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Rotator Cuff Tendinopathy

Assessment & Management

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BACKGROUND

1% of adults consult a GP with new shoulder pain annually

500 000 adults in the UK

Point prevalence of shoulder pain \approx 26%

70% with new episode not recovered by 6/52

50% c/o persistent problems > 6/12

40% not recovered at 1/1

Ottenheijm et al (2011)

3rd most common reason for MSK consultation

Disorders of the 'rotator cuff' are thought to be the commonest cause of this pain.

Despite this commonality and burden, 'rotator cuff tendinopathy' is poorly understood

ASSESSMENT

Largely undertaken within a pathoanatomic framework

Aim = identify structure at fault

Incorporates a range of physical examination tests & imaging, e.g. diagnostic ultrasound

This approach has been criticised:

Limitations of tests & imaging

Diagnostic categories not usefully informing Rx

Diagnostic categories of limited prognostic use

PHYSICAL EXAMINATION TESTS

E.g. Hawkins-Kennedy, Neer sign, Empty can etc



Physiotherapy xxx (2010) xxx–xxx

Physiotherapy

Review

Reliability of physical examination tests used in the assessment
of patients with shoulder problems: a systematic review

Stephen May*, Ken Chance-Larsen, Chris Littlewood, Dave Lomas, Mahmoud Saad

Faculty of Health and Wellbeing, Sheffield Hallam University, Sheffield S10 2BP, UK

***‘...no consistent evidence that any examination procedure
used in shoulder assessments has acceptable levels of
reliability.’***

PHYSICAL EXAMINATION TESTS

'Special' orthopaedic tests

- **Sensitive**
 - proportion of people with shoulder pain/ pathology correctly identified
- **Not specific**
 - proportion of people without shoulder pain/ pathology correctly identified

This means...

- Confirm what the patient tells you; that their painful shoulder is painful! Also hurts those without shoulder pain!!
- Unrealistic to think that these tests selectively tension specific structures
 - Lewis J (2008). Rotator cuff tendinopathy/subacromial impingement syndrome: is it time for a new method of assessment?

IMAGING

Frost et al (1999)

- Using MRI could not distinguish between people diagnosed with subacromial impingement and age-matched controls according to structural pathology

Templehof et al (1999); Worland et al (2003); Yamamoto et al (2010)

- Up to 40% of the general population have asymptomatic rotator cuff tears

IMAGING

Littlewood et al (2013)

- Systematic review relating to prognostic factors
- Biomedical diagnosis, relating to specific tissues at fault, e.g. , bursal thickening, calcification, presence of tendinopathy, partial or full thickness tear of the rotator cuff **not** associated with clinical outcomes

IMAGING

Drew et al (2012)

- Systematic review
- Observable structural pathology, e.g. tendon degeneration, does not explain response to therapeutic exercise

So, patients report improvement but corresponding changes not seen in the tissue

IMAGING

Imaging as a means of improving accuracy and hence improving Rx outcomes

Roddy et al (2015): RCT

US-guided injection and PT-led exercise

US-guided injection and exercise leaflet

Unguided injection and PT-led exercise

Unguided injection and exercise leaflet

PT-led exercise superior to exercise leaflet

Also superior exercise adherence

No additional benefit from US-guided injection

ALTERNATIVE APPROACHES

Moving beyond pathoanatomic diagnosis to rehabilitation classification

Shoulder Symptom Modification Procedure (SSMP)

Lewis (2009)

Mechanical Diagnosis & Therapy (MDT)

McKenzie & May (2000)

**Staged Approach for Rehabilitation Classification:
Shoulder Disorders (STAR–Shoulder)**

McClure & Michener (2015)

ALTERNATIVE APPROACHES: EVIDENCE

Shoulder Symptom Modification Procedure

Limited evaluation (citation search (n = 99) & first author search)

Reliability

Predictive value

Clinical effectiveness

Lewis et al (2005). Subacromial Impingement Syndrome: The Effect of Changing Posture on Shoulder Range of Movement

Changing posture (Tx & scapula) was associated with:

Significant increase ($P < .001$) in ROM in shoulder flexion and abduction in the plane of the scapula.

