Arthroscopic Latarjet Procedure

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The increase in popularity of arthroscopic shoulder surgery in the past 20 years has led to an expansion in the operative treatment options available for shoulder instability. This in part can be explained by the arthroscopic exposure given to a new generation of shoulder surgeons throughout residency and fellowship training, and the enthusiasm with which many open surgeons have pioneered and embraced stabilizing techniques. In addition, the added scrutiny of the shoulder afforded by the use of the arthroscope has led to an improved understanding of previously unrecognized soft tissue lesions underlying many cases of instability. The role of glenoid and humeral head bone defects in recurrent instability has also been better appreciated arthroscopically, especially when these lesions are evaluated in combination with preoperative radiological studies.

Despite advances in techniques and instruments, and improvements in surgical training, there still remains a significant failure rate when stabilization procedures inadequately address the underlying pathology.\textsuperscript{1} The open Latarjet procedure has shown excellent and reliable results in the recent literature.\textsuperscript{2–6} The natural evolution of this procedure is an all-arthroscopic technique to confer all of the advantages of the open procedure while using a minimally invasive technique.

IS THERE A NEED FOR THE ARTHROSCOPIC LATARJET PROCEDURE?

Most shoulder surgeons are familiar with either an arthroscopic or open Bankart repair for recurrent shoulder instability largely because a capsulolabral avulsion from the glenoid rim is the most common lesion associated with shoulder dislocations.\textsuperscript{7} This technique has demonstrated excellent results when used to treat isolated soft tissue Bankart lesions.\textsuperscript{8,9} However, a problem emerges when this form of repair is used in patients who have more extensive soft tissue injuries such as complex labral disruptions, capsular attenuation, or humeral avulsion of glenohumeral ligament (HAGL) lesions. In these cases, reducing the labrum back on to the anterior glenoid is often not sufficient to restore shoulder stability,\textsuperscript{1} particularly when the labral tissue is no longer functional or there is a capsular detachment on the humeral side.

Inferior results have also been associated with a capsulolabral repair when it is used in cases where bony deficiency is a major contributing factor to the recurrent instability.\textsuperscript{10,11} This concern has been raised by many investigators after several years of follow-up, particularly with regard to young patients (<20 years) and those involved in overhead or contact sports.\textsuperscript{12} In 2006, Boileau and colleagues\textsuperscript{11} reviewed 91 consecutive patients

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who had undergone Bankart repairs for anterior shoulder instability, and found a 15.3% recurrence rate. The cause for recurrence was most commonly bone loss on the glenoid, bone loss on the humeral head, or inferior ligament hyperlaxity (as indicated by an asymmetric hyperabduction test). A combination of these abnormalities can result in up to 75% recurrence of instability after soft tissue repair, because the repair does not restore the glenoid articular arc that is reduced secondary to the glenoid bone loss or the engaging Hill-Sachs lesion.

There is an apparent need for an alternative surgical strategy to a standard Bankart repair to restore stability when the glenohumeral ligaments are torn or attenuated in combination with glenoid bone loss or an engaging Hill-Sachs lesion.

**WHEN TO CONSIDER THE LATARJET PROCEDURE**

All patients undergo a detailed history and clinical examination followed by radiography (including a Bernageau view) or computed tomography (CT)/magnetic resonance imaging (MRI) studies. This process usually identifies clinical situations in which a capsulolabral repair is thought to be insufficient and therefore a Latarjet procedure is believed to be superior. However, the situation can arise when the need for a Latarjet procedure becomes apparent only on initial arthroscopic inspection. For this reason it is necessary to consent patients accordingly.

The arthroscopic Latarjet procedure is considered in the following situations.

**Complex Soft Tissue Injuries**

Improvements in radiological investigations, especially when radiopaque dyes are used, has led to enhanced identification of HAGL lesions on preoperative CT or MRI scans. However, it is common to detect these lesions for the first time on arthroscopic inspection (Fig. 1). Multiple techniques are described for the arthroscopic repair of HAGL lesions, and most of these include only small case series with short follow-up periods.13–15 The authors’ experience using an all-arthroscopic soft tissue repair technique with anchors was disappointing because of postoperative stiffness experienced by some patients.

