

Rehabilitation of Patients with Massive Rotator Cuff Tears

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Home Page

- This programme gives details about the identification and management of patients with massive, irreparable rotator cuff tears. A rehabilitation programme has been developed and evaluated at Torbay Hospital, Devon and this will help therapists wishing to know more about this programme.

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Background

The shoulder problems most commonly faced by the older population are those associated with later life degenerative tears – age associated tendinopathies. Our interest in this patient group sprang from observations that some patients with massive tears are asymptomatic in spite of having no cuff function, whereas other patients have very little function and may suffer from significant pain. A massive rotator cuff tear is deemed to be one with the tendon end retracted back further than 5cm from the tear.



Background 2

Many studies have been undertaken to try and establish just how common this problem is. A study by Milgrom in 1995 looked at 90 asymptomatic adults between the ages of 30 and 99. It was noted that there was a marked increase in cuff tears in the over 50s. By the seventh decade 50% of this group had full thickness tears, and 80% had them by the age of 80. A more recent study by Worland in 2003 looked at 59 asymptomatic adults and found that 40% of over 50s had full thickness tears. In spite of such a high percentage of asymptomatic people having cuff tears, it is still deemed to be a common cause of shoulder pain and dysfunction.



Background 3

Many patients with rotator cuff tears are successfully managed non-operatively (Arcuni 2000, Rodgers et al 1996,). In 1995 Hawkins looked at a group of 33 patients with full thickness tears who had been managed conservatively. Of the 33 patients, 14 were dissatisfied at 3.5 year follow up. 12 of these patients opted for surgery but 2 were still dissatisfied with the result of surgery. The size of the tear is deemed to be an important determinant in outcome for these patients (Barolozzi 1994, Cofield 2001) and it is those with massive cuff tears which cause the greatest challenge to successful surgical management .



Background 4

Olsewski (1994) found that sub-acromial decompression is successful for the management of patients with full thickness tears who do not have demands of strength and repeated shoulder elevation and whose principle complaint is pain. It has long been recognised that muscles such as deltoid which are used for power and speed often create subluxing shear forces as well as the desired anatomical movement (Perry 1983). One of the features of massive rotator cuff tears is the subsequent upward migration of the humeral head which can develop due to the pull of deltoid creating shear forces. This can eventually cause erosion of the underside of the acromion and concern is felt about carrying out a procedure that further reduces the thickness of the acromion.



Background 5

One study (Rockwood 1995) identified the importance of the anterior portion of deltoid as being an important determinant of good recovery following decompression surgery for massive, irreparable cuff tears. A small study involving 10 patients (Burkhart 1991) showed that normal shoulder function was possible with massive unrepaired cuff tears if there was a balance in two force couples, one in the transverse plane and one in the coronal plane.



Background 6

Observations at Torbay Hospital of patients with massive cuff tears who functioned well, suggest that they utilise the anterior portion of deltoid more strongly in order to achieve elevation. It was also observed that patients who had active lateral rotation fared better than those who struggled to activate lateral rotation. Certain patients suddenly become symptomatic with what is radiologically shown to be a long standing cuff tear. The plain x-ray shows upward migration of the humeral head which is a factor that happens over a long period of time. In these patients, a loss of the force couple may have made the shoulder become symptomatic.



The Torbay Programme

- Torbay Hospital is situated in South Devon and covers an area of serving a population of
- More than 25% of the population are over the age of 65.
- The resident population is nearly doubles in the summer.
- Work has been ongoing since 2000 to develop and evaluate a rehabilitation programme for patients with massive cuff tears



Aims of the Programme

- Patient education
- Goal setting
- Modification of activity
- Re-education of muscle activation and timing
- Improvement of function
- Relief of pain



Principles of the Programme

- A prime objective of the programme is to give the patient a good understanding of the cause of their shoulder problem and to ensure that they are aware of the goals of the rehabilitation programme.
- Improved scapula position- backward tilting of the scapula to increase subacromial space
- Strengthening anterior deltoid
- Activation and strengthening of teres minor
- Functional elevation to try and reduce impingement of the humeral head under the acromion process
- The focus of this rehabilitation programme is based around muscle imbalance principles. These principles were developed from clinical observations rather than scientifically proven theories.
- The next step forward with this work has to be to try and place it on a more scientific basis.



