The Origin of “Shoulder” Pain:
Although your pain actually originates from damaged structures within your shoulder, you may feel that the pain is coming from your upper arm instead. This is known as Referred pain – our conscious brain doesn’t know where to localize pain from deep body sites so instead we feel pain in the part of our outer body which is supplied by the same nerves as the deep part that was injured. Shoulder pain is usually referred to the upper arm. Sometimes the pain can be felt over the front of the shoulder as well as immediately at the back of the shoulder.
Injuries to many different structures around the shoulder may all result in referred pain being felt over this single location in your upper arm. Conditions which cause referred pain include: bursitis, biceps tendonitis, rotator cuff tendonitis, rotator cuff tendinosis, rotator cuff tears, labral cartilage tears, articular cartilage damage, shoulder joint arthritis and adhesive capsulitis/frozen shoulder. Pain in the shoulder or arm may secondarily affect your neck or radiate up towards your neck.

There is also considerable overlap between the pain referred to the upper arm due to shoulder injury and pain referred to the arm but actually coming from a pinched nerve in the neck. These nerve-pinching conditions may include: Cervical Spondylosis (arthritic bone spurs between the vertebrae) Herniated (bulging) Cervical Disc or rarely, Thoracic Outlet Syndrome - where the nerve(s) in your lower neck are pinched between your ribs and your collar bone. Some patients may have more than one cause for their arm or shoulder pain at the same time! It is not uncommon for patients to start out with pain from one source (shoulder) which then is gradually replaced by secondary pain from their neck or vice versa - adding to the diagnostic confusion.

For this reason, part of your Orthopaedic care may be allocated to assessing and reassessing the contribution of painful conditions from both your neck & your shoulder(s).
Routine X-Rays:
These are the best way to look for calcific tendonitis or calcific bursitis, fractures, arthritis and many bone tumors.

MRI:
MRI shows other abnormalities of the shoulder including: soft tissue (non-boney) tumors, subtle fractures, ganglion cysts and tears of the labrum & long head of the biceps tendon. Any abnormalities of the rotator cuff such as tendinosis (micro tearing) and partial thickness rotator cuff tears (visible tearing), will have an abnormal MRI signal in the Supraspinatus so it is often difficult to differentiate between cuff tendinosis, partial thickness tears and small, full thickness tears. The MRI shows calcific tendonitis quite poorly because the Calcium deposits and rotator cuff tendon appear quite similar on MRI.

MRI Arthrogram:
This is essentially a pre-operative test used to better define the exact surgical procedure required and to help predict the expected recovery from surgical repair. An Arthrogram is performed first by injecting local anesthetic into your shoulder under X-ray control. The needle position within the shoulder joint is confirmed by injecting a small amount of IVP (kidney) dye and Gadolinium before removing the needle and moving you to the MRI scanner. The Gadolinium coats the internal joint structures allowing better discrimination between the types of rotator cuff disease as well as showing conditions such as labral tears, SLAP tears and frozen shoulder during the MRI scan.

Shoulder Arthritis:
True shoulder (Gleno-Humeral) arthritis is uncommon since it is not a weight bearing joint and less stressed than the knees or hips. Shoulder Arthritis usually presents with gradual onset of deep aching pain & stiffness and X-Rays confirm the joint space narrowing. Treatment typically includes Physical Therapy, Non-Steroidal Anti-inflammatory Drugs, Cortisone Injections (up to 3 per year) rarely arthroscopic surgery and in very severe cases, Total Shoulder Replacement.

A-C Joint Arthritis:
Most patients over the age of 40 have X-Ray evidence of Acromio-Clavicular arthritis (between the end of the collar bone and the acromion) but very few actually have significant pain from this joint! The disease is most common in weight lifters and some recreational athletes who may also damage or tear the small cartilage in that joint. The diagnosis is both confirmed and treated with Cortisone injections into the A-C Joint. Should injections become ineffective, Arthroscopic removal of the A-C Joint and the outer ¼” of the collar bone usually relieves the pain.
Frozen Shoulder Syndrome:
Frozen Shoulder is caused by an intense inflammation of the entire shoulder joint capsule (not just the rotator cuff). It often causes severe pain and very pronounced stiffness. Also known as Adhesive Capsulitis, this syndrome occurs in two forms.

Primary Frozen Shoulder usually starts without injury or overusing the shoulder and is characterized by gradual onset of pain in the shoulder and upper arm followed by relatively rapid onset of stiffness. It is more common in Diabetics though the exact reason for this is unproven.

Secondary Frozen Shoulder occurs after an injury to the shoulder such as a fall on the affected side, shoulder dislocation, rotator cuff injury or after shoulder surgery. It can also occur after unrelated medical diagnoses such as Heart Attack.

Treatment of Frozen Shoulder:
Typically, Frozen Shoulder Syndrome has 3 phases. The first (acute) phase includes the onset of inflammation, pain & stiffness. In the second phase, the acute inflammation subsides leaving the shoulder stiff but painful only when stretched excessively against the tight capsular restraint. The third and final phase is when the tightness and end of range discomfort in your shoulder gradually resolve. Without treatment, Frozen Shoulder Syndrome may take up to 18 months to run through all 3 phases.