Where patients have had multiple dislocations, the intrinsic structure of the glenohumeral ligaments is usually found deranged, although this may not be evident macroscopically. Simply reposing this damaged tissue back to the glenoid does not necessarily restore stability to the shoulder. This practice has been likened to rehanging a baggy or incompetent hammock.

A further soft tissue injury is that of the irreparable labrum, especially in which there has been a complete radial tear thereby effectively breaking the ring. A repair of the labrum in this situation rarely provides sufficient strength of healing to restore stability.

In these situations, reattaching or repairing these structures leads to a suboptimal outcome either through stiffness or recurrence, and as such a Latarjet procedure would be performed.

**Bony Defects**

**Glenoid bone loss**

Glenoid bone loss as the cause for recurrent instability is frequently overlooked but is usually manifested by an avulsion type bony Bankart lesion, an impacted fracture, or erosion of the anteroinferior glenoid rim. Radiographs may show a fracture or a more subtle loss of contour of the anteroinferior glenoid rim.16 A decrease in the apparent density of the inferior glenoid line often signifies an erosion of the glenoid rim between the 3- and 6-o’clock position. An axillary or Bernageau view may show flattening of this area of the glenoid when bone loss has occurred. CT provides a more detailed imaging modality, which is essential to quantify the bone loss preoperatively.17 CT reconstructions also provide a more robust static measurement than those afforded by the arthroscopic view (Fig. 2).

The amount of glenoid bone loss can be assessed during preoperative evaluation or surgery. With adequate imaging, bone loss can be determined with the Bernageau view, sagittal and oblique CT scans, and 3-dimensional
reconstructions. In addition, the amount of glenoid bone loss can be verified arthroscopically by measuring the distance from the glenoid rim to the bare spot, thereby assisting the surgeon in identifying an inverted pear glenoid, and confirming substantial bone loss and the likely failure of an isolated soft tissue repair. The threshold beyond which a soft tissue repair is likely to fail is difficult to define, and significantly increased glenohumeral instability has been suggested with defects anywhere between 21% and 28.8% of the glenoid (although caution should be exercised when comparing measurement methods).

Even when the bony fragment is present, replacing it is not always sufficient to restore the bony glenoid articular arc, especially when recurrent episodes of instability have further eroded the remaining glenoid edge. There are also issues regarding healing in this potentially necrotic bone. In these cases a bony reconstruction should be considered.

**Humeral bone loss**

The location and size of the Hill-Sachs lesion determines the degree to which the articular arc is reduced and when the lesion will engage on the glenoid. Dynamic arthroscopy with the shoulder in abduction and external rotation will demonstrate whether the lesion will engage during a functional or athletic overhead range of movement. To reduce the chances of recurrence, the articular arc must be increased to prevent early engagement of the lesion on the glenoid rim when the arm is externally rotated; this can be achieved with the use of a bone block procedure. An alternative to this would be the “remplissage” procedure as described by Purchase and colleagues (suturing of the infraspinatus and posterior capsule into the defect).

By enlarging the glenoid articular arc with a bone graft, the joint surface contact areas are increased and therefore the joint surface contact pressures are reduced during external rotation. The remplissage procedure does not alter the joint contact surface areas or increase the articular arc, and therefore has no effect on reducing the joint contact pressures, which may then have an effect on the development of future arthrosis. Advancing the infraspinatus and capsule into the humeral bony defect can also significantly decrease the amount of external rotation the patient may be able to achieve postoperatively.

**Combinations of glenoid and humeral bone loss**

These 2 lesions usually occur in tandem with varying degrees of severity. Preoperative radiographs and CT scans usually identify these lesions, but an arthroscopic dynamic evaluation of stability is necessary to determine the likely clinical effects of this combination. The presence of an engaging Hill–Sachs lesion coexisting with a glenoid bone defect markedly reduces the defect size threshold at which recurrence will occur if the patient had only one soft tissue or bony defect in isolation. Latarjet procedure is found to be appropriate to address the abnormal anatomy.
Revision Surgery for Instability

If the initial stabilizing procedure fails because of any of the reasons mentioned earlier, then a Latarjet procedure is ideally suited to restore stability. However, a second group of patients were observed who had seemingly successful Bankart repairs but went on to develop postoperative recurrent instability after 5 to 7 years. In this particular group, the soft tissue stabilization was adequate to return the patient to a sedentary lifestyle but it had not restored satisfactory stability for more active and sporting pastimes. This finding can in part explain the excellent results seen in series with a short follow-up. In these cases, although the initial operation was considered successful, the pathologic lesion was never truly corrected and the glenoid subsequently became increasingly eroded. These patients can be effectively managed with a Latarjet as well.

