

# Information for Patients about Shoulder Surgery

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# Information for Patients about Shoulder Surgery

## Introduction

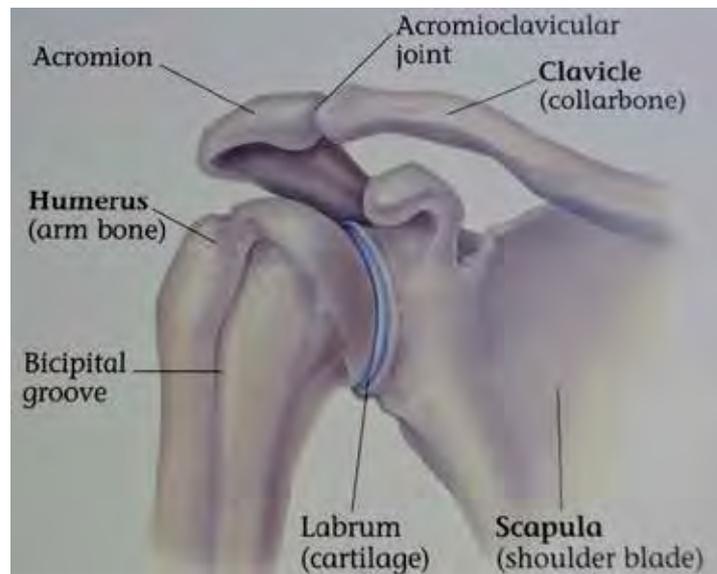
We have put this information booklet together to educate our patients about their shoulder condition, treatment options and post-surgical care.

Please keep this booklet for future reference. It is not a detailed source of information and you may also wish to refer to our website [www.allanwangorthopaedics.com.au](http://www.allanwangorthopaedics.com.au) for animated videos of surgical procedures. If you require further information or have concerns regarding your treatment please contact the office to discuss with Dr Wang or his staff.

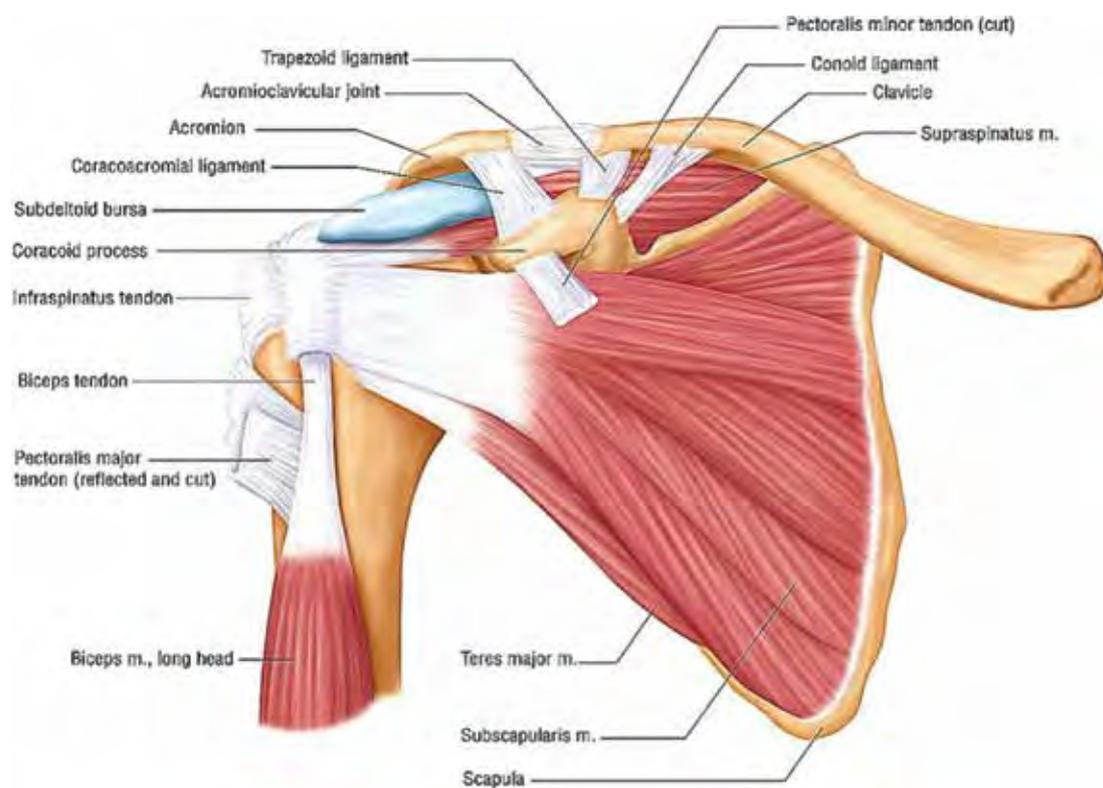
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# Shoulder Anatomy

## Bone and Joints of the shoulder



## Important Muscle Groups of the Shoulder



# Shoulder Impingement and Rotator Cuff Tendon Disorders

## What is Impingement Syndrome?



Figure 1: Tendonitis

The movement of the shoulder joint is dependent on the surrounding muscles and tendons - the rotator cuff complex. The rotator cuff comprises of four tendons. Supraspinatus tendon is the most frequently damaged tendon because when the arm is elevated, the tendon can rub ("impinge") against the undersurface of the acromion bone at the top of the shoulder. *(Fig 1)*

