

+ Arthroscopic technique for performing Remplissage

Using the HEALICOIL[®] PK Suture Anchor

A shoulder technique
guide as described by

Larry D. Field, MD

Director, Upper Extremity Service
Mississippi Sports Medicine and
Orthopaedic Center
Jackson, MS



HEALICOIL[®] PK
Suture Anchor

Introduction

The shoulder is the most common joint to be traumatically dislocated. The incidence of Hill-Sachs lesions following a primary anterior shoulder dislocation is high, ranging in reports from 47% to 90%.¹⁻³ The term, Hill-Sachs lesion, was coined after a 1940 report by Harold A. Hill, MD. and Maurice D. Sachs, MD. which detailed their experience with 119 cases of dislocated shoulders in which they identified a pathognomonic impaction fracture of the posterosuperolateral humeral head. This Hill-Sachs lesion was described in their report as a line of condensation on the internal rotation view of the humerus.⁴ Diagnosis of a Hill Sachs lesion is obtained either with advanced diagnostic imaging (**Figure 1**) or dynamic arthroscopic assessment (**Figure 2**).⁵ Hill-Sachs lesions can create instability with patient apprehension in the affected shoulder, and lesions that prove to be associated with instability often involve either 25-30% of the humeral head or 5/8 of the radius of curvature, and are



Figure 1



Figure 2

engaging with the anterior glenoid.⁶⁻¹⁰ In patients with these posterior humeral head defects, arthroscopic posterior capsulotenodesis with posterior capsule and infraspinatus, or Remplissage, is an arthroscopic procedure that can be utilized to supplement arthroscopic Bankart repair. The Hill-Sachs ‘Remplissage’ technique is similar to an arthroscopic repair of a partial-thickness, articular-surface rotator cuff tear. It consists of fixation of the infraspinatus tendon and posterior capsule to the abraded surface of the Hill-Sachs lesion.¹¹ The Remplissage procedure offers an effective and valuable technique for patients with certain Hill-Sachs lesions and has been demonstrated to reduce the risk of recurrent instability.¹²⁻¹⁶

The following technique guide was prepared under the guidance of Larry Field, MD. Created under close collaboration with the surgeon, it contains a summary of medical techniques and opinions based upon his training and expertise in the field, along with his knowledge of Smith+Nephew's products.

S+N does not provide medical advice and recommends that surgeons exercise their own professional judgement when determining a patient's course of treatment. This guide is presented for educational purposes only. **Prior to performing this technique, or utilizing any product referenced herein, please conduct a thorough review of each product's indications, contraindications, warnings, precautions and instructions as detailed in the Instructions for Use provided with the individual components. Dr. Field is a paid consultant of S+N.**



Figure 3



Figure 4a

Patient positioning/portal placement

It is the author's preference to position the patient in a lateral decubitus position when managing Hill-Sachs lesions, although the procedure can be performed in the beach chair position as well if preferred. The patient is tilted posteriorly 30° to the vertical plane rather than 'straight' lateral decubitus. The arm is then prepped and draped in sterile fashion and suspended in approximately 10-15 pounds of balanced suspension during the procedure. Standard arthroscopic portals are used and are further discussed below in the surgical technique. (**Figure 3**)

Surgical technique

The surgical technique is composed of six surgical steps, which includes a Bankart repair.

Step 1: Patient set-up and arthroscopic assessment

1a. Set-up

The operative shoulder should be evaluated while supine on the operating room table for stability and range of motion (ROM) while focusing on the position of the arm when the humeral head begins to engage or sub lux anteriorly to glenoid; this is compared with the contralateral extremity. The author prefers the lateral decubitus position for the patient, with the arm suspended in balanced traction and the shoulder tilted approximately 30° posterior from the vertical plane thus improving access to the anterior shoulder during Bankart repair. (**Figure 4a**)



Figure 4b

1b. Posterior portal

Standard technique for posterior portal placement is used, placing the portal 2cm inferior and 2cm medial to the posterolateral corner of the acromion, in the soft spot. (Figure 4b)

1c. Diagnostic arthroscopy

After portals are established, diagnostic arthroscopy is begun, paying close attention for the presence of a Hill-Sachs lesion while noting the size, location, and orientation. (Figure 4c)

1d. Dynamic arthroscopic assessment

The arm is then removed from traction for the dynamic assessment of the shoulder which should include taking the shoulder from the neutral position into external rotation at 0°, 45° and 90° of abduction, and an anterior drawer test is performed while the glenohumeral joint is viewed from the posterior portal. (Anterior portal can be used for dynamic assessment, as well). Engaging Hill-Sachs lesions are an indication to proceed with Remplissage in addition to Bankart procedure. After completion of the dynamic assessment, a standard anterior portal is established using standard technique while viewing through the posterior portal. (Figure 4d)

NOTE: A second more inferiorly located posterior portal may be required to adequately access the humeral head defect for anchor placement and suture passage later in procedure.