Patient Activity

Many patients now demand a quicker return to sports or their occupation, or they have a high risk of recurrence. This is particularly true for patients involved in collision sports (eg, rugby), overhead sports (eg, climbing), throwing sports, and high-demand physical overhead occupations (eg, carpentry). The ability to recreate a stable shoulder with a reduced rehabilitation time to return to full activity is another advantage of the arthroscopic Latarjet technique.

HOW DOES THE LATARJET PROCEDURE RESTORE STABILITY?

The procedure was first described by Latarjet in 1954 when he published his technique of transferring the horizontal part of the coracoid to the anteroinferior margin of the glenoid from the 2-o’clock to the 6-o’clock position. The original procedure required the upper part of the subscapularis to be detached, but this has since been modified to place the coracoid graft through a horizontal split in the subscapularis and fix it preferably with 2 screws. Patte and colleagues explained the success of the open Latarjet procedure by virtue of the triple blocking effect. First, the triple bony reconstruction of the anterior glenoid serves to increase the glenoid articular arc (the bone block effect). This reconstruction prevents an otherwise engaging Hill-Sachs lesion from leveraging on the potentially deficient anteroinferior glenoid rim. Second, the split subscapularis tendon provides dynamic stability in abduction and external rotation due to the tension created by its intersection with the newly positioned conjoined tendon (the hammock effect). Finally, the capsule can be attached to the remnant of the coracoclavicular ligament on the coracoid (the Bankart effect).

WHY NOT PERFORM A MODIFIED BRISTOW PROCEDURE?

The initial description of Bristow procedure by Helfet entailed securing the detached tip of the coracoid to the repaired vertical split in muscle belly of subscapularis. This split was initially required to expose and decorticate the bone of the glenoid neck. Incorporating the coracoid in the suture closure of this defect was performed to appose the bony surfaces of the freshly osteotomized coracoid, and the glenoid neck and was later modified to employ a single screw fixation of the coracoid in a standing position. The Latarjet procedure instead applies the coracoid process in a lying position, which allows the natural shape of the inferior coracoid surface to follow the contour of the anterior glenoid. This position is then secured and compressed by 2 screws, giving the Latarjet procedure the advantage of providing an increased surface area of bone to bone contact to promote bony union. Furthermore, the use of 2 screws for fixation allows greater compression and gives excellent rotational stability, and minimizes graft micromotion with any conjoined tendon contraction. These differences in technique allow a significantly accelerated postoperative rehabilitation, and favor graft union and stability for the Latarjet procedure.

WHY PERFORM A LATARJET PROCEDURE INSTEAD OF A FREE BONE GRAFT?

It has been previously demonstrated that the sling effect of the conjoined tendon crossing the...
subscapularis has a significant effect on shoulder stability. This effect is best understood by considering that the further the shoulder goes into external rotation, the more the newly placed conjoined tendon will stabilize the shoulder through its increased tension and sling effect over the inferior subscapularis muscle. The added important soft tissue stabilizing effect does not occur when free bone block transfers are performed.

A free bone graft does have a role in restoring the glenoid articular arc in cases of large anterior glenoid bony deficiencies, and for posterior instability when there has been posterior glenoid bone loss or a reverse Hill-Sachs lesion; this is because there is no local osseo-tendinous structure that can be transferred posteriorly. A free bone graft is also a useful tool in the management of the failed or revision Latarjet procedure.

SHOULD I CHANGE FROM AN OPEN TO AN ARTHROSCOPIC PROCEDURE?

Although the open Latarjet procedure has proven to be successful in restoring shoulder stability, performing the procedure arthroscopically offers many advantages. These include the following.