Changing posture was not found to have a significant effect on the intensity of pain experienced, although the point in the range of shoulder elevation at which they experienced their pain was significantly higher ($P < .001$).

ALTERNATIVE APPROACHES: EVIDENCE

Mechanical Diagnosis & Therapy

Again, limited evaluation (MII reference list)

Preliminary evidence of reliability

Abady et al (2014); $K = 0.90$

May & Ross (2009); $K = 0.83$

Using patient vignettes

Skilled MDT therapists

Evidence of effectiveness

Limited; case series, e.g. Aytona & Dudley (2013)

ALTERNATIVE APPROACHES: EVIDENCE

Garrison et al (2010)

Patients with 'Shoulder Impingement Syndrome'

**No difference in outcome ASES score
between initial responders (GRoC > 5) and non-
responders (GRoC < 5)**

Early GRoC associated with final GRoC ($r = 0.48$; $p < 0.01$)

**Hence, early perceived change is associated with perceived
change in one's condition overall, but not related to self-
report of function**

ALTERNATIVE APPROACHES: EVIDENCE

STAR–Shoulder

Based on pathoanatomic diagnosis plus judgement of level of tissue irritability (low, medium, high) & impairment, e.g. restricted shoulder flexion

Reliability & validity to be determined

KEEPING IT SIMPLE

In context of uncertainty, my approach to diagnosis/ classification is:

1. Exclude cervical spine

Repeated movement assessment

2. Exclude shoulder pain with restriction

> 45 degrees lateral rotation ($k = 0.82$ (0.65-0.99))

(Hanchard et al 2005)

3. Pain with resisted testing

Typically abduction / lateral rotation ($k = 0.81$)

(Palmer 2000)