Figure 4c

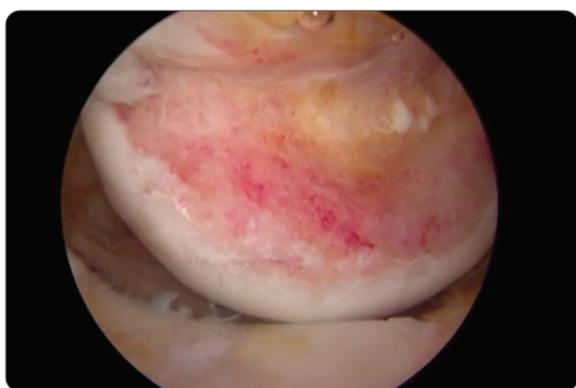


Figure 4d



Figure 5

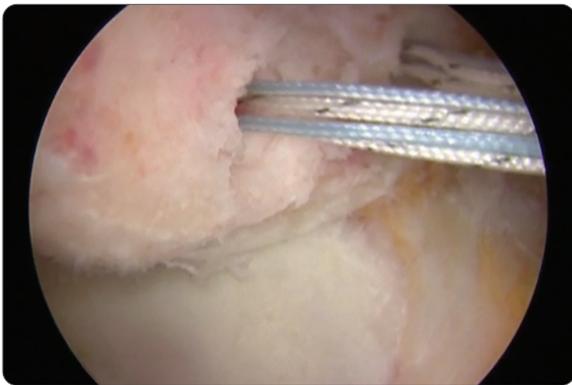


Figure 6

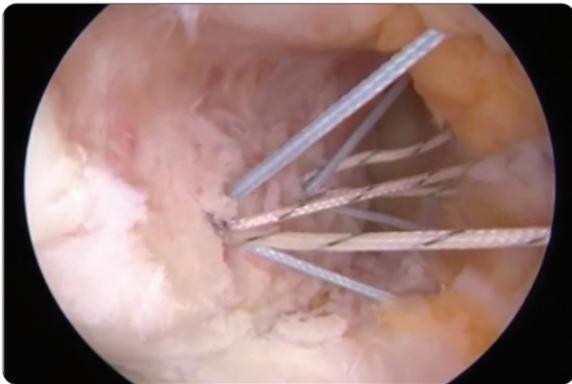


Figure 7

Step 2: Debridement

Debridement of the Hill-Sachs lesion must be performed for complete evaluation of lesion. Debridement is carried out with an arthroscopic shaver making sure to remove any unnecessary tissue present in the defect. This is performed through the posterior portal while viewing from the anterior portal. Debridement is also performed to help stimulate the bony bed to assist in healing of the soft tissues. (Figure 5)

Step 3: Anchor placement

After debridement is performed, complete visualization of the Hill-Sachs lesion is now possible and attention is taken to appropriate placement of anchors. One or two HEALICOIL[®] PK 5.5mm double loaded suture anchors are typically used by author, depending on the size of lesion. Anchors are placed immediately adjacent to articular cartilage of the posterior humeral head defect. (Figure 6)

Step 4: Suture passing

With the use of a retrograde suture passer, all suture limbs are then passed sequentially from inferior to superior through the capsule and infraspinatus along the axis of Hill-Sachs lesion. All sutures used for the Remplissage procedure are left untied until completion of the Bankart repair. (Figure 7)

NOTE: It is very important to complete Remplissage anchor placement and suture passage through to posterior capsule and infraspinatus prior to repair of the Bankart lesion since re-tensioning of the anterior ligamentous structures that occurs with Bankart repair results in significant posterior humeral head translation. This obligate posterior humeral head shift dramatically reduces the 'working space' available to perform the Remplissage procedure within the posterior glenohumeral joint space adjacent to the Hill-Sachs lesion.