Graft Placement

Placement of the bone graft is more accurate under arthroscopic control. Several different views can be afforded by the arthroscopic technique that not only improve graft placement but also reduce the chances of overhang and impingement. Lateral graft placement has been associated with the subsequent development of glenohumeral arthritis.

Management of Associated Shoulder Pathologies

Open surgery does not easily allow the treatment of concomitant pathologies, particularly of the superior and posterior shoulder, such as superior labrum anterior posterior (SLAP) tears and posterior labral lesions. These lesions can be missed or prove challenging to treat, and can be addressed much more readily with an arthroscopic approach.

Bidirectional Instability

Concurrent anterior and posterior instability is uncommon and difficult to diagnose. However, when this does occur it can be treated during the same surgical procedure by using anterior and posterior bone blocks using arthroscopic methods. This treatment is not possible through a single open approach.

Shoulder Stiffness

Even though the strength of the bone block fixation allows early mobilization, the risk of adhesions and shoulder stiffness is higher with an open technique than with arthroscopy.

Ease of Conversion

If during an intended Bankart repair the tissue is determined to be nonreconstructable, the surgeon can perform an arthroscopic bone block stabilization without potentially having to reposition the patient or convert to open surgery. This technique is especially useful to arthroscopists who use the beach chair position for stabilization surgery.

Faster Rehabilitation

As in other joints, arthroscopy offers the advantages of less postoperative pain, earlier mobility, and quicker rehabilitation, and return to sports.

Cosmesis

The arthroscopic Latarjet procedure uses small skin incisions that are esthetically superior to a single larger open incision.

HOW DO I INTRODUCE THE ARTHROSCOPIC LATARJET INTO MY SURGICAL PRACTICE?

Initially, the operating surgeon should be familiar and experienced with performing the procedure using an open technique because it permits a more global understanding of the anatomy involved and the potential difficulties of the procedure. It also serves as a safety net when performing the arthroscopic procedure to allow the surgeon to convert to the open technique if necessary. Before embarking on the arthroscopic procedure, the first step in this transition requires the surgeon to be acquainted with the arthroscopic instruments. The familiarity can be achieved by performing the open Latarjet using the arthroscopic instruments.

Once the surgeon is proficient in using the instruments for the open procedure, he or she can then make the transition to perform the arthroscopic Latarjet procedure. The transition should proceed in a stepwise fashion, and the surgeon is encouraged to convert to the open procedure at any stage if necessary to ensure the optimal result. With training and experience it is possible to perform the entire procedure arthroscopically. Of paramount importance is an optimally placed graft to provide bony union and shoulder stability.
without complications. The surgeon should not hesitate to open the shoulder at any stage if this is the best way of achieving the optimal placement of graft.

The technique is conveniently broken down into 5 stages.

**Joint Evaluation/Achieving Exposure**

The consented and prepared patient is positioned in the beach chair position with the arm in gentle traction. Preoperatively an interscalene block is performed before the induction of general anesthesia.

The intra-articular evaluation is started through the standard “soft spot” and posterior A portal is made and a probe is introduced through the rotator interval (RI). This probe uses the anterior E portal, which is established using an outside-in technique (the anterior portals can be seen in Fig. 5). A dynamic stability assessment is made and the internal structures are further assessed with the probe (glenoid defects, humeral defects, HAGL and so forth).

**Open the rotator interval and subscapularis exposure**

The glenohumeral joint is opened at the upper border of subscapularis (Fig. 6), and the anteroinferior labrum and middle glenohumeral ligament are resected between the 2- and 5-o’clock position to expose the glenoid neck using electrocautery. The intended graft site is marked, and the capsule between the glenoid neck and subscapularis is split. To provide a healthy base for graft healing, the glenoid neck is abraded with the burr. Both sides of the subscapularis tendon are then exposed, with particular attention to the articular side of subscapularis. These releases are necessary to facilitate the transfer of the coracoid graft.

If there is any other intra-articular pathology, it can be dealt with at this stage (eg, a SLAP repair). If the inferior glenohumeral ligament or posterior labrum is damaged but reparable, this can be achieved with suture anchors.

Once this intra-articular preparation is completed, extra-articular preparation is done.

