# HAVING TO 'SHOULDER' THE BURDEN

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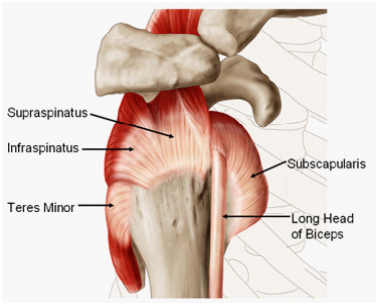
**Commonly missed injuries - tendon tears**
The rotator cuff is a group of tendons that connects the four muscles of the upper shoulder to the bones. The strength of the cuff allows the muscles to lift and rotate the humerus (the bone of the upper arm).

**Typical Case Scenario:**
A 54 year old lady falls at home and develops severe immediate pain from her shoulder. She goes to A&E where x-rays are taken and are normal. She cannot move her arm due to the pain. She is told that she has a 'sprain' and should see her GP if it doesn't settle. She sees her GP 3 days later, where the pain has settled but she still is unable to lift her arm up by itself. After months of physiotherapy she pays herself to see a shoulder surgeon who diagnoses a rotator cuff tear and she is listed for a surgical repair.



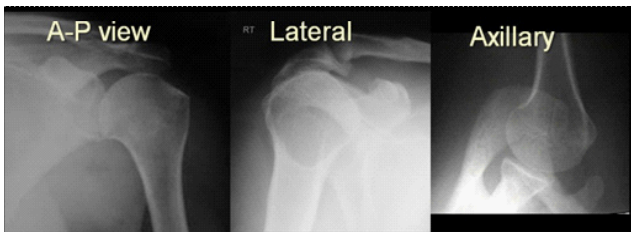

**Distal Biceps Tendon Rupture**
The biceps muscle attaches to the forearm via a thick tight tendon, which you can feel in the front of your elbow. This is the 'distal biceps tendon'. Like the Achilles tendon is tends to degenerate and possibly become worn with overuse and age. It is prone to rupture in older heavy lifters (manual labourers, weight trainers and strength athletes).

A rupture typically occurs when performing a lifting movement with the arm or when the arm is forced suddenly into hyperextension (such as in a straight-arm rugby tackle). Commonly bruising occurs. If the injury is not seen by a clinician aware of this injury, it can be missed and this is not uncommon. Diagnosis is by clinical suspicion from the nature of the injury and deformity of the biceps muscle ('Popeye' sign). An MRI or ultrasound scan is not essential and sometimes can be confusing if reported by a radiologist who does not understand the injury. If the injury is correctly diagnosed it should be referred to an upper limb surgeon for consideration of a repair as soon as possible.

Generally in athletes and manual workers the biceps tendon should be reattached to its original insertion point. If not repaired a 50% loss of elbow strength can be expected, along with cramping discomfort of the biceps when trying to perform manual activities, such as weight lifting or trade work.

As with rotator cuff tears, these repairs are easier to perform within the first 4 weeks of injury. Late or missed repairs may require complex reconstruction procedures.

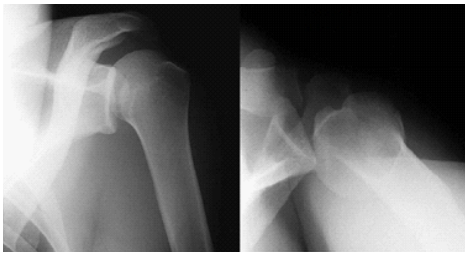
**Fractures and dislocations**
Any traumatic injury of the shoulder presenting to A&E (or even a GP) should be x-rayed. As with any other area of the body a single x-ray is not sufficient. At least two x-rays should be performed in planes perpendicular to each other. This substantially reduces the risk of missing a fracture or dislocation. For shoulder injuries a standard 'Trauma Series' has been described and should be used. This includes an AP x-ray, lateral x-ray and Axillary (axial) x-ray.




X-rays taken in A&E and GP surgeries must be reported by a radiologist and the radiology reported reviewed and acted upon. Many x-rays in A&E are viewed by junior medical staff or nurse practitioners, increasing the likelihood of missing fractures initially. Therefore a safeguard review system must be part of the A&E service. All fractures must be referred to the Fracture Clinic for further management.

**Greater Tuberosity**
The most commonly missed fractures are greater tuberosity fractures, which can be difficult to see on a single x-ray view and sometimes even on all three trauma x-rays. However, a diligent review process should raise the suspicion and the injury can be detected on repeat x-rays, ultrasound or MRI scan.

**Dislocations**
A posterior shoulder dislocation is when the shoulder pops out backward. It is much less common than anterior. It often occurs during a convulsive seizure or with major trauma. The dislocation can be missed if a full trauma series or inadequate x-rays are performed, as above.