The subacromial bursa which surrounds the rotator cuff tendon can also become swollen and inflamed (bursitis). Elevation of the arm can cause the bursa to impinge against the acromion as well. *(Fig 2)*

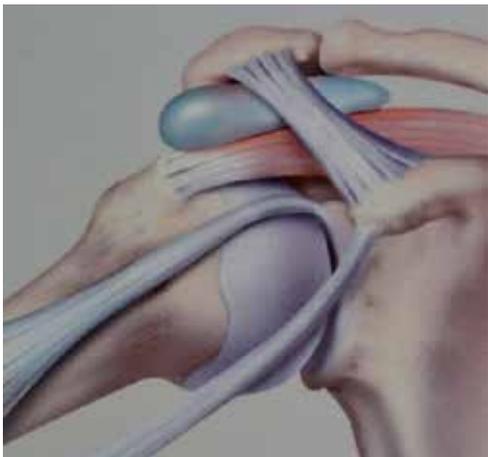


Figure 2: Bursa swelling and impingement

Impingement is more likely if the acromion bone has a downward curve or has a spur. Spurs from an arthritic acromioclavicular (AC) Joint may also contribute to symptoms.

## What causes Impingement Syndrome?

Rotator cuff tendon damage and bursitis can result from a sudden traumatic injury such as a fall or heavy lifting. Degenerative Tendon damage may also occur slowly from repetitive activity and overuse, or as part of the aging process. Tendon damage varies from tendon fraying to partial tears to full thickness tears and multiple tendon tears can occur. *(Fig 3)*

## Symptoms from Impingement Syndrome

You will notice pain, especially reaching overhead, and at night lying on the injured shoulder. Weakness and loss of shoulder movement may occur. These symptoms are called the "Impingement" Syndrome.

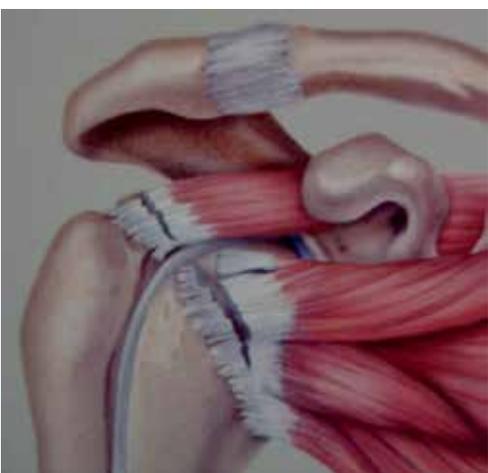


Figure 3: Rotator cuff tear

## What treatment is available?

In mild cases, your shoulder symptoms will improve with rest, anti-inflammatory tablets, some physiotherapy and one or two cortisone injections.

When symptoms are chronic or are more severe, your doctor will order shoulder X-rays and an ultrasound or MRI scan. If there is a bone spur on the acromion, surgery is often necessary to remove the bone spur (acromioplasty) to prevent ongoing tendon impingement and further tendon damage.

If there is a tear in the rotator cuff tendon, surgery is usually required, as the tendon cannot heal by itself and the tendon tear may enlarge in future. Larger or multiple tendon tears will require more extensive surgery and occasionally the tendon damage may not be fully repairable.

## What happens at Surgery?

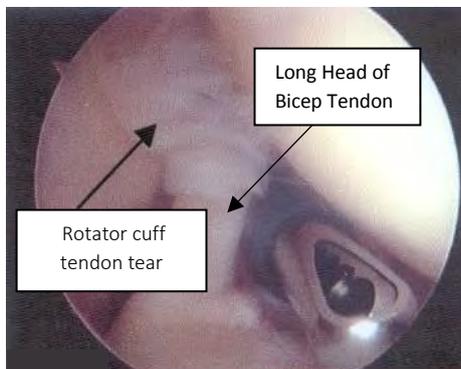


Figure 4

At surgery, an arthroscopy is performed thru small keyhole incisions. The ball and socket joint is inspected. A frayed or torn rotator cuff tendon tear can be confirmed. **(Fig 4)** If damage to other structures is identified eg. Biceps tendon and glenoid labrum, they may need surgical attention as well.

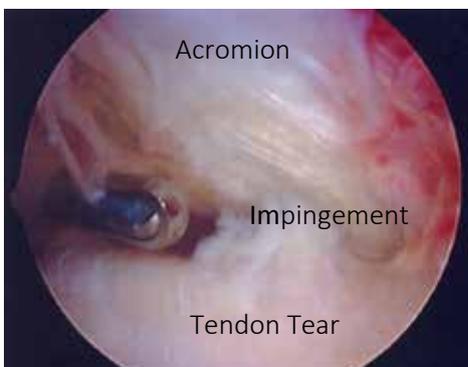


Figure 5

A partial tear or subluxation of the **long head of Biceps tendon** is quite a common arthroscopic finding and maybe contributing to pain. This Biceps tendon damage is treated by release (**tenotomy**) or surgical repair (**tenodesis**). Tenotomy may lead to a change in the biceps muscle contour in the upper arm ("popeye muscle"). However as the Biceps is formed by two tendons, the other half of biceps compensates well after tenotomy. Tenodesis is an option in younger and more active patients though early recovery will be slower than tenotomy.

### Acromioplasty ± AC Excision



Figure 6

The arthroscope is then placed in the subacromial space. The thickened ligament and inflamed bursa are debrided. **(Fig 5)** Any spurs on the underside of the acromion are shaved away and the acromion flattened (**acromioplasty**). **(Fig 6)** This allows clearance for the underlying rotator cuff tendon to glide smoothly without impingement. If the **AC joint** is arthritic, the end of the clavicle and its bone spurs are also shaved (**AC excision**).