**Coracoid soft tissue preparation**

The coracoacromial ligament (CAL) is located and is followed down to the coracoid, where it is detached. The anterior aspect of the conjoined tendon is liberated from the fascia on the deep aspect of the deltoid, and the lateral side of the conjoined tendon is released, the inferior limit of which is the pectoralis major tendon.

There is a tissue barrier medial to the conjoined tendon that separates the plexus from the subcoracoid bursa (Fig. 7). This barrier is opened to reveal the nerves to the subscapularis, and further gentle inferior dissection exposes the axillary nerve. It is important to identify these nerves and appreciate their location when it comes to placing future portals. Any further soft tissue attachments to the coracoid in the bursa are released to free the coracoid for its later transfer.

The scope is moved from the posterior A portal to the anterolateral D portal to give a better viewing perspective of the anterior structures. This portal lies 1 cm inferior and lateral to the anterolateral
corner of the acromion, and is also created using an outside-in technique.

**Subscapularis Split**

*Establish the I portal in apex of axillary fold*
This portal gives excellent access to the anterior glenoid neck in the correct direction to place the screws for the graft. First, a spinal needle is placed in the apex of the anterior axillary fold and is guided under direct vision to pass lateral to the conjoined tendon and above the subscapularis. The needle is advanced to the glenoid neck at the intended graft site and a 2-cm incision is made in the skin for the I portal.

*Determine the level of the subscapularis split*
The switching stick is inserted through the A portal and passed across the glenohumeral joint at the level of the glenoid defect. It is then advanced through the subscapularis to establish the level of the split. The conjoined tendon and plexus are retracted medially to prevent neurologic injury on further advancement of the switching stick. The switching stick now holds the plexus and conjoined tendon medially while penetrating the subscapularis at the level of the split.

*Establish the J portal*
This portal is placed midway on an arc between the I and the D portals using an outside-in technique. It gives a more heads-on view of the coracoid whereas the D portal gives a better lateral view. Two perpendicular views are necessary to ensure optimum coracoid preparation.

*Subscapularis split*
The subscapularis is elevated with the switching stick, introducing the electrocautery through the J portal, and the split is commenced (Fig. 8). The scope is moved to the J portal and the electrocautery to the I portal to complete the split. The split is completed down to the glenoid neck in the line of the subscapularis fibers, extending from the lateral insertion of the subscapularis on the lesser tuberosity, passing medially close to the axillary nerve.

At this point, if this is revision surgery, alternatively an iliac crest graft can be placed as the subscapularis split is done and the glenoid neck exposed.

*Harvesting the Coracoid Graft*
At this point the scope is in the J portal and the electrocautery is in the I portal. A trocar is placed in the D portal and the space is elevated above the coracoid (like using a retractor in open surgery).

*Define the H Portal*
The H portal is necessary to allow instrument access to the superior coracoid. Two needles are placed to locate the tip and the midpoint of the coracoid. Next, the arthroscope (J portal) is rotated to give a perpendicular view of the coracoid to ensure correct needle alignment. This step serves to guide the position of the coracoid drill guide. Once satisfactory, a superior incision is made for the H portal.

The pectoralis minor tendon on the medial border of the coracoid is now released, taking care to remain on bone at the coracoid level (Fig. 9). Below this, the conjoined tendon can be...
released medially using blunt dissection, taking special care to prevent damage to the musculocutaneous nerve and plexus.

With this dissection completed and having an awareness of the position of the nerves, the surgeon can proceed with the knowledge that everything lateral to the conjoined tendon is safe.

**Drilling the coracoid**

It is important to regularly change the viewing angle of the arthroscope by rotation to ensure mediolateral alignment of the coracoid drill guide. The guide is placed over the junction of lateral two-thirds and medial one-third of the coracoid, and α hole (inferior and distal) is drilled with a k wire. It is important while doing this to visualize under the coracoid to verify that the direction of the k wires is perpendicular to the superior surface of the coracoid, and to prevent subscapularis penetration. The coracoid drill guide is rotationally aligned around the α wire and then the second k wire is inserted into the β (proximal) hole (Fig. 10).

The drill guide is removed and the wire positions are checked with the scope in the D and J portals. A coracoid step drill is used to overdrill both holes, and the drills and k wires are removed.