Due to the severe pain that may occur during the first phase of Frozen Shoulder, many patients need treatment at least until they reach the less painful second phase. Traditionally Physical Therapy has been prescribed to prevent or minimize stiffness but I find that aggressive (albeit well intentioned) stretching exercises may worsen the condition by inadvertently increasing the inflammatory process which in turn leads to even more pain and stiffness. Patients in this situation are usually treated with “Active Rest” and oral anti-inflammatory medicines. Severe cases may require up to 3 injections of local anesthetic mixed with cortisone into the shoulder joint to reduce the inflammatory process. Note that in frozen shoulder, cortisone injections are used primarily to reduce the pain of the 1st Stage but do not usually result in a rapid reduction in stiffness. Typically once the pain settles sufficiently to allow a reasonable night’s sleep (Stage 2), most patients choose to allow the residual stiffness to gradually resolve over the ensuing months. If the pain is resistant to treatment or unrelenting, manipulation under anesthesia (vigorous manual stretching of the shoulder capsule while you or your shoulder are anesthetized) and sometimes, arthroscopic release of the tight capsule, may offer earlier recovery. Note that none of these techniques work in every case and both manipulation under anesthesia and arthroscopic release have been associated with recurrence of the inflammatory (1st) phase. It is always best to choose the simplest, safest and least invasive method to get the pain under control. The stiffness usually takes care of itself thereafter.
Rotator Cuff Tendinosis:
In the young athlete, rotator cuff inflammation is usually associated with overuse (especially throwing & lifting) or significant trauma. While patients in their 30’s occasionally have shoulder pain due to overuse of otherwise normal tendons (Tendinitis), by the time we reach age 40, rotator cuff symptoms become very common because the Supraspinatus tendon is both mechanically and biologically disadvantaged. The Supraspinatus Tendon is the most important & highly stressed portion of the rotator cuff; unfortunately, it also has a poor blood supply which reduces its ability to heal itself. The Rotator Cuff is constantly in use - stabilizing the shoulder whenever our hand moves. This constant contraction tends to wring-out the microscopic blood vessels within the tendon - further compromising the nutrition and healing ability of the rotator cuff. As a result, the rotator cuff tendons age prematurely - resulting in Tendinosis. I like to compare it to polypropylene rope which has been left out in the sun. The rope appears intact, but with use, its fibers break & fray easily. Like the sun-damaged rope, age and use accelerates the microscopic degeneration throughout the rotator cuff tendons. The body tries to repair these, but the process is slow. The result for some of us is a prolonged cycle of inflammation & repair responsible for the aching and pain, which may take months or even years to settle down as the repair process is gradually completed.

Shoulder Bursitis:
The bursa we are usually referring to in the shoulder is a large tissue sac located between the rotator cuff tendons and the boney arch of the shoulder (Acromion & outer collarbone). A healthy bursa sac is thin, flimsy and contains little or no fluid. It helps reduce friction between the rotator cuff and the undersurface of the Acromion when we raise our arms to the front or to our side. Bursitis means inflammation - redness & thickening of the bursa. The inflammation can occur spontaneously (no injury) or it can be caused by trauma, unexpected/repetitive (over)use or inflammatory conditions such as arthritis.

Shoulder Impingement:
Impingement occurs when the top surface of the rotator cuff rubs against the front underside of the Acromion (boney arch of the shoulder) causing pain as the arm is raised.

Primary Impingement:
In this condition the primary problem is the abnormal boney arch or Acromion which in turn causes secondary irritation of the rotator cuff & bursa. While some of us are born with excessive downward curving of the leading edge of their Acromion, most frequently, calcification of the Coraco-Acromial Ligament (which is attached to the underside of the Acromion) occurs at the leading edge of the Acromion. This spur may, in turn, rub against or even erode the underlying rotator cuff tendon each time the arm is raised.

Secondary Impingement:
Micro-tearing due to ageing or overuse causes inflammation and swelling of the rotator cuff known as Degenerative Tendinosis. Its overlying bursa may also become inflamed. When the arm is raised, the thickened rotator cuff & bursa are pinched secondarily against an otherwise normal acromion.
Calcific Tendonitis/Calcific Bursitis:
In this condition, calcific deposits form within the rotator cuff tendons (usually the Supraspinatus) or within the sub-acromial bursa which overlies the tendon. Calcification occurs in patients from their 30’s to advanced age and may cause considerable rotator cuff swelling and pain. It may also be present yet cause no symptoms for many years. It is frequently diagnosed on X-rays done for reasons other than pain. It remains unclear why the calcification occurs only in some individuals. Although the Calcium appears dense like bone on X-ray, it is actually the consistency of toothpaste. It may occur as a discrete collection within a pocket in the Supraspinatus tendon or it may spread out through the fibers of the rotator cuff and the bursa. If the Calcium remains contained within the tendon or bursa sac, it may not require any treatment (it may dissolve on its own). Unfortunately most patients experience pain due to repetitive use of the shoulder squeezing the Calcium Pyrophosphate (bone) crystals into the shoulder joint or the bursal sac causing cycles of inflammation, pain weakness & stiffness.

Treatment of Calcific Tendonitis/Calcific Bursitis:
In the absence of significant symptoms, no treatment is required. Mild cases will respond to “Active Rest” and over the counter Non-Steroidal Anti-inflammatory Drugs or Tylenol. Cortisone injections can also be very helpful for persistent mild to moderate symptoms. If the symptoms are disabling, persistent or make restful sleep difficult, then surgery may be performed. During arthroscopy, the shoulder joint proper first is carefully inspected for other painful conditions which are treated simultaneously. The arthroscope is then inserted into the bursa which can then be removed along with any calcium deposits within it. The calcium deposits are then removed from the Supraspinatus by making small slits in the tendon and milking out the toothpaste-like material arthroscopically. Usually the slits in the tendon do not require suture repair and heal well with prompt rehabilitation.
Rotator Cuff Tears:

- **Acute Traumatic Rotator Cuff Tears:**
  These occur in otherwise normal & healthy Supraspinatus tendons. In young patients, significant trauma such as a fall to the side or a major sports injury may load an otherwise healthy rotator cuff to the point where it tears away from its boney attachment to the Humerus. Frequently these patients experience a loud pop or tearing sound followed by immediate difficulty (and considerable pain) raising their arm.

