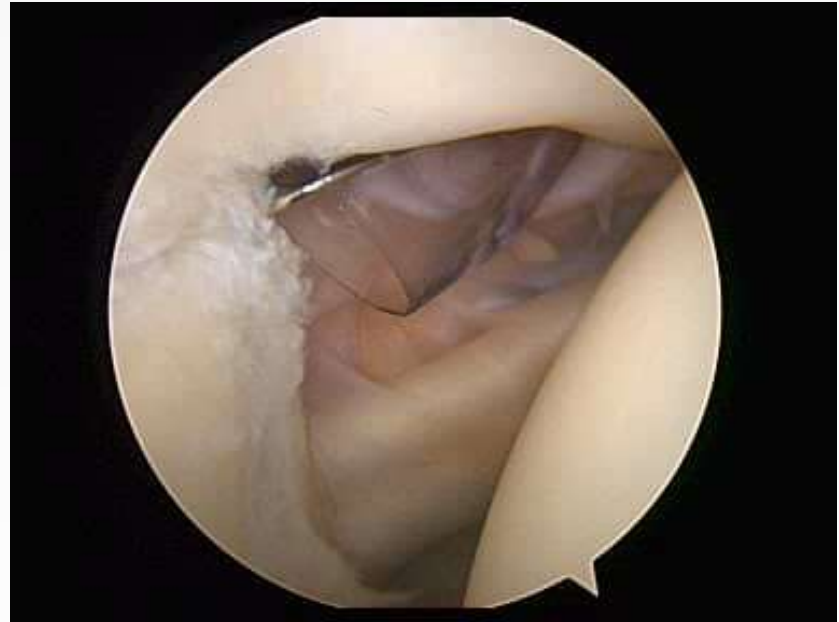
A HAGL lesion is humeral avulsion of the glenohumeral ligament that occurs from shoulder dislocation, with avulsion of the inferior glenohumeral ligament from the anatomic neck of the humerus (**J sign**).

A **BHAGL** is a bony HAGL, or a HAGL lesion that involves a bone fragment

SLAP lesion

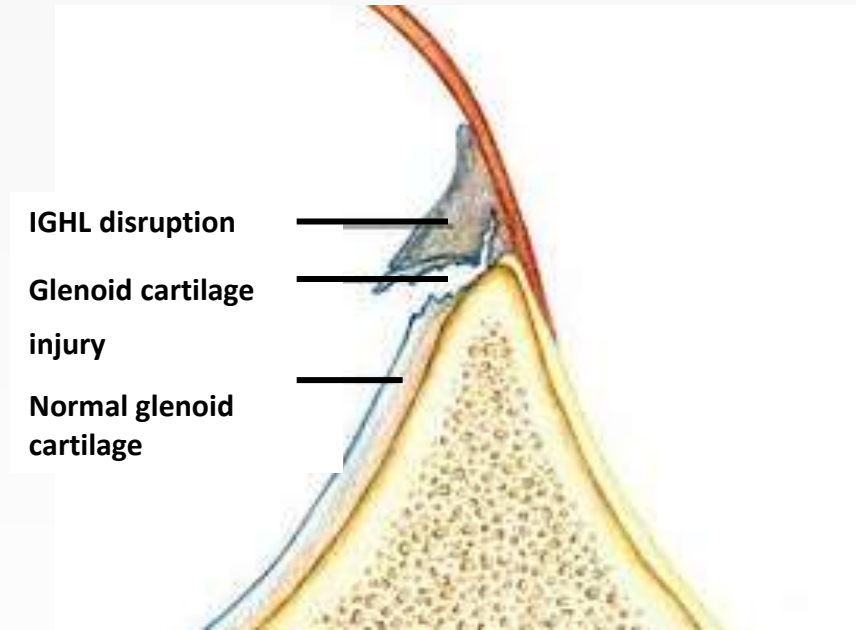
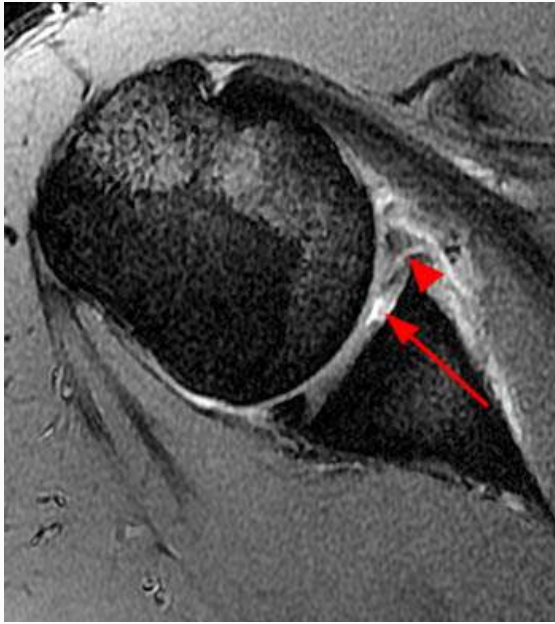


Type II SLAP



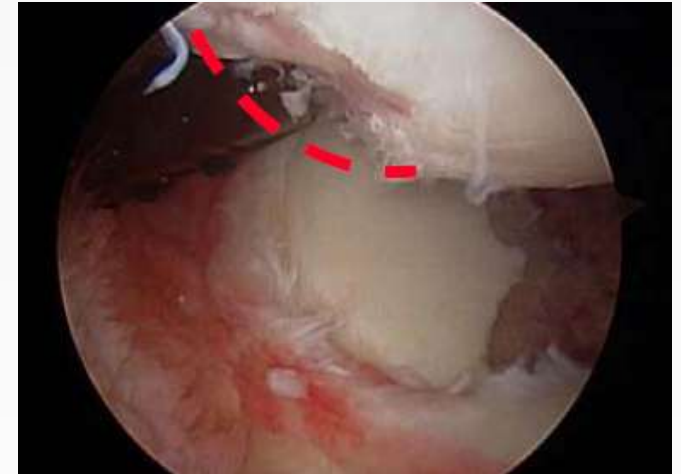
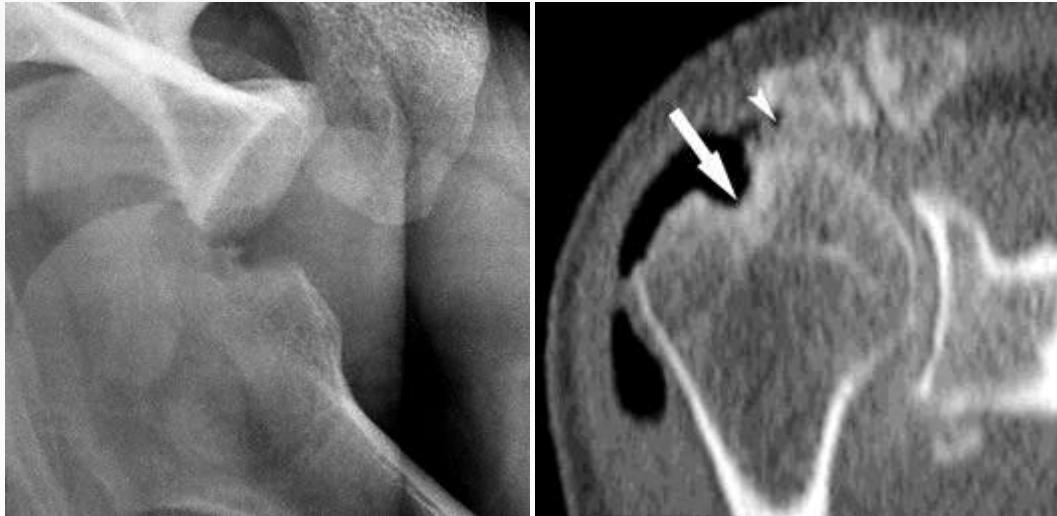
SLAP is an acronym for superior labral tears, that propagate anterior and posterior in reference to the biceps anchor. Originally, SLAP lesions were classified by Snyder et al, based on arthroscopic evaluation

GLAD lesion



The GLAD lesion refers to glenolabral articular disruption, which involves a tear of the anterior inferior labrum with an associated glenoid chondral defect.

Hill-Sachs lesion



< 20% leave alone

20-40% grey zone

> 40% need to treat

Engaging Burkhart

engages in functional position

The Hill-Sachs lesion is a cortical depression in the humeral head. It results from its forceful impaction against the anteroinferior rim of the glenoid when the shoulder is dislocated anteriorly (reverse Hill-Sachs in posterior dislocation).

Surgical treatment considerations

- (1) Is the problem in the glenohumeral joint?
- (2) Is the problem one of failure to maintain the humeral head in its centered position?
- (3) What mechanical factors are contributing to this instability?
- (4) Are the identified mechanical factors amenable to surgical repair or reconstruction?

This evaluation is based primarily on a carefully elicited history, a physical examination of the stability mechanics, plain radiographs and MRI scan

Implications for surgical reconstruction

For surgical treatment of glenohumeral instability to be appropriate, the instability must be attributable to **mechanical factors** that can be modified by surgery.

The causes may be deficiencies of the glenoid concavity, deficiencies in the muscles that compress the head into the socket, and/or deficiencies in the capsule and ligaments

Best current practice

Widespread acceptance of an **all-arthroscopic** approach to shoulder instability is lacking, partly because of the high failure rate that was reported in early studies.

Stein DA, et al. Arthroscopic stabilization of anterior shoulder instability: A review of the literature. Arthroscopy 2002;18:912-924.

Hobby J, Griffin D, Dunbar M, Boileau P. Is arthroscopic surgery for stabilisation of chronic shoulder instability as effective as open surgery? A systematic review and meta-analysis of 62 studies including 3044 arthroscopic operations. J Bone Joint Surg Br 2007;89:1188-1196.

Arthroscopic Versus Open Repair for Traumatic Anterior Shoulder Instability: A Meta-analysis

Nicholas G. H. Mohtadi, M.D., F.R.C.S.C.,

Ivan J. Bitar, M.D., Treney M. Sasyniuk, B.P.E., Robert M. Hollinshead, M.D., F.R.C.S.C.,
and Wade P. Harper, M.B.B.S., F.R.A.C.S.(Orth)

TABLE 4. *Surgical Outcomes*

Study	Total No. of Shoulders		Recurrence		Reoperation*		RTA		Traumatic Recurrence	
	Arthro	Open	Arthro	Open	Arthro	Open	Arthro	Open	Arthro	Open
Cole et al. ^{47,48}	37	22	6	2	2	1	33	22	6	2
Geiger et al. ⁵¹	16	17	7	2	4	0	8	16	DNR	DNR
Guanche et al. ⁵⁰	15	12	5	1	2	0	11	9	DNR	DNR
Jorgensen et al. ⁶⁰	21	20	2	2	1	0	18	20	1	0
Karlsson et al. ⁵⁷	60	48	9	5	4	3	DNR	DNR	DNR	DNR
Kartus et al. ⁶¹	18	18	0	1	0	1	DNR	DNR	DNR	DNR
Kim and Ha ⁵⁶	59	30	2	2	2	2	DNR	DNR	2	2
Sperber et al. ⁵⁹	43	13	15	4	DNR	DNR	26	9	DNR	DNR
Steinbeck and Jerosch ⁵³	30	26	7	3	2	1	DNR	DNR	2	1
Roberts et al. ⁵⁸	30	32	5	2	3	0	25	30	1	1
Weber ⁶²	43	106	7	4	5	3	19	68	6	4

Research performed from 1966 to October 31, 2003

Systematic Review With Video Illustration

Arthroscopic Stabilization for First-Time Versus Recurrent
Shoulder Instability

Robert C. Grumet, M.D., Bernard R. Bach Jr, M.D.,
and CDR Matthew T. Provencher, M.D., MC, USN

- cohort studies (Level I to II) that evaluated:
- outcomes of patients undergoing arthroscopic stabilization after the first dislocation or multiple recurrent episodes
- 15 studies (5 in the first-time dislocation group and 10 in the recurrent instability group).
- There were no differences in recurrence or complication rate

Arthroscopic Versus Open Treatment of Bankart Lesion of the Shoulder: A Prospective Randomized Study

Carlo Fabbriciani, M.D., Giuseppe Milano, M.D., Antonio Demontis, M.D., Salvatore Fadda, M.D., Fabio Ziranu, M.D., and Pier Damiano Mulas, M.D.