**Inserting the top hats**

The drill holes are now tapped to prepare for the top hat and glenoid screws (5.0/3.5 mm). The taps are cannulated and allow placement of the coracoid-securing flexible Chia wire. This wire is passed through the tapped drill holes in the coracoid and out through the H portal. It serves to allow the cannulated introduction of the top hat washers and also later transfer control of the coracoid between portals. The top hats are then inserted over the Chia wire and (see Fig. 10) a portal plug placed in the H portal to prevent water escaping.

The Subscap Channeler is a large trocar placed through the subscapularis split via the I portal onto the glenoid neck in the intended graft location. This step serves to judge whether the earlier soft tissue split is adequate to allow transfer of the coracoid to the glenoid neck.

**Retrieving the Chia wires through the I portal**

The coracoid will ultimately be controlled and directed from the I portal and as such the Chia wires must be transferred there. To do this the crochet hooks are passed through the coracoid positioning cannula in the axillary I portal to retrieve these (Fig. 11). Once retrieved, slotted pegs with specific narrow channels are placed over both Chia wires to prevent water being lost through the cannula (Fig. 12).

**Coracoid osteotomy**

Once the coracoid is prepared, osteotomy is performed. The burr is used on the superior, inferior, and lateral aspects of the coracoid, proximal to the β hole, to create a stress riser. The medial aspect of the osteotomy site can be burred through the H portal. The osteotome is now placed in the H portal and a controlled osteotomy is carried out (Fig. 13).

**Coracoid Transfer**

To gain rigid control of the graft, it must be reduced onto the coracoid positioning cannula. This step is achieved by placing gentle traction on both limbs of the Chia wire (Fig. 14), then
passing the coracoid 3.5 screw over the Chia wires. The screw advances through the top hat and into the coracoid, where it engages the bone. The coracoid should now be secure on the coracoid positioning cannula.

**Graft trimming**

The freshly harvested graft is mobilized, and all remaining adhesions of the pectoralis minor and the medial fascia are removed. Particular attention must be paid to prevent injury to the musculocutaneous nerve while this is done. The mobilized coracoid usually has a medial spike arising from its base that must be trimmed to permit good bony contact with the glenoid. To do this the scope is held by the assistant, and with the surgeon using a 2-handed technique, the graft is controlled on the cannula with one hand and trimmed with the burr with the other. Ideally, the burr is held stationary while the coracoid is manipulated around the burr to allow the accurate debridement of the graft and to minimize any risk to the plexus.

The graft is now ready for transfer and fixation to the glenoid. The coracoid on the coracoid positioning cannula (I portal) is manipulated to the glenoid neck. This action is made easier by elevating the subscapularis split with the switching stick.

**Coracoid Fixation**

Once the graft is sited on the glenoid neck in the desired position, fixation is undertaken. Two long
k wires are inserted through the coracoid positioning cannula, passing through the graft and then the glenoid to gain temporary fixation. The scapula must be pulled posteriorly by the assistant using a posterior drawer on the upper arm to decrease the relative glenoid anteversion. The handle of the cannula must be pushed medially to ensure there is minimum angulation between the k wires and the glenoid surface. These wires will emerge through the skin of the posterior shoulder, at which stage a clip is placed on them.

The position of the graft is then checked from different portals to ensure the best vertical and horizontal position. It is preferred to place the graft from the 3- to 5-o’clock position and flush with the glenoid.

**Drill and screw the graft**

The α coracoid 3.5 screw (inferior) is removed and the 3.2 glenoid drill passed over the k wire. The length of the definitive screw can be read from the depth gauge on the drill. The drill is removed (k wire remains) and the screw is placed in the α hole. The same action is repeated for the β hole after which the inserted screws are alternately tightened to reduce the graft in compression onto the glenoid neck (Fig. 15). The k wires can then be removed posteriorly.

**Final check**

The graft and screw position are checked through the D (Fig. 16), J, and A portals, and any final trimming can be done at this stage with the burr.

**POSTOPERATIVE MANAGEMENT**

Postoperatively the patients require no immobilization and may begin full active range of movements immediately. Patients can return to work as soon as pain allows and play low-risk sports at 3 weeks. For high-risk (throwing) and collision sports, the authors recommend that patients do not resume these activities before 6 weeks (Figs. 17 and 18).