- **Degenerative Rotator Cuff Tears:**
  These occur typically in middle-aged and older patients who may have had mild, aching discomfort in their shoulders in the preceding year. The mild pain experienced by many patients for months or years (before they complete their rotator cuff tear) usually originates from micro tears (Tendinosis) within the degenerative rotator cuff tendons or may be due to an undiagnosed partial thickness cuff tear. Tears may also be caused by impingement of the tendon against the overlying Acromion. When a degenerative cuff tears, the patient may experience sudden pain (and sometimes a tearing sensation) during quite modest activity. The subsequent weakness while raising their arm sideways is very variable. Most patients experience pain with sudden movements, difficulty reaching overhead or to the side and especially reaching behind their back to fasten clothes, thread their belt etc. Degenerative tears are unique in that the tearing tends to occur in the highly stressed undersurface of the degenerating rotator cuff tendon first. This may be the result of delamination of the Supraspinatus tendon or its cause.

- **Partial Thickness Rotator Cuff Tears:**
  - **Articular Surface Partial Thickness Rotator Cuff tears:**
    These typically occur on the undersurface (articular surface) of the rotator cuff. During the Degenerative Tendinosis process, the Tendon tends to delaminate horizontally like defective plywood. Initially the horizontal splits do not affect the integrity of the tendon but with repetitive use, the most highly stressed portion of the rotator cuff closest to the joint, tears away from its boney attachment to the Humerus. If the delamination defect is close to articular surface, most of the outer rotator cuff fibers remain attached to the humerus and the Supraspinatus function is preserved. Because of this, the symptoms of a small Partial Thickness Rotator Cuff Tear will often be identical to those of Tendinosis. If the delamination defect is closer to the bursal surface, a much thicker defect in the Supraspinatus attachment occurs once the articular surface fibers retract and the symptoms (and treatment) may more closely resemble a full thickness cuff tear.

  - **Bursal Surface Partial Thickness Rotator Cuff Tears:**
    Rarely rotator cuff tears are caused by Primary Impingement - bone spurs eroding the rotator cuff incompletely from above. In the modern era of arthroscopic surgery, we find this is much less common than was previously reported.
Treatment of Rotator Cuff Tendinosis, Bursitis & Impingement Syndrome:

- **Home Treatment (Active Rest):**
The first goal is to reduce the inflammation of the rotator cuff & bursa. Start with “Active Rest” - avoidance of strenuous or painful activity yet using the arm carefully as tolerated for most day to day activities to give the torn, stressed or inflamed tissues a chance to heal yet prevent stiffness and loss of muscle. Over the counter medicines such as Aleve & Ibuprofen reduce the inflammation and Tylenol can also be taken to for pain. You may find local heat from a heating pad or hot shower/tub comforting. Most find an ice pack or other cold therapy helpful when the pain is recent or severe. Sleeping is often difficult so try sleeping in a recliner chair or on extra pillows. Your primary care doctor may prescribe pain killers for bedtime use. Active Rehabilitation is effective once the acute pain has begun to settle. The 1st phase of rehab involves a gentle but full stretching program - don’t stretch too hard - if you find yourself holding your breath, you are stretching too vigorously! Be sure to hold each stretch for at least 30 seconds (the length of a TV commercial). Strengthening exercises can be slowly introduced once you regain your full Range of Motion. There are stretching exercises attached to this handout.

- **Physical Therapy (Active Rehab):**
Physical Therapy relieves pain in most cases of Rotator Cuff Tendinosis/Bursitis by reducing swelling, stiffness and restoring your normal range of motion, strength and a sense of trust for everyday activities. As with any other tendinosis, stretching is a key component of your recovery. Once the initial pain begins to settle and your range of motion is restored, your therapist will begin to cautiously strengthen your shoulder and core muscles. Unfortunately some patients experience recurrence or worsening of their pain each time strengthening exercises are started and seem to respond only to prolonged periods of rest. Recently several studies have been published indicating that small rotator cuff tears may heal (or at least become asymptomatic) with physical therapy alone. Understand that the recovery from rotator cuff tendonitis/bursitis/rotator cuff tear is often a long drawn out affair! Many patients require 3 to 6 months to achieve some measure of comfort and may experience minor discomfort for 12 to 18 months or more. It is impractical to continue formal outpatient physical therapy for months at a time so most patients will be taught a simple home therapy program by their physical therapist who may then supervise your progress every few weeks to increase or moderate your program.

- **Cortisone Injections:**
Cortisone is a powerful steroid-type anti-inflammatory drug, which helps shrink the swollen bursa and painful rotator cuff tissue. While it may be given in tablet form (Medrol Dose Pack or Prednisone tablets) large doses of oral Cortisone are required to reach the shoulder tissues which increases the risk of damage to other bones and joints. To prevent these unwanted side effects, I inject very small amounts of Cortisone (Depo-Medrol or Celestone) into the shoulder joint or bursa. There is a minor systemic effect (Diabetics will see their blood sugar rise for 24-36 hours) but most of the injected Cortisone stays within the shoulder tissues. I mix local anesthetic with the Cortisone before injection and most patients feel only a brief “jab” as the needle is inserted and do not feel the cortisone being injected. Most feel temporary, immediate relief of their shoulder pain followed by a bruised feeling for a day or two after the injection. It may take over a week for the Cortisone injection to shrink the swollen tissue and deliver its full effect.