4. Caution with 'instability'

TERMINOLOGY



Subacromial impingement syndrome

Subacromial pain syndrome

Supraspinatus tendinitis/ tendinosis/ tendinopathy

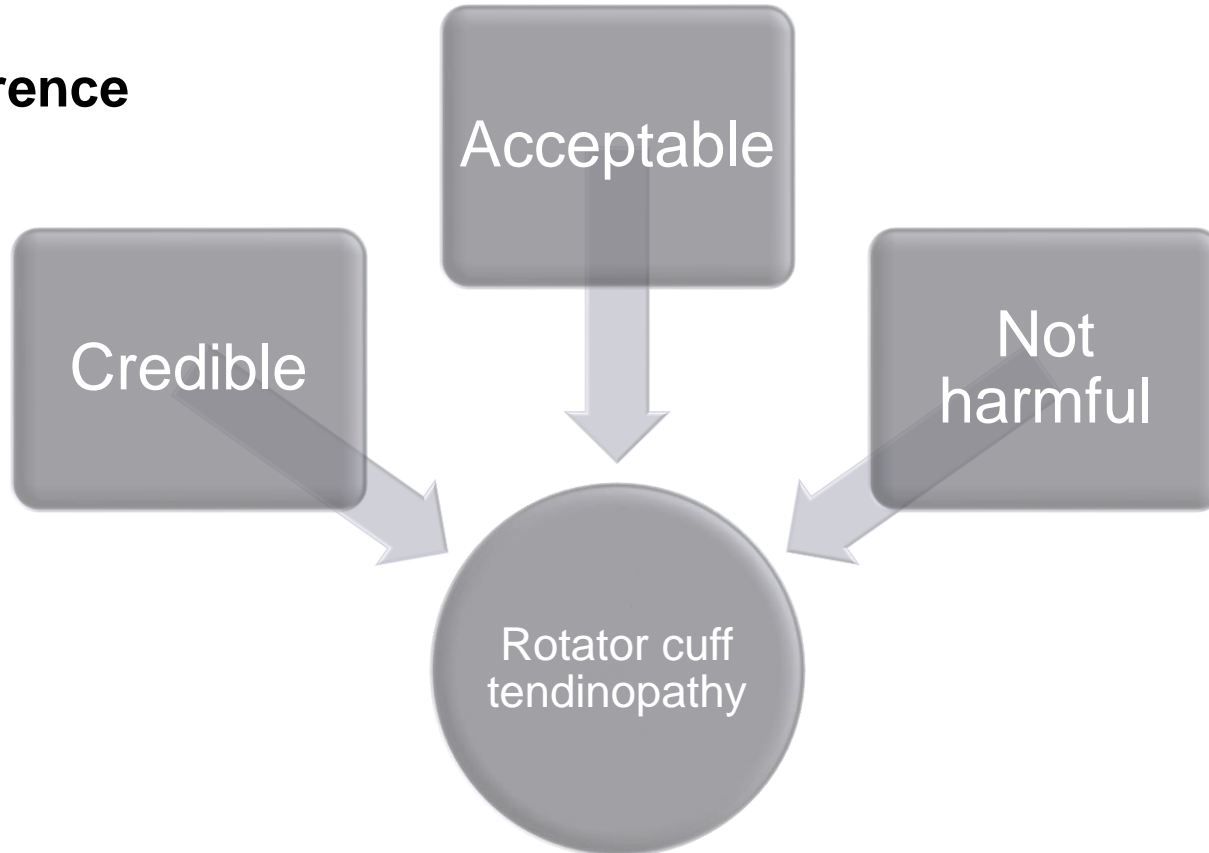
Bursitis

Rotator cuff disorder/ disease etc

Mechanical shoulder pain without restriction

TERMINOLOGY

My preference



MANAGEMENT

Shoulder & Elbow. ISSN 1758-5732

S REVIEW ARTICLE

A review of systematic reviews of the effectiveness of conservative interventions for rotator cuff tendinopathy

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Received

Received 4 July 2012;
accepted 15 January 2013

Keywords

Shoulder pain, rotator cuff, rehabilitation,
systematic review

Conflict of interest

None Declared.

Funding

This work was produced by Chris Littlewood under the terms of a Doctoral Research Fellowship issued by the Secretary of State for Health. The funding body have played no role in the design, writing of the protocol manuscript or decision to submit for publication.

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DOI:10.1111/sae.12009

ABSTRACT

Background Rotator cuff tendinopathy is common and a wide range of conservative interventions are currently used to treat this problem. The purpose of this review is to systematically review the systematic reviews that evaluate the effectiveness of conservative interventions for rotator cuff tendinopathy.

Methods An electronic search of PEDro, MEDLINE and the Cochrane Library was undertaken and supplemented by hand and citation searching. The AMSTAR checklist was adopted for quality appraisal and a narrative synthesis was undertaken.

Results Twenty-six systematic reviews were retrieved. Methodological quality was variable. Exercise and multimodal physiotherapy appear to confer superior outcomes over no treatment or placebo, although the clinical significance of these results remains unclear. Surgery does not confer an additional benefit over exercise alone or multimodal physiotherapy. Combining manual therapy with exercise is not currently supported, neither is the use of corticosteroid injections or acupuncture. Other commonly prescribed interventions lack evidence of effectiveness.

Conclusions Exercise and multimodal physiotherapy might be effective interventions for rotator cuff tendinopathy, although the clinical significance of this effect is unclear. This interpretation is drawn from systematic reviews comprising mainly small randomized controlled trials that frequently measure outcome in a heterogeneous manner, limiting the strength of any conclusions.

EFFECTIVENESS OF CONSERVATIVE INTERVENTIONS FOR ROTATOR CUFF TENDINOPATHY

‘Exercise’, whether completed at home or in a clinic setting, appears to confer superior outcomes over no treatment or placebo

- Additional benefits might be gained with higher doses of ‘exercise’.

Multimodal physiotherapy or surgery, confer no additional benefit over exercise alone.

Multimodal physiotherapy confers superior outcomes over no treatment or placebo

- Surgical intervention does not offer additional benefit over multimodal physiotherapy.

EFFECTIVENESS OF CONSERVATIVE INTERVENTIONS FOR ROTATOR CUFF TENDINOPATHY

Manual therapy, corticosteroid injections, acupuncture are not supported by current evidence.

- No added benefit over active exercise alone
- Not superior to active control

Other commonly prescribed interventions lack evidence of effectiveness.