Figure 8

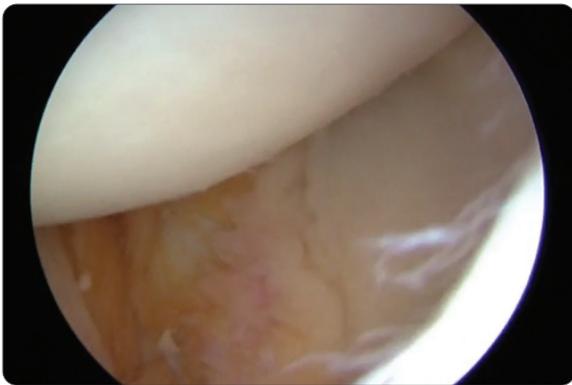


Figure 9

Step 5: Bankart repair

After completion of posterior anchor placement and suture passing, two additional portals are made for the Bankart repair, the first including a mid-anterior portal, placed immediately superior to subscapularis tendon with an appropriate angle for placing anchors into the glenoid rim. The second portal is an anterior superior portal, which is used for viewing while a soft tissue elevator is inserted through the mid anterior portal and used to elevate and remove any scarred capsular or labral tissues that may inhibit adequate reattachment of the labrum. Typically, three or four SUTUREFIX[®] Ultra double loaded suture anchors are used, depending on size of lesion, and spaced between the 5:30 and 11 o'clock positions and the 6:30 to 11 o'clock positions, for right and left shoulders respectively. Anchor placement and suture tying is started inferiorly and moved superiorly along glenoid rim. While passing suture limbs, they are placed in a more inferior position to corresponding anchor to help restore adequate tissue tension on the labrum. Often with the labral repair, the author includes anteroinferior capsular tissue when passing sutures providing a capsular imbrication as well as superior shift. (Figure 8)

Step 6: Remplissage suture tying

After Completion of the Bankart repair, the Remplissage sutures are now tied while viewing from the anterior portal. This is performed by retrieving the sutures through a cannula in the posterior portal. After sutures are retrieved, they are blindly tied through the cannula but only after the cannula is advanced down to the infraspinatus fascia. Alternatively, direct visualization of suture tying can be performed by accessing the subacromial space and visualizing the process directly. The author prefers a sliding knot with three alternating half hitches for knot tying, and this is repeated with all suture limbs. After all sutures are tied, arthroscopic evaluation of glenohumeral joint stability is then performed to confirm appropriate glenohumeral joint balance and centering. (Figure 9)

Postoperative management*

Patient is placed into sling with abduction pillow prior to leaving operative room. Rehab begins with passive pendulum exercises for first two weeks while maintaining active motion distally to shoulder, instructions given to patient to perform at home. At 2-6 weeks, formal physical therapy under supervision is begun and passive elevation to 90° with passive external rotation to 30° is added to the pendulum exercises already being performed. Strengthening at two weeks begins with scapular engagement exercises with assistance and education at therapy. Typically at six weeks, active motion is progressed in all patients with progression from isometric strengthening to more dynamic exercise including periscapular and rotator cuff strengthening. By 12 weeks, patients should have obtained full ROM and now begin functional strengthening in multiplanar positions.¹⁹ The author maintains and recommends a close working relationship with your physical therapist so patient protocols can be adjusted as needed.

* The views and opinions expressed for postoperative care are solely those of the surgeon(s) and do not reflect the views of Smith & Nephew, Inc. In no event shall Smith & Nephew, Inc. be liable for any damages whatsoever (including, without limitation, damages for loss of business profits, business interruption, loss of business information, or other pecuniary loss) arising out of the use of or inability to use the expressed views.

Ordering information

HEALICOIL[®] PK Suture Anchor Pre-loaded with ULTRABRAID[®] Suture*

Reference #	Description
72203379	HEALICOIL PK 5.5mm Suture Anchor with two (#2) ULTRABRAID Sutures

HEALICOIL PK Accessory Devices*

Reference #	Description
72202621	Tapered Awl, 3.8mm, disposable
72201915	Tapered Awl, 3.8mm, reusable
72203634	HEALICOIL/TWINFIX [®] ULTRA Threaded Dilator, 5.5mm, reusable

SUTUREFIX[®] ULTRA Suture Anchor*

Reference #	Description
72203854	SUTUREFIX ULTRA Anchor 1.9mm S with two blue, blue cobraid (#1) ULTRABRAID Sutures

SUTUREFIX ULTRA Accessory Devices*

Reference #	Description
72203856	Twist drill, 1.9mm S

72203857	Drill Guide, crown tip, reusable, S
72203859	Drill Guide, fishmouth tip, reusable, S
72203861	Obturator, blunt tip, reusable, S
72203862	Obturator, cannulated, reusable, S
72203863	Obturator, trocar tip, Reusable, S

WEREWOLF[®] COBLATION[®] System**

Reference #	Description
72290038	FLOW 90 [°] COBLATION Wand
72290105	Controller

DYONICS BONECUTTER[®] PLATINUM Blades

Reference #	Description
72202531	BONECUTTER PLATINUM Blade, 4.5mm
72202530	BONECUTTER PLATINUM Blade, 5.5mm

*Manufactured by Smith & Nephew, Inc., 150 Minuteman Road, Andover, MA 01810 USA.