- **Ketorolac Injections:**
Ketorolac (Toradol) is a non-steroidal anti-inflammatory drug that may be injected into the shoulder bursa in place of Cortisone with similar effect. Ketorolac can be injected into the shoulder bursa more frequently than Cortisone due to its safety profile. It is often alternated with Cortisone injections.
**Arthroscopic Acromioplasty:**
If the rotator cuff remains swollen but completely torn, arthroscopic surgery may be used to remove the swollen bursa, remove the overhanging portion of the acromion or bone spurs at the front of the shoulder. Sometimes even when the acromion has a normal contour, shaving part of the underside of the acromion can be helpful to relieve pain from a swollen rotator cuff or shoulder bursa (just like in our home when we replace the carpet in our home and find a door sticks. The real culprit is the thicker carpet but the easiest solution is often to plane a bit off the bottom of the door).

**Non-Operative Treatment of Rotator Cuff Tears:**
The initial treatment is “Active rest” - avoidance of strenuous or painful activity to give the torn or stressed fibers a chance to heal yet using the arm carefully for most day to day activities to prevent stiffness and loss of muscle. Small acute rotator cuff tears usually heal slowly (up to 18 months for some) but almost completely with rest and rehabilitation and rarely progress to become large or massive tears unless additional injuries occur.

**Rotator Cuff Repair:**
Most acute or large rotator cuff tears (where there is significant weakness raising the arm) are treated surgically with arthroscopic rotator cuff repair, mini-open rotator cuff repair or open rotator cuff repair depending on the type and location of the tear.
**Biceps Tendonitis**

The Long Head of the Biceps Tendon enters the shoulder in a boney trough at the front of the shoulder between the attachments of two of the rotator cuff tendons (Supraspinatus & Subscapularis). The biceps tendon attaches to the labrum (shoulder cartilage) at the top of the shoulder socket. Many patients develop degenerative tendinosis in the Long Head of the Biceps tendon just like the degeneration seen in the rotator cuff tendons. In some patients, bone spurs narrow the bone trough or the tendon rubs against the edges of the trough and becomes frayed or inflamed. Tearing of the upper fibers of the Subscapularis tendon (part of the rotator cuff) or the adjacent ligaments allows the tendon to slip out of its groove and rub over the bone edges causing clicking or pain.

![Biceps tendon with Fraying & Inflammation](image)

**Non-Operative Treatment of Biceps Tendonitis:**

Many patients and especially those with minor fraying of the biceps tendon may respond well to active rest and rehabilitation combined with occasional Non-Steroidal Anti-Inflammatory Drugs. Occasionally a cortisone injection will significantly reduce the symptoms and allow the tendon to heal.

**Biceps Tenotomy & Biceps Tenodesis:**

In resistant cases, arthroscopic surgery may be required - the tendon is easily released from its labrum origin allowing it to slide down its groove out of the shoulder. This may result in a bulge in the biceps muscle below the shoulder - the “Popeye sign”. Usually this is a minor cosmetic abnormality and causes few if any symptoms.

In those patients who aren’t comfortable with some muscle bulging in the arm, the tendon can be surgically attached to or implanted into the bone through a small open incision in the upper arm. Be aware however that due to the degenerative nature of the tendon which caused the tendon pain in the first place, it is not uncommon for the transplanted tendon to re-tear at its reattachment site subsequently (resulting in recurrence of the “Popeye sign” despite the Tenodesis).
SLAP Tears:
The human shoulder joint is a modified ball & socket joint. The upper arm has the ball (humeral head) at its upper end while the Glenoid is the name for the flat socket-like structure at the outer edge of the shoulder blade (scapula). Surrounding the edge of the socket is a rubbery cartilage structure called the Glenoid Labrum. Shaped like a finishing washer, it deepens the socket and provides a suction cup like cradle for the head of the Humerus. At its upper edge (about 12 o’clock on the clock face) is the attachment of the long biceps tendon. In some throwing athletes and in older adults with unusual injuries, the pull of the biceps can tear the labrum or peel the superior (upper) labrum from the bone. In medical terms this is called a SLAP tear - an acronym which stands for Superior Labral tear - Anterior & Posterior.

Non Operative Treatment for SLAP Tears:
In older patients, and especially those with small tears (mainly fraying of the superior labrum) active rest and rehabilitation combined with occasional Non-Steroidal Anti-Inflammatory Drugs will usually allow the symptoms to settle.

SLAP Repair is recommended for younger patients and especially throwing athletes to repair the detached or torn superior labrum back to the bone. Using the arthroscope, the detached labrum is smoothed and its bone attachment site is roughened with a small burr to stimulate healing. Several small suture anchors are then drilled into the bone and their sutures are tied around the torn labrum to hold it securely against the bone until the tear heals. In patients over the age of 40 and especially if the patient also has a rotator cuff tear, SLAP repair causes additional stiffness and may prolong recovery even when the rotator cuff repair is also performed arthroscopically.
As a result, in patients over age 40, (especially for incomplete detachment of the Superior Labrum) I usually just detach the biceps tendon from the Labrum (Biceps Tenotomy), debride (shaving smooth) any minor Labral Tear, and accept the minor residual laxity in the Labrum (which causes few if any symptoms).