If a small tendon tear is noted – a debridement and trimming of the tear is often sufficient.

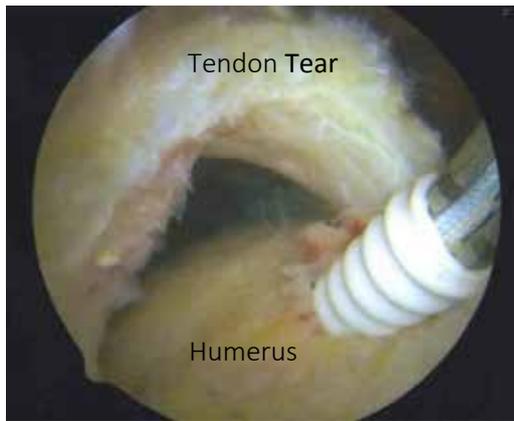


Figure 7



Figure 8

## Rotator Cuff Repair Surgery

If a larger or full thickness tendon tear is noted, surgical repair is performed with sutures and small resorbable anchors passed into the bone. *(Fig 7)*

Smaller rotator cuff tears are repaired arthroscopically with minimal skin scarring. *(Fig 8)*

Larger rotator cuff tears require a skin incision on the side of the arm. Large and longstanding tendon tears may not be fully repairable or may not heal well after surgery. Re-tearing off the cuff tendon may occur. Occasionally further surgery is required.

More recent surgical advances include using a collagen patch to reinforce the rotator cuff repair, or addition of growth factors (platelet rich plasma) which may improve tendon healing.

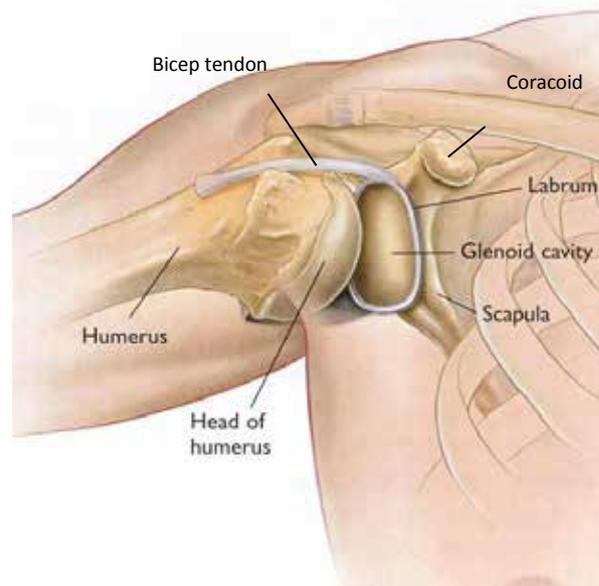
# Shoulder Joint Instability and Labrum Tears

## Anatomy

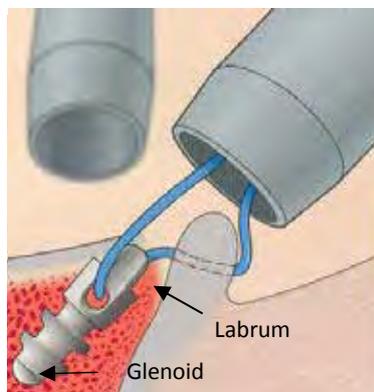
The shoulder joint is a ball and socket joint held together by tendons, capsular ligaments and a fibrous cartilage which deepens the socket called the labrum.

## What is Shoulder Instability?

Wrenching or jarring injuries can cause the shoulder joint to dislocate, sublux (partially dislocate) or feel unstable with painful clicking or a loose sensation. Treatment includes wearing a shoulder brace, followed by physiotherapy and modifying sports or work activities. Further investigations including x rays and MRI scans will show the extent of damage to bone and soft tissue structures.



**Figure 1: Normal Shoulder Anatomy**



**Figure 2**

## Bankart Tear

If the shoulder has dislocated a common type of damage is an anterior labrum tear with separation from the glenoid socket (Bankart tear). If physio isn't helping or you wish to remain very active, your shoulder is at risk for recurrent dislocation. **Bankart labrum repair surgery** may be necessary. This is keyhole arthroscopic surgery.

The **ANTERIOR** labrum is repaired to the edge of the socket (glenoid) with bone anchors and the capsular ligaments are tightened with sutures. The posterior labrum can also tear, causing posterior shoulder pain and clicking. A **POSTERIOR** Bankart arthroscopic repair or debridement (clean up) may be required.

With severe or multiple dislocations, bone damage occurs. The edge of the glenoid bone socket may fracture or erode, or the humeral head may be damaged (Hill Sach lesion) which puts the shoulder joint at greater risks for re injury.

## SLAP Tear

Another common type of damage is the **SUPERIOR** labrum tear or SLAP tear (Superior Labrum tear from Anterior to Posterior). SLAP tears can be traumatic or degenerative. The biceps tendon attaches to the superior labrum and SLAP tears usually don't heal well without surgery. SLAP tears can be debrided or can also be repaired arthroscopically with suture anchors. Another surgical treatment for SLAP tears is detachment of the biceps tendon from the superior labrum thereby reducing the stress on the SLAP injury. The bicep tendon can then be repaired outside the shoulder joint with suture anchors (**tenodesis**) or left to reattach spontaneously further down the arm (**tenotomy**).