**Manufactured by ArthroCare Corporation, 7000 W. William Cannon Drive, Austin, TX 78735.

Products may not be available in all markets because product availability is subject to the regulatory and/or medical practices in individual markets. Please contact your Smith+Nephew representative or distributor if you have questions about the availability of Smith+Nephew products in your area.

Additional instruction

To order the instruments used in this technique, call **+1 800 343 5717** in the U.S. or contact an authorized Smith+Nephew representative. Prior to performing this technique, consult the Instructions for Use documentation provided with individual components – including indications, contraindications, warnings, cautions and instructions.

CAUTION: U.S. Federal law restricts this device to sale by or on the order of a physician.

Learn more at smith-nephew.com



Smith & Nephew, Inc.
150 Minuteman Road
Andover, MA 01810
USA

www.smith-nephew.com
T +978 749 1000
US Customer Service:
+1 800 343 5717

[®]Trademark of Smith+Nephew.
All trademarks acknowledged.
©2022 Smith+Nephew. All rights reserved. 06980 V4 03/22

References

- Taylor DC, Arciero RA: Pathologic changes associated with shoulder dislocations. Arthroscopic and physical examination findings in first-time, traumatic anterior dislocations. *Am J Sports Med.* 1997;25:306-311.
- Widjaja AB, Tran A, Bailey M, Proper S: Correlation between Bankart and Hill-Sachs lesions in anterior shoulder dislocation. *ANZ J Surg.* 2006;76:436-438.
- Calandra JJ, Baker CL, Uribe J: The incidence of Hill-Sachs lesions in initial anterior shoulder dislocations. *Arthroscopy.* 1989;5:254-257.
- Hill HA, Sachs MD: The grooved defect of the humeral head: a frequently unrecognized complication of dislocations of the shoulder joint. *Radiology.* 1940;35:690-700.
- Kodali P, Jones MH, Polster J, et al: Accuracy of measurement of Hill-sachs lesions with computed tomography. 2011;20:1328-1334.
- Hovellius L: Anterior dislocation of the shoulder in teenager and young adults. Five year prognosis. *J Bone Joint Surg.* 1987;69:393-399.
- Hovellius L, Augustini BG, Fredin H, et al: Primary anterior dislocation of the shoulder in younger patients. *J Bone Joint Surg.* 1996;78:1677-1684.
- Hovellius L, Eriksson K, Fredin H, et al: Recurrences after initial dislocation of the shoulder. *J Bone Joint Surg.* 1983;65:343-349.
- Burkhart SS, Danaceau SM: Articular arc length mismatch as a cause of failed bankart repair. *Arthroscopy.* 2000;16:740-744.
- Burkhart SS, DeBeer JF: Traumatic glenohumeral bone defects and their relationship to failure of arthroscopic Bankart repairs: significance of the inverted-pear glenoid and the humeral engaging Hill-Sachs lesion. *Arthroscopy.* 2000;16:677-694.
- Wolf EM, Pollack M, Smalley C. Hill-Sachs "Remplissage": An arthroscopic solution for the engaging Hill-Sachs lesion. *Arthroscopy.* 2007;23:e1-e2 (Suppl, Abstr).
- Kirkley A, Werstine R, Ratjek A, Griffin A: Prospective randomized clinical trial comparing the effectiveness of immediate arthroscopic stabilization versus immobilization and rehabilitation in first traumatic anterior dislocations of the shoulder: long term evaluation. *Arthroscopy.* 2005;21:55-63.
- Franceschi F, Papalia R, Rizzello G, et al: Remplissage repair-new frontiers in the prevention of recurrent shoulder instability: a 2 years follow up comparative study. *Am J Sports Med.* 2012; 40: 2462-2469.
- Boileau P, O'Shea K, Vargas P, et al: Anatomical and functional results after arthroscopic Hill-Sachs Remplissage. *J Bone Joint Surg.* 2012;94:618-626.
- Zhu YM, Lu Y, Zhang J, et al: Arthroscopic bankart repair combines with Remplissage technique for the treatment of anterior shoulder instability with engaging Hill-Sachs lesion: a report of 49 cases with a minimum 2 year follow-up. *Am J Sports Med.* 2011;39:1640-1647.
- Nourissat G, Kilinc As, Werther JR, et al: A prospective, comparative, radiological, and clinical study of the influence of the "Remplissage" procedure on shoulder range of motion after stabilization by arthroscopic Bankart repair. *Am J Sports Med.* 2011;39:2147-2152.
- Tokish JM, Abrams JS: Arthroscopic Management of Anterior Instability in Patients with Moderate Humeral Bone Loss: The Remplissage Technique. *AAOS Advanced Reconstruction: Shoulder 2.* 2016;Chapter 10; 97-109.