Biceps Tenotomy & Biceps Tenodesis:
Biceps Tenotomy is usually performed in older patients for SLAP tears - the tendon is easily released from its labrum origin allowing it to slide down its groove out of the shoulder. This may result in a bulge in the biceps muscle below the shoulder - the “Popeye sign”. Usually this is a minor cosmetic abnormality and causes few if any symptoms.
In those patients who aren’t comfortable with some muscle bulging in the arm, the tendon can be surgically attached to or implanted into the bone through a small open incision in the upper arm. Be aware however that due to the degenerative nature of the tendon which caused the tendon pain in the first place, it is not uncommon for the transplanted tendon to re-tear at its reattachment site subsequently (resulting in recurrence of the “Popeye sign” despite the Tenodesis).
Arthroscopic Surgery of the Shoulder:
I often describe shoulder arthroscopy as though I was working on the ceiling in a 1 story house. See the individual descriptions below:

a) Gleno-Humeral (shoulder joint) Arthroscopy:
Inside the shoulder joint, the Glenoid appears like a small flat saucer, rimmed by the cartilage labrum. The Head of the Humerus is a large round ball covered with articular (bearing surface) cartilage which rests within the shallow socket. Continuing our 1 story house analogy, the rotator cuff is seen as the “ceiling” of the shoulder joint. The undersurface of the rotator cuff is inspected carefully to look for partial tears after I check the rest of the shoulder joint for other problems. Partial thickness rotator cuff tears can be shaved smooth with arthroscopic shavers or sealed with radiofrequency instruments (Debridement). I inspect the bearing surface on both sides of the ball & socket joint and can smooth or remove damaged shoulder rim cartilage (Labral Debridement or Repair) tidy up minor bearing surface damage (Debridement) remove inflamed tissue lining the joint (Synovectomy) release tight “frozen shoulders” and repair or remove biceps detachment (SLAP repair & Biceps Tenotomy).

b) Bursal Arthroscopy:
The shoulder bursa is like the “attic” in our 1 story house analogy. The boney arch of the shoulder represents the “roof rafters”, the rotator cuff forms the “attic floor” which is covered by “insulation” (inflamed bursal tissue). During Shoulder Bursa Arthroscopy I first remove the bursal tissue with mechanical & radiofrequency instruments in order to properly visualize the rotator cuff. Once the bursa is removed I may tidy up the frayed ends of full thickness rotator cuff tears and repair the torn tendon back to the bone (Rotator Cuff Repair). If the rotator cuff is not visibly torn, a Subacromial Decompression (Acromioplasty) creates more space for the swollen Rotator Cuff tendons. Just as we plane a sliver off the bottom of our doors at home when they catch on thicker carpets, the surgical solution in the shoulder is often to grind off a small portion of the underside of the bony arch (Acromioplasty) allowing more clearance for the swollen rotator cuff and to reduce the impingement of the repaired cuff against the bone until the rotator cuff slowly heals & shrinks back to its usual thickness.

Arthroscopic Rotator Cuff Repair:
With the arthroscope in the shoulder bursa, once the rotator cuff tear is clearly seen, several small hollow tubes (Cannulas) are threaded through the shoulder muscles - permitting the surgical instruments to pass in and out of the bursal space easily. The torn edge of the rotator cuff is cut back to healthy tendon on the inner side and frayed rotator cuff fibers are cleaned off the Humerus on the outer side of the tear. This footprint (tendon attachment site) is roughened to stimulate blood flow (for subsequent healing to the tendon). Several small suture anchors are then drilled into the footprint. The sutures from each anchor are each threaded through the rotator cuff tendon and then tied - holding the healthy (but slightly shortened) tendon down against the healthy bone of the footprint. It will take a minimum of 8 weeks for the tendon to begin to attach its fibers to the bone. Until then - only a very few sutures are holding the repaired rotator cuff in place - so it is critical not to overstress this initial repair too soon! After Rotator Cuff repair, while it is tempting to think that the repair makes the shoulder normal again, it is important to remember that: the degenerative tendinosis process affects the entire tendon as well as the rest of the rotator cuff. The tendons that are repaired are never normal and are prone to tearing again! This is especially true in smokers or Diabetics, both of whom have poorer blood supply to their tendons due to impaired microcirculation. It is rare for a patient that continues to smoke, to heal their rotator cuff after surgical repair!
Rotator Cuff Repair:

Recovery from Arthroscopic Shoulder Surgery (No Repair):
You will usually wear a sling for comfort for the first week or so after surgery. Typically with these types of surgery, tissue is cleaned up (debrided) or tight tissue is released during the arthroscopic procedure. Since there has been no structural repair performed, it is very important that you & your therapist start an aggressive Range of Motion Program immediately after the surgery. You will be taught a simple program to repeat on your own at home at least 4-5 times each day. You will visit your therapist 2-3 times weekly until your ROM returns to normal. Your goal will be to regain full ROM within 10 - 14 days of your surgery. Read the post-op instructions from me and your therapist carefully as you are generally allowed to use your arm and shoulder as normally as comfort will allow immediately after these types of surgery.

Recovery from Arthroscopic Shoulder Repair:
After Arthroscopic Repairs, you will need to wear a sling to protect the repair for the 6-8 weeks it takes to develop enough strength in the repaired tissue to accept even light loads. Your sling can be removed for stretching as well as passive-assisted exercises when you first see your therapist. **Do not use the muscles on your operated arm to lift, reach forward, reach to the side or reach behind your back until instructed to do so by me and/or your physical therapist.** Once you have regained a full Passive Range of Motion and 6-8 weeks have elapsed, your physical therapist will start a formal program of active stretching and strengthening. It usually takes 6 months (often a year) to regain reasonable strength in your rotator cuff and shoulder muscles. Most patients begin to feel that their shoulder is normal again (or at least fully recovered) about 18 months after their surgery. Although studies have shown only 60% of repaired cuffs actually heal completely, over 80% of patients experience good pain relief and improvement in strength sufficient to perform most normal daily activities and sleep comfortably.