No recurrence of dislocation in either group at 2 years fup

TABLE 2. Follow-up Results (Mean \pm SD) According to Constant Score

	Pain	Function	ROM	Strength	Absolute Score	Relative Score (%)	Improvement in Points
Arthroscopic							
Mean	13.5	18.9	39.6	17.5	89.5	97.1	23
SD	2.42	1.10	0.84	1.72	4.25	3.81	5.89
Open							
Mean	13.5	17.6	37.8	17.8	86.7	94.1	20.2
SD	2.42	2.01	1.99	1.69	6.07	7.37	8.22
P	1.000	.090	.017	.698	.248	.28	.39

Systematic Review

Long-Term Outcomes After Bankart Shoulder Stabilization

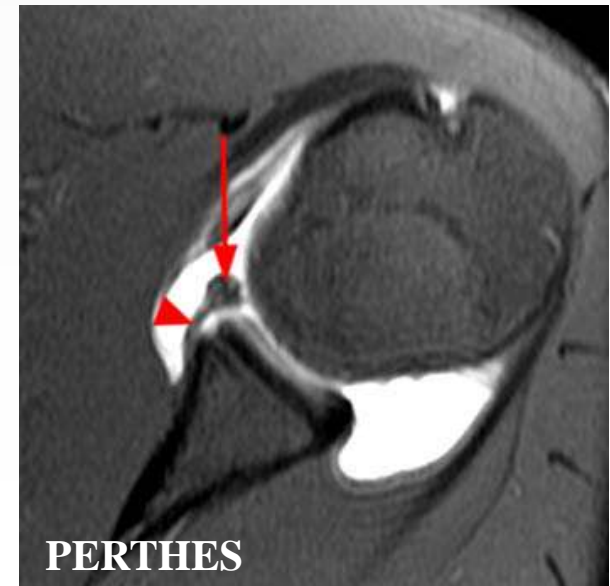
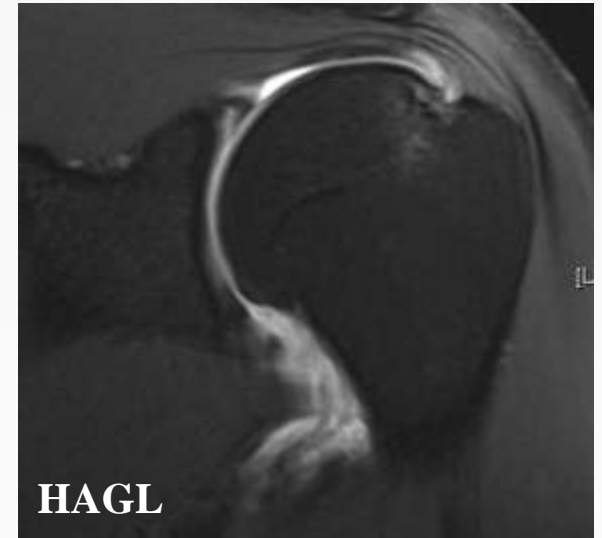
Joshua D. Harris, M.D., Anil K. Gupta, M.D., M.B.A., Nathan A. Mall, M.D.,
 Geoffrey D. Abrams, M.D., Frank M. McCormick, M.D., Brian J. Cole, M.D., M.B.A.,
 Bernard R. Bach Jr., M.D., Anthony A. Romeo, M.D., and Nikhil N. Verma, M.D.

Table 7. Comparison of All Surgical Techniques Analyzed

	Arthroscopic Bankart Repair With Suture Anchors	Arthroscopic Bankart Repair With Tacks	Arthroscopic Bankart Repair With Transglenoid Caspari Technique	All-Arthroscopic Bankart Techniques (n = 584)	Open Bankart Repair (n = 731)
Length of follow-up (yr)	7.3	11.5	8.4	9.1	13.1
Recurrent dislocation rate (%)	8.5	17	8	11	8
Recurrent subluxation rate (%)	4	7	3	5	5
Timing of recurrent instability (yr)	2.2	3.1	1.2	2.5	3.7
% of recurrently unstable patients who underwent revision surgery	57	30	67	41	19
% of recurrent instability due to new trauma	60	48	35	48	24
% of radiographic OA					
Overall	26	56	19	39	33
Mild	12	38	12	25	23
Moderate	12	15	6	12	5
Severe	2	3	1	2	5
Rate of return to sport at preinjury levels	87	53	79	74	89
Final follow-up Rowe score	84.6	92.0	88.8	87.2	85.6
Final follow-up Constant score	90.6	82.3	88.1	86.4	82.2
Final follow-up WOSI score	NR	419	NR	NR	NR

NR, not reported; OA, osteoarthritis.

- “modern” arthroscopic techniques
- our understanding of the multifactorial etiology of GH instability
- recognition of complex injury patterns with advanced imaging
- increasing learning curve



Current Concepts With Video Illustration

The Rationale for an Arthroscopic Approach to Shoulder Stabilization

Fotios P. Tjoumakaris, M.D., and James P. Bradley, M.D.

Current arthroscopic techniques have evolved to where **arthroscopy should be the preferred method of repair** for anterior instability, posterior instability, and MDI, because the results show equal stability, better motion, improved functional outcomes, and most importantly, return to sports

Concise Review

Arthroscopic Shoulder Stabilization:
Is There Ever a Need to Open?

Eric J. Kropf, M.D., Fotios P. Tjoumakaris, M.D., and Jon K. Sekiya, M.D.

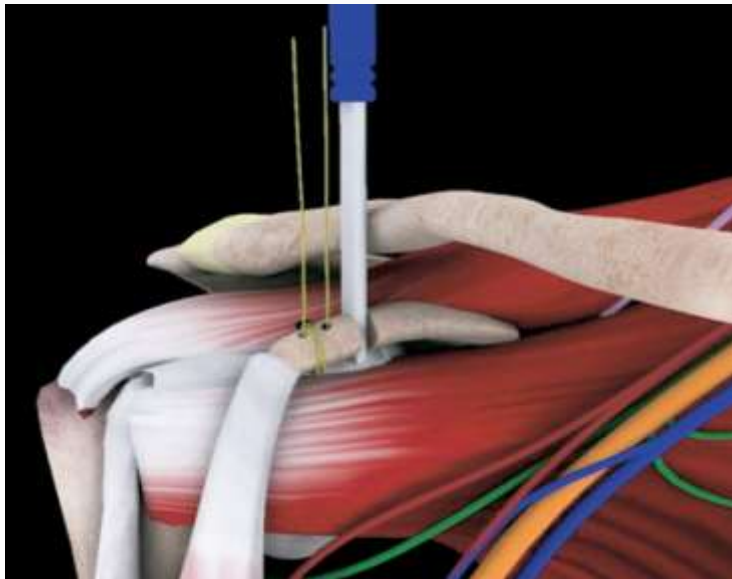
Arthroscopic stabilization is clearly contraindicated when a significant pathologic lesion cannot be adequately addressed as a result of the limitations of current techniques or instrumentation.

We believe that **sizable glenohumeral bone defects** remain the only absolute contraindication to an all-arthroscopic approach

Technical Note

The Arthroscopic Latarjet Procedure for the Treatment
of Anterior Shoulder Instability

Laurent Lafosse, M.D., Etienne Lejeune, M.D., Antoine Bouchard, M.D., Carlos Kakuda, M.D.,
Reuben Gobezie, M.D., and Tony Kochhar, M.Sc., F.R.C.S.(Tr&Orth)



Patient Perceptions of Open and Arthroscopic Shoulder Surgery

John W. Sperling, M.D., M.B.A., Adam M. Smith, M.D., Robert H. Cofield, M.D.,
and Sunni Barnes, Ph.D.

TABLE 1. Patient Perceptions of Open and Arthroscopic Surgery

	Center A			Center B		
	Open	Arthroscopy	No Difference	Open	Arthroscopy	No Difference
My hospital stay will be shorter	0%	88%	12%	3%	81%	16%
My surgery will be less expensive	6%	68%	26%	12%	52%	36%
My recovery will be faster	1%	91%	8%	3%	87%	10%
I will have less pain	2%	79%	19%	4%	79%	17%
I will have better motion*	10%	44%	46%	5%	68%	26%
My time away from activities will be shorter	3%	84%	13%	3%	81%	16%
My long-term outcome will be better*	13%	42%	45%	7%	60%	33%

* $P < .05$ (χ^2 test).

Open Operative Treatment for Anterior Shoulder Instability: When and Why?

Peter J. Millett, Philippe Clavert and Jon J.P. Warner
J Bone Joint Surg Am. 87:419-432, 2005. doi:10.2106/JBJS.D.01921

Arthroscopic equipment & lack of expertise

Marked bony deficiencies

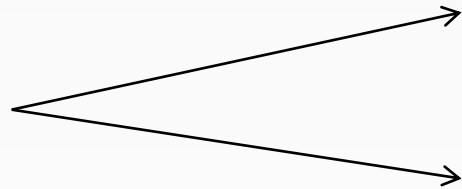
Capsular ruptures, Prior failed thermal capsulorrhaphy

RC lesions?

HAGL lesions?

Collision athletes?

Revision arthroscopic surgery?



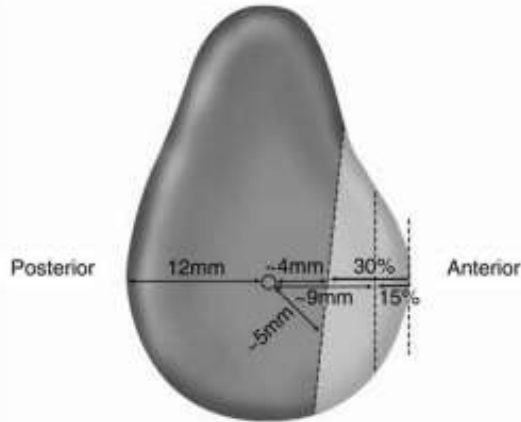
Engaging Hill-Sachs defects
($\geq 30\%$ of humeral head)
Significant glenoid bone
defects ($\geq 25\%$)



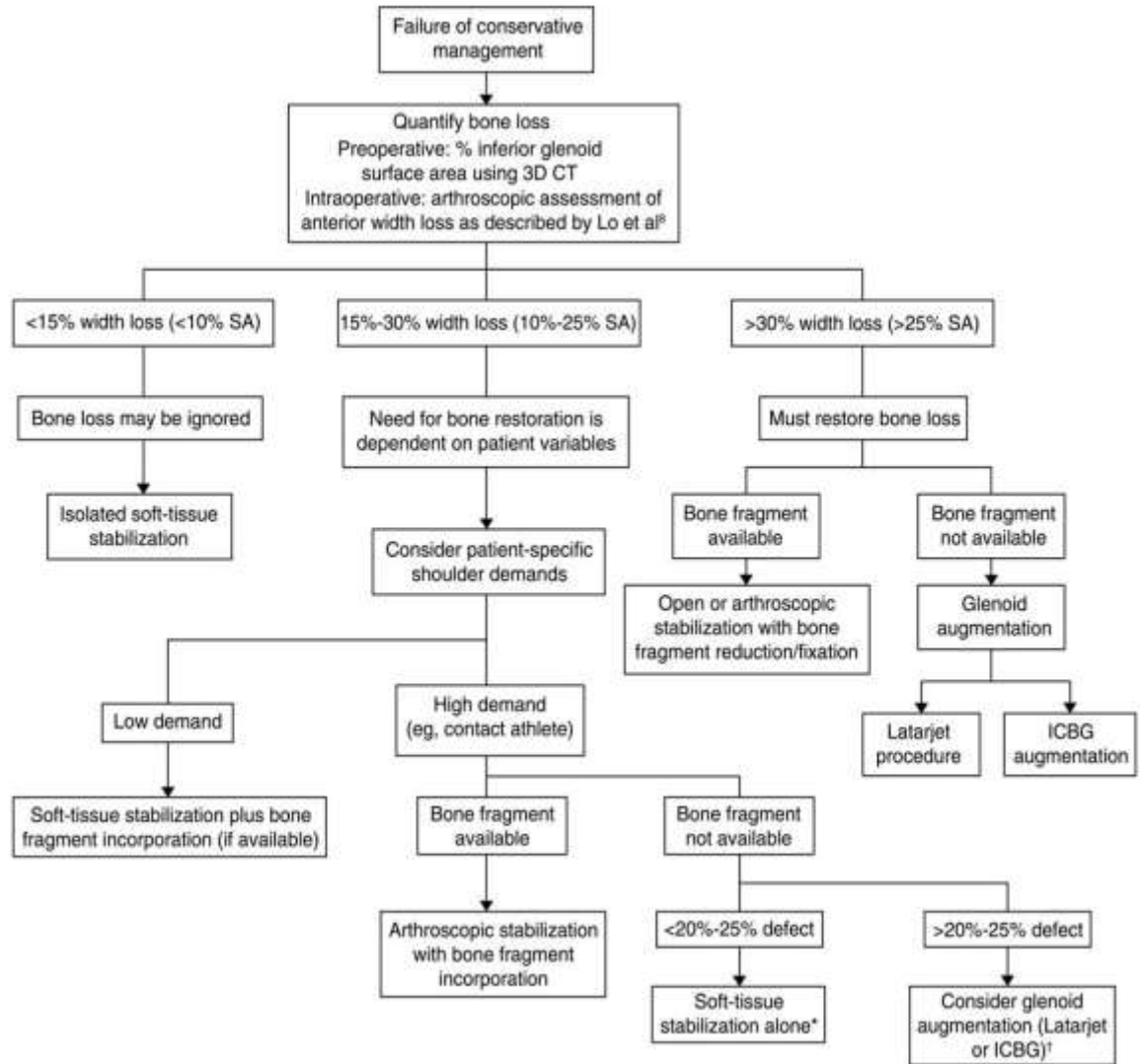
Review Article

Glenoid Bone Deficiency in Recurrent Anterior Shoulder Instability: Diagnosis and Management

