

Musculoskeletal Rehabilitation: Assessment and Management of the Rotator Cuff Mini Series

Session One: Assessment

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Assessment & Management of the 'Rotator Cuff': An evidence-based approach

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Session one: Assessment

In this session we will cover examination of the shoulder including limitations of current approaches and the potential for misinterpretation of the findings of the tests and scans we use. An assessment process that enables a clinical diagnosis of rotator cuff tendinopathy will be discussed, along with clinical application, while also recognising the limitations of our current understanding and areas of practice where further research is needed.

Intended learning outcomes

- 1. To develop a research informed approach to the assessment of people with rotator cuff tendinopathy
- 2. To gain understanding of the practical application of a simple assessment framework for people with rotator cuff tendinopathy
- 3. To recognise limitations in current knowledge and avenues for further research

The burden of shoulder pain and disorders of the rotator cuff

In the UK it has been estimated that approximately 500 000 adults consult their GP with a new episode of shoulder pain each year [1]. This is a significant number of people that does not take in to account those people complaining of ongoing shoulder pain. Combining those with a new and existing episode of shoulder pain, up to one in four people complain of this problem at any one time [1]. These statistics highlight how common shoulder pain is.

As well as being a common problem, there is another important factor to take in to account when considering the burden of shoulder pain. It has been reported that 70% of people who complain of a new episode of shoulder pain still complain of problems six weeks after onset; perhaps this is not too concerning. But, six months after the onset of a new episode of shoulder pain, 50% still complain of problems and by 12 months after onset, 40% still complain of problems [2]. This means that for many people shoulder pain is not a short-lasting, self-limiting problem. In fact, a significant proportion can expect to have ongoing problems and for those people who do recover, a recurrent episode is common. This epidemiological understanding of shoulder pain is important and should underpin our approach to the management of this problem (more on this later).

When we think about shoulder pain, disorders of the rotator cuff are widely regarded as the most common cause [1]. As will become evident throughout this webinar series, this is probably an oversimplified perspective. But, clinically it is common to see patients who complain of shoulder pain; they can still move their arm but it hurts them to move and if they lay on the affected side or try to lift something, a pain response ensues. It is this group of patients that this webinar series will focus on.

Terminology

A range of different diagnostic terms are used to describe or classify patients who complain of shoulder pain but can still move their arm although it hurts them to move and if they lay on the affected side or try to lift something, a pain response ensues. These terms include subacromial impingement syndrome, subacromial pain syndrome, supraspinatus tendinitis, supraspinatus tendinosis, rotator cuff tendinopathy, rotator cuff related shoulder pain, bursitis etc etc [3,4].

This range of terms, that might be describing the sample clinical entity, probably reflects our lack of understanding of this common and burdensome problem (again, more on this later as the webinar series progresses). There currently isn't one preferred or accepted term to describe this specific shoulder pain presentation although there has been some recent progress with regards to terminology we should stop using. The findings of a recent randomised controlled trial (RCT) [5] that reported similar clinical outcomes between arthroscopic surgery to remove the subacromial spur thought to cause shoulder pain and placebo surgery where the subacromial spur was not removed, challenged the validity of subacromial impingement. Furthermore, a recent qualitative interview study [6] described how a diagnosis of subacromial impingement explained with reference to a subacromial spur causing the problem can serve as a barrier to engagement with non-surgical treatment, for example physiotherapist-led exercise, and thus is potentially harmful given that surgery does not appear to be superior to physiotherapy for this shoulder condition [7].

So, it seems that we should not stop using the term subacromial impingement syndrome in this context which is a sign of progress but it remains unclear what terminology might be preferable. All the terms listed above have limitations; currently my preference is to use the term rotator cuff tendinopathy. This terminology might help the patient to understand their problem in a non-threatening way and might provide a platform on which an active, exercise-based rehabilitation programme can be prescribed. But, as will become evident through this webinar series, rotator cuff tendinopathy is a simplistic term that probably does not reflect the complexity of this problem. However, from hereon in, the term rotator cuff tendinopathy will be used to describe those patients who complain of shoulder pain but can still move their arm although it hurts them to move and if they lay on the affected side or try to lift something, a pain response ensues.

From a learning perspective, this might be a good time for you to pause and reflect; what is your preferred terminology and why?

Diagnosis

When we think about making a diagnosis or classification of shoulder pain, we think about tests, procedures or scans that might help inform such clinical-decision making. However, for such tests, procedures or scans to be helpful they should be reliable, valid, help inform an effective treatment strategy or help us understand the prognosis. If these tests, procedures or scans cannot offer this information then it is appropriate to ask what is their purpose? Let us now consider current approaches to diagnosis from this perspective.