SURGERY

Procedure justified by the model of subacromial impingement

- Abrasion by the under side of the acromion onto the soft tissues of the subacromial space, e.g. bursa, rotator cuff tendons

Hence, removal of the inferior aspect of the acromion with resection of the coracoacromial ligament +/- removal of a hypertrophic ACJ

- Lewis (2011)

THEORY QUESTIONED

But, if the abrasive/ compression theory of subacromial impingement was valid, would expect to see:

- Abrasion to the superior side of the rotator cuff
- Presence of significant inflammatory markers
- Symptoms associated with acromial morphology, e.g. hooked acromion = greater symptoms
 - Lewis (2011)

THEORY QUESTIONED

But:

- Most tears of the rotator cuff are on the articular (inferior) not bursal (superior) aspect
- Minimal inflammatory markers identified during surgery
- No significant correlation between acromial shape and rotator cuff pathology
 - Lewis (2011)
- Patients improve with painful loaded exercise
 - Littlewood et al (2014; 2015)

PRACTICE QUESTIONED

Conservative treatment or surgery for shoulder impingement: systematic review and meta-analysis

- Seven RCTs (n = 347)
- No significant difference between surgery and conservative treatment
 - Saltychev (2015)

PRACTICE QUESTIONED

Ketola et al (2013)

- Five year follow-up
- RCT comparing arthroscopic SAD to a structured exercise programme
- Both groups improved over time but no significant difference between the groups
- Conclusion: 'Structured exercise treatment seems to be the treatment of choice for shoulder impingement syndrome'

IMPLICATIONS

The assumption that surgery is a superior or definitive treatment does not hold true

- Concern that rates of surgery are dramatically increasing
 - 254% increase in operations performed in USA (96 to 06)
 - Approx. 6k per year to 20k per year in New York State alone
 - Vitale et al (2010)
- *‘Research findings are irrelevant because physiotherapy received in the real world is not the same as that received in the research studies’*

So, what makes an effective physiotherapy intervention?

IMPORTANT COMPONENTS OF AN EXERCISE PROGRAMME

Exercise for rotator cuff tendinopathy – A systematic review of contextual factors and prescription parameters

- Littlewood et al (2015). International Journal of Rehabilitation Research
- Significant outcomes can be achieved when programmes are prescribed by physiotherapists with varying degrees of experience
- Patients of varying age, duration of symptoms and severity of pain and disability can achieve significant outcomes
- Whether the exercise is completed at home or within a supervised clinic setting does not appear to matter
- Pain production or pain avoidance during exercise **does not appear to matter**
 - Implications for Rx prescription, progression and self-monitoring though

IMPORTANT COMPONENTS OF AN EXERCISE PROGRAMME

- Inclusion of some level of **resisted exercise** does seem to matter although the optimal level is unclear
- Also unclear is the optimal number of exercise repetitions, although **higher repetitions** might confer superior outcomes
- **Three sets** of exercise is preferable to two or one set but the optimal frequency, e.g. daily, three times weekly, is unknown
- It can be expected that most exercise programmes should demonstrate clinically significant outcomes by **twelve weeks** but the potential for achieving significant outcomes is less clear prior to this time point.

SCAPULA STABILISATION EXERCISES

What about the type of exercise?

- Unclear guidance from the literature due to the varied approaches evaluated

But, scapula stabilisation exercises are very popular and very commonly prescribed...

- Surely case for inclusion is strong...

SCAPULA STABILISATION EXERCISES

Points to consider:

- Scapula dyskinesis is present in those with and without painful shoulder syndromes
 - (Catlin et al. 1995; Lucasiewicz et al. 1999)
- Scapulae of dominant shoulder shows greater retraction and upward rotation at all points during elevation of the arm (Morais and Pascoal 2013)
 - Highlights the presence of relative movement differences in the scapulae of asymptomatic or healthy individuals.

SCAPULA STABILISATION EXERCISES

Ratcliffe et al (2014). Is there a relationship between subacromial impingement syndrome and scapular orientation? A systematic review. BJSM.

‘Currently, there is insufficient evidence to support a clinical belief that the scapula adopts a common and consistent posture in SIS.

It also raises the possibility that deviation from a ‘normal’ scapular position may not be contributory to SIS but part of normal variations.’