Dana P. Piasecki, MD
 Nikhil N. Verma, MD
 Anthony A. Romeo, MD
 William N. Levine, MD
 Bernard R. Bach, Jr, MD
 LCDR Matthew T. Provencher, MD, MC, USN



3-4 mm from anterior lip (15%)
 4-9 mm in front of spot (15-30%)
 < 4 from the spot (> 30%)



Open Surgical repair: categories

Anatomic

- Capsulolabral reconstruction → Bankart-Perthes, Rockwood, DuToit staple capsulorrhaphy, inferior capsular shift

Non -anatomic

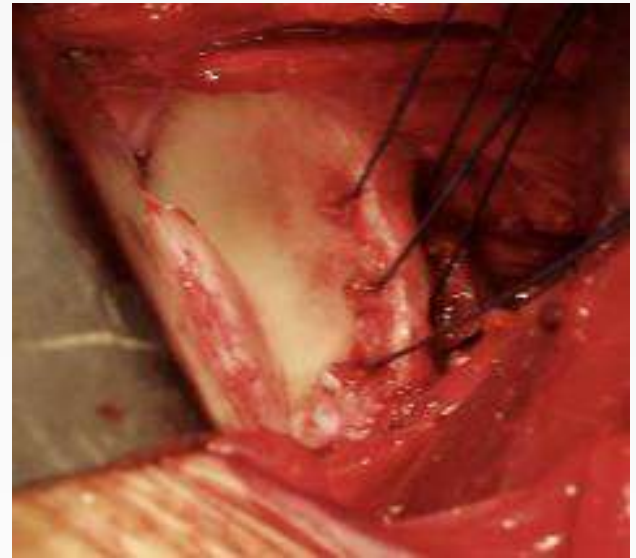
- Subscapularis procedures → Putti-Plat, Magnuson-Stuck
- Bone block procedures → Oudard and Trillat, Eden-Hybinette, J-graft
- Coracoid transfer → Bristow, Latarget-Patte
- Osteotomy of Humerus → Weber, Cautilli, Joyce and Mackell

Combined techniques

Capsulolabral reconstruction

“Bankart repair” (1923, 1939)

- first performed by Perthes (1906)
- shave off bone from the anterior glenoid
- reconstruction of the avulsed capsule and labrum at the glenoid lip, using simple drill holes
- subscapularis, which is carefully divided to expose the capsule, is re-approximate without shortening
- osteotomy of the coracoid



Bankart repair for recurrent anterior glenohumeral instability: Results at twenty-nine years' follow-up

Stéphane Pelet, MD, Brigitte M. Jolles, MD, and Alain Farron, MD, Lausanne, Switzerland

30 pt for review after 29 years

3 pt (10%) recurrence of dislocation

5 patients symptomatic osteoarthritis

mean loss of external rotation 24°

mean loss of internal rotation was 19°

global rate of **osteoarthritis** 40%



preop



4 years



29 years

Long-Term Results of Staple Capsulorrhaphy for Anterior Instability of the Shoulder*†

BY SHAWN W. O'DRISCOLL, M.D., PH.D., F.R.C.S.(C)‡, AND DENNIS C. EVANS, M.D., F.R.C.S.(C)§, TORONTO, ONTARIO, CANADA

*Investigation performed at the Upper Extremity Reconstructive Service, Division of Orthopaedic Surgery,
St. Michael's Hospital, University of Toronto, Toronto*



FIG. 3.A

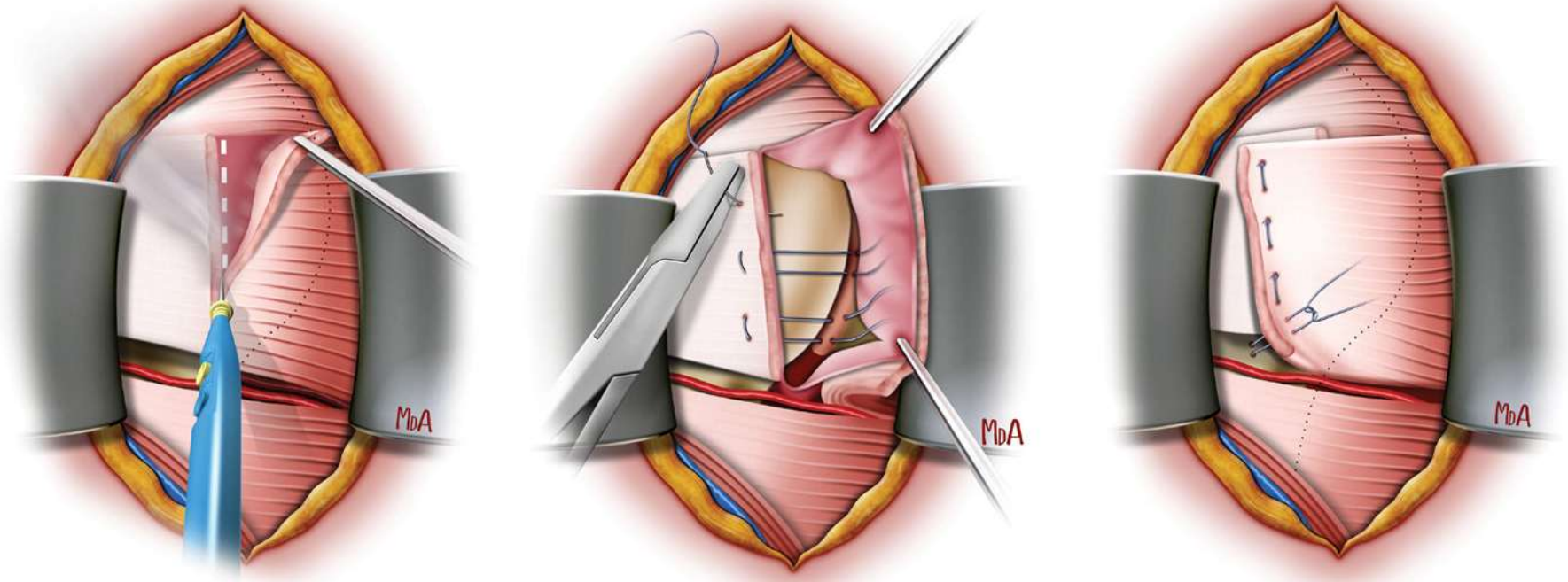


FIG. 3.B

The subjective and objective results after the stapling procedure were not as good as previous reports have suggested, and we no longer recommend staple capsulorrhaphy for anterior instability of the shoulder, even when it is augmented by a Putti-Platt procedure.

Subscapularis procedures

“Subscapularis shortening Putti-Platt (1925)”



Glenohumeral osteoarthritis after Putti-Platt repair

Henrica M. van der Zwaag, MD, Ronald Brand, PhD, Willem R. Obermann, PhD, and Piet M. Rozing, PhD, Leiden, The Netherlands

(J Shoulder Elbow Surg 1999;8:252-8.)

Table V Distribution of shoulders with glenohumeral osteoarthritis by 3 time intervals to follow up (n = 66)

Diagnosis	Length of time until follow-up		
	10 to 20 y	20 to 30 y	30 to 40 y
No arthrosis	20 (74%)	4 (16%)	2 (14%)
Arthrosis	7 (26%)	21 (84%)	12 (86%)
Mild	6	12	5
Moderate	1	7	5
Severe	0	2	2

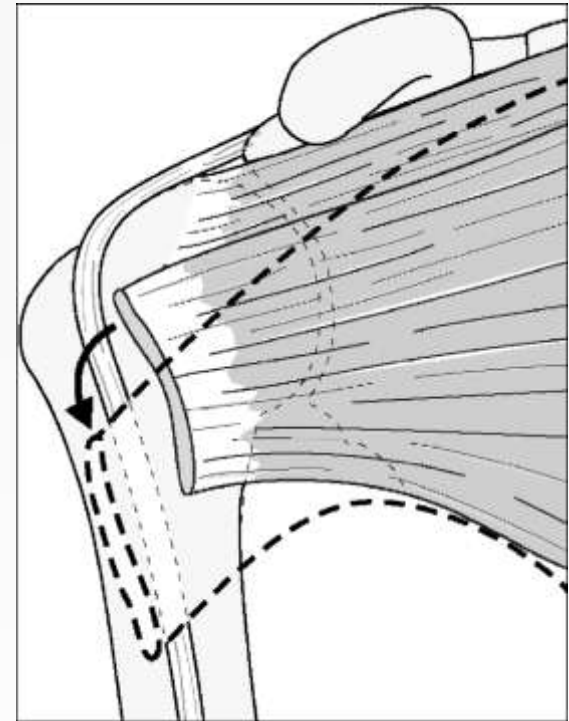


“The rate of glenohumeral arthrosis is increased in patients who have undergone a Putti-Platt procedure and is positively correlated with the length of time since surgery”

Subscapularis procedures

“Magnuson – Stack (1940)”

Transfer of the subscapularis tendon from the lesser tuberosity across the bicipital groove to the greater tuberosity



[Acta Orthop Scand Suppl. 1997 Oct;275:69-71.](#)

Recurrent traumatic anterior dislocation of the shoulder. 218 consecutive cases treated by a modified Magnuson-Stack procedure and follow for 2-18 years.

[Karadimas JE.](#)

Department of Orthopaedics, University of Athens, Greece.

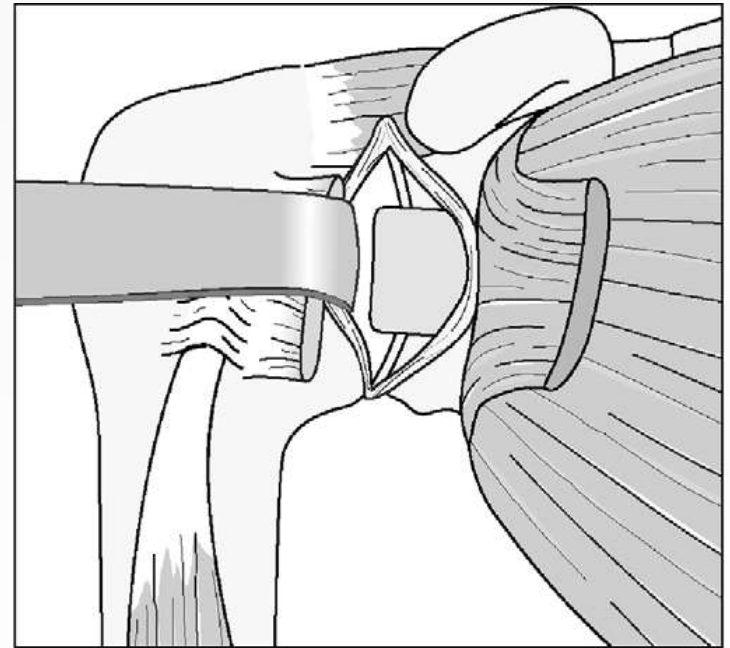
Abstract

Over a period of 30 years (1961-1991), 218 patients with recurrent anterior dislocation of the shoulder were operated on at the Naval Hospital of Greece using a modified Magnuson-Stack method. The modification involved transfer of the subscapularis tendon not only laterally to the bicipital groove, but also 1 cm distally (Karadimas et al. 1980). 210 patients (213 shoulders) were examined after a follow-up of 9 (2-18) years. Results were evaluated according to pain, limitation of motion, muscular power and atrophy. 183 patients (87%) had very good results, 21 cases (10%) had good results, while 6 cases (3%) had fair results. Only 3 recurrences (1%) were recorded.