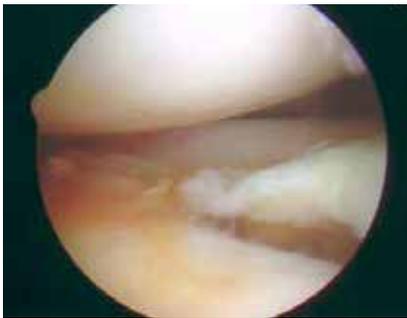


Figure 3: Bankart Tear

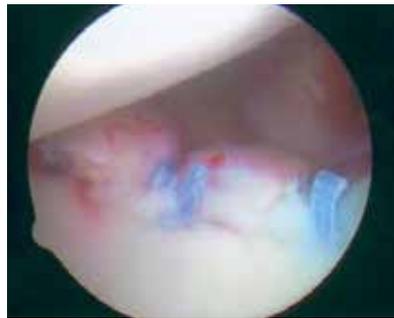


Figure 4: Arthroscopic Bankart repair with suture anchors

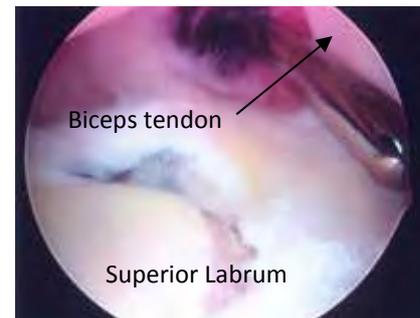


Figure 5: SLAP Tear

## Multidirectional Instability

Some patients will have generalized looseness of their joints (fingers, kneecaps, ankles etc) and may develop pain, a loose sensation and lack of confidence in using their shoulder. The instability may be in one or more directions. Physiotherapy and taping often restore stability for these patients. Occasionally surgical tightening of joint laxity is required.

## Open Surgery

After severe or multiple dislocations, other joint damage can occur. Rotator cuff tendons may tear and may also require surgical repair. Joint surfaces are scuffed and subjected to abnormal shear forces and chondral damage and arthritis can develop. Bone damage or fractures may need screw fixation. In the presence of bone damage, multiple dislocation, previous failed surgery with scarred and poor quality labrum and capsule tissue, joint hyperlaxity and young patients playing contact sport, arthroscopic Bankart repair may not be appropriate. Bone graft surgery from the pelvis or transferring of the bony coracoid to reconstruct the anterior glenoid damage may be required (Latajet procedure).



Figure 6: Latajet Repair

This is an open surgical procedure, not keyhole surgery. Two screws usually fix the coracoid to reinforce the glenoid. (**Fig 6**)

## After Surgery

A sling is worn full time for four to six weeks. Physio is then required for 2-3 months to recover movement. Progress continues for 6 months and vigorous work activity and sports are restricted during this time to reduce the risk of the repair breaking down.

Complications after shoulder instability and stabilisation surgery are very uncommon.

They do include:

- Recurrent dislocation/ instability
- Infection
- Stiffness of the shoulder joint
- Development of arthritis due to the previous dislocations.
- Implant loosening or breakage.
- Bone non union/ screw problems after the latajet procedure.

The final level of functional recovery depends on the degree of bony and soft tissue damage to the shoulder joint.

# Post Operative Instructions

## Acromioplasty ± AC Joint Excision

A **prescription for pain tablets** will be provided by the hospital on discharge. Generally take **Paracetamol** regularly: 1 to 2 (500mg) tablets three times a day with meals and this will reduce the need for stronger medication. You can take Anti-inflammatory medication (eg Celebrex, Naprosyn, Mobic, Voltaran etc) as well. For breakthrough pain eg. after exercise or at bedtime, take **Oxycodone** (tradenname Endone or Oxynorm) 1 to 2 (5mg) tablets once or at most twice a day. This is a narcotic prescription. Oxycodone should be taken sparingly. It may make you lightheaded and nauseous and should not be combined with alcohol or sleeping pills.

### PRECAUTIONS:

1. Wear the sling for 4-5 days after surgery. When the sling has been removed, please be very protective of your operated shoulder. Any activity or exercise that HURTS potentially HARMS your shoulder at this early stage after surgery.
2. In general, don't lift or push greater than 1.0kg with the operated arm for the first 2-3 weeks.
3. Avoid sudden movement.
4. Avoid the risk of re-injury. It is a good idea to wear the sling as protection in busy shopping centres, or for support when out on long walks.
5. Please keep your hospital dressings on.
6. Generally it is best to remain off work and driving a motor vehicle until you are reviewed by Mr Wang one to two weeks after surgery.

### POST OPERATIVE EXERCISES:

- a. The aim of these exercises is to recover overhead movement of the operated arm, with the **assistance** of the good arm. Use your good arm to control movement of the operated arm.
- b. Do the following exercises to discomfort, never pain. Warm up first (eg hot shower), do the exercises SLOWLY and smoothly. Do two exercise sessions per day, each session need be only 2-3 minutes. Cool down with a cold pack afterwards.
- c. Your physiotherapist may also attend to your neck and upper back. Maintain good posture. Squeeze your shoulder blades together. Tuck your chin in.
- d. It is normal to have some pain for 6-8 weeks after acromioplasty. Sleeping on your affected shoulder or heavy or impact activity should be avoided for 2-3 months.