SCAPULA STABILISATION EXERCISES

Various means of assessment

- Poor levels of reliability
 - (Ellenbecker et al. 2012)

No clear advantage, in terms of clinical effectiveness, of specific scapula stabilisation programmes versus general exercise programmes

SCAPULA STABILISATION EXERCISES

Struyf et al. (2013) evaluated the effect of a scapula focused rehabilitation programme incorporating specific scapula stabilisation exercises and manual therapy

Significant improvements in shoulder pain and disability at the end of treatment and after three months but the measurements of scapula dyskinesis did not change.

Camargo et al. (2015) Effects of Stretching and Strengthening Exercises With and Without Manual Therapy on Scapular Kinematics, Function, and Pain in Individuals With Shoulder Impingement: A RCT.

Adding MT to an exercise protocol did not enhance improvements in scapular kinematics, function, and pain in individuals with SIS. The noted improvements in pain and function are not likely explained by changes in scapular kinematics.

FURTHER RESEARCH

Littlewood *et al. BMC Musculoskeletal Disorders* 2012, **13**:62
<http://www.biomedcentral.com/1471-2474/13/62>



STUDY PROTOCOL

Open Access

A mixed methods study to evaluate the clinical and cost-effectiveness of a self-managed exercise programme versus usual physiotherapy for chronic rotator cuff disorders: protocol for the SELF study

Chris Littlewood^{1*}, Jon Ashton², Sue Mawson³, Stephen May⁴ and Stephen Walters¹

DEVELOPMENT OF A SELF-MANAGED EXERCISE INTERVENTION



Physiotherapy

Physiotherapy 99 (2013) 358–362

Protocol

Development of a self-managed loaded exercise programme for rotator cuff tendinopathy

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DEVELOPMENT OF A SELF-MANAGED EXERCISE INTERVENTION

Single exercise approach

- Including regression and progression

Prescribed in relation to most symptomatic direction, usually abduction

- Produces pain during exercise but no worse upon cessation

Typically over a 12-week period

- Contact with physiotherapist up to four times
 - Flexible and directed by patient need

DEVELOPMENT OF A SELF-MANAGED EXERCISE INTERVENTION

Within a self-managed framework:

- Knowledge translation
- Exercise/ skill acquisition
- Self-monitoring/ interpretation of physiological signs, e.g. pain
- Goal setting and monitoring
- Problem solving
- Pro-active follow-up

A self-managed single exercise programme versus usual physiotherapy treatment for rotator cuff tendinopathy: A randomised controlled trial (the SELF study)

Clinical Rehabilitation
1-11
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DOI: 10.1177/0269215515593784
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Chris Littlewood¹, Marcus Bateman², Kim Brown³,
Julie Bury⁴, Sue Mawson⁵, Stephen May⁶ and
Stephen J Walters¹

Multi-centre RCT

- Three centres

Recruited patients referred to 2° care physiotherapy (n = 86)

Diagnosis of rotator cuff tendinopathy operationalised as:

- Largely preserved shoulder ROM
- Pain with resisted shoulder testing
- No obvious involvement of Cx spine

RANDOM ALLOCATION

Participants randomised to:

- The self-managed exercise intervention (n = 42), or
- The control (n = 44)
 - Usual physiotherapy treatment
 - Exercises, manual therapy, electrotherapy, acupuncture etc