Bone block procedures

“Eden-Hybinette Procedure (1932)”

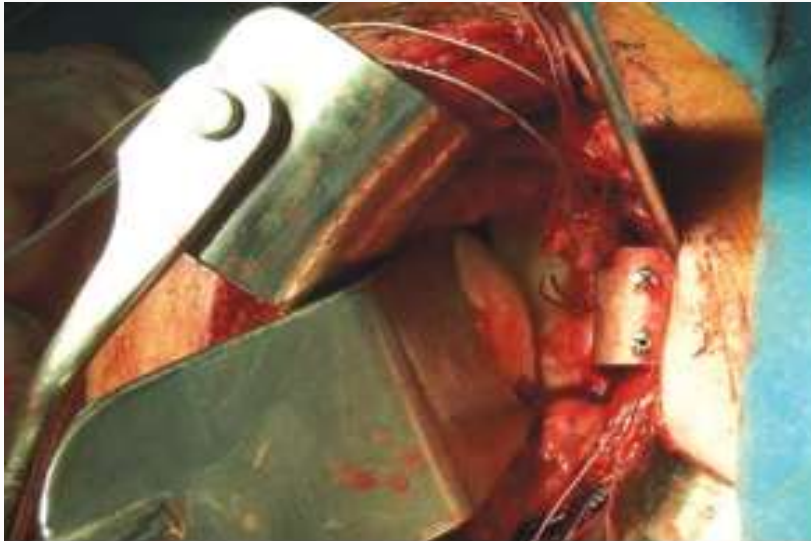
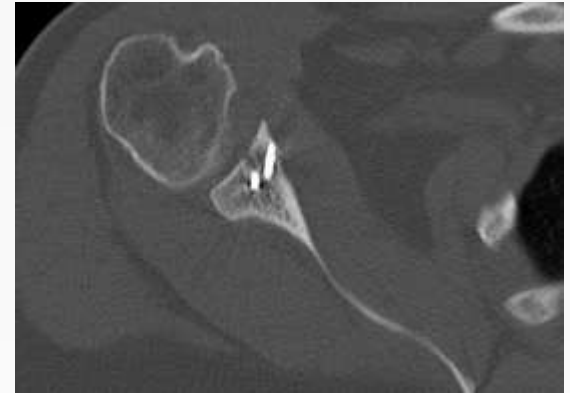
- creation of a trough through the capsule and into the anteroinferior aspects of the scapula neck.
- a tricortical iliac crest bone graft was then wedged into the trough without fixation



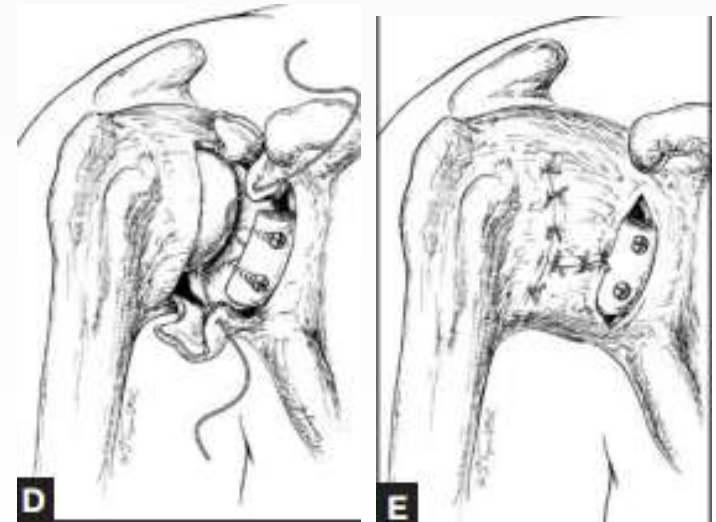
Open Shoulder Stabilization Procedure Using Bone Block Technique for Treatment of Chronic Glenohumeral Instability Associated With Bony Glenoid Deficiency

Michael Khazzam, MD, Steven M. Kane, MD, and Matthew J. Smith, MD

Am J Orthop. 2009;38(7):329-335.



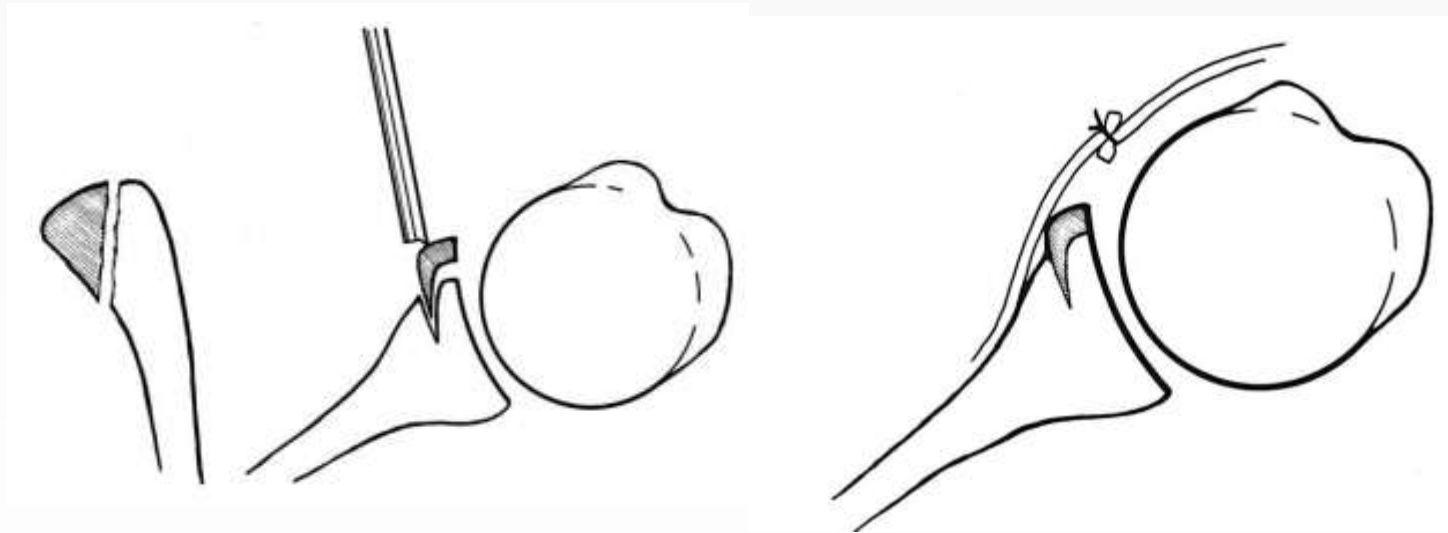
Our 1- to 2-year follow-up showed that the bone block stabilization procedure had successful outcomes and can be recommended for use in patients with recurrent shoulder instability and a significant glenoid bony defect.



Reasons for failure after surgical repair of anterior shoulder instability

J Shoulder Elbow Surg
May/June 2004

Mark Tauber, MD,^a Herbert Resch, MD,^a Rosemarie Forstner, MD,^b Michael Raffl, MD,^a and Josef Schauer, MD,^a Salzburg, Austria

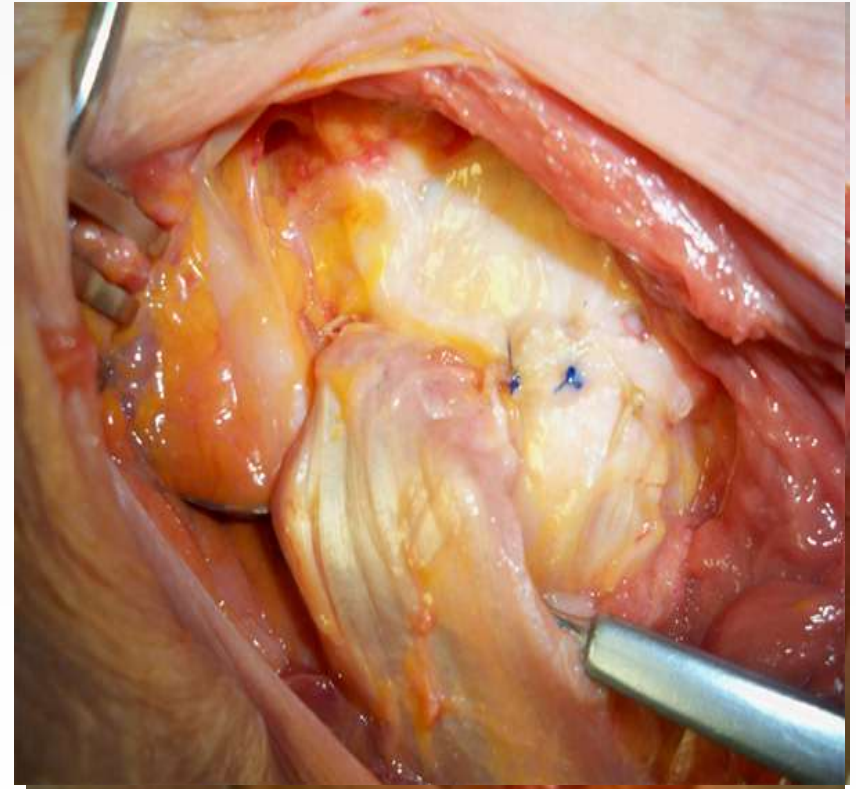


J-bone graft procedure

Coracoid transfer

“Bristow - Helfet procedure (1958)”

- coracoid tip is transferred to the anteroinferior glenoid neck and serves as a bone block
- the transferred conjoint tendon acts as a strong dynamic buttress across the anterior and inferior aspects of the joint



The Modified Bristow Procedure for Anterior Shoulder Instability

26-Year Outcomes in Naval Academy Midshipmen

LCDR David T. Schroder,* MD, MC USNR, LCDR Matthew T. Provencher, MD, MC USN, CDR Timothy S. Mologne, MD, MC USN (ret), CDR Michael P. Muldoon, MD, MC USN (ret), and CAPT Jay S. Cox, MD, MC USN (ret)

From the Division of Orthopaedic Shoulder and Knee Surgery, Department of Orthopaedic Surgery, Naval Medical Center San Diego, San Diego, California



Conclusion: This study represents the longest follow-up in the literature of the modified Bristow procedure. The authors have shown nearly **70% good and excellent results** and recurrent instability comparable with other long-term follow-up studies of open instability procedures.

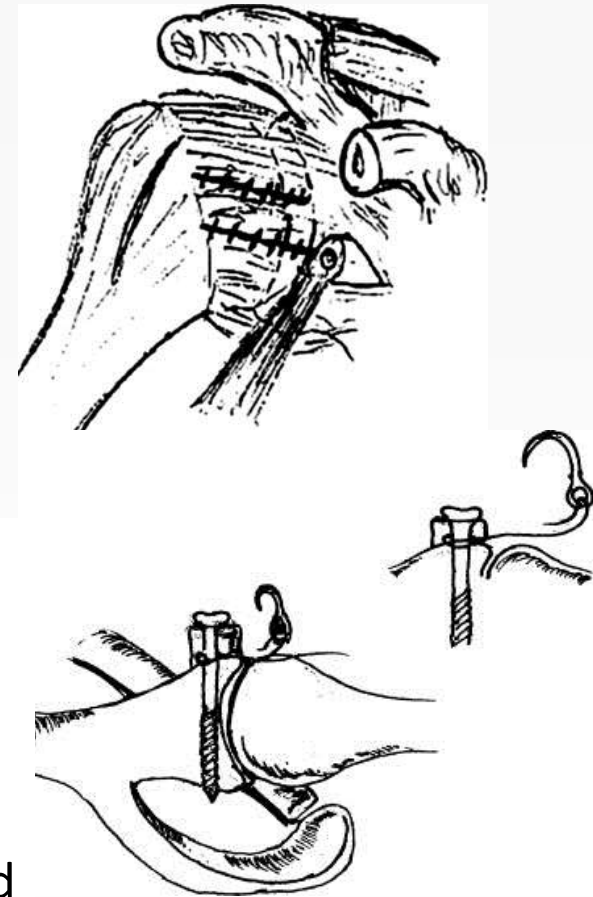
Shoulder

The effect of capsular repair, bone block healing, and position on the results of the Bristow-Latarjet procedure (study III): long-term follow-up in 319 shoulders

Lennart Hovelius, MD, PhD^{a, b}, Björn Sandström, MD^b, Anders Olofsson, MD^b, Olle Svensson, MD, PhD^a, Hans Rahme, MD, PhD^c

- 319 shoulders, 3 (1%) revision surgery
- bony union in 83%
- position too medial to the glenoid rim (1 cm) was associated with recurrence.