'Special' Orthopaedic Tests

Many of us have been taught specific tests or procedures aimed at diagnosing the specific tissue at fault, e.g. Neer's impingement test, Hawkins-Kennedy impingement test, O'Brien's test, Empty can, Full can etc etc. We have been schooled to think about diagnostic labels such as subacromial impingement, rotator cuff tear, labral tear etc, i.e. pathoanatomic diagnoses. However, increasingly we are seeing the limitations of such pathoanatomic thinking.

Reliability of a test refers to whether we can agree with ourselves when repeating a test, providing the status of the patient remains the same, or whether we can agree with our colleagues if we both undertake the same test on the same patient [8]. Reliability is important because as physiotherapists we often judge the success, or otherwise, of our treatment based on an initial test followed by a retest once we have intervened, for example following a manual therapy technique. If we see what we regard as a positive change then that might be justification to continue with the treatment, and vice versa. Similarly, whether we can agree with our colleagues is also important; if I do a test which is

negative and you do a test which is positive, who do we believe? For such clinical reasoning to be valid, the tests we use need to be reliable.

However, numerous systematic reviews have now evaluated the reliability of these 'special' orthopaedic tests and the results are not promising. May et al. [8] concluded '...no consistent evidence that any examination procedure used in shoulder assessments has acceptable levels of reliability.' This means that any change we observe or any difference in opinion between colleagues might actually be due to an unreliable test rather than a true difference.

Furthermore, these 'special' orthopaedic tests are regarded as sensitive but not specific [9]. This means that essentially such tests should be regarded as pain provocation tests not capable of identifying the specific structure at fault. Hence, both the reliability and validity of these commonly used 'special' orthopaedic tests is called in to question. Perhaps this is one reason why we have seen such an explosion in the use of diagnostic imaging...

From a learning perspective, which special orthopaedic tests do you routinely use and why? Do they help inform the treatment you will offer or give useful information about prognosis?

Diagnostic Imaging

It is interesting to reflect on the exponential rise in the use of diagnostic imaging for shoulder pain. We have observed a similar journey with regards to spinal pain where imaging, for example MRI, are regarded as low-value interventions, i.e. they don't offer much in terms of informing effective treatment pathways or informing prognosis for most, and in some situations the use of imaging might actually be harmful by giving unhelpful pathoanatomic labels to patients [10]. Recognising this, interventions are now being developed to reduce referral for unnecessary imaging and to also aid helpful interpretation of such tests, rather than, for example, reporting normal age-related findings as pathological [10].

We are seeing similar patterns emerge in the shoulder with structural 'pathology' not well associated with pain [11,12] and observable structural pathology not changing despite patients reporting reduced pain and improved function [13]. It seems sensible to suggest, based on current research evidence, that it is time to look beyond 'special' orthopaedic tests and observable structural pathology to explain the pain that our patients complain of.

Rehabilitation classification systems

Recognising the limitations of assessment processes that aim to identify specific structures at fault, alternative diagnostic or classification systems have been developed. With regards to the shoulder, two alternative approaches to assessment of the shoulder that make no assumptions about the underlying structural pathology are McKenzie & May's Method of Mechanical Diagnosis & Therapy [14] and the Shoulder Symptom Modification Procedure by Lewis [9]. While approaches that make no assumption about the underlying structural pathology are intuitively appealing, we still need to ask questions about the reliability of such procedures and whether they offer useful direction in terms of treatment that is superior to usual care or whether they offer useful information about prognosis. Currently it seems fair to reflect that these alternative rehabilitation classification systems are in their infancy; we have some conflicting research evidence regarding reliability [15–17] and a lack of research evidence about whether they help us arrive at useful prognostic predictions [18].

Posture and Scapula dyskinesis

Linking with the dominant biomedical mode of clinical reasoning that aims to identify the specific structure at fault, biomechanics seem to have been at the forefront of the clinical reasoning of many clinicians. We have been taught to believe that 'faulty' resting positions or 'faulty' movement patterns might explain the underlying mechanisms of the pain that our patients complain of. But, just as there are questions to be asked about the role of structural pathology, there are also questions to be asked about the role of biomechanics.

With regards to the shoulder, many have accepted the validity of the 'impingement' posture. This is the posture where patients present with, what we term, an exaggerated thoracic kyphosis and a resultant internally rotated humeral head. Our interpretations have led us to believe that when patients with an 'impingement' posture elevate their arms that the rotator cuff is compressed or abrased underneath the acromion due to the reduced subacromial space leading to 'subacromial' shoulder pain. This mechanistic mode of thinking is intuitively appealing; we 'correct' the posture and the symptoms improve – simple, or not! Barrett et al [19], in a systematic review, challenged this perspective by concluding that resting thoracic kyphosis is very similar in people with and without shoulder pain and as a result increased thoracic kyphosis may not be a key contributor to shoulder pain.