## Active Assisted Exercises



### 1. "Pray and Lift"

Restores Forward Elevation

Count 3 seconds up, hold 3 seconds and 3 seconds down



### 2. "Spider climbs the wall"

Restores Sideways Elevation (abduction)

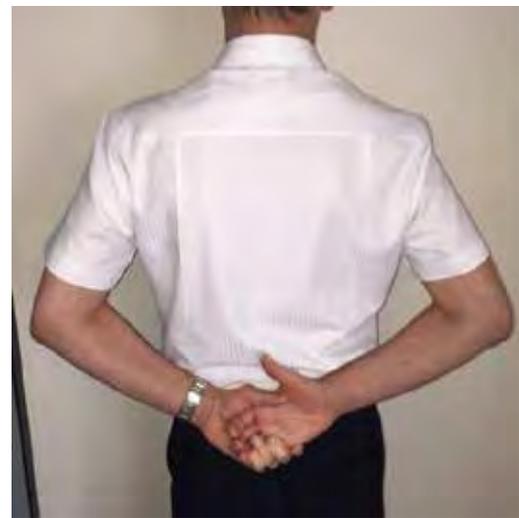
Use your fingers to climb the arm slowly upwards in abduction



### 3. "Open the Gate"

Restores External Rotation

Keep the elbow by the side and using the opposite (left) arm, gently push the operated right arm outwards, hold, and then pull the arm inwards



### 4. "Stand Easy"

Restores behind the back movement

Use the opposite (left) arm to gently pull the operated right arm posteriorly then elevate the right hand higher up your back.

# Post Operative Instructions

## Rotator Cuff Repair AND Bankart Labrum Repair

1. You will stay in hospital overnight.
2. Antibiotics are provided to minimize the risk of infection.
3. You will wear compression stockings to help prevent deep vein thrombosis.
4. A **prescription for pain tablets** will be provided by the hospital on discharge. Generally take **Paracetamol** regularly: 1 to 2 (500mg) tablets three times a day with meals and this will reduce the need for stronger medication. For breakthrough pain eg. after exercise or at bedtime, take **Oxycodone** (tradenname Endone or Oxynorm) 1 to 2 (5mg) tablets once or at most twice a day. This is a narcotic prescription. Oxycodone should be taken sparingly. It may make you lightheaded and nauseous and should not be combined with alcohol or sleeping pills.

**Ice packs** will help reduce pain, and reduce swelling and bruising. A haematoma (collection of blood) may form down your arm especially if you are on blood thinners. This haematoma will resolve over time.

5. If a **sling** has been applied, please keep this on day and night to prevent tension and stress on the surgical repair. Learn how to apply the sling while you are in hospital. The sling should rest on the side of your hip, not resting on the front of your chest. It should support the weight of your arm. Your shoulders should be on the same level. (**Fig 1**)

The sling can be removed only for washing, dressing and gentle exercises. You should not sleep on the affected side. Initially you may be more comfortable sleeping in a recliner chair or slightly sitting up, rather than fully flat.

6. The sling will be required for 5-6 weeks after surgery. You cannot drive a motor vehicle during this time.

7. Gentle exercises will decrease stiffness of the shoulder and other joints in the upper limb. Do your exercises slowly and gently, to the point of discomfort never pain.

Before exercising, warm up with a warm shower or hot pack. After exercising apply a cold pack. Do your exercises for 2-3 minutes twice daily.



**Figure 1**

## Initial Shoulder Exercises include:

### 1. “Cradle the Arm and Rock the Baby” Pendulum Exercise:

Stand and bend forward at the waist. Hold the operated arm at the elbow with your opposite hand. Lift the operated arm out of the sling. Use your opposite hand to support the weight of the operated arm at the elbow. Do NOT let the arm hang or swing unsupported.

Slowly move your operated arm side to side then forward and back, then circle clockwise and anti-clockwise five times each. (**Figs 2 & 3**) Only move as far as is comfortable. This will help prevent stiffness in the operated shoulder.

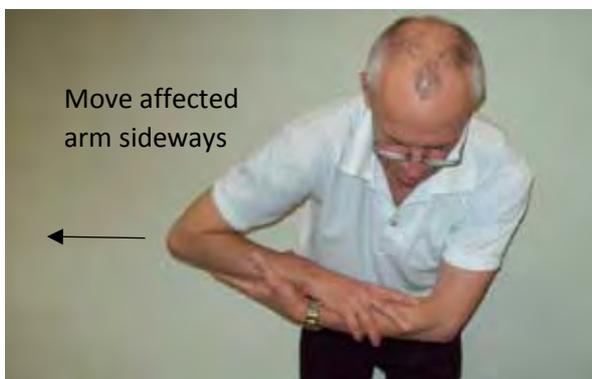


Figure 2



Figure 3

2. “Open the Gate” External Rotation: The operated arm has the Elbow flexed at 90° and positioned by the side. Using the opposite hand (left), gently **rotate** the operated arm outwards to the side, just to the point of discomfort, not pain. (**Fig 4**) Hold the stretch, then pull the operated arm inwards again. Repeat five times.

**Note:** The operated shoulder movements are **passive** by using the opposite arm. Active movements of the operated shoulder on its own accord should be avoided as these can damage the surgical repair. The same must apply during showering and dressing.

3. Gently and slowly bend and straighten your elbow five times.

4. Gently clench your hand to make a fist and stretch your fingers out straight five times. Finger swelling and stiffness is common and tingling from subclinical carpal/ cubital tunnel syndrome may occur. This usually resolves when the swelling goes down.