The open Bristow-Latarjet procedure is a good alternative for revision surgery and for shoulders with a bony Bankart lesion. When a **horizontal capsular shift** was added to the repair, the results with respect to recurrences and subjective assessment were improved



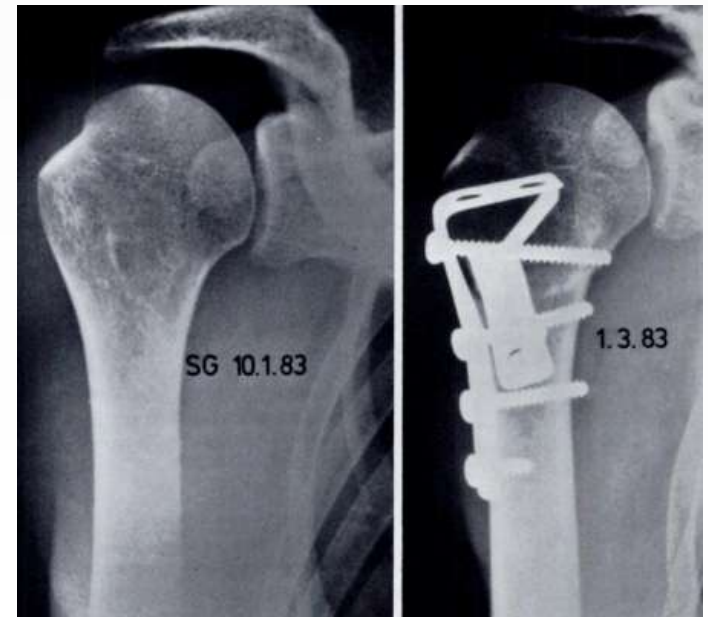
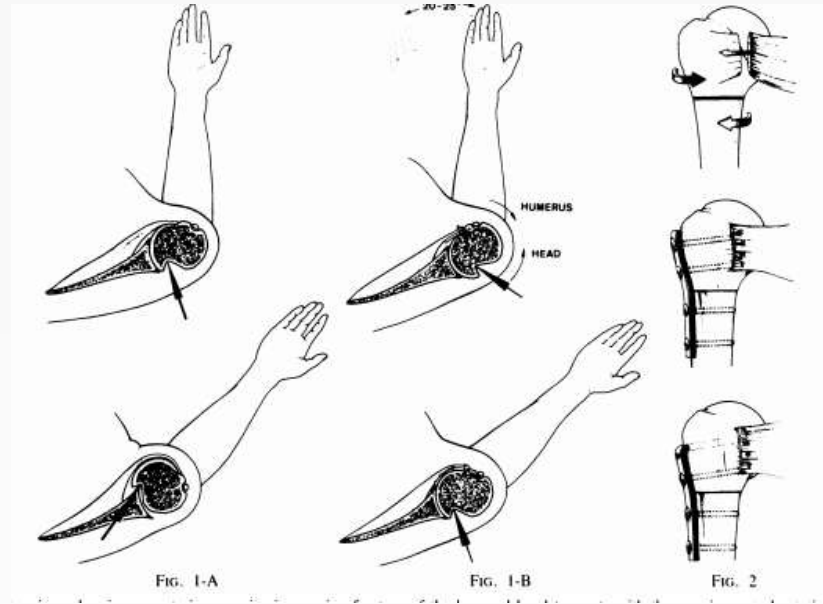
Humerus osteotomy

Rotational humeral osteotomy for recurrent anterior dislocation of the shoulder associated with a large Hill-Sachs lesion

BG Weber, LA Simpson, F Hardegger and S Gallen
J Bone Joint Surg Am. 1984;66:1443-1450.

- subcapital osteotomy
- medial rotation of the head (25°)
- shortening of the subscapularis tendon and capsule anteriorly

average loss of external rotation >5 degrees, without noticeable diminution of power or function in most patients. The results as graded by a standard rating scale were good to excellent in 90 per cent



Does Weber's rotation osteotomy induce degenerative joint disease at the shoulder in the long term?

Matthias P. Flury, MD, Joerg Goldhahn, MD, Patrick Holzmann, MD, and Beat R. Simmen, MD, Lengghalde, Switzerland

J Shoulder Elbow Surg
November/December 2007

Only 3 patients (9%) did not show signs of degeneration.

↑ increased internal rotation of the head
more severe degenerative disease



“We therefore recommend this osteotomy only as a salvage procedure whereby the internal rotation of the humeral head should not exceed 20 degrees”

Combination of capsulolabral techniques

- **Repair of Bankart lesion**

- **Inferior capsular shift**

Neer CS, Foster CR :

Inferior capsular shift for involuntary inferior and multidirectional instability of the shoulder. JBJS Am 1980

- **Reinforced cruciate repair**

Neer CS, Fithian TE:

Reinforced cruciate repair for anterior dislocation of the shoulder. Orthop Trans 1985

160 pt at Patras University Hospital (5% recurrences)

Surgical steps



**Direction of the instability
(under anesthesia)**

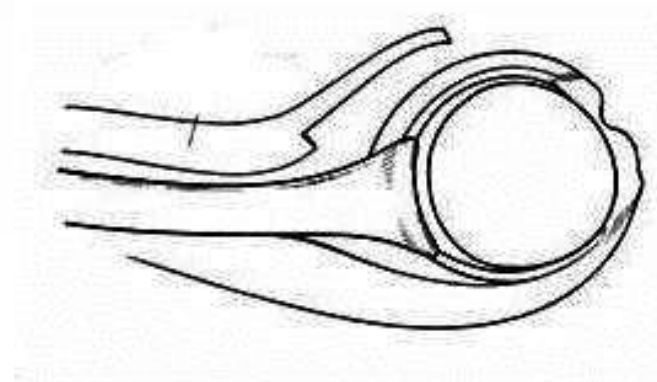
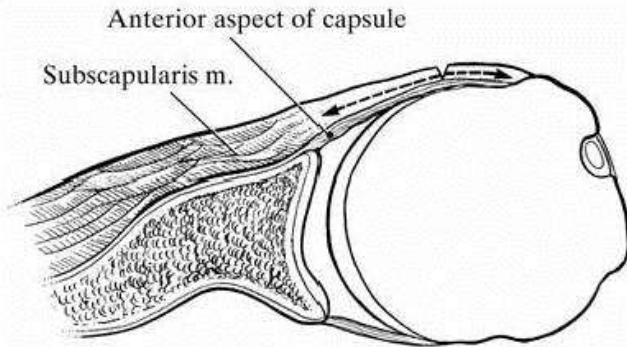
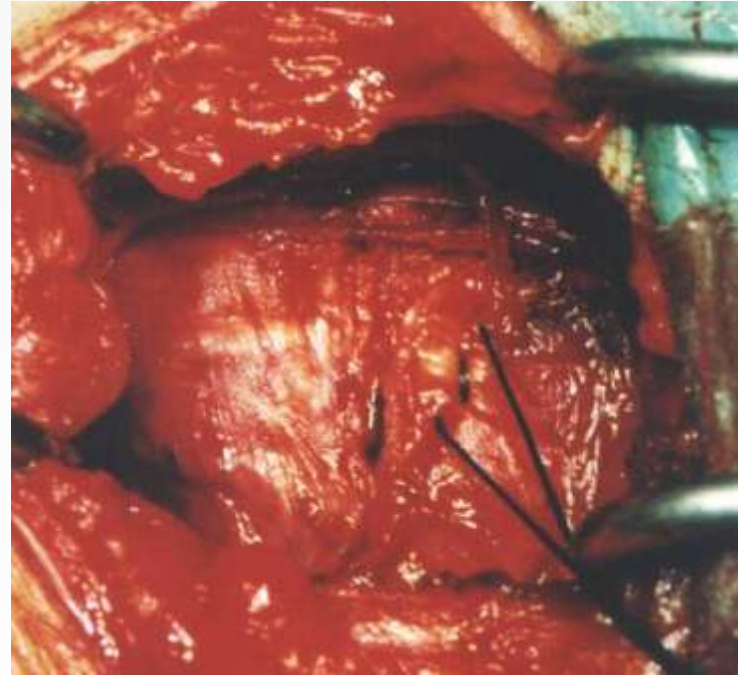
beach chair position



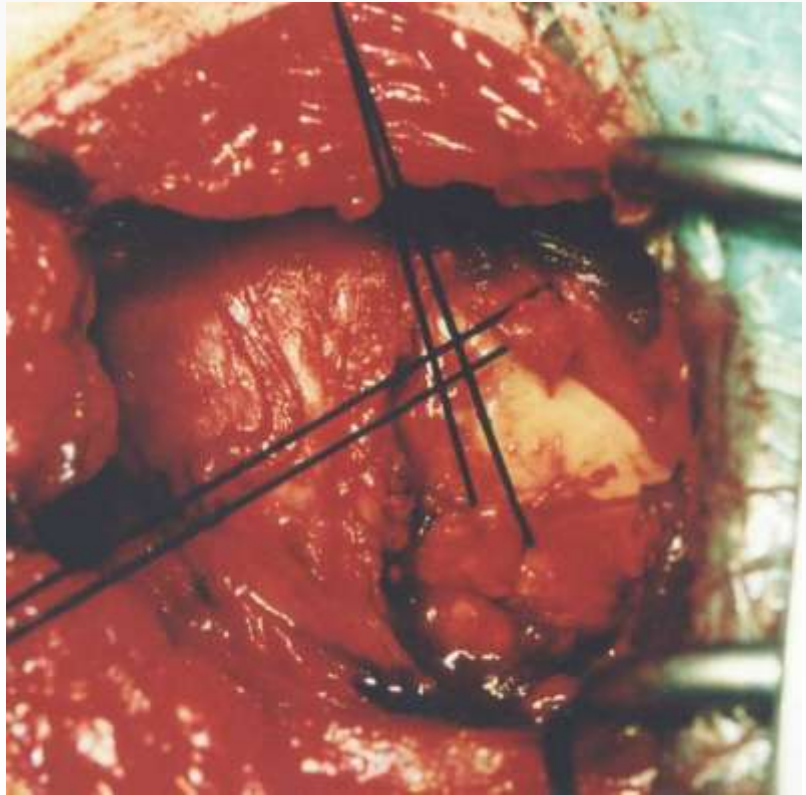
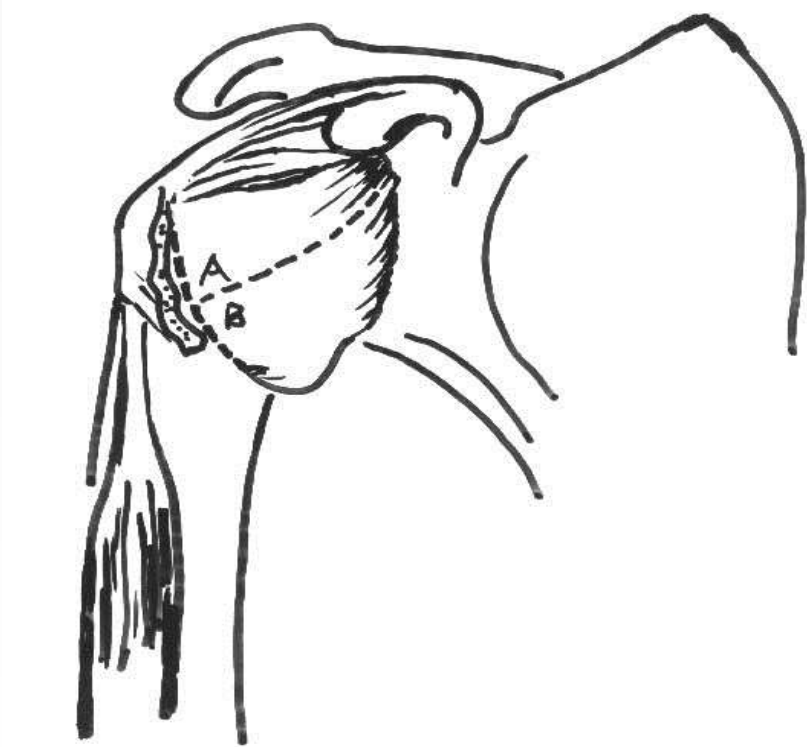
**axillary approach
(Ryan-Lesley)**