Similarly, from a biomechanical perspective, scapula dyskinesis has been a popular focus over recent years. But, we see scapula dyskinesis in those with and without shoulder pain and we also observe asymmetry between the resting and dynamic movement patterns between the dominant and non-dominant shoulder [20]. This suggests that asymmetrical rather than symmetrical postures might be the norm, despite what we have all previously been taught.

A recent systematic review by Hickey et al. [21] evaluated whether the presence of scapular dyskinesis in asymptomatic athletes increased risk of developing future shoulder pain. This review was conducted on the backdrop of conflicting evidence and concluded that athletes with scapular dyskinesis have 43% greater risk of developing shoulder pain than those without scapular dyskinesis.

The review reports 65% (104/160) of those with scapular dyskinesis did not go on to develop shoulder pain, whereas 25% (65/259) of those without scapular dyskinesis did. As the authors reflect, an increased risk informs us only that there is an increased chance of developing shoulder pain, but is not a guarantee that it will, i.e. the presence of scapular dyskinesis does not guarantee that an athlete will develop shoulder pain nor does its' absence guarantee that shoulder pain will not develop. This is important to recognise because increasingly we are appreciating the multi-dimensional nature of shoulder pain presentations across the biopsychosocial spectrum and therefore it is potentially only appropriate to consider such findings as one part of the shoulder 'puzzle' [22].

But, to be considered a useful part of the 'puzzle', where a factor is associated with increased risk, the risk factor needs to be modifiable; if not then perhaps the value of being aware of the risk is open to debate because in some situations this awareness can lead to harm. A recent systematic reviews has evaluated the effectiveness of scapular-focused approaches while at the same time collecting data to help understand why such approaches do or don't work [23]. While this review reported improvements in patient report of pain and function, questions were raised in relation to whether scapula kinematics changed in a concordant way or even changed at all. These findings provide the platform on which to suggest that changes in scapular kinematics do not adequately explain such improvements in pain and function and indeed question whether scapular dyskinesis is a modifiable risk factor.

Although in symptomatic populations and with relatively short-term follow-up, the findings from these reviews raise relevant questions in relation to some current assumptions. Other questions remain also; one such question being is scapular 'dyskinesis' an individual adaptation to optimise function? If such a hypothesis were true then it would support observation that the scapula does not adopt a common and consistent posture in painful shoulder conditions [24] and perhaps is another example of where we have 'pathologised' a normal human response to our surrounding environment.

Returning to the review by Hickey et al. [21], the relative risk statistic, reported as 1.43 (95% Cl 1.05 to 1.93); the headline figure of a 43% increased risk is appealing but where a statistic is derived from a sample and aiming to infer findings to a population, there will always be uncertainty. In this case, the 95% confidence interval, i.e. the range of values within which the true population value lies, reflects this uncertainty. So, the true population risk ranges from 1.05, i.e. almost no increased risk (where 1 = no increased risk) to 1.93, i.e. almost twice the risk. Furthermore, reliability of the assessment of scapular dyskinesis is widely recognised to be poor [25]. This has direct implications, as identified by the authors of the review who conducted a sensitivity analysis to determine the effects of a different assessment of scapular dyskinesis. An alternative approach to assessment demonstrated that the presence of scapular dyskinesis at baseline was indicative of a 28% increased risk (RR=1.28, 95% Cl 0.93 to 1.76). Hence, a different method of assessment results in a more cautious estimate of risk and again, with reference to the 95% confidence interval it can be seen that there is wide variability around this point estimate with a relative risk of less than one indicating a protective effect of scapular dyskinesis on developing a future episode of shoulder pain.

As is evident from this research, there are lots of questions surrounding our current approaches to the assessment of patients with shoulder pain. Research is currently doing a great job challenging current assumptions but it is not always evident how we should interpret this challenge and apply the research evidence to clinical practice.

Examination of the shoulder and classification of 'rotator cuff tendinopathy'

In response to the uncertainty described above, I will now describe my current approach to the examination of patients who have a primary complaint of shoulder pain. I think it is important to highlight that this is one approach and one interpretation. It is an approach that has evolved in response to clinical experience and research evidence but it also is an approach that is likely to evolve further as our understanding develops. Please keep this in mind and please keep questioning! Perhaps it might be best, at this stage, to use my suggestions as a reference point to reflect on your approaches to examination of patients with shoulder pain and consider the key differences between the approaches and the reasons for this.

The examination process I will describe is a two-stage process; the first stage aims to make a provisional diagnosis or classification of shoulder pain before the second stage aims to establish baseline capacity and an appropriate exercise prescription. The second stage will feature in the second webinar.

Step One

Recognising the limitations of the 'special' orthopaedic tests and acknowledging that they probably can't be currently seen as more than pain provocation tests, my approach to examination begins with asking the patient to undertake a movement or task that reproduces their pain, for example reaching to a shelf, serving at tennis etc. Previously, somewhat tongue in cheek, I have referred to

this test as the 'most special' orthopaedic test. Of course, this is simply a baseline functional test as a platform from which the rest of the examination is undertaken.

Step Two

Once the baseline functional test has been completed, the next stage is to examine the cervical spine. Again, there is no consensus regarding the optimal way to examine the cervical spine in patients who have a primary complaint of shoulder pain. It seems that approaches vary widely, where some clinicians would not routinely examine the neck where a patients' primary complaint is shoulder pain provoked with shoulder movement; some clinicians might simply examine single movements of the neck for range of movement deficits or pain provocation; some clinicians might use repeated movements, some manual testing, some just neurological testing etc etc (this reflects research work in progress). Based on clinical experience, between five and 20% of patients with a primary complaint of shoulder pain seem to report a reduction or increase in shoulder pain in response to a repeated movement examination of the neck. Examination of single movements seems to miss this and manual testing seems to create opportunity for false positive testing, i.e. palpation of a painful or 'stiff' motion segment not related to the shoulder complaint.

So, in the research relating to rotator cuff tendinopathy that we have undertaken to date, we have adopted and adapted McKenzie's method of repeated movement examination of the neck [14]. This does not infer that this is the only way or best way to examine the neck, but it is the approach we have adopted thus far in research. The process is as follows (this will be explained in full during the webinar series):

- Complete baseline functional test
- Repeat cervical retraction with patient overpressure x 10
- Repeat baseline functional test
 - If better, examination ceases and repeated cervical retraction with patient overpressure is the prescribed treatment
 - o If worse, further focus on the cervical spine is indicated
 - If no effect, progress the examination
- Repeat cervical retraction/ extension x 10
 - If better, examination ceases and repeated cervical retraction/ extension with patient overpressure is the prescribed treatment
 - o If worse, further focus on the cervical spine is indicated
 - If no effect, progress the examination
- Repeat cervical side flexion to the left with patient overpressure x 10
 - If better, examination ceases and repeated cervical side flexion to the left with patient overpressure is the prescribed treatment
 - o If worse, further focus on the cervical spine is indicated
 - o If no effect, progress the examination
- Repeat cervical side flexion to the right with patient overpressure x 10
 - If better, examination ceases and repeated cervical side flexion to the right with patient overpressure is the prescribed treatment
 - \circ $\;$ If worse, further focus on the cervical spine is indicated
 - o If no effect, we progress the examination to the 'shoulder'

Step Three

Look to differentiate the 'stiff' shoulder from the 'non-stiff' shoulder because 'stiff' shoulders seem to have a different prognosis and respond differently to the treatments we currently offer (this will be discussed later in the webinar series with, for example, response to corticosteroid injections).

> A 'non-stiff' shoulder would be confirmed if lateral rotation of the shoulder is > 45 degrees or > 50% of the unaffected shoulder [26]

Step Four

If a 'non-stiff' shoulder is identified, then a provisional diagnosis of rotator cuff tendinopathy is established if the shoulder pain that the patient complains of is reproduced with resisted testing; often the most helpful way of confirming this is to resist the functional movement that the patient complained of at the outset of the examination.

Where patients have a primary complaint of instability, the management pathway described in the subsequent webinars is not recommended. Instead, the approach described by Bateman et al [27] is recommended. Online resources to support delivery of this programme are available here: https://www.youtube.com/watch?v=pjnuApc7zZM&list=PLPsEhjqihhKf758Hx_kgkg4JzASOOnjai

So, if examination of the neck, as described, does not affect the baseline functional test; if a 'stiff' shoulder can be excluded; if pain is reproduced with resisted tests, and the patient's primary complaint is <u>not</u> one of instability, then the provisional diagnosis or classification of rotator cuff tendinopathy is established. This provisional diagnosis then lays the pathway for the second stage of the examination.

Next webinar

The next webinar will build on the recommendations from this initial webinar and will further explore the research literature with regard to management of rotator cuff tendinopathy. This will pave the way for the second stage of the examination with consideration of establishing baseline capacity, facilitating effective self-management and prescription of an optimal exercise programme.

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