Figure 4

5. Make sure your posture is good and avoid slouching. Do some neck stretches and chin tucks.
6. In the first day or two after surgery – performing some general exercises will aid recovery. These include cough and deep breathing (to keep your chest healthy) and frequent short walks (to prevent deep vein thrombosis and pulmonary embolus). You can discard your white compression stockings when you are mobile.

Mr Wang will review you at one to two weeks after surgery.

With regards to work, generally you would be off all work duties until you are reviewed after surgery.

# Rehabilitation Program

## At 6 Weeks after Surgery

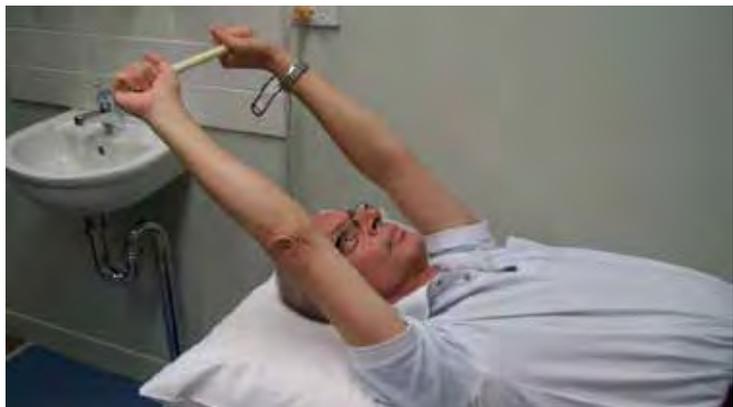
When the sling has been removed and the shoulder is comfortable, more active rehabilitation exercises can begin. The following are guidelines and you will be supervised by your physiotherapist or exercise physiologist.

### Active Assisted Exercises

#### 1. Overhead pulley



#### 2. Stick Exercises (later)



- a. The aim of these exercises is to recover overhead movement of the operated arm, with the assistance of the good arm (via the pulley or stick). Use your good arm to control movement of the operated arm.

- b.** Do these exercises to discomfort, never pain. Warm up first (eg hot shower), do the exercises SLOWLY and smoothly, especially as the operated arm comes down. Cool down with a cold pack afterwards.
- c.** Your physiotherapist may also attend to your neck and upper back. Maintain good posture.

### **PRECAUTIONS:**

1. When the sling has been removed, please be very protective of your operated shoulder. Any activity or exercise that HURTS potentially HARMS your shoulder repair, and should be avoided. PAIN is a warning to slow down or stop.
2. In general, don't lift or push greater than 1.0kg with the operated arm.
3. Avoid sudden movement or impact movement.
4. Avoid the risk of re-injury. It is a good idea to wear the sling as protection in busy shopping centres, or for support when out on long walks.
5. Do not swing the operated arm under the force of gravity. The tension on the repair site may snap sutures or dislodge anchors and damage the reconstruction.
6. Do not reach behind your back or lift directly sideways until Dr Wang gives the okay.
7. Avoid any manipulation of your shoulder joint.

### **Active Exercises**

At 10-12 weeks after your shoulder reconstruction and after Professor Wang gives the okay you may progress to the next stage, of ACTIVE shoulder exercises. The objective is to further improve overhead motion, and begin light strengthening of shoulder girdle muscles. Ongoing supervision by your physiotherapist is important for safe and optimal rehabilitation. Hydrotherapy can also commence, supervised by your therapist.

## 1. Spider Climbs the Wall



Use your fingers to slowly climb the operated arm sideways up a wall (abduction). Elevating your arm activates your shoulder muscles. Slowly descend the wall using similar finger action. Initially stand close to the wall and only elevate your operated arm to the point of discomfort.

## 2. Theraband



Your physiotherapist will start you on light elastic bands (red, yellow) and later progress to stronger bands (green) and add exercises as comfort allows. The above two exercises are good to start with.

- Avoid sideways Arm Raises with weights or elastic bands. (Abduction movements)

Studies show most patients recover good function for daily activities by four months after surgery. However functional improvements and strength will slowly improve for up to 12 months. Rehabilitation times will vary depending on the extent of your surgery. It is best to start slowly and gently with your rehabilitation exercises, rather than risk an early mishap or re-injury to your shoulder which may affect your final outcome.

# Frozen Shoulder “Adhesive Capsulitis”

## What is it?

The shoulder joint is a ball and socket joint held in place by the surrounding muscles and tendons and enclosed by the joint capsule. The joint capsule can become inflamed for several reasons including minor trauma, surgery, medical conditions including diabetes or following a stroke.