FOLLOW-UP

Three, six and twelve months via post

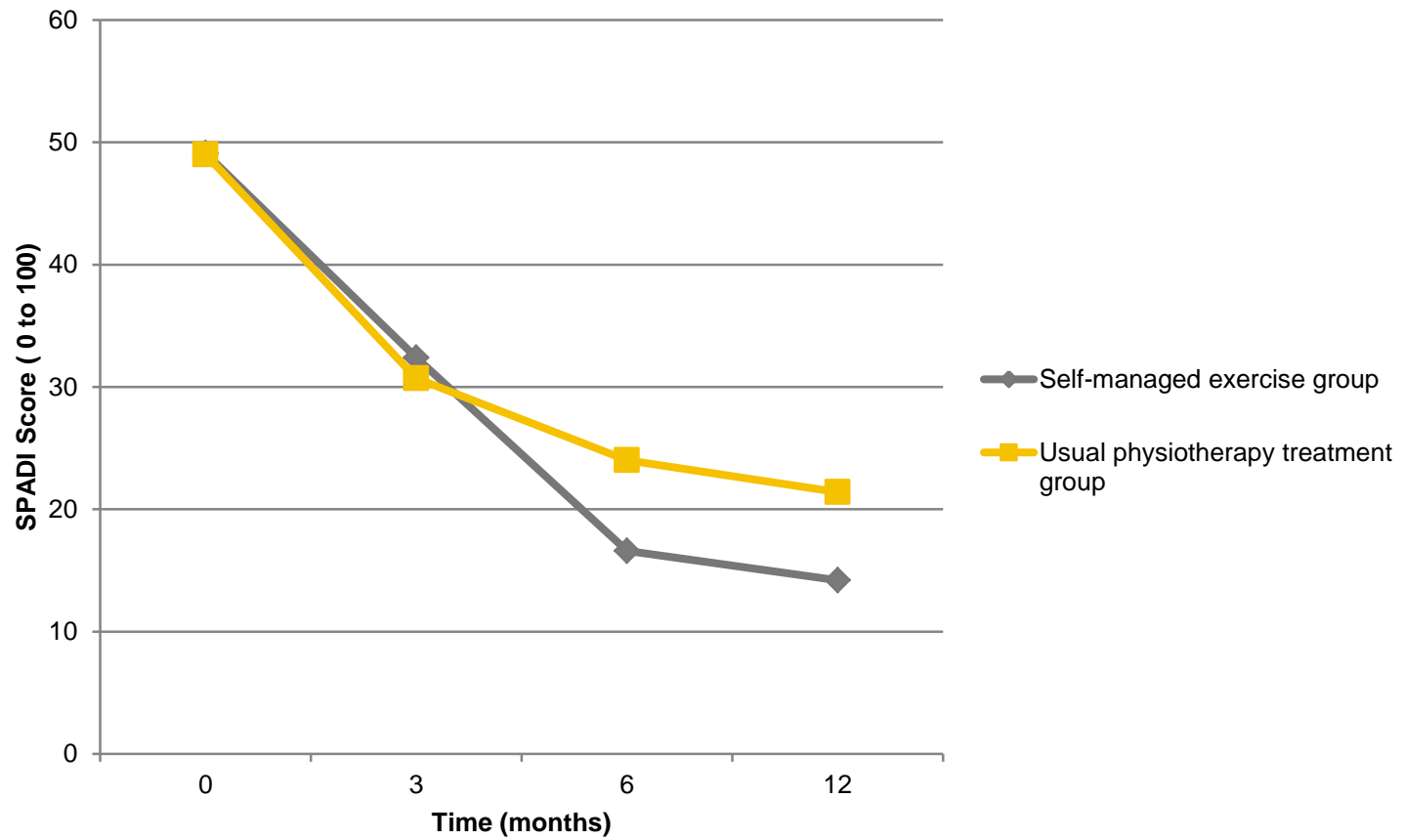
Primary measure; SPADI

- 13 item measure of shoulder pain & disability validated for use in this population
 - MCIC of 10 points
- Secondary measure SF-36

RESULTS

Characteristic	Treatment group			
	Self-managed exercise		Usual physiotherapy	
	Responder	Non-responder	Responder	Non-responder
	Mean or count	Mean or count	Mean or count	Mean or count
Age (years)	58.3	45.7	58.5	46.9
Gender - male	12	5	18	8
Gender – female	15	10	15	3
Duration of shoulder symptoms (months)	11.8	11.5	18.1	15.6
SPADI	44.8	56.9	47.4	53.6
GSES	32.9	31.9	32.4	32.6

RESULTS





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CONCLUSIONS

Limited role of tests and imaging

Evaluation of rehabilitation classifications needed

‘Complex’ physiotherapy does not seem to add value

Surgery is unproven

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CONCLUSIONS

So, why not just do the simple things well?

- *Advice*



- *Exercise*

- *Adherence/ self-monitoring*
- *Time (min. 12 weeks of progressive exercise)*

@PhysioChris 