Subscapularis cut (leave 1/3 attached to the capsule)



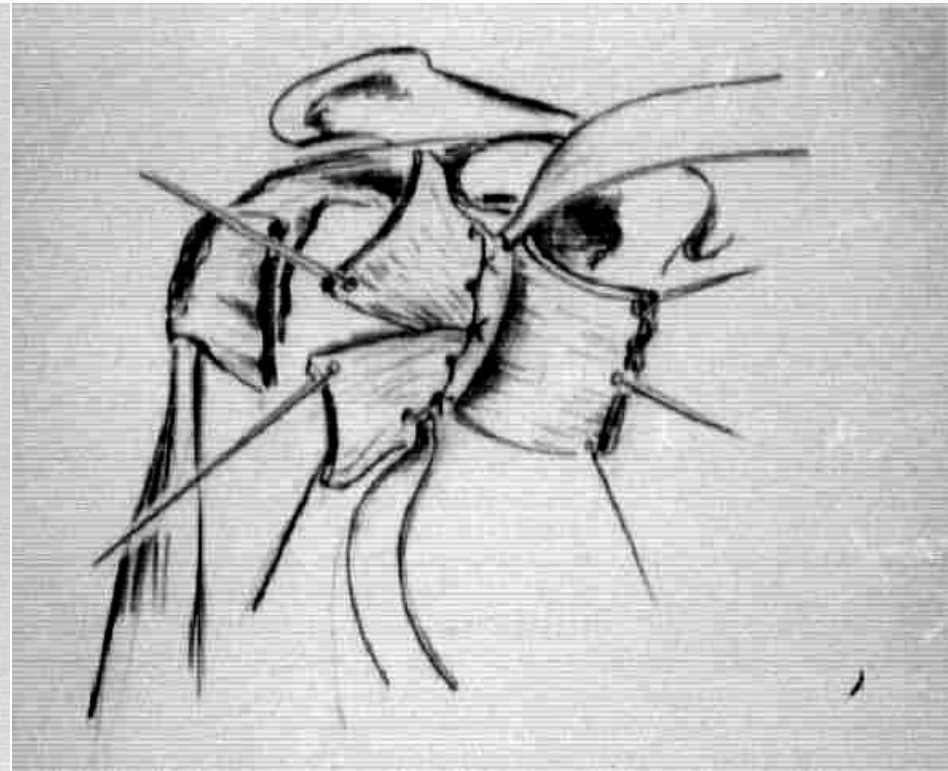
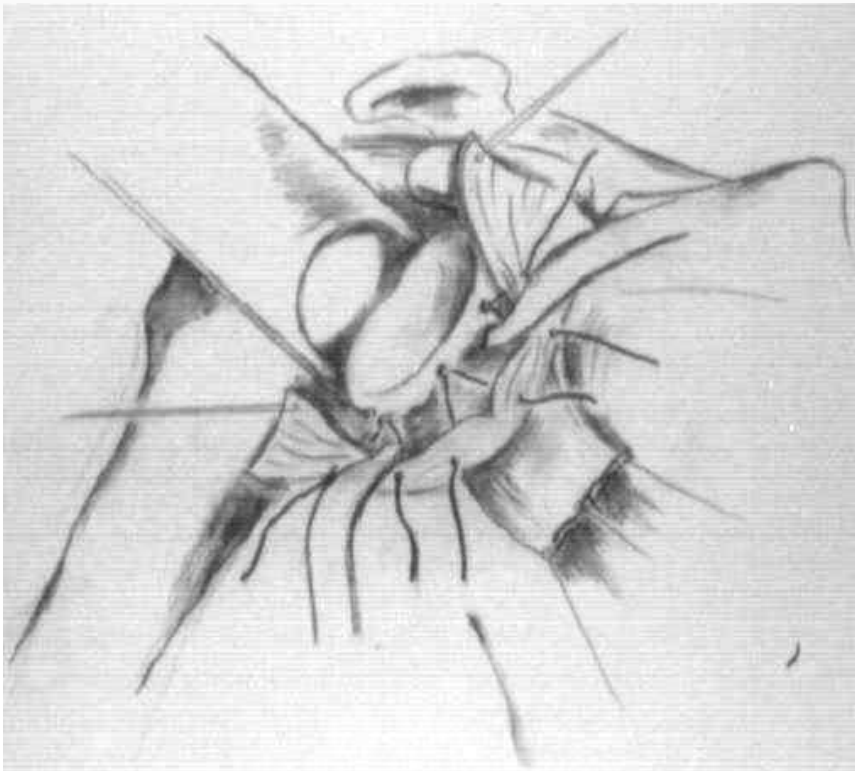
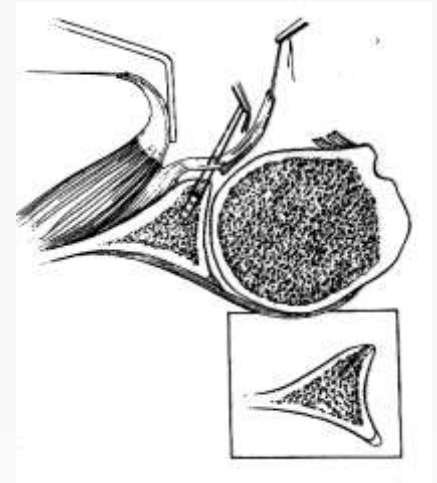
The capsule is opened in “ T-shape”



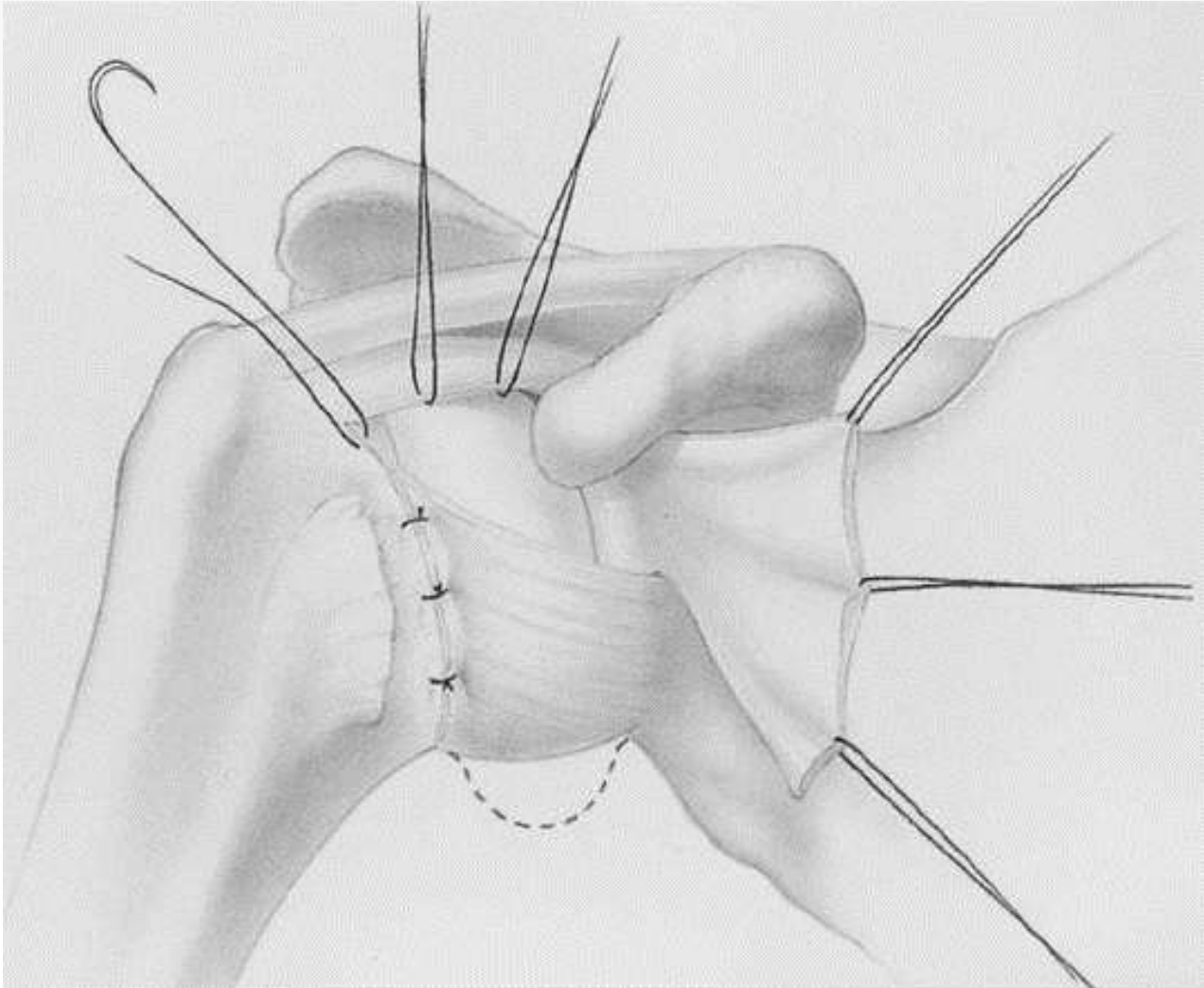
Repair of capsulolabral detachment

Three holes with drill 2,5mm (3:00, 5:00, 7:00)

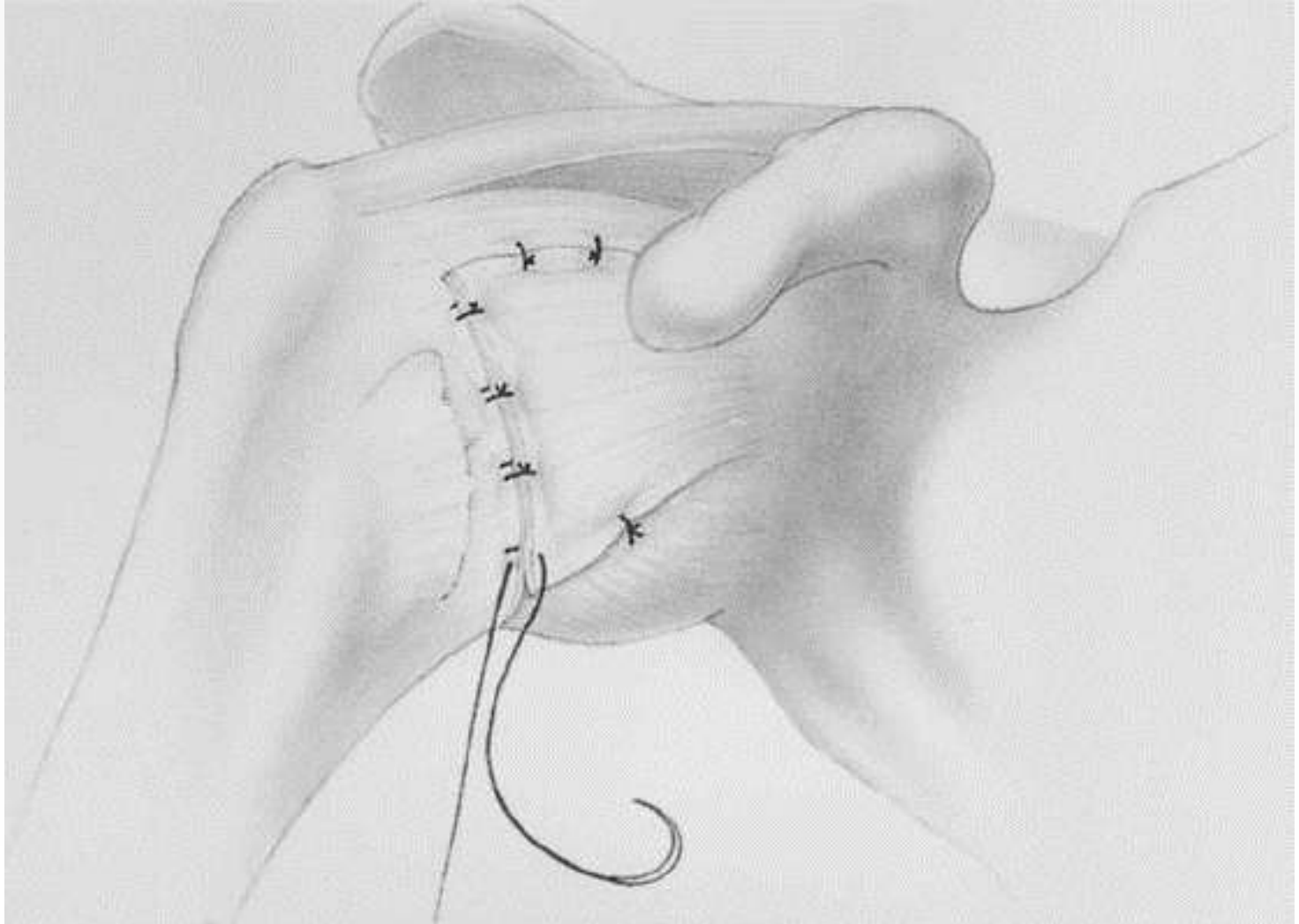
Glenocapsular reattachment with ethibon No 2 (Mitec G II)