The shoulder looks satisfactory on the A-P view but is clearly dislocated posterior in the axial view

**Shoulder Surgery**
Any surgical act, or better, any therapeutic act, always implies a minimal risk of failure. Therefore it is essential to focus on the diagnostic–therapeutic risk factors involved in any given pathology, thus allowing a clear distinction to be made between normal routine situations and challenging conditions.

There are many areas of medical care that are vulnerable to the risk of failure. Not all of these are under the direct control of the senior surgeon (something which most patients are not aware of). The most important aspects to take into consideration are:

1. Correct diagnosis: correct treatment can only follow a correct diagnosis.

2. Severity of the disease: the more serious the anatomo physio-pathological alterations are, the more challenging treatment is and in all likelihood, the less predictable the results.

3. Frequency in practicing treatment: The more experience a surgeon has in performing a procedure, the easier it becomes and the better the outcomes. The surgeon improves his/her technique, allowing him to successfully confront delicate and awkward phases of treatment, therefore reducing the risk involved.

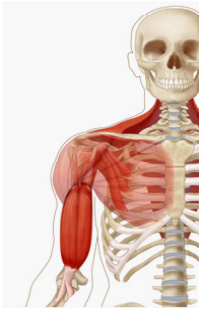
4. Difficult surgical techniques: despite the experience and ability of the surgeon, the occurrence of errors and complications is directly proportionate to the complexity of the procedure itself.

5. Rehabilitation: this is a crucial part of functional recovery and should be considered part and parcel of treatment. The type of rehabilitation practised should be suited to the disease, the surgery performed and the individual needs of the patient.

6. Complications (frequency and importance): this particular factor is of substantial significance in the assessment of potential failure of any given treatment. It is a requirement for surgeons to make patients aware of common and significant complications of a particular treatment and weigh this against the risks and benefits of alternative treatments.

7. Evaluation of results: There are many published studies on the results of specific treatments. However, these may vary depending on population variances, surgeon's experience and expertise and facilities. Therefore, every clinician should be diligent in knowing his/her own results and auditing them regularly.

The shoulder is unique in that it is a complex of five joints and over thirty muscles. It is the most mobile joint of the body and we are reliant on it to position our hand in space to perform almost all of our daily activities. Thus, any loss of shoulder function or pain is extremely disabling.



The major nerves and blood vessels which supply the arm and hand pass very close to the shoulder joint and are always at risk of injury. The shoulder joint itself is deep under multiple layers of thick muscles and therefore more difficult to access than most other joints. However, due diligent and careful technique should avoid risk to surrounding structures.

**Arthroscopic Surgery**
Arthroscopic (keyhole) surgery has made access to the shoulder simpler and safer. It has also reduced the risk of complications such as bleeding and infection. For example, the deep infection risk for rotator cuff repair surgery is reduced from 1.9% to under 0.5%. However, arthroscopic surgery requires a different type of surgical skill and expertise to open surgery. It is also costly and requires numerous machines of modern technology to all be working perfectly at the same time. Therefore, the results of arthroscopic procedures are dependent on the following:

1. The surgeon's training, experience and abilities: This is similar to an airline pilot, although the training far less stringent or consistent. Nowadays, a specialist shoulder surgeon performing complex reparative arthroscopic procedure should have had at least one year of a specialist shoulder fellowship, in addition to his/her standard orthopaedic training. He should have attended courses on the techniques and shown an aptitude for the skills required.

2. Equipment: Arthroscopic shoulder surgery should not be performed without a fluid management pump, shaver unit, radiofrequency unit and good quality visual imaging system. Unfortunately surgeons some times do tolerate lesser quality equipment under socio-economic, managerial and patient pressures. This will lead to a higher risk of complications and intra-operative errors.

3. Implants: There is sufficient data on the suture-anchors that we use in shoulder surgery to show that the older implants are less strong or resilient as modern implants. Implant failure is thus less likely to occur with modern implants. However, anchors may still dislodge from poor quality bone or tendon tissue.

4. Documentation: Arthroscopic surgery is viewed via a camera system, thus image and video recording of the surgery is much simpler than open surgery. A surgeon should keep a visual record of the procedure, ideally in a digital format.

5. Post-operative Care: Although the surgery is performed through small incisions the recovery can still take months and post-operative pain needs managing. Good, appropriate and early rehabilitation improves and accelerates the overall recovery.

**Common Shoulder Procedures**
There are risks common to most shoulder surgical procedures. These include:

1. Infection: The deep infection risk with arthroscopic surgery is less than 0.5% but with open surgery is greater than 1.5%.

2. Stiffness: temporary stiffness of the shoulder is common after shoulder surgery, with an overall risk of 5%. This is higher with more complex open surgery and long periods of immobilisation after surgery.

3. Nerve injury: Nerve injuries are rare but can be devastating if permanent. The nerves most at risk are the Axillary nerve (which supplies deltoid and lifts the arm up) and the musculocutaneous nerve (which supplies biceps and bends the elbow).

**Rotator Cuff Repair**

As mentioned previously, the rotator cuff is essential for normal shoulder movement. If it is traumatically torn in a younger, active patient (generally under the age of 70 years) a repair is required. Likewise, degenerative 'tearing' of the rotator cuff occurs as part of the normal ageing process and can occur more rapidly in some people due to genetic factors. These people do not have a sudden onset of pain and weakness and tend to be older than the traumatic group. They can be managed with non-operative measures of pain control, physiotherapy and sometimes arthroscopic debridement procedures. These rotator cuffs are likely to fail an attempted repair due to the poor muscle and tendon quality.

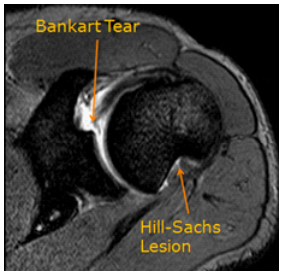
Sometimes there is an overlap between the two groups, such as when a degenerate tear suddenly ruptures further as a result of a fall and the person then developes pain and weakness. It can be difficult for a surgeon to know before surgery whether the muscle quality will be sufficiently robust to survive a repair. Therefore, the failure rate of rotator cuff repairs is between 12% and 25% in most studies. Despite the failure of the repair, there still is a 95% improvement in pain relief.

The results of open and arthroscopic repairs are the same. The risk of infection is significantly higher with open rotator cuff repairs but not all surgeons have the skills and facilities yet to perform arthroscopic repairs yet. Post-operative stiffness is a common complication. It often resolves spontaneously but can take 12-18 months to fully recover. This can be reduced with good surgical technique (soft tissue releases and a solid repair that allows early and safe mobilisation).

**Shoulder Instability**

Most shoulder dislocations are 'traumatic'. For example, a rugby player dislocating his shoulder in a tackle. A typical pattern of injuries occur in the shoulder (Bankart lesion and Hill-Sachs lesion). In a younger active person (under 21 years of age) this usually requires surgical repair, as the redislocation rate is over 80%. In older people it can be managed non-operatively until further dislocations occur, as the recurrence rate is much lower.

'Atraumatic' shoulder instability is a much more complex range of shoulder instabilities to manage. This requires management by a specialist shoulder team (surgeon and therapist) with an interest and expertise in this range of conditions. The role of surgery and rehabilitation is more complex and inappropriate stabilisation surgery can complicate further management and increase morbidity. The recurrence rate after shoulder stabilisation surgery should be approximately 5%. This does depend on recognition of the pathologies and the correct surgery to address them. I call this 'a la carte surgery'. The results of arthroscopic repair are similar to open repairs, using modern techniques. The surgeon should also have a robust rehabilitation protocol, which is clear and correctly applied by the therapist.




The complication of slight stiffness, particularly with regard to external rotation, until recent years, was not evaluated negatively as it lent a certain degree of articular stability. In fact, such types of surgery (Putti-Platt, Magnuson-Stack) set out to correct instability by limiting external rotation. Nowadays, a limitation in external rotation greater than 15° is not well tolerated as most of these patients require full external rotation as part of their working and sports activities.

Any errors in inadequate recognition of the type of shoulder instability, pathological lesions, patient selection and surgical technique are likely to lead to a poor outcome, complications and higher risk of recurrence. Errors in rehabilitation therapy can compromise the final result and increase the risk of failure.

**Summary**

Complications and errors represent a not uncommon event during the course of a therapeutic procedure and open the way to failure causing serious repercussions both on the health of the patient and on the professional status of the physician. Very often, such an event culminates in a medical malpractice suit. For this reason, the study of risk factors is more important than ever, the principle objectives being to:

- Emphasise to the patient the difficulties involved in the procedure, the risks and benefits. Sufficient information should be provided in both verbal and written form to allow informed consent.
- Remind the physician of the more delicate step involved in the procedure that require greater caution and a high level of skill and preparation make the doctor aware of the procedures that present particularly difficult problems.
- Familiarise the legal profession with the implications, risks and expected outcomes, as well as the gravity of an eventual medical error.

In this review I have highlighted how numerous and important the risk factors predispose to failure are during diagnosis, treatment and recovery of the common and significant shoulder disease and surgical situations.

**For more information please see:**

**www.shoulderdoc.co.uk**