**CLINICAL RESULTS**

The all-arthroscopic Latarjet procedure has been performed on more than 180 shoulders since its inception in December 2003. Preoperative, peroperative, and postoperative data on all these patients have been prospectively collected.
The demographics of the first 100 shoulders comprised 98 patients, with 46 right shoulders and 54 left shoulders. The male to female patient ratio was 4:3 and the average age of the patients was 27.5 (range, 17–54) years. Of these patients, 88% were involved actively in sports, 38% of these at a competitive level.

All patients had sustained dislocations (1–3, 40%; 4–10, 50%; >10, 10%) with 97% of these being traumatic in nature. Of the patients, 15% had undergone previous surgery for instability, all of whom had undergone Bankart repairs. The average delay from the initial dislocation to the Latarjet procedure was 54 months (range, 1 month to 20 years).

Radiographic evaluation revealed Hill-Sachs lesions in 89% of shoulders, and 25% had evidence of a glenoid fracture.

All procedures were performed by one surgeon (L.L.), with operative time reduced from 4 hours at the inception of the procedure to an average of 45 to 50 minutes. Concomitant lesions were found in 7% of patients (6 SLAP tears, 1 posterior Bankart lesion) that were treated during the same procedure.

**Eighteen-Month Follow-Up**

Of the 98 patients, 62 were available for direct clinical review, 27 were reviewed by telephone conversation and structured questionnaire, and 11 patients were lost to follow-up.

Eighty percent of patients described their result as excellent and 18% as good, with 2% disappointed with their outcome. All patients had returned to work at a mean of 2 months (range, 7 days to 4 months) and returned to sport at 10 weeks (range, 21 days to 6 months).

**Radiographic Results**

Radiographic evidence of arthrosis was assessed and compared with preoperative films according to the criteria of Samilson and Prieto.28 11% had progressed 1 stage only (stage 0: 24 patients [69%], stage 1: 9 [26%], stage 2: 2 [6%]).

Coracoid graft position was reviewed using CT scanning. The graft was flush with the glenoid in 80%, medially placed in 8%, and there was lateral overhang in 12%. Vertically positioning was 78% perfect (3 to 5 o’clock), too high in 7%, and too low in 5%. Screw angle in relation to the glenoid face was on average 29° (range, 2°–50°).

**Complications**

Perioperative complications included 2 hematomas, 1 intraoperative fracture of the graft, and 1 transient musculocutaneous nerve palsy that fully recovered. Late complications included 4 cases of coracoid nonunion, and of these 4 cases, 2 had originally undergone coracoid fixation using just 1 screw. A further 3 shoulders were found to have lysis around the screws leading to prominence. In total, 4 patients required late arthroscopic screw removal.

At 26 months, 35 patients were available for review and on average, patients had lost 18° external rotation as compared with the opposite shoulder. There were no cases of recurrent dislocation.

These results represent all the available patients from the first 100 procedures performed, and therefore those procedures performed at the start of the learning curve.

**SUMMARY**

Soft tissue Bankart repairs yield good results when used for capsulolabral avulsions and tears. However, patients with more complex pathologic instability require a surgical option that addresses the underlying abnormalities to ensure a low rate of recurrence postoperatively. The use of arthroscopy and radiological investigations has identified more complex soft tissue and bony lesions that
can be more successfully treated using a Latarjet procedure. The authors have advanced this technique to make it possible arthroscopically, and therefore confer the benefits that this type of surgery offers.

Before embarking on surgery of this complexity, it is important that the surgeon becomes familiar with the open technique and the arthroscopic instruments it uses. To introduce this into practice, a stepwise progression of the technique is recommended in the stages as described, whereby the surgeon converts to the open procedure at any point to ensure an optimal result. With training and experience, this procedure can then be performed entirely arthroscopically.

The arthroscopic Latarjet technique has shown excellent results at short- to mid-term follow-up, with minimal complications and good graft positioning. As such, this procedure is recommended to surgeons with good anatomic knowledge, advanced arthroscopic skills, and familiarity with the instrumentation.

REFERENCES