Inferior capsular shift



Cruciate repair



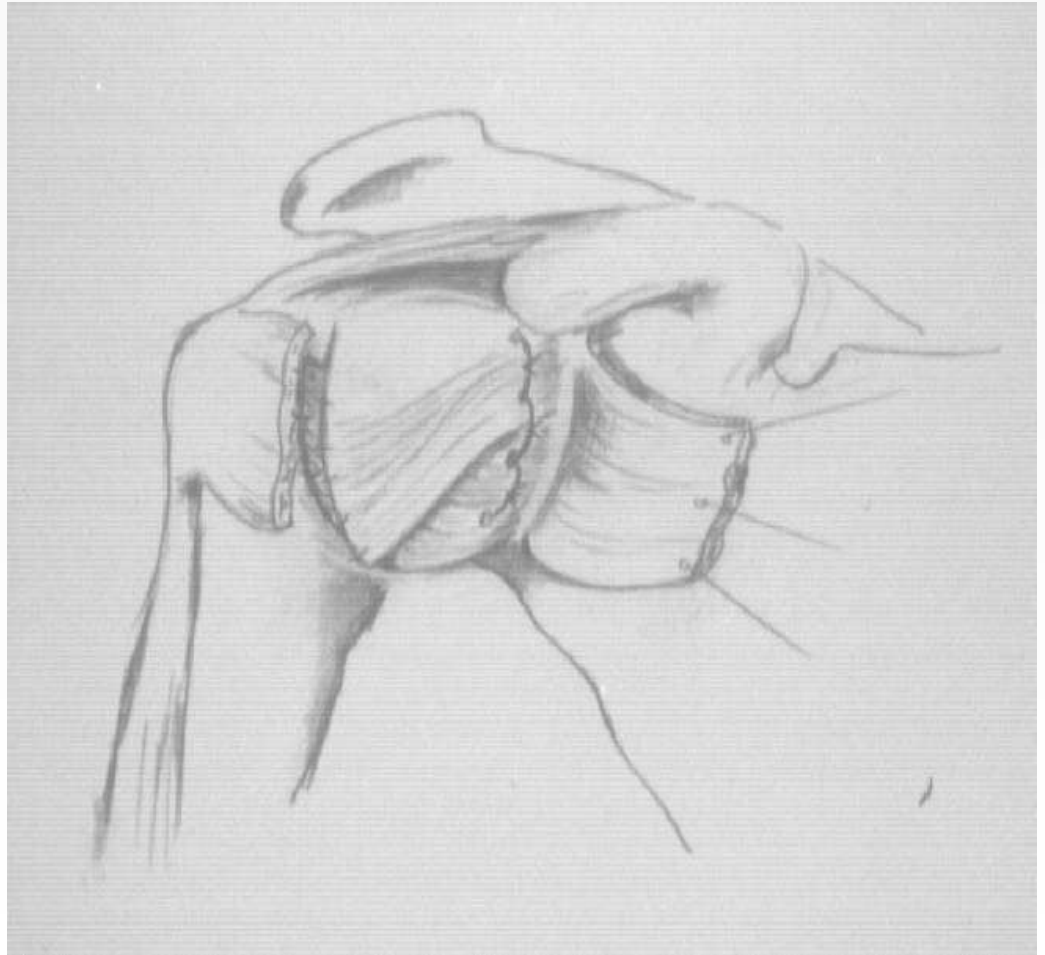
...to reinforce anterior capsule

arm position

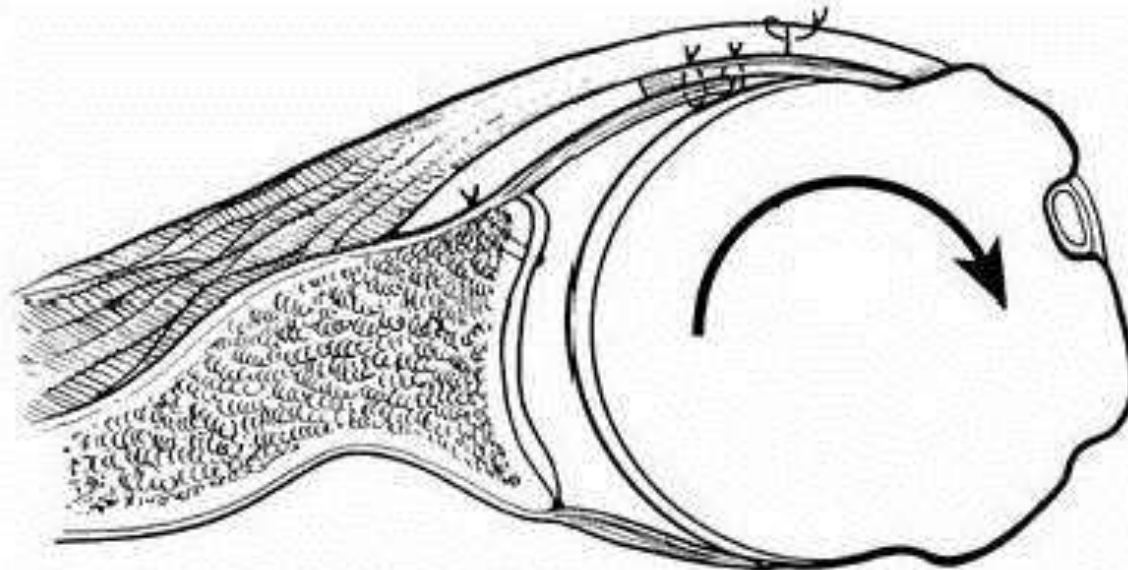
Elbow flexion 90°

Shoulder lift

External rotation 10°



Subscapularis is reattached in its anatomical insertion (without shortening)



No functional limitation of external rotation



POST OPERATIVELY

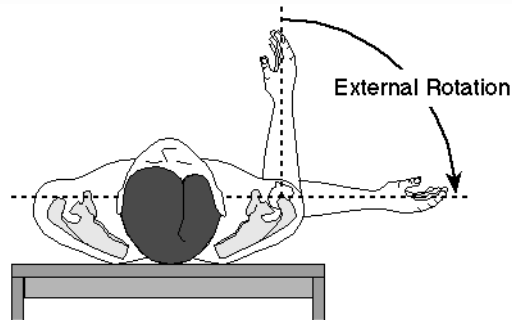
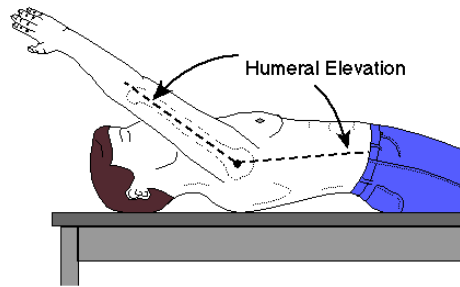
- **First 48 hours :
Velpeau**



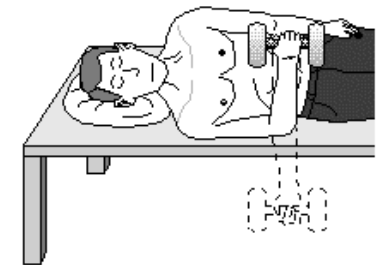
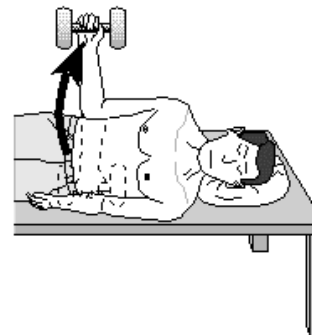
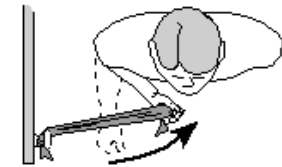
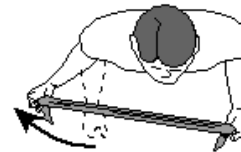
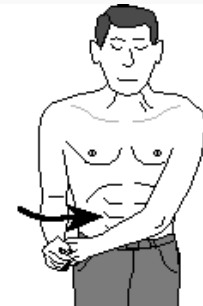
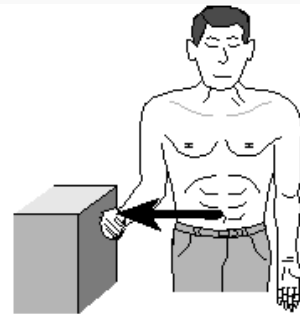
- **Till 4th week : controlled ext
rotation gradually to neutral
position**



● **4th to 6th week : active assisted immobilization**



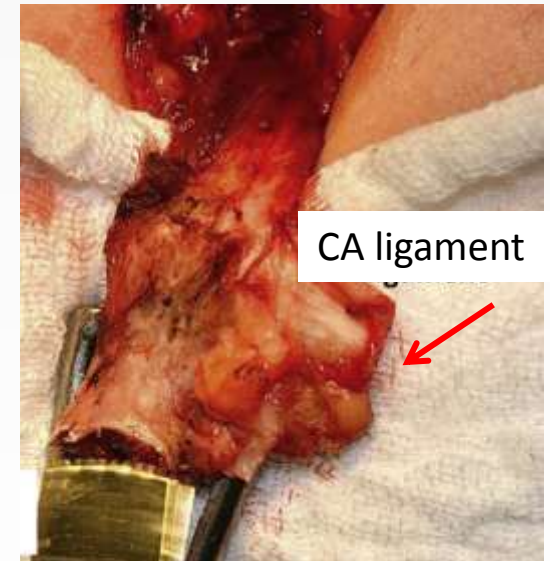
● **After 6th week : muscular strengthening**



Coracoid transfer

“Latarzet procedure (1958)”

- the **gold standard** treatment for anterior glenohumeral instability in the presence of glenoid bone loss
- 3 stabilizing mechanisms
 - coracoid process acts as a bony extension
 - conjoint tendon act as a soft tissue sling preventing anterior subluxation
 - the capsule can be repaired to the stump of CA ligament, thus providing a new, strong, inferior glenohumeral ligament

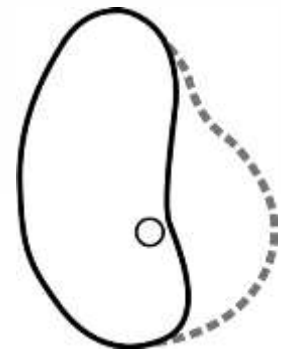
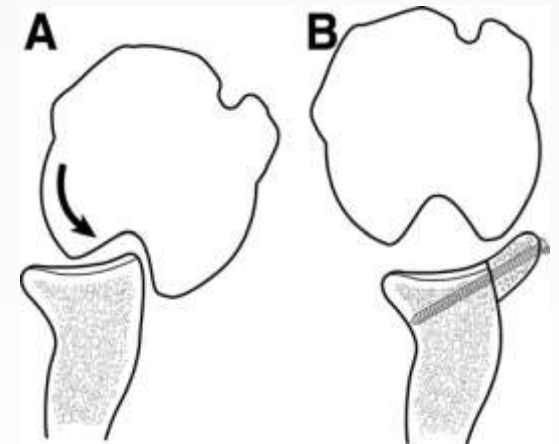
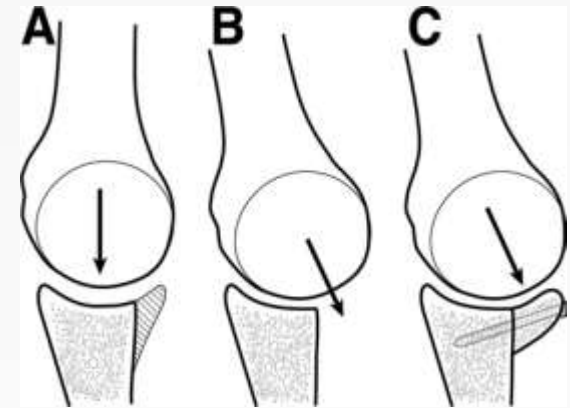


