



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

Session Two: Management

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

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Session two: Management

In this session we will cover management of rotator cuff tendinopathy. This will include a critical review of the literature to inform an assessment process that provides a foundation on which an individualised, structured and progressive exercise programme is prescribed.

Intended learning outcomes

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

What is effective management?

Rotator cuff tendinopathy, like other musculoskeletal conditions, changes over time whether the patient receives treatment or not. The natural history of a condition refers to how the condition changes over time without treatment. Typically, the natural history might include a sudden or gradual onset with a period of worsening symptoms before those symptoms peak and then gradually improve before, sometimes, recurring again. If we are going to prescribe a treatment, for example medication, manual therapy or exercise, then it seems sensible to suggest that this treatment should result in greater improvement of the pain presentation than the natural history alone. Because, if the problem would get better at the same or faster rate through natural history as compared to the prescribed treatment, i.e. the prescribed treatment offers no added value, then what would be the motivation of prescribing a treatment that comes with cost and time implications and possible side-effects? So, when we are looking to prescribe a treatment we are looking, at the very least, for evidence that that treatment is better than natural history with regard to how quickly the patient gets better or the extent of their recovery. But, as will become evident, it isn't always apparent that the treatments we do offer are superior to natural history alone...more on this throughout the webinar.

Physiotherapy practice; past and present

In 2011 we conducted a survey of current UK physiotherapy practice with reference to rotator cuff tendinopathy [1]. At that time, we found that physiotherapists would offer a range of different interventions for this pain presentation including various forms of exercise, manual therapy, electrotherapy, acupuncture, taping, deep transverse friction massage, corticosteroid injections etc. So, essentially, all the treatments within the scope of physiotherapy at the time might be offered to patients with rotator cuff tendinopathy.

Based on the survey findings we then undertook a review of systematic reviews to look at the clinical effectiveness of all these different physiotherapy interventions [2]. The review concluded that there was no one superior treatment but exercise was promising given that it appeared to be similarly effective to surgery in the short, mid and long-term but clearly less costly and less risky. Also, exercise based approaches appeared to be similarly effective to multimodal physiotherapy, i.e. where more than one intervention, for example exercise plus manual therapy or exercise plus electrotherapy, is offered. Again, the simplicity and relative cost of the exercise alone approaches are what informed the suggestion that exercise appears to be a promising intervention. Furthermore, other treatments that might be added to exercise, for example manual therapy, acupuncture, ultrasound, laser did not appear to add value over exercise alone. Shockwave therapy

was not superior to placebo for patients with rotator cuff tendinopathy and although corticosteroid injections seem to offer a small, short-term, pain relieving effect, there is concern about the potential for longer-term harm (more about this in the third webinar).

We subsequently repeated a similar survey of practice in 2016 [3]. Although there might be differences in the physiotherapists who responded to this later survey, it was apparent that UK physiotherapy practice had evolved over the ensuing years with much greater emphasis on exercise for rotator cuff tendinopathy although the optimal type and dose of exercise remained unclear.

The findings of the 2016 survey also aligned with the publication of a recent systematic review evaluating the effectiveness of interventions for rotator cuff tendinopathy [4]. This systematic review essentially concluded that exercise remains a promising intervention and the benefit of adding further interventions remains unclear.

From a learning perspective, this might be a good time for you to pause and reflect; what is your preferred approach to the management of people with rotator cuff tendinopathy?

If exercise is a feature of management, what influences the type of exercise prescribed and the dose, including number of sets, repetition and duration?

Exercise for rotator cuff tendinopathy; opportunities and challenges

When we look at the randomised controlled trials that have evaluated the effectiveness of exercise then it becomes apparent why exercise has been viewed as a promising intervention for rotator cuff tendinopathy. Over time these trials consistently report reduced pain and improved function [5–9]. But, what is also apparent from these randomised controlled trials is that although patients, on average, improve over time there is a level of residual pain and disability, i.e. patients don't seem to fully recover.

Furthermore, when exercise has been compared to credible sham treatments, including de-tuned ultrasound and exercise of the unaffected shoulder [10,11], exercise did not confer better clinical outcomes. So, although exercise for tendinopathy is intuitively appealing and is simple and relatively cheap, it is apparent that not all patients respond to exercise, a proportion of those who do respond don't fully recover, and when compared to sham treatments in robust randomised controlled trials the comparative effectiveness is not confirmed.

So, this raises questions in relation to how promising exercise really is. Do we need to think differently about rotator cuff tendinopathy rather than continue to slavishly prescribe exercise programmes for our patients? Or, do we need to think about the components of an optimal exercise programme and develop our approach accordingly before inferring that exercise is not superior to sham treatment? At this stage it seems sensible to suggest that we need to give more thought to what constitutes an optimal exercise programme and then evaluate such an approach within a high quality randomised controlled trial – only then will we know the answer to this important question.

Important components of an exercise programme

Recognising that there were numerous randomised controlled trials evaluating the effectiveness of exercise for rotator cuff tendinopathy, it seemed prudent to try to learn from these studies and try to identify what are the most important components of an exercise programme. Previously we undertook a systematic review with this aim to identify the important contextual factors and prescription parameters [12].

Interestingly, perhaps, this systematic review reported that the amount of experience of the physiotherapist was not a key factor in helping patients achieve good clinical outcomes. Furthermore, age, duration of symptoms and severity of pain and disability did not need to be barriers to achieving good clinical outcomes. Instead, older patients with longer duration of symptoms and higher levels of pain and disability often just need more time to respond to treatment.

One consistent point of contention when thinking about exercise prescription for rotator cuff tendinopathy is whether the exercise should be painful or not. There are many strong clinical beliefs in circulation but the systematic review concluded that whether exercise was painful or not did not seem to be a key ingredient – good clinical outcomes can be achieved with both approaches. However, since the publication of this systematic review, a further updated systematic review has been published that suggested prescribing exercise that produces pain/ discomfort while exercising might confer better clinical outcomes than prescribing exercise that is not painful in the short-term, at least [13]. This is a real challenge to thinking and something we will consider in more detail during the webinar.

Further to the systematic review by Littlewood et al. [12], other components that seemed to be key to an optimal exercise programme include using resisted exercise with high repetitions and sets, although the upper limit of sets and repetitions is not yet known. A critical component appears to be that patients need time to respond to an exercise programme; a minimum of 12 weeks of structured and progressive exercise.

However, one aspect of exercise prescription that was difficult to identify a direction was in relation to the type of exercise. A range of different exercises can be prescribed for patients with rotator cuff tendinopathy but it was unclear whether one type of exercise was superior to another. But, reflecting on the findings of the surveys of current practice, it was apparent that scapular stabilisation exercises were a popular prescription for patients with rotator cuff tendinopathy – so surely the case for this prescription is strong?

Bury et al. [14] conducted a systematic review evaluating the effectiveness of scapular-focused approaches for patients with rotator cuff tendinopathy. This systematic review concluded that there was no difference in terms of effect on pain between the scapular-focused approach and general strengthening exercises but interestingly, in the short-term (< 6 weeks), the scapular focused approach conferred better outcomes in terms of reducing disability than the general strengthening exercises. Bury et al. concluded that this finding should be treated with caution though due to the risk of bias of the included studies, i.e. we might not be able to trust the findings because of limitations in the way the studies were conducted. Furthermore, it is interesting to note that any initial benefit, if a true benefit, was lost at further follow-up with the systematic review reporting no difference between scapular-focused approaches and general strengthening approaches at three months.

Of further interest are studies that report reduced pain and improved function over time in patients with rotator cuff tendinopathy classified as having scapula dyskinesia [15,16] but also aim to measure scapula dyskinesia before and after the intervention period. It is often assumed that scapular-focused approaches, including specific exercise, manual therapy and strapping, reduce pain and correspondingly improve function by improving the position and movement of the scapula. Research studies have challenged this assumption by reporting reduced pain and improved function over time, in response to a scapular-focused approach, but without significant change in the position

or movement of the scapula. So, it seems, that these changes in pain and function cannot be solely attributed to biomechanical changes.

In line with this thinking, scapula stabilisation exercise approaches have been used underpinned by an assumption that we should stabilise before we strengthen. This is a concept tested by Mulligan et al. [17]. These researchers randomly allocated patients with rotator cuff tendinopathy (they used the label subacromial impingement syndrome) to one of two approaches; first, a four-week period of scapula stabilisation exercises followed by a four-week period of general strengthening exercise, or, second, a four-week period of general strengthening exercise followed by a four-week period of scapula stabilisation exercises. The key difference here is the sequence in which the exercises were prescribed where the hypothesis was that those patients who initially undertook a period of scapula stabilisation exercise followed by general strengthening would do better than those who simply began with general strengthening. The study concluded that there was no difference between the two approaches which appears to challenge the concept of stabilising before strengthening; perhaps it is not as important as we first theorised.

Further to this discussion, one important consideration is whether there is an optimal number of exercises that we should prescribe. From the survey work we did previously [3,18], it appears that it is typical for physiotherapists in the UK to prescribe between four and six exercises for patients with rotator cuff tendinopathy. DeJaco et al. [19] undertook a randomised controlled trial evaluating the effectiveness of two exercises versus six exercises for patients with rotator cuff tendinopathy and concluded that there was no difference in terms of clinical effectiveness. So, we can prescribe more exercises but we need to be mindful that more might not confer better outcomes for our patients and, in some situations, might just be an extra burden given time pressures etc.

From a learning perspective, how many exercises do you typically prescribe for patients with rotator cuff tendinopathy and what is your rationale for this?

Making sense

Clearly this volume of research and some of the messages can appear confusing and also challenging to many of the concepts we have previously been taught. In this context, we'll now move on to discuss a self-managed exercise programme that we have developed and evaluated [20].

The self-managed exercise programme consists of one individually prescribed exercise. So, this is a different exercise for each patient, based upon our examination findings, but patients are only asked to undertake one exercise. This exercise is progressed over time so the exercise changes but they are still only asked to do one exercise at any one time. Similarly, in some cases it will be necessary to regress the exercise if the response is unacceptable to the patient but still only one exercise is performed at any one time.

Once the provisional classification of rotator cuff tendinopathy is made, as detailed in the first webinar and accompanying notes, then the exercise of choice is prescribed in relation to the most symptomatic shoulder movement. This is where the baseline functional test is useful as a starting point for exercise prescription, i.e. often this will be the most symptomatic movement. The guiding principle is that exercise should produce discomfort/ pain; that is ok and is indicating that we are challenging the patient, but that symptom response should always be acceptable to the patient. Acceptable during the exercise and after the exercise. There appears to be no value in prescribing an exercise that is painful to the patient to the point where it is unacceptable because clearly this elevates the chance of them not adhering to the programme. So, the term 'acceptable' symptom response is used as a guiding principle and again, clearly, this will vary between patients.

This is an approach that we have evaluated in a pilot randomised controlled trial and then a main randomised controlled trial in the UK NHS [21,22]. The self-managed exercise programme appeared to be acceptable to both patients and physiotherapists and we reported no significant difference between this single self-managed exercise approach and multimodal physiotherapy. In the context of these trials, multimodal physiotherapy typically consisted of a greater number and wider variety of exercises, often including scapula stabilisation exercises, as well as manual therapy, electrotherapy and acupuncture, according to the preference of the treating physiotherapist. This appears to be an interesting finding given the guiding principles and simple nature of the self-managed exercise programme. There are, of course, limitations to these studies so clearly this is an area that requires further research but a result that might begin to challenge our thinking.

Clearly though, although complex does not appear to be superior to more simple approaches from the literature reviewed so far, what still isn't clear is whether either the complex or simple approaches are superior to natural history. This lack of understanding is something that physiotherapists need to remain mindful of.

Practical application of the self-managed exercise programme

Following the provisional diagnosis of rotator cuff tendinopathy (stage one of the examination), the second stage of the examination informing the specific exercise prescription is as follows (this will be explained in full during the webinar series):

Let us take an example of a patient who complains of shoulder pain when they reach up to a shelf. Perhaps they assume a step stance position before reaching forwards and up to the shelf. In this example we would break the movement down and begin testing in the step stance position with the arm at their side. Here we would begin a process of isometric testing; beginning with 10 repetitions of pressure on, pressure off. Once the 10 repetitions are complete we ask the patient; 'how was that? Ok? Acceptable?' If so, we test a further 10 repetitions and then repeat the questions. If the response remains acceptable then we move on and test a further 10 repetitions. If, after testing three sets of 10 repetitions, the response remains acceptable then we progress to an assessment of three sets of 10 repetitions of early isotonic movement in the functional (reaching) plane following the same procedure, using, for example, an elastic resisted band or hand weight. Again, if the response remains acceptable we progress to mid-range work which is the point where most patients complain is their primary problem. We repeat the testing and if this response is acceptable to the patient in the zone that is the primary problem in relation to their baseline functional test then this is the initial exercise prescription for the patient.

You will observe by going through this process that you are teaching the patient how to progress their exercise; clearly this could also include increasing the number of sets, repetitions, load, speed, as well as changing direction. So, this second stage to the examination helps the patients to understand how to progress but also regress their exercise if it becomes unacceptable at any point during their rehabilitation. The number of sets, repetitions, load are not fixed. These are guiding principles from which you will need to use your professional judgement to tailor the exercise prescription to the individual patient in front of you.

During the webinar I will ask you to reflect on scenarios where the patient reports improving, unchanging or worsening clinical status and think about how you might respond.

From a learning perspective, imagine a patient with rotator cuff tendinopathy whose baseline functional test indicates shoulder pain at the point of impact when serving at tennis. How would you break this movement down and begin the process of progressive testing?

The self-managed exercise framework

The two stage examination process beginning with a provisional diagnosis of rotator cuff tendinopathy and then leading into the second stage of the examination where the progressive testing takes place is a reasonably simple process. But, there are some other vital components to this programme.

The first vital component is to help the patient understand their shoulder pain problem in a constructive way that might facilitate engagement with an exercise programme. When we know so little, as will be discussed in the third webinar, it is difficult to explain pain in a convincing way. We need to be mindful of causing harm by offering unhelpful labels that might serve as a barrier to engagement with rehabilitation but we also need to be mindful that if we communicate too much uncertainty then we might lose confidence in the patient, particularly given that there will always be someone or something, e.g. Google, in a position to offer a specific diagnosis with certainty (rightly or wrongly). In this context, I currently suggest a halfway house approach and describe this shoulder pain problem as; 'this is an issue with the muscles and tendons of your shoulder; they lack capacity, strength and fitness and so need an exercise programme to address this.' I recognise this as an over-simplistic explanation, as will become evident during the third webinar, and hope the acceptability and credibility of our explanations to patients will evolve over time as we understand more about musculoskeletal pain presentations.

The second vital component of the programme is to give the patient time to master their exercise. I think we often forget that many patients aren't familiar with exercising and don't have the confidence to just get on with it. In a different context, imagine if someone asked you to build a garden wall for them and you had no building experience; would you jump straight in and get building? Perhaps some of you might but I expect many of you wouldn't and this lack of experience, confidence and skill might serve as a barrier to getting the wall built. I think this might be similar for patients when prescribed exercise. So, the exercise prescription begins with a demonstration by the physiotherapist, the patient then has the time, during the progressive testing approach, to master the exercise and then this is reinforced by videoing the patient on their smart phone or by asking them to draw a diagram of them exercising along with instructions about the number of sets and repetitions and expected response.

Thirdly, patients need to be given the means to self-monitor. This is important in relation to exercise adherence through provision of a simple exercise diary to record when and when they haven't exercised. This might help the patient to recognise how little exercise they actually have done which then feeds in to the follow-up session with the physiotherapist where barriers to exercise adherence are discussed. It seems quite simple but if patients want to improve with exercise then it seems sensible to suggest that they need to do the exercise. Exercise adherence is a complex construct which is influenced by a range of factors including the obvious, such as time, but perhaps also the less obvious, including whether the patient actually believes that the exercise or other treatment prescription is appropriate for them.

It also seems important to help the patient to monitor their progress over time. From the first webinar, it was apparent that many patients do not improve quickly. A lack of clear early improvement can impact negatively on motivation and hence exercise adherence. So, clear messages about prognosis need to be given early, i.e. this will take a minimum of 12 weeks to see a clear difference. Also, it might be helpful to ask patients to report their functional difficulty using the Patient Specific Functional Scale [23] over time so that they can see that progress is happening, even

if slowly. Then set meaningful goals with the patient so they can understand what they are aiming for. Again, using the Patient Specific Functional Scale can help this.

Also, perhaps one useful strategy to employ, when we are trying to facilitate exercise adherence is to ask the patient when they will fit this exercise in to their schedule. Typically, within this programme, we ask patients to undertake the exercise twice per day and so, given the simplicity, we are suggesting a time commitment of four to five minutes per day. This might not seem a lot and in truth it isn't but certainly it is worth trying yourself to see whether you can fit it in to your daily schedule. The discussion can then be around using prompts or fitting the exercise around existing commitments to facilitate exercise adherence.

Finally, although the programme is labelled as a self-managed exercise programme this does not mean that the patient is left alone to do the exercise. Follow-up physiotherapy is indicated, if the patient requires this support. The suggested focus of the follow-up though is supporting self-management, progressing exercise and addressing barriers to exercise adherence. The philosophy though is that these follow-up sessions are patient driven rather than routine follow-ups.

These concepts will be discussed further during the webinar.

Next webinar

The next webinar will focus on the pain of rotator cuff tendinopathy and aim to highlight the likely multi-dimensional nature of this pain presentation as a basis on which to think about why some of our patients respond to treatment but others don't. The webinar will then focus on things we might consider in the context of a non-responding patient before summarising and concluding this webinar series.

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