Recovery from Mini-Open Shoulder Repair:
Mini-Open & Major Open Shoulder Repairs generally follow an identical rehabilitation timetable to Arthroscopic Shoulder Repairs. You will need to wear a sling to protect the repair for the 6-8 weeks it takes to develop enough strength in the repaired tissue to accept even light loads. Your sling can be removed for stretching & passive-assisted exercises 2-3 days after the repair when you first see your therapist. Do not use the muscles on your operated arm to lift, reach forward, reach to the side or reach behind your back until instructed to by me and/or your physical therapist. Once you have regained a full Passive Range of Motion and 6-8 weeks have elapsed, your physical therapist will start a formal program of active stretching and strengthening. It usually takes at least 6 months (often a year) to regain reasonable strength in your rotator cuff and shoulder muscles. Most patients begin to feel that their shoulder is normal again (or at least fully recovered) about 18 months after their surgery. Although studies have shown only 60% of repaired cuffs actually heal completely, over 80% of patients experience good pain relief and improvement in strength sufficient to perform most normal daily activities and sleep comfortably.
My Current Surgical technique:
I recommend Pre-operative Interscalene Brachial Plexus Block combined with General Anesthesia plus our multimodal analgesia post-operative protocol to provide excellent pain relief immediately. Usually your surgery will be performed as an outpatient procedure and you typically will be able to go home within 2 hours of the completion of your surgery. Each patient’s circumstances are different and should you experience any medical issues, or any post-operative irregularities, you may be required to stay overnight for safety.
Most shoulder surgery will be performed arthroscopically. Some procedures (such as Biceps Tenodesis will routinely be performed through small open incisions - not necessarily because they can’t be done arthroscopically but because the open surgery is simpler, faster or ensures a better, more predictable or more durable end result. Most arthroscopic procedures may be converted to mini-open procedure or even to a traditional open procedure as the need arises during your surgery. My primary concern is to give you the best result possible and some patients’ anatomy or surgical problems do not allow surgery to be adequately performed well arthroscopically or with as small an incision as you might wish. Technical considerations may require that larger or additional incisions be created during your surgery though this should not affect your ability to go home the day of surgery. As with all surgery, each patient recovers at a different rate so you may find your personal initial recovery to be faster than expected or slower than others you know who have undergone similar procedures.

Before Surgery:
I recommend you contact your PCP as soon as you decide to proceed with surgery if you have any known health problems (Mandatory for Diabetic Patients). This additional lead time will allow your own doctor to examine you carefully and complete any additional tests or referrals to other specialists (cardiologists etc.) so that your health is optimized before your surgery. Cammie, my assistant, will contact you and confirm your surgery date. She will also send you a copy of your surgical consent form to read over, sign and return to my office prior to the surgery. Feel free to write on it - circle or underline any areas that aren’t crystal clear- jot down any questions as you read it over. If you find you have made any notes on the form - call us for answers (843) 682-7480!
While waiting for surgery, be sure to plan for your return home - usually the day of surgery. If you have special needs or expect to be alone at home for the first night after surgery, be sure to let us know so we can make alternate discharge plans in advance.
You may be interviewed by the hospital nurse by phone 1-2 weeks prior to your surgery. You may be asked to go to the hospital 1-2 weeks prior to your surgery for education classes, and to complete any blood tests, urine tests. EKG or other testing that has not already been done by your PCP. You may meet with the anesthesiologist in person during that visit.
- To discuss any questions you may have about the Interscalene Block Anesthesia
- Be sure to specifically discuss your anesthesia concerns with your anesthesiologist prior to the day of surgery so that you understand clearly what type of anesthetic you may expect to receive.
- It is very important that you do not smoke before surgery.
- You may safely continue your arthritis medicine up to the day of surgery (even though the hospital nurse may tell you to stop it).
- If you take aspirin to prevent heart attack or stroke, be sure to continue taking it up to the day of surgery (even though the hospital nurse may tell you to stop it).
- If you take Plavix or Coumadin /Jantuven, or Xarelto be sure that you have received specific and written instructions from my office at least 1 week prior to your arthroscopic shoulder surgery.
- Be sure to call my office with any questions, concerns or changes in your health or medications prior to surgery (843) 682-7480.
Scheduling Arthroscopic Shoulder Surgery:
The process starts once you call my assistant Faye at (843) 682-7480 to schedule your surgery. Be sure to tell Faye about any new medical concerns since your last visit and specify your preferred surgery dates. I will review your file personally before scheduling your procedure. Faye will obtain necessary pre-authorizations and contact you with a preliminary surgery date. Of course I would be pleased to meet with you to discuss any questions you may have - especially if you have any concerns about the procedure we discussed, but in most cases, if you have no additional questions, we can schedule your shoulder surgery over the phone. Depending on the interval since your last visit you may be asked to schedule a review with me or for additional tests or X-rays. Your existing medical conditions may require that you receive medical clearance before surgery. We appreciate your patience as we try to balance your scheduling preferences with the available surgical time and necessary pre-operative testing for your safety. Usually your surgery will be performed on a Tuesday or a Thursday.

What is Regional Anesthesia? Will I Have To Be Awake For My Surgery?
In most cases we use an Interscalene Regional Block Anesthetic. After you are lightly sedated, a fine needle is inserted above your collar bone to allow injection of local anesthetic around the nerves which supply your arm & shoulder. Each anesthesiologist may employ a slightly different technique but the results are similar for all our providers. You may experience mild twitching in your arm if they use a nerve stimulator to localize the nerves that they will to anesthetize. Other times you may notice the cold gel used during Ultrasound localization of those same nerves. These are usually quite painless and the needle is withdrawn immediately after the injection. Within minutes your arm will feel warm and numb. You may notice a temporary drooping of your eye lid on the affected side (actually a sign of a good block that resolves completely within hours of the procedure). You may also note a strange inability to take in a really deep breath while the block is working. Because you cannot feel any pain during your surgery, you may not need as deep a level of general anesthesia and less potentially nausea-causing medications. Your anesthesiologist will also give you a general anesthetic during your procedure. Feel free to discuss this with your anesthesiologist at the pre-operative clinic visit. Remember that this technique is not suitable for every patient. Your anesthesiologist will discuss alternative anesthesia options with you and may recommend an entirely different technique.