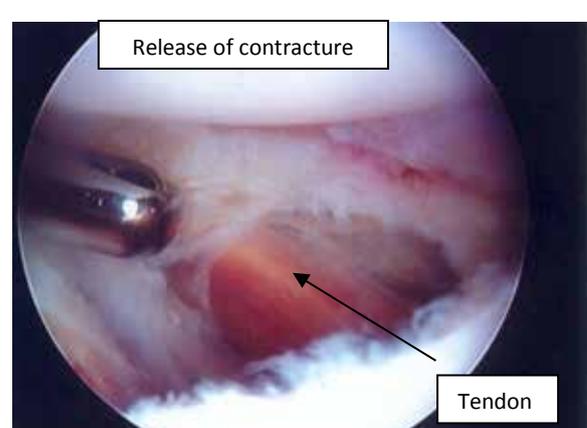
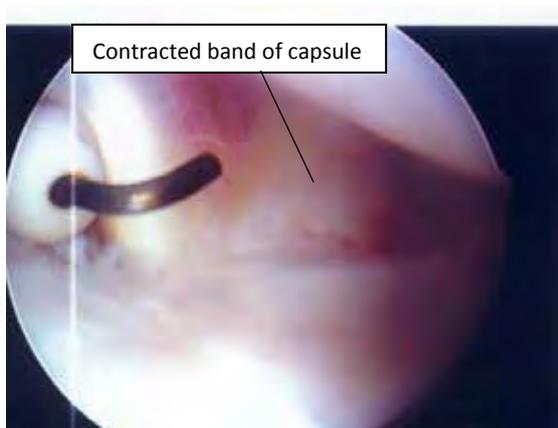
## Symptoms

When the capsule is inflamed (capsulitis), you will notice pain felt over the front and side of your shoulder and down the arm. The pain may be severe and disturb your sleep. Over several months, the inflammation settles and the pain lessens but the capsule thickens and contracts causing shoulder stiffness ("adhesive capsulitis"). The stiffness may stop you reaching overhead or getting your hand behind your back. It may put more strain on the base of the neck causing neck pain. Frozen shoulder may persist from several months to one or two years, but in most cases the condition will resolve on its own accord.

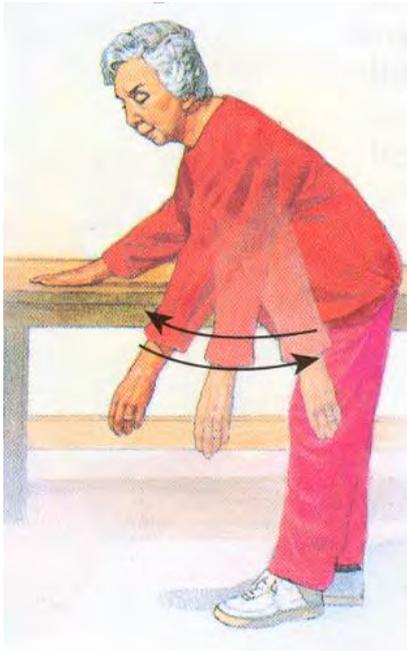
## How is it treated?

When the pain is severe, usually tests including X rays and scans are done to exclude other causes for shoulder pain. These causes include arthritis, acromial bone spurs and tendon tears or referred pain from your neck. However if these tests are normal, treatment comprises of pain medication, physiotherapy, massage and gentle home exercises and hydrotherapy. The warm water helps to relax tight muscles and buoyancy aids assist in recovery of motion. Attention to posture is important, as a "slouch" will often cause secondary neck pain. One or two cortisone injections under radiology guidance into the shoulder joint capsule is helpful to reduce the inflammation.

If the pain is settling but the stiffness is severe, a manipulation under general anaesthetic can be performed to breakdown the contracted capsule. Also an arthroscopic surgical release of the joint contracture is occasionally required and can improve shoulder movements quite quickly.



## Exercises for Frozen Shoulder



Warm the shoulder under a hot shower and then gently swing your arm using gravity, forward and backwards; and side to side.



Stretch upward using a bookshelf or use your fingers to climb the arm up the wall.

Hold the stretch for 5 seconds then slowly let the arm down.



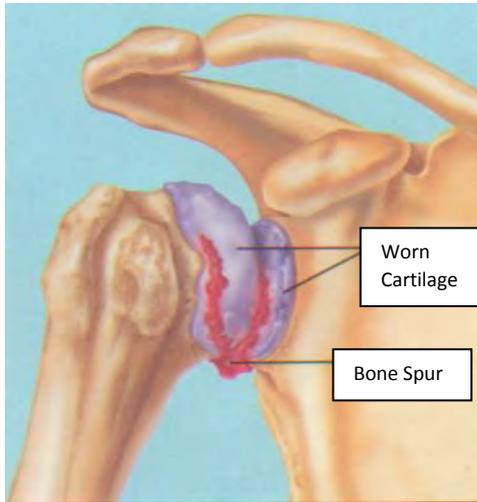
Reach behind, using a towel or stick if necessary.



Stretch outwards. Cool the shoulder down with a cold pack after exercising.

# Total Shoulder Replacement (TSR)

## What is Shoulder Arthritis?



In a normal shoulder joint, cartilage covers the head of the humerus bone and socket (glenoid) of the scapular bone. The cartilage allows smooth and painless gliding of the joint surface on shoulder movement. In shoulder arthritis, the cartilage layer wears through and the exposed bone surfaces grate causing joint pain and stiffness. (*Fig 1*) In addition the muscles and tendons surrounding the shoulder joint (rotator cuff) develop wear and tear damage and this also affects shoulder movement and strength.

Figure 1

## What is a Total Shoulder Replacement (TSR)?



Figure 2: TSR

A TSR is a procedure when the damaged and worn bone ends are surgically removed and replaced with metal and plastic components. (*Fig 2*) Occasionally only half the shoulder is replaced (hemiarthroplasty), with a metal humeral head. Not replacing the glenoid (socket) avoids the risk of future glenoid component loosening and is an option in the younger more active patient. However some pain may persist and hemiarthroplasty may need conversion in future to a total shoulder replacement if shoulder arthritis were to progress.