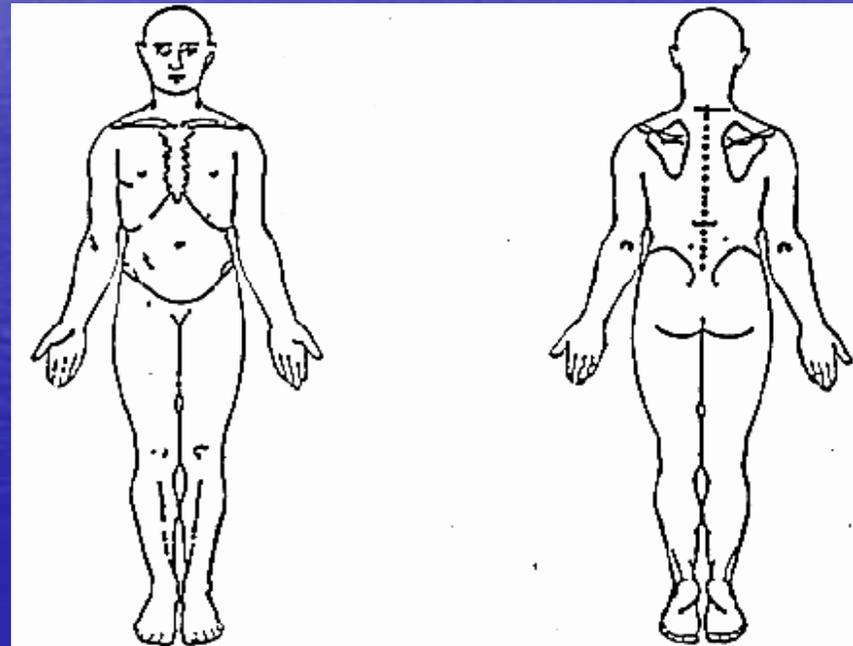
Assessment

- The following links will take you directly to different sections of the assessment process
- [Subjective](#)
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Subjective Assessment

- Due to the age of many of the patients with massive cuff tears, it is essential to ascertain what their life style and activity needs are. It is also important to try and establish any factors responsible for their shoulder becoming symptomatic.



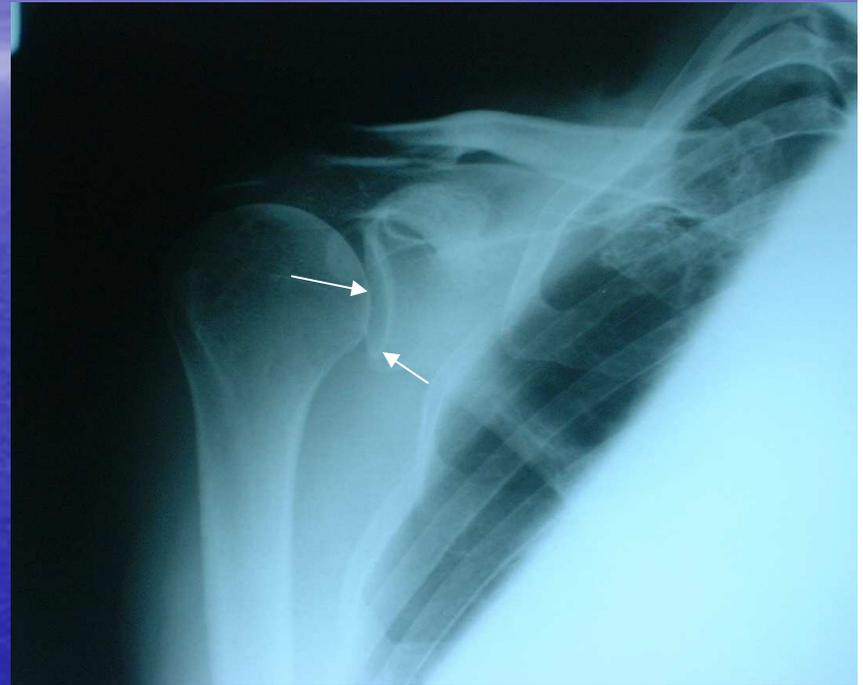
Observation

- Wasting over Scapula giving a more flattened and bony appearance. This is sometimes easier to feel than to see.



X-Ray Appearance

- With a long standing massive rotator cuff tear there will be upward migration of the humeral head. This can be seen by tracing Shenton's line to detect the degree of migration. In a normal shoulder there will be a smooth transition from the inferior point of the glenoid to the head of the humerus. This example exhibits an upward "step" from the inferior part of the glenoid to the humerus.