Will I Feel Any Pain After My Operation?
The movement usually returns to your arm and hand later in the day once you are home. It may be several hours before you regain normal feeling in your shoulder and arm. Anti-inflammatory pain medicine will be continued after surgery and enhances the effectiveness of pain pills such as Oxycodeone, Hydrocodone, Tramadol & Tylenol which you will receive on a regular schedule for the first few days to prevent pain.

When Will I Be Allowed To Move my Arm After Surgery?
My patients begin their rehabilitation as soon as they leave the recovery room. You are encouraged to start bending and straightening your fingers and elbow immediately after surgery. You will be encouraged to get out of bed walk to the bathroom as soon as the General Anesthesia effects have worn off. You will be taught a simple, effective, exercise program by our physical therapist within 2 days of surgery which you must continue daily at home. I do not use Continuous Passive Motion (CPM) machines routinely. After surgery you may have to protect your new shoulder repair by wearing a Don Joy Ultra Sling for all activities except bathing and your prescribed exercises. Most patients are quickly able to do a simple home exercise (stretching) program and reduce the frequency of Outpatient Physiotherapy. Once your repair is sufficiently strong you will attend formal Outpatient PT more frequently to strengthen the muscles for approximately 4- 8 weeks. Other patients prefer to work with a personal trainer or resume a home gym program.
**What Are My Restrictions While Recovering from Arthroscopic Rotator Cuff Surgery?**
After Arthroscopic Repairs, you will need to wear your Don Joy sling to protect the repair for the 8 weeks it takes to develop enough strength in the repaired tissue to accept even light loads. You may remove the waist belt & bolster once comfortable if you are not a restless or stomach sleeper. Your sling can be removed for stretching & passive-assisted exercises 2-3 days after the repair when you first see your therapist. **Whenever resting at home, remove the sling and rest your operated arm on the arm of your chair to prevent the stiffness& contracture that will occur if you have your arm resting across your belly in the sling.** You may use your operated hand for light self-care, typing etc. as long as your elbow is at your side. Do not use a regular computer mouse in your operated hand. (Trackballs are ok though). You will probably need to sleep in a recliner chair or propped up on pillows for several weeks after surgery. You may lie flat in bed safely as soon as it’s comfortable for you. **You must regain full Passive Range of Motion and be at least 8 weeks after Rotator Cuff Repair before starting active exercises.** Your newly repaired cuff is not strong enough to overcome the forces of gravity or any residual shoulder stiffness. If you do not follow these restrictions your repair will fail!

**What Are My Restrictions Once I've Recovered from Arthroscopic Rotator Cuff Surgery?**
Since the purpose of your shoulder surgery is to allow you to return to as active a lifestyle as possible. I encourage unlimited activities within the limits of comfort. Most exercise machines are fine after surgery although I recommend lower resistance and more repetitions on weight machines. You should permanently avoid activities which remain painful or likely to result in falls that could recreate your original injury.

**What Are The Complications of Arthroscopic Shoulder Surgery?**

*Blood Clots* can form in the veins of either arm after arthroscopic shoulder surgery. This is very rare and therefore prophylactic anticoagulation is not recommended routinely. Blood Clots can form in the legs of any patients undergoing arthroscopic shoulder surgery. You will be fitted with Sequential Compression Devices (SCD's) immediately before surgery. These automatically inflate and deflate during surgery to squeeze your calf muscles from the ankle to your knee - helping prevent blood clot formation during your surgery. Unless you have a personal or family history of Deep Vein Thrombosis (leg clots) or Pulmonary Embolism (lung clots), the risk of blood clots is very small and additional prophylactic treatment such as blood thinners are not recommended.

Fatal pulmonary embolism (due to clot lodging in the lungs) has been reported only very rarely in healthy patients undergoing arthroscopic shoulder surgery. Recent studies show that early mobilization after your surgery is very important in reducing the formation of blood clots.

*If you or first degree relatives have ever had a blood clot in a leg vein or in the lung, you are a very high risk patient and should seriously consider receiving additional anticoagulation post-op.*

*Incomplete Healing of the Repair* is the most common complication of arthroscopic shoulder surgery - especially rotator cuff repair. Studies show that up to 40% of Rotator Cuff Repairs do not heal completely on subsequent MRI's. Despite these radiographic abnormalities, most (over 80%) patients are very pleased with their pain relief and improvement in shoulder function after arthroscopic shoulder repair.

*Post-op Frozen Shoulder Syndrome* occurs to a minor degree in most patients but usually responds to the exercise program. Approximately 10% of patients experience severe stiffness which persists for months after surgery. Most patients respond to a series of Cortisone injections but these cannot be started until atypical infection has been ruled out and at least 3 months has elapsed since surgery (otherwise the Cortisone may interfere with the tendon healing). Rarely patients require Manipulation under Anesthesia or Arthroscopic Release of Frozen Shoulder Syndrome.

*Intra-operative Fracture* of the humerus occurs very rarely during or after Arthroscopic Surgery. The risk of fracture is slightly increased after Biceps Tenodesis or if an exceptionally large number of anchors are required for Rotator Cuff repair. The risk is also increased with Osteoporosis, Falls & Extreme Activities.
Complications of Arthroscopic Shoulder Surgery Continued?

Unexplained Pain persisting beyond the first year after Arthroscopic Shoulder Surgery can occur in up to 10% of patients. My personal experience is that significant, sometimes unexplained pain may occur for several months after surgery but usually settles within 1 year. Persistent pain & stiffness will usually prompt a thorough search for occult (hidden) infection.