Another common type of shoulder replacement is the “reverse TSR”, where the socket is placed on the humerus and the head (either metal or polyethylene) is placed on the glenoid. (*Fig 3*) A Reverse TSR is designed for arthritis with rotator cuff tendon damage or end stage rotator cuff disruption with loss of active shoulder movement.



Figure 3: Reverse TSR

## When is a TSR required?

The main reason to undergo TSR is severe chronic shoulder pain from arthritis. Other treatments such as physiotherapy, pain medication, injections, or arthroscopic (keyhole) surgery may have been unsuccessful in managing symptoms. Patients undergoing TSR have shoulder pain severe enough to interfere with daily activity, disturbing sleep, and requiring regular pain medication.

Most patients undergoing TSR will also have stiffness and weakness in shoulder movement. This may interfere with overhead reaching or behind the back activity. A TSR will usually improve shoulder movement and strength. However movement of the artificial joint will not be normal, especially if there is extensive rotator cuff tendon damage as well.

A third and uncommon reason for shoulder replacement is a severe fracture dislocation of the humeral head. The bony damage is too severe to fix with surgical plates or pins. A shoulder replacement for fracture dislocation of the shoulder produces a comfortable shoulder but movements are usually quite limited.

## What happens in hospital?

Pre admission is performed before surgery. Blood tests, ECG and urine tests are taken. Any sites of infection such as skin rashes, dental sepsis need to be dealt with before surgery.

Usually you are admitted the day of surgery. The anaesthetist may contact you beforehand to discuss general anaesthetic and nerve blocks to help keep you comfortable after surgery.

Following surgery, you will remain in hospital for three to four days. During this time, the surgical drain and intravenous line are removed, and you will be discharged with a prescription of pain medication.



Figure 4

## How long is the recovery?

A sling is required to immobilise the shoulder for four to six weeks. **(Fig 4)**

No shoulder exercises are permitted for two weeks. However in the sling, you should squeeze a soft ball or clench your fist several times a day to prevent finger stiffness. You should go for frequent short walks for general well-being and to prevent thrombosis in your legs. After your postsurgical review with Mr Wang, very gentle passive movement exercises are allowed.

Physiotherapy exercises and hydrotherapy can begin when the sling is removed. Shoulder comfort, range of motion and strength gradually improve for many months. However a TSR does not recover normal shoulder function. Even long term, some patients with a TSR may have some discomfort, stiffness, they may not sleep comfortably on the affected shoulder, and would need to limit heavy gardening and sporting activity.

### Post Total Shoulder Replacement: Basic Exercises



#### 1. "Pray and Lift"

Forward elevation, count 3 seconds up

Hold 3 seconds, and 3 seconds down



#### 2. "Spider Climbs the Wall"

Sideways elevation (abduction)

Use your fingers to climb the arm slowly upwards in abduction then slowly descend



#### 3. "Hitchhike"

Theraband Strengthening



#### 4. "Rowing"

Theraband Strengthening

Functional improvements and strength will slowly improve for up to 12 months. Rehabilitation Times will vary depending on the extent of your surgery. It is best to start slowly and gently with your rehabilitation exercises, rather than risk an early mishap or re-injury to your shoulder which may affect your final outcome.

## What are the possible complications of TSR?

TSR is major surgery and usually performed in older patients with severe shoulder disability. Complications are rare, but can occasionally occur. These include:

### **1. Infection**

This occurs in approximately one percent of cases despite routine antibiotic prophylaxis. There is a higher risk in patients with diabetes or skin rashes. Most infections are minor, and can be treated if detected early with antibiotics and a surgical wash out. Very rarely, infections can be serious with antibiotic resistant bacteria and the TSR components may need removal and replacement at a later date when the infection has settled. Even more rarely, the infection may still not settle and more radical surgery such as a shoulder fusion may be required.

Infection may occur many years after surgery and it is important that any future episodes of skin infection, dental sepsis or other infections are promptly treated with antibiotics to prevent the spread of infection to your TSR.

### **2. Thromboembolism**

This is uncommon compared to hip and knee replacement. Nevertheless blood clots can form in the legs (deep venous thrombosis) and can travel to the lungs (embolus) after shoulder surgery. You will be fitted with compression stockings before surgery, and post operatively, will receive anticoagulant injections until you are fully mobile. These anticoagulant injections may cause bleeding problems such as wound ooze and bruising down the arm or swelling (hematoma), but will prevent thromboembolism.

### **3. Damage to bone, nerves or blood vessels**

TSR surgery is performed close to arteries and nerves. Damage to these structures is possible, but this is very rare. Bone quality is usually weakened in chronic arthritis. Rarely the bone may fracture when implanting the prosthesis.

#### **4. Prosthesis Complications**

A TSR is not as sturdy as total hip and total knee replacements. The socket component is small and may loosen in bone or dislodge after an injury such as a fall. Over many years the plastic bearing surface may wear out. Also the joint replacement may dislocate, where the humeral head separates from the socket. This may occur following a specific injury such as a fall, or progressively over years as the rotator cuff tendons surrounding the TSR breakdown.

If prosthesis complications occur, further surgery may be required. The implants may need adjustment in position, or replacement. Most shoulder replacements last ten years or more before revision surgery is required. Younger more active patients are more likely to require revision surgery than sedentary patients.

#### **5. General Medical Complications**

In older patients, medical conditions, eg. pre-existing cardiac respiratory or vascular disease may be exacerbated by anaesthesia, or surgery. Mr Wang may refer you to the appropriate specialist to optimise your general medical condition prior to your TSR surgery.