Coracoid transfer

“Latarjet procedure (1958)”

The Latarjet reconstruction extends the glenoid articular arc so that

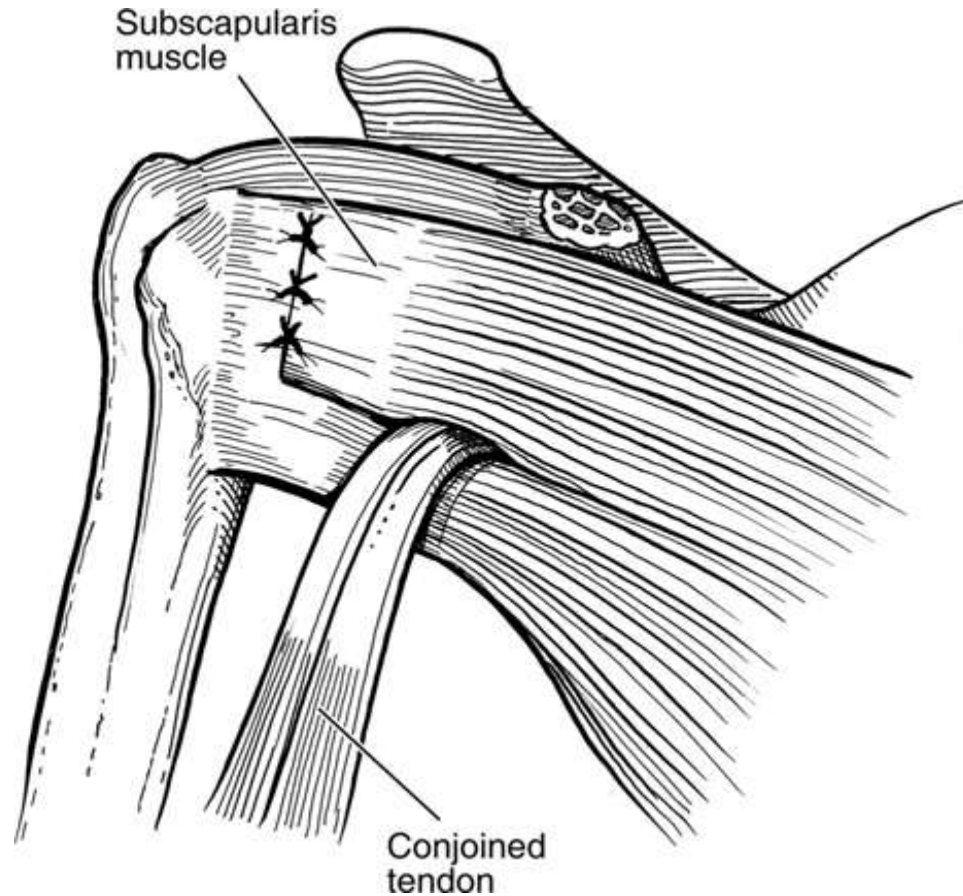
1. off-axis loads are resisted by bone rather than soft tissue
2. the humerus cannot externally rotate enough to cause engagement of the Hill-Sachs lesion over the front of the graft.



Results of Modified Latarjet Reconstruction in Patients With Anteroinferior Instability and Significant Bone Loss

Stephen S. Burkhart, M.D., Joe F. De Beer, M.D., Johannes R. H. Barth, M.D.,

Arthroscopy: The Journal of Arthroscopic and Related Surgery, Vol 23, No 10 (October), 2007; pp 1033-1041





ELSEVIER

REVIEW ARTICLE

Complications associated with open coracoid transfer procedures for shoulder instability

Usman Butt, MRCS^a, Charalambos P. Charalambous, MSc, MD, FRCS (Tr & Orth)^{b,*}

30 studies describing the results of **1658** coracoid transfer procedures

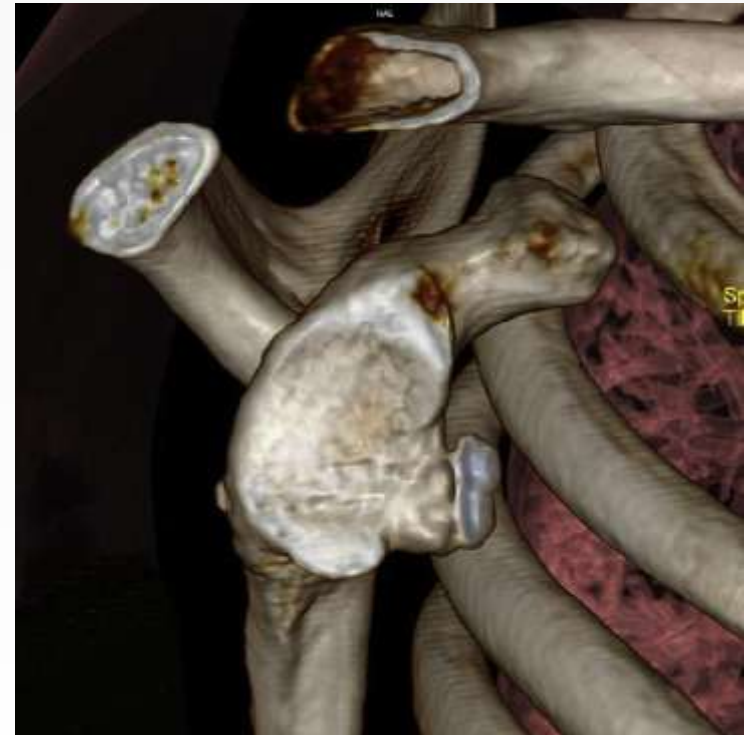
- reoperation 4.9%
- recurrent instability 6.0%
- hardware complications 6.5%
- graft nonunion, fibrous union, or graft migration **10.1%**
- graft osteolysis 1.6%
- nerve palsy 1.2%
- infection occurred in 1.5%

Coracoid graft osteolysis after the Latarjet procedure for anteroinferior shoulder instability: a computed tomography scan study of twenty-six patients

Giovanni Di Giacomo, MD^a, Alberto Costantini, MD^a, Nicola de Gasperis, MD^{a,*},
Andrea De Vita, MD^a, Bernard K.H. Lin, MD^a, Marco Francone, MD^b,
Mario A. Rojas Beccaglia, MD^a, Marco Mastantuono, MD^b

The most relevant osteolysis was represented by the superficial part of the **proximal** coracoid

No patient with recurrent shoulder dislocation. This reinforced the hypothesis that the coracoid bone graft is not the principal factor in the Latarjet procedure for anteroinferior shoulder stabilization.

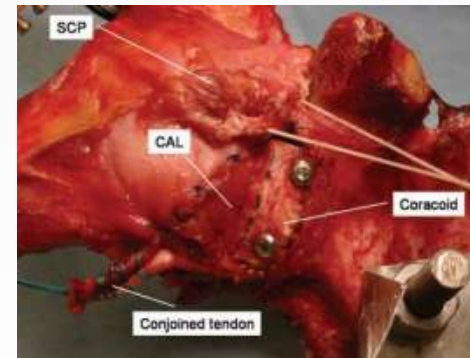
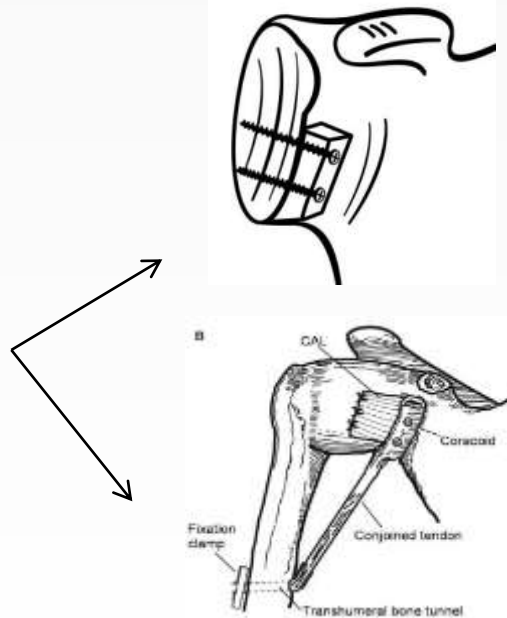
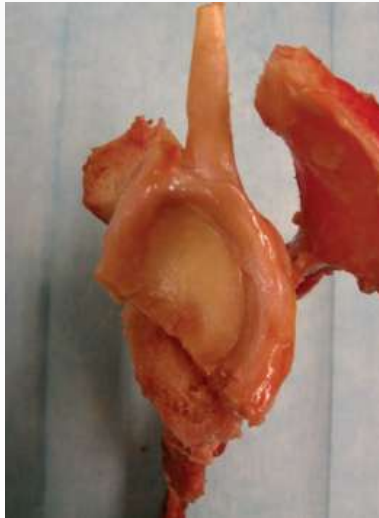


Open Shoulder Repair of Osseous Glenoid Defects

Biomechanical Effectiveness of the Latarjet Procedure Versus a Contoured Structural Bone Graft

Mathias Wellmann,^{*,†} MD, Wolf Petersen,[‡] MD, Thore Zantop,[‡] MD, Mirco Herbort,[‡] MD,
Philipp Kobbe,[§] MD, Michael J. Raschke,[‡] MD, and Christof Hurschler,[†] PhD

The American Journal of
Sports Medicine

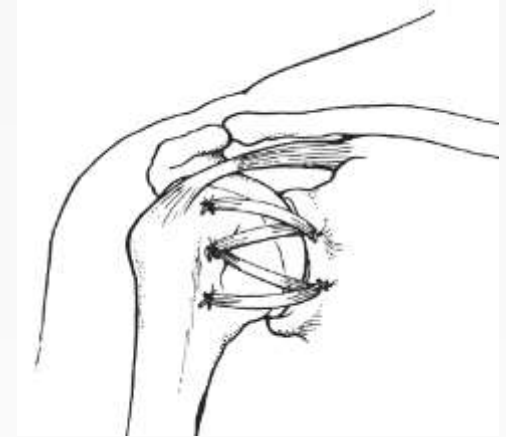


Biomechanically, the Latarjet procedure outperforms the bone graft in reducing translation in anteroinferior glenoid bone defects.

The advantage of the Latarjet procedure is particularly evident at 60° of glenohumeral abduction.

**Revision anterior capsular shoulder stabilization using
hamstring tendon autograft and tibialis tendon allograft
reinforcement: Minimum two-year follow-up**

Jess G. Alcid, MD,^a Scott E. Powell, MD,^b and James E. Tibone, MD,^{c,d} Toms River, NJ, and Panorama City and
Los Angeles, CA



15 patients

2 years fup

ASES score 73

no postoperative dislocations

decreased range of motion

2 patients TSA



Open Operative Treatment for Anterior Shoulder Instability: When and Why?

Peter J. Millett, Philippe Clavert and Jon J.P. Warner
J Bone Joint Surg Am. 87:419-432, 2005. doi:10.2106/JBJS.D.01921

Arthroscopic equipment & lack of expertise

Marked bony deficiencies

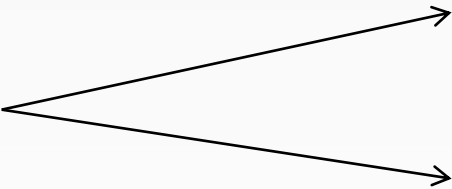
Capsular ruptures, Prior failed thermal capsulorrhaphy

RC lesions?

HAGL lesions?

Collision athletes?

Revision arthroscopic surgery?



Engaging Hill-Sachs defects
($\geq 30\%$ of humeral head)
Significant glenoid bone
defects ($\geq 25\%$)

Personal preference

Always start with diagnostic arthroscopy

- (1) First time dislocation, young pt = Arthroscopic Bankart
- (2) Recurrent traumatic instability \pm ALPSA = Arthroscopic Bankart repair + inferior capsular shift, [OPEN in collision athletes + cruciate reinforcement, open in HAGL lesion]
- (3) First time dislocation/small bone loss = Arthroscopic Bankart + incorporation
- (4) First time dislocation/ $>$ osseous fragment = open reconstruction + fixation
- (5) Recurrent traumatic instability/significant bone loss = Latarzet procedure
- (6) Revision arthroscopy + bone loss = Latarzet procedure
- (7) Instability in elderly patients \pm RC injury = Bristow procedure