Deep Infection occurs in less than ½-1% of arthroscopic shoulder surgeries. It occurs more frequently in smokers and patients with diseases that affect our natural immunity such as Diabetes, Rheumatoid Arthritis and Malnutrition. Obese patients are at significantly increased risk of both superficial & deep wound infection (paradoxically they may be malnourished too). Longer, more complicated operations, and revision surgeries carry a significantly higher risk of deep infection. There is a well-known association between (arthroscopic) shoulder surgery and infections associated with bacteria which we all carry on our skin yet don’t seem to cause deep infection as readily in other joints or body areas. Though fortunately rare, these atypical bacterial infections can be very difficult to detect and therefore delays in starting treatment are common.

If deep infection occurs, you will need additional arthroscopic, possibly open surgery which may permanently negate the original repair. At least six weeks of intravenous antibiotics are usually required after deep shoulder infection.

Nerve Injury is a rare event after arthroscopic surgery but is always hard to diagnose immediately (since most patients receive a nerve block before the surgery and have variable numbness and paralysis normally after surgery). Generally speaking most arthroscopic procedures near the rotator cuff do not endanger any major nerves. Arthroscopic stabilization procedures do place the Axillary nerve at risk (it may get looped into the repair by the sutures) and if injured, typically results in marked pain & paralysis of the Deltoid muscle - you can’t raise your arm. Very rarely, your positioning during surgery may expose previously undiagnosed cervical disk herniation causing nerve pain & muscle weakness in the distribution peculiar to the affected nerve (most often C6). Spinal cord injury from disc herniation during surgery has been reported rarely. Nerve injuries due to the anesthesia block have been reported but are very rare and usually due to bleeding complications rather than direct nerve injury from the injection itself.

General Medical Complications occur proportionately to your age, health and lifestyle. My assistant will be pleased to provide you with a copy of our standard consent form for Arthroscopic Shoulder Surgery so that you can read about these general and specific risks in further detail.

Will I Need a Blood Transfusion?
Blood Transfusion is not required for healthy patients undergoing Arthroscopic Shoulder Surgery except in the case of an unanticipated emergency.

Do the Implants Require Removal?
In most cases, the implants I use are non-metallic, made from inert polymers and designed to be permanently implanted in the human body. I do not recommend these be removed (this is almost impossible to do without disrupting your newly healed repair anyway). On the rare occasion where an implant loosens and becomes prominent to the point of causing symptoms, the first step is to ensure that there is no deep or atypical infection causing the pain or implant loosening. In infection is present, the implant is usually removed arthroscopically during the surgery to treat the infection. Otherwise the loose implants are removed during revision of the failed rotator cuff repair.
A more common, but difficult to diagnose implant problem, is tissue irritation due to prominent knots in the polyethylene core sutures used for the original repair. Occasionally these knots do not incorporate into the healing tissue and may remain prominent - irritating the surrounding tissues or potentially damaging the joint surfaces. Once diagnosed, these can be removed arthroscopically.
RESTRICTIONS AFTER A ROTATOR CUFF REPAIR

It takes the repaired rotator cuff tendon about 8 weeks to begin healing to the bone. Until then, only the sutures I placed during your surgery hold the tendon attached to the bone. If you start “active” exercises - reaching or lifting your arm against gravity or other resistance, before the cuff has time to heal, the repair will fail!

Keep your affected elbow close to your side at all times until instructed to resume normal activity!
Do not reach forwards, sideways or behind your back using your operated hand alone until instructed to begin “Active Exercises” (It is safe to do these “Passive-Assisted Stretches” in the meantime.)

PASSIVE-ASSISTED STRETCHES & EXERCISES:
Each exercise takes about 2 minutes to perform and should be repeated 4 to 5 times each day. You may need to apply heat for 10-15 minutes before exercise and apply ice to control any pain or swelling after your exercise session. If a stick is required, try using a broom handle, hockey stick handle, yardstick or golf club.

Pendulum Exercises (Warm ups)
• Remove the Ultra Sling & let your arm dangle freely
• Bend forward at the waist so that your torso is parallel to the floor
• Gently swing your arm forwards & back (like a pendulum)
• Relax as you try to swing a little further each time
• Next swing your arm from side to side (like a pendulum)
• Don’t hold your breath as you try to swing a little further each time
• Finally swing your arm in gradually enlarging circles
  Start clockwise then try counter-clockwise
• Repeat 10 times, 4-5 sets/day

External Rotation Stretches - Stick method
• Keep your elbows touching your sides
• Grasp a stick as though you were carrying a laundry basket
• Push the stick to rotate your operative arm outwards until you feel a tight stretch in the front of your shoulder
• Hold the stretch for 30 seconds
• Try to relax & don’t hold your breath!
• Repeat 5-10 times, 4-5 sets/day

External Rotation Stretches - Doorway method
• Stand in a doorway facing the door jamb
• “Shake hands” with the door jamb & grasp it firmly with the hand on your operated side
• Keep your elbow touching your side
• Slowly turn your feet & body away from the affected side until you feel a tight stretch in the front of your shoulder
• Hold the stretch for 30 seconds without holding your breath
• Repeat 5-10 times, 4-5 sets/day

Passive Assisted Flexion Stretches
• Lie on your back in a comfortable position
• Grasp your affected wrist with your palms facing each other
• Keep your operated elbow straight & your thumb pointing up
• Use your good arm to lift your operated arm over your head
• Try to stay relaxed and don’t hold your breath
• Stretch upwards trying to touch your affected thumb to the bed
• Hold the stretch for 30 seconds then slowly relax completely
• Repeat 5-10 times, 4-5 sets/day
• It may take 2-3 weeks to touch the bed (with your elbow straight)