Ultra-sound Image



Objective Assessment

- The shoulder assessment should include special tests which are indicative of cuff tears. Other causes of shoulder pain or dysfunction must also be identified or eliminated. It is important to remember to consider the cervical spine in any assessment of the shoulder.



Scapula dyskinesia

Patients with massive rotator cuff tears tend to exhibit marked abnormal scapula movement on forward elevation of the arm



Special Tests

Massive Cuff Tears



Positive Humeral Thrust Test

- Hold the acromion between your thumb and first finger. Place your middle finger over the humeral head and then ask the patient to flex the shoulder by 40 degrees. The humerus will thrust forward under your middle finger rather than rolling back under the acromion if the test is positive.



Napoleon's Sign (Belly Press Test)

Testing for subscapularis function

- Normal – both elbows come in front of the body when pressing abdomen and bringing elbows forward
- Abnormal – unable to bring elbows forward



Hornblower's Sign

Testing for teres minor function

- Normal – able to raise hand from mouth to external rotation in 90 degrees of scaption
- Abnormal – unable to externally rotate shoulder to perform the manoeuvre



Infraspinatus Lag

Testing for infraspinatus function

- Passively take arm into external rotation and ask patient to hold the position when you let go. If the arm swings back to neutral, this is a positive lag sign



Subscapularis Lag

Testing for
subscapularis function

- Passively take arm away from the body behind the back. If the patient is unable to hold the position when you let go, the lag sign is positive



Ruptured Long Head of Biceps

- The right biceps shows the typical “golf ball” appearance. The left long head of biceps is intact



Management of Massive Cuff Tears

- The principle of this programme is to improve the function without exacerbating pain
- The programme has been designed so that the patient works at their own pace, moving onto the next level in the programme when they have mastered the previous one



Modification of Activity

- Modification of activity plays an important part of the programme. Patients are given advice regarding using short arm levers to achieve elevation and taking a paced approach to activities. Coping strategies for activities of daily living are also discussed with patients in response to their individual needs.



Scapula Stabilisation

- Due to the age of many of the patients, strengthening of the scapula stabilisers is done in sitting, but this exercise may be more effective done in lying were possible



Starting Position for Strengthening Deltoid

- Where possible begin the programme with the patient in supine. Some patients progress better with the elbow tucked into the body but others need to be in some abduction. Start with the elbow flexed and push up towards the ceiling



Progression of control

- Once the patient can easily and painlessly attain 90° then the arm should be moved in a controlled manner through an arc of 40°



Progression for Strengthening Deltoid

- The weight held by the patient can be varied according to their ability. A plastic 1 litre drink bottle is a useful home tool as the weight can be adjusted by the changing the quantity of liquid.
- Progress these exercises into a more vertical position by gradually raising the bed when the exercise is easy and painless in supine.



Progression to Sitting

- Elevation in sitting is an important functional activity, but it must be done with a short arm lever. Power and control can be improved by repeating the stretch in elevation



Wall Slides

- Wall slides are far more useful than walking the fingers up the wall when the patient is unable to achieve elevation in a vertical position. Work can be done then to achieve eccentric control on lowering from elevation.



Strengthening Lateral Rotation

- It can be useful to work on strengthening lateral rotation with the patient in supine as well as in sitting. It is important to control the lateral rotators eccentrically with the resistance band.



Stretches – lateral rotation

- The range of lateral rotation can become very restricted due to the difficulty with initiating the movement. It is important that the patient learns to stretch the arm out into lateral rotation



Stretches – internal rotation

- Stretches into internal rotation can be carried out in half side lying if the patient is able to lie in this position. For those who are unable to lie in this position then gently stretches behind the back using a towel may be used. These need to be within the patients limits of pain.



Pilot Study

- The rehabilitation study has been evaluated in a pilot study. All 10 patients in the study improved with both function and pain scores.
- A further randomised controlled trial is being undertaken at present



Results of Pilot Study – Primary Outcome Measure

Patient	Age & Gender	Oxford Shoulder Scores		
		Baseline	3 Months	Improvement
1	71 F	27	23	4
2	70 F	34	23	11
3	78 M	32	16	16
4	77 F	31	28	3
5	72 F	34	18	16
6	83 M	35	18	17
7	72 F	47	34	13
8	79 F	32	29	3
9	73 M	44	31	13
10	81 M	23	19	4



Future Developments

- Completion of Randomised Controlled Trial
- Helping patients with more challenging presentations



References

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