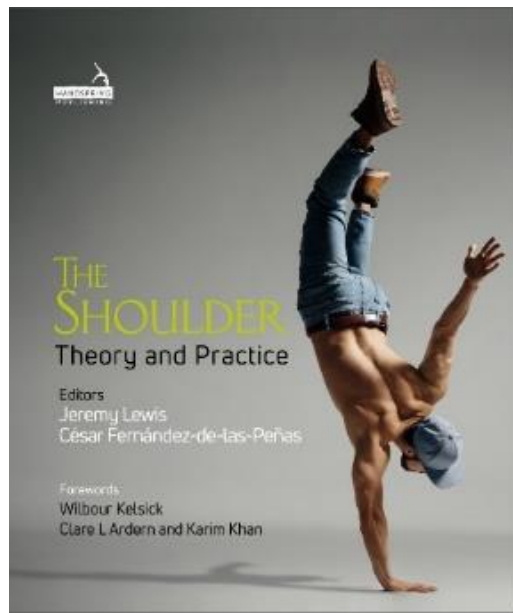


The Shoulder

Theory & Practice

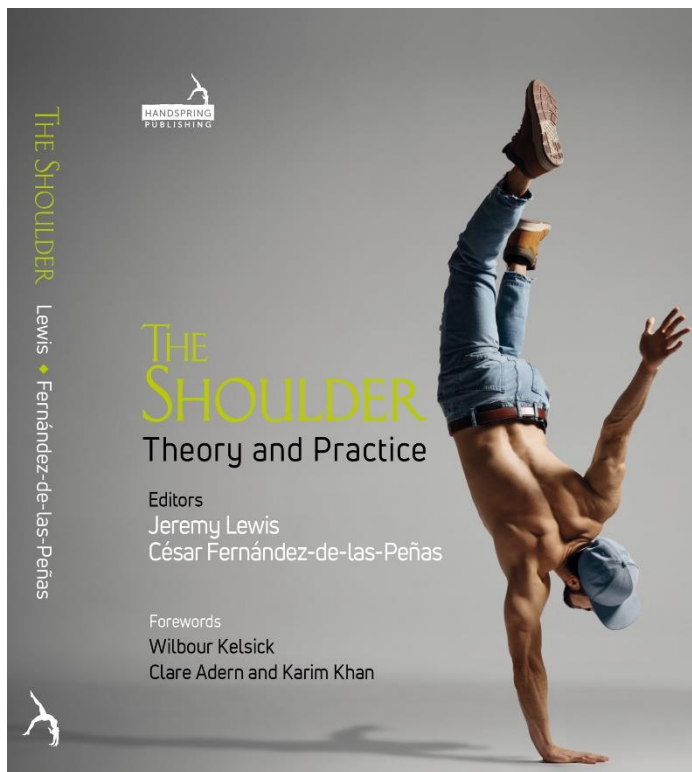
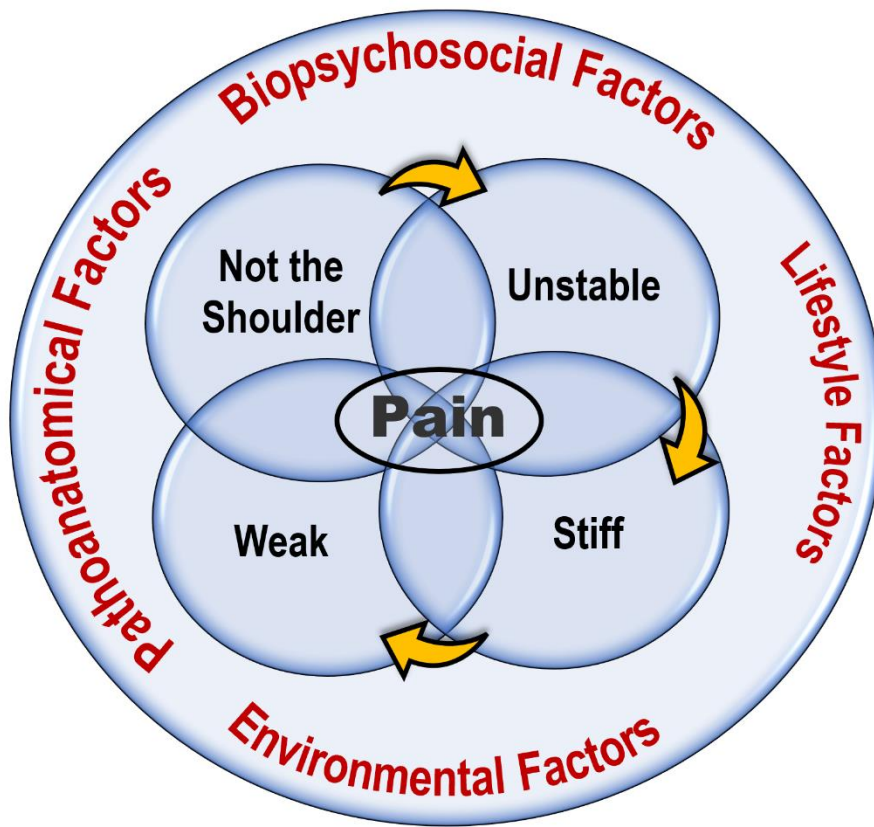
Course



(22nd Edition - 2022)

Jeremy Lewis PhD FCSP
Consultant Physiotherapist
Professor of Musculoskeletal Research

www.drjeremylewis.com



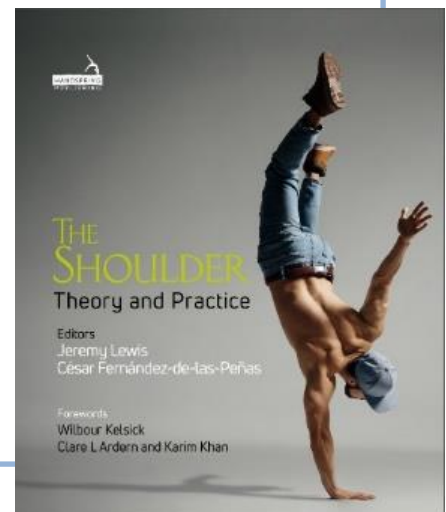
The Shoulder: theory and Practice Hardback (also eBook) was one resource used to support this course. It provides information in greater detail and covers additional content not covered in the course.

If you purchase the book through www.drjeremylewis.com Using your affiliate code (ie code used to watch pre and post course videos, within 2 weeks of completing the course you will receive 10% off the RRP.

The Shoulder: **Theory & Practice** **Course** (22nd Edition - 2022)

Jeremy Lewis PhD FCSP

- ▶ Consultant Physiotherapist
 - ▶ Professor of Musculoskeletal Research
 - ▶ MSK Sonographer
 - ▶ Independent Prescriber
- Bachelor of Applied Science (Physiotherapy)
 - Postgraduate Diploma in Musculoskeletal Physiotherapy
 - Postgraduate Diploma in Sports Physiotherapy
 - Postgraduate Diploma in Biomechanics
 - Master of Science (Manipulative Therapy)
 - Injection Therapy
 - PhD
 - Postgraduate Certificate in Diagnostic Imaging (Ultrasound)
 - independent Prescriber



	Face 2 Face	Online Live	Hybrid	Online In Your Own Time
Course options:	Traditional face to face (F2F) course. Pre-course participants are asked to watch 3 hours of theory videos (over 2 weeks-to allow more time for practical during course.) After course all theory & practical videos (>100) are available for 4 weeks.	Identical content as F2F course. Pre-course participants are asked to watch 3 hours of theory videos. Practical during course via combination of live practice and video files. After course all theory & practical videos (>100) are available for 4 weeks.	Identical content as F2F course. Any combination of Face 2 Face and Online Live requested by course host. After course all theory & practical videos (>100) are available for 4 weeks.	Identical content as F2F course. All theory and all practical are available online. Participants can complete the course in their own time and pace. Course involves quizzes and links to other resources. Coming soon!
For more information visit www.drjeremylewis.com				

The Shoulder: *Theory & Practice* Course Program 22nd Edition

Jeremy Lewis PhD FCSP Consultant Physiotherapist | Professor of Musculoskeletal Research

Please note: The order of the program, content, and timetable structure may vary

Proceeds from this course support an international research program

Day 1

9:00 - 9:30

Introduction, Evidence Based Practice, Psychosocial Factors Epidemiology & Outcomes

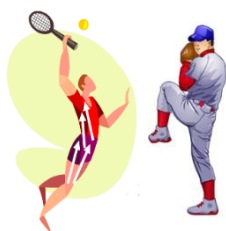
Psychosocial factors that will surprise you! And some facts to impress your friends at dinner parties!



9:30 - 10:30

Function, Anatomy, Biomechanics, Evolution, The Kinetic Chain

How does the shoulder function? Importance of considering regional and whole-body kinematics in relation to shoulder function.

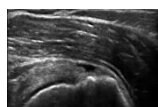


10:30 - 10:45 Break



10:45 - 12:30 Assessment

This clinically orientated & practical session highlights the dilemma of diagnosis. It includes a biopsychosocial approach to assessment. & management supporting the clinical reasoning process. Includes in depth discussion on orthopaedic tests, posture & imaging. Pain science is discussed, as is the importance of the words we use in clinical practice.



12:30 - 13:15 Lunch



13:15 - 15:00 Assessment (cont.)

15:00 - 15:15 Break



15:15 - 18:00 Rotator Cuff Related Shoulder Pain

This theoretical and practical session involves a very detailed and in-depth review of this multi-factorial problem. The current evidence-based research across professions evidence regarding the aetiology and pathology of this condition will be presented in detail. This session includes a critical appraisal of the use of injection therapy in the management of RCRSP and critically compares outcomes between surgical & non-surgical intervention. Evidence based management is presented in detail. The importance of lifestyle and its impact on RCRSP are discussed.

Day 2

9:00 - 9:15

Review of Day 1 and Discussion

9:15 - 10:30

Shape-Up-My-Shoulder (SUMS) Rehabilitation Program

This theoretical and practical session will present a three-stage rehabilitation program that may be considered for the majority of musculoskeletal shoulder presentations. The presentation includes finding a 'safe' entry point into rehabilitation and how to progress, from the earlier stages to the end 'chaotic' stage of rehabilitation. Patient education, promotion of self-efficacy and self-management, choosing between formalised and non-formal rehabilitation programs tailored to the individual patient. High end, hard, and 'chaotic' rehabilitation will be included.

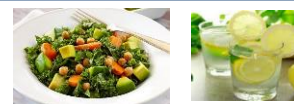
10:30 - 10:45 Break



10:45 - 12:30

Shape-Up-My-Shoulder (cont.)

12:30 - 13:15 Lunch



13:15 - 15:00

Shape-Up-My-Shoulder (cