Citation for published version:

Fiona M. Sandford, Thomas A. B. Sanders, R. Nutr, and Jeremy S. Lewis, 'Exploring experiences, barriers, and enablers to home- and class-based exercise in rotator cuff tendinopathy: A qualitative study', *Journal of Hand Therapy*, Vol. 30 (2): 193-199, June 2017.

DOI:

https://doi.org/10.1016/j.jht.2017.05.001

Document Version:

This is the Accepted Manuscript version.

The version in the University of Hertfordshire Research Archive may differ from the final published version.

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Title: Exploring experiences, barriers and enablers to home and class based

exercise in rotator cuff tendinopathy: a qualitative study

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- Abstract:
- 5 Study design: qualitative study
- 6 Introduction: Adherence is paramount to the successful outcome of exercise based treatment.
- 7 Purpose of study: The barriers and enablers to adherence to a home and class based exercise
- 8 programme were explored in this qualitative study.
- 9 Methods: Semi-structured interviews were carried out in order to establish common themes relating
- to the participants experiences during a year-long randomised controlled trial.
- 11 Results: Twelve participants were interviewed. The main enablers to exercise were highlighted as
- 12 equipment, perceived benefit from the exercises, and longer and more intensive monitoring.
- 13 Barriers included lack of motivation, lack of equipment and pain.
- 14 Conclusions: Implications for practice are incorporating enablers and addressing barriers including
- self-discharge from classes, the importance of longer term follow-up and the benefits of adopting
- 16 exercise into a well-established routine may provide potential benefits.
- 17 Level of evidence: N/A
- 18 Conflict of interest: None
- 19 Keywords: exercise, barriers, adherence, enablers, rotator cuff tendinopathy.

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- 1. Introduction:
- 22 Exercise is the mainstay of rehabilitation treatment for rotator cuff (RC) tendinopathy (1, 2), often
- 23 delivered in class based settings with home exercise plans in support. Little is known about the
- 24 barriers, enablers and motivators in RC exercise based treatment. More is known regarding
- adherence to exercise in general but not in this cohort of patients.
- Adherence is defined as "the act or quality of sticking to something." (3). It has been described as
- 27 the "most unpredictable, least controllable variable in a medical intervention" (4). By its very nature
- 28 clinical outcome is intrinsically linked to adherence (3-5). Non-adherence has been reported to
- attribute to the ongoing disability with subsequent or associated reduction in the ability to work and
- 30 loss of wages (6). Although studies have highlighted the importance of adherence in securing a

successful outcome, in the clinical setting adherence is often erratic (7, 8). Adherence does not appear to be an all or nothing issue; rather it appears to be one of gradation, with some patients adhering to varying degrees and with different components of treatment (5, 9).

There are several quantitative studies on exercise in RC tendinopathy (10-14) but those investigating qualitative aspects are lacking. Similarly, there is limited published information relating to the experiences of individuals who have participated in an exercise class based programme as well as carrying out concomitant home exercises. Littlewood et al (2014) explored patient expectations and barriers which might influence self-managed exercise for patients in a group of six patients in a private physiotherapy practice in northern England.

This qualitative study aimed to explore factors affecting adherence to a prescribed home and class based exercise programme in the National health service setting in Central London for those with rotator cuff tendinopathy and highlight enablers or suggestions for strategies to overcome any barriers identified. It is envisaged that through the identification of barriers to treatment adherence, clinicians may be able to develop and suggest methods to enhance adherence to exercise prescription for people with RC tendinopathy.

2. Methods:

2.1 Study design:

A qualitative descriptive approach using semi-structured interviews was employed.

2.2 Positionality of researcher

The researcher was the chief investigator (CI) of a double-blind placebo controlled randomised controlled trial (RCT) entitled: (The efficacy of long chin polyunsaturated fatty acids and exercise in the treatment of RC tendinopathy. Trial registration: ISRCTN 17856844). This was a year-long trial where patients with rotator cuff tendinopathy were randomised into one of two groups. Both groups participated in an eight -week class based exercise programme with a complementary home exercise programme to perform. One group of participants was provided with long chain polyunsaturated fatty acid supplements and the other group with a placebo supplement. Levels of adherence to exercise in the RCT was measured using a self-report diary and the attendance record of the class. The mean reported level of adherence across both groups was 75% of classes or 6.2 out of 8 classes attended (standard deviation 2.5) and 11.2 minutes (SD 8.5) out of a prescribed 20 minutes of the home exercise programme daily. One participant reported doing no home exercises

at all. Both the class based and home exercise programme were designed to increase shoulder strength, mobility and proprioception. The CI, a physiotherapist, was responsible for recruiting, consenting and interviewing all the participants who then took part in this qualitative study. She also transcribed the interviews, coded the transcripts and led the development of the themes from the data. Cross verification or researcher triangulation was achieved with another researcher independently coding and analysing the transcripts and a consensus being reached as to the themes and sub-themes.

2.3 Ethical considerations

Ethical approval was granted for this study from Bromley Research Ethics Committee, Bromley Primary Care Trust, Bassetts House, Broadwater Gardens, Farnborough, Kent BR6 7UA (REC ref: 08/H0805/21). Written informed consent was obtained from each participant prior to interview. Anonymity and confidentiality of participants was ensured in the process of data collection and analysis through transcripts and recordings being identified by participant number only.

2.4 Participants and recruitment

A minimum of ten and a maximum of forty participants were sought to be interviewed, dependent on resources available. Participants were purposively sampled from participants taking part in the RCT, to ensure the views of people from different age groups, gender and social backgrounds were captured. Participants who completed the main study between January 2012 and April 2013 (n=45) were approached by email, post or telephone and invited to attend for an interview. All participants were interviewed following their one year review at the end of the RCT.

2.5 Interviews

Interviews took between 12-35 minutes each and were face to face semi-structured interviews. They were conducted by a physiotherapist researcher in a quiet assessment room in a clinical research facility in a large central London National Health Service (NHS) Trust. Interviews were conducted solely by the chief investigator (CI) with only the CI and participant present and were audio recorded on two digital Dictaphones to ensure accuracy and preservation of the information. No field notes were made. The interviews were transcribed verbatim by the CI and checked for accuracy by one of the co -authors against the original recording. Participants were offered a copy of the transcript of the interview. A naturalism mode of transcription was used where the transcript matches as closely as possible the actual interview with every utterance recorded (15). No repeat interviews were conducted.

An iterative research strategy was adopted, with open questions framed around the interview schedule/ topic guide (Appendix), starting with general questions which were then honed to more specific questions based on the responses of the participant but within the wider context of the research aims.

In developing the interview guide a deductive approach was taken, using topics generated from the Cl's personal experience, reflection, as well as the literature. A list of topics to be explored was generated, from which questions were developed.

At the start of each interview the participant was welcomed and thanked, followed by a synopsis of the participant's involvement in the study (start date and intervention). The purpose of this was to relax the participant and provide focus to the interview.

Each participant was then asked a series of questions (Appendix), however they were not necessarily asked in the same order as detailed in the Table, as is common practice in semi-structured interview methods (16). Further questions were asked if clarification was required or if probing was necessary to gain more details.

2.6 Data analysis

A thematic style of analysis was used to explore across the data set to identify repeating patterns of meaning. An inductive approach was taken where there were no pre-determined themes set to explore and the analysis was data driven. The thematic analysis was undertaken by the CI using the six point guide described by Braun (17). The six stages included; familiarisation with the data through reading and re-reading; the generation of initial codes using Nvivo V10 software (QSR International (UK) Ltd, London UK); then analysing and grouping the codes to generate themes, review, discussion and consensus between the researchers regarding the themes, their name and definition. Extracts from the interviews were chosen to illustrate effectively the themes and sub themes. The final stage was writing of the discussion where relevant literature was reviewed and cross comparisons made with the findings of this study to enable synthesis for the reader. Divergent views were reported within the themes.

Triangulation was achieved through checking of the transcripts against the original recordings and the discussions between the researchers regarding codes, themes and analysis. The participants did not have an opportunity to provide feedback on the findings.

3. Findings and results

3.1 Sample description

Twelve participants responded to the request to take part in the study and were interviewed with an equal number of males and females and an equal number allocated to the treatment and placebo groups. The majority were aged between 50-69 years (50%) and employed (58%). The mean change (improvement) in the Oxford Shoulder Score (OSS) over the twelve-month period was 14.17 (range 0-22), with 6 points change representing a clinically meaningful change (18). The OSS consists of twelve questions, four pertaining to pain (33% of total score) and eight (67% of total score) to assess activities involved in daily function (19, 20). The mean percentage change in pain (when performting activities) intensity as measured by the numerical rating score (NRS) was an 81% decrease which equates to a substantial improvement (21). The NRS is an 11-point scale anchored on the left with 0 representing no pain and 10 the worst pain imaginable. The characteristics were representative of the wider participant group of the randomised controlled trial reflecting the purposeful sampling method used. There was no significant difference in age, employment of mean change in OSS between those who responded to the request to take part in the qualitative study and those who did not.

4. Thematic analysis and discussion

This study provides an invaluable insight into the individual participant's experiences of carrying out a class based and home exercise programme. It helps guide and shape future studies and current practice. The context of RC tendinopathy must be considered when discussing participant's experiences and their adherence to treatment in particular. The context of a condition is known to be an important influence on how a patient absorbs information and decides to use that information (22). Patients with chronic conditions have been found to be less adherent, although not statistically significant, than those with acute post-operative conditions (9). It is well recognised that the motivation to adhere with treatment can differ depending on the condition and population (23).

The barriers and enablers to exercise highlighted in this study indicate that there are few key areas which could be enhanced to maximise patient's engagement with their treatment.

Three main themes were identified from the analysis of the transcripts:

- 1. Experiences relating to participation in a scientific study
- Self-efficacy
- 156 3. Enablers/facilitators and barriers to exercise

4.1 Experiences relating to participation in a scientific study

Participants were motivated to take part in the study by both the trial processes (specialist assessments and additional symptom monitoring and assistance as part of the trial follow up which they were aware was over and above routine treatment) and by the interventions which were perceived as a source of potential benefit.

"I felt that the study would benefit myself plus other people." Participant 57.

Another aspect of the trial participation which participants commented on was the feeling of obligation to the trial or the scientific process of the trial which increased their motivation or ability to adhere with the prescribed treatment.

"The study gave me the incentive to carry on doing the exercises and so I was quite pleased with that and also to have a measure made of how well I was progressing." Participant 62.

"I would have stopped doing it [the exercises] then [on discharge from the class at eight weeks] so the further follow up was very useful to me." Participant 60.

These comments are illustrative of the value the participants placed on the follow up and more intensive monitoring and feedback regarding their progress and condition which they received on the trial. It is unrealistic to imagine that this level of supervision (year-long follow up) would be possible in current clinical practice. However, it might be possible to schedule an additional review appointment a few months after the time the patient is discharged. This might further encourage and motivate the individual to continue with the exercise programme, allow progression of the exercises ensuring they continue to be relevant to the patient and may (if future research demonstrates) translate to improved outcomes. This additional review appointment could potentially take the form of; face to face appointments, a telephone call, or email correspondence depending on resource availability and patient preference.

However, one participant felt that they were recovering well on discharge from the class and would have been happy to cease treatment at that point with no further desire to have been followed up or monitored;

"The assessments, I wouldn't honestly say I found them helpful because the condition was clearing up....I would have been happy to leave physio at 8 weeks." Participant 76.

The expressed preference of the majority of participants for the ongoing support is in concordance with studies investigating barriers and enablers to adherence with a home exercise programme for RC tendinopathy (9, 24, 25). The feedback and monitoring is essential in conveying the importance

and value of the rehabilitative process, progressing exercises where appropriate to gain maximal outcome as well as recognising the patient's efforts, their progress and achievements. Patients may be motivated by a desire to please or not let down healthcare professionals (25, 26).

4.2 Self-efficacy

The degree of an individual's self-efficacy is important in the rehabilitation process as it can influence the engagement of the individual in the rehabilitation and the extent to which they will preserve when faced with difficulties or distractions (27) and can determine how they incorporate a treatment plan or exercise programme into their everyday lives (25).

The importance placed on being able to manage their own condition through improved knowledge and a feeling of increased control was highlighted as a recurrent theme within the participants' transcripts.

"I was very down in the dumps because I was constantly in discomfort and no-one was listening and once I'd started the exercises and whatever I was taking I found it was a lot easier because I felt it was something I could manage myself and I could control what I was doing." Participant 57.

"I've been through a series of classes and I've seen the benefits. I've just come to the realisation that it is something that I just have to manage and by doing the exercises I feel I can manage it...exercise is key for me." Participant 75.

Education regarding the condition, the treatment options available and the expected recovery period have all been found to be key components to facilitate adherence to treatment (3). This is especially the case with RC tendinopathy where a meaningful recovery often takes several months (28). Indeed, one participant commented;

"At first I expected to see an improvement within a few weeks but it was so small. They tried to encourage me saying it was a long haul and by the end they said it would be six to nine months. I think it might have helped to know the six to nine month time frame at the beginning." Participant 62.

This illustrates and emphasises the need to find strategies to educate patients regarding expected rehabilitation and recovery times to ensure their expectations are realistic.

4.3 Enablers and barriers to exercise

The exercise group was cited as being good fun and helpful by several participants;

"The group aspect was good, it was really fun......I enjoyed doing the exercises every Thursday morning, it was one hours really fun and that really helped me a lot." Participant 56.

Group exercise has been found to be beneficial in other physiotherapy studies where peer support has been cited as a benefit of class based exercise over individual exercise (29, 30). The enjoyment of the exercise class coupled with the supervision and assistance given to them within the class proved to be an enabler to them exercising. However, one participant expressed they found exercising in a class setting uncomfortable and so reported they did not attend regularly.

The individualisation of treatment in a class setting is a challenge and some class attendees run the risk of feeling that they are bring given a one size fits all approach as one participant voiced in the interview;

"There were several people in the group, everybody doing the same exercise and I did those exercises. I had several sessions but it didn't help at all." Participant 70.

Another participant felt,

"Once I knew what to do I could pretty much do it at home" Participant 66.

This range of comments supports the idea empowering patients to manage their own attendance and discharge from a class based intervention in line with their personal requirements from the service. This study highlighted that some participants felt they had attended enough or too many classes and others would have preferred more. One suggestion might be that patients could elect when to leave the class and continue with exercises at home. Thus, reducing non-attendance and allowing those who need more classes to access these within reason.

Pain was found to have been a motivator, enabler and facilitator to exercise. In some, exercise decreased their shoulder pain and therefore this increased their motivation and incentive to continue with the exercises and get continued and or increased relief. Initially it is often the pain at its peak which has led the person to seek treatment and thus it served as a prompt or reminder to do the exercises.

"As I was getting better, my motivation increased." Participant 60.

This concept also links into perceived benefit from the treatment where if the patient can see or experience immediate benefits from the treatment the patient is believed to be more likely to continue with it. This is interlinked with the relationship between the perceived balance between the costs and benefits of rehabilitation (31). Littlewood et al (2014) found that quick and meaningful relief in pain or response to therapy was a crucial feature of continued engagement with exercise treatment for rotator cuff tendinopathy (25).

Pain was also used to assist in the self-management of the condition. Participants described re-starting the exercises when they experienced pain again.

"It's easier to do the exercises when you can feel a definite benefit. It's always hard to exercise to prevent something from getting worse." Participant 66.

This further emphasises the need for the right exercises or treatment plan for that individual at the right time so that they can see that progress is being made. This could be a feature of a review appointment, progressing exercises or reviewing exercises to make sure that those which are being continued are appropriate and will result in reduced re-access to the healthcare system.

However, others found pain to be a barrier to exercise.

"Those exercises were hurting me and I was not benefitting at all." Participant 70.

"There was one exercise that I was given earlier that I thought at the time might have made things worse, so I stopped doing it" participant 69.

This is in concordance with some of the literature where pain has similarly been found to be a barrier to exercise, especially worsening pain with exercise (32, 33).

The relationship between the reduction in the impact that the condition is having on the person's life and the reduction in the adherence is intrinsically interlinked. As the illness becomes less important in the person's life and the perceived seriousness of it reduces. Sluijis et al (1993) who investigated physiotherapist's and patient's beliefs regarding adherence with exercises in the private sector in the Netherlands found that the degree of disability provided the strongest link with the level of adherence with an exercise programme. Those whose condition caused greater difficulties with functioning demonstrated greater adherence to the home exercise programme than those who had less hindrance from their condition;

"I think the low level of my condition meant I was not highly motivated [to do the exercises]." Participant 76.

The participant's responses also suggest that the right equipment should be provided. Several participants reported the Theraband ™ (Performance Health, Akron, Ohio, USA) which was provided to the participants to allow them to carry out the home exercise programme, as a key enabler. They found the resistance exercises were effective and found it a reminder or visual prompt to do them.

"you can do it everywhere and anywhere." Participant 64.

"The elastic band, I think, is worth the money and I liked being able to go up the levels....I felt like I was progressing." Participant 60.

Time and the need to fit in an extra thing during the day have been frequently cited in the literature as barriers to exercise (9, 25). This was highlighted in some of the participant's responses, "never find time." Participant 56.

The importance of linking in doing the exercises with an already established routine was highlighted within the transcripts. Functional routines such as washing, dressing or meal times, were all discussed as possible opportunities where exercise could be incorporated as part of that daily routine. These strategies could be suggested and discussed with patients to collaboratively problem solve to maximise adherence in a clinical setting. This is supported by the findings by Williams and Adams (2000) who found that those who integrated their exercise programme into their lifestyle managed a greater level of adherence with minimal behavioural change (34).

The participants cited forgetfulness as a barrier and suggestions were made regarding smart phone reminders or daily emails from the research team to aid memory. M-health or mobile-health is a term which is used to describe the support of health care and public health through the use of mobile devices (35). A systematic review investigating the effect of m-health on chronic disease concluded there was mixed evidence supporting its use (36). The potential for benefit is clear with the widespread use of mobile and wireless devices throughout the world in all spheres of daily life but currently evidence to support its influence on adherence to healthcare interventions is inconclusive.

Some participants expressed it was their lack of motivation and self-discipline which was the overwhelming barrier to exercise;

"At home there was the problem with self-discipline, finding the time for it. But I have got loads of time but still its self-discipline that's always the problem.....the big problem was lack of motivation." Participant 62.

It is unsurprising that this was expressed in the data within this study as low self-efficacy, depression, anxiety, helplessness and poor self-discipline have all been found to be barriers to treatment adherence (32).

4.4 Limitations

The sample size was small within this study and participants were selected pragmatically due to the resources available. Having only the views of twelve participants carries with it a risk of bias that that views raised were not representative of the larger sample. However, data saturation was

considered to be achieved as the data ceased to reveal new themes (37). The richness of the data generated from the participants interviewed with overlapping themes also gives confirmability to the conclusions drawn.

An iterative approach was used in this study to influence subsequent interviews after analysis of preceding data. Whilst this allows rich and detailed data collection to occur over time and at many different levels it also carries with it the risk of researcher bias with preconceived assumptions and the potential narrowing of the topic field. In order to try to mitigate this the researcher's ideas and thoughts during and before the process were documented. This heightened her awareness to her preconceptions and how this might interact with the data. Each interview was conducted stating with broad opening questions to allow the participant to steer the conversation and provide the information they felt was relevant.

The interviewer was the physiotherapist whom had assessed the participants and co-designed the study. This carries an inherent bias. Whilst the interviewees were put at ease and invited to explore the negative as well as the positive aspects of the trial and the experiences some might have been reluctant about being honest or held back with some of their responses. However the positionality of the interviewer also brought some advantages, an in-depth understanding of the intervention and a working therapist-patient relationship having met the participants on a minimum of five occasions previously. It must also be acknowledged that although there was triangulation of the data from a second researcher who is also a physiotherapist to agree themes the interpretation of the data is largely the perspective of one physiotherapist. Another researcher examining the raw data might well have elicited different themes.

The interviews were conducted ten months after the intervention had ceased as the participants attended the exercise class only for the first two months of the year-long follow up. This undoubtedly challenges the recall of the events, experiences and feelings at the time the participant was involved in the RCT.

Additionally, the level of education attained by the participants was also not recorded in this study. This has previously been shown to be significantly related to adherence (4, 9).

5 Conclusions:

This study explored the experiences of participants' taking part in a randomised controlled trial and the enablers or barriers to adherence with the exercise based intervention.

Participants valued their experience within the study as largely being a positive one. The main enablers to exercise were highlighted as equipment, the perceived benefit from the actual exercises, incorporating exercise into an established routine, the longer follow up and more intensive monitoring and feedback received in the trial. Barriers included lack of motivation, lack of suitable equipment and pain whether it improving or worsening.

These findings can be used to inform study design for future studies and guide current clinical practice with self-discharge from classes and longer term monitoring being key clinical areas for further investigation.

Appendix:

Interview guide

Topic	Questions and prompts
Overview of experience.	Can you give me an overview of your experience of the study?
	Prompts: can you describe your experience, what was your lasting memory or overall impression of doing the exercises, your shoulder pain?
Aspects of exercise programme most/least enjoyed.	Were there any aspects of the exercise programme which most/least enjoyed? What were they?
Aspects of the exercise programme easiest/hardest to implement.	Were there any aspects of the exercise programme which you found easiest/ hardest to implement? What were they?
Aspects the exercise programme, if any, continued beyond the study.	Were there any aspects the exercise programme, if any, continued beyond the study? If so which ones and to what extent? Any reasons why you continued? Any perceived benefits? Do you plan to continue long term?

Factors or strategies which participants found helped them to take the supplements (Enablers).

Did you have any or find any factors or strategies which you found helped you to take the supplements (enablers)? If so what and how did they help you? Prompts: Support from family or friends, individual skills such as organising and planning, written advice, email/phone support? Provision of supplements and the way in which they were provided?

Factors or strategies which participants found helped them to complete the exercises (Enablers).

Did you have any or find any factors or strategies which you found helped you to complete the exercises (enablers)? If so what and how did they help you?

Prompts: Support from family or friends, individual skills such as organising and planning, motivation?

Provision of exercise booklet, theraband, having attended the exercise class and email/phone support?

Factors or problems which participants encountered which prevented or limited their ability to carry out the exercise programme (barriers).

Were there any factors or problems which you encountered which prevented or limited your ability to carry out the exercise programme (barriers)? If so what, is there anything which could be done to alleviate them?

Physical experiences during the intervention (for example feelings of wellbeing).

Can you discuss any physical experiences during the intervention (for example feelings of wellbeing)? If yes how did these affect you? Any side effects?

Emotional experiences during the intervention (for example feelings of control/ lack of control).

Can you discuss any emotional experiences during the intervention (for example feelings of control/ lack of control)? Do you remember any feelings or emotions during the study? If yes what were they, when did they occur? Prompts: feeling more or less in control of their condition and its treatment- ask for reasons why.

Feeling more of less certain of a positive outcome from treatment?

Social consequences of the	Did you find any social consequences of taking part in
intervention and taking part in a	the study or doing the exercises? If yes how did you
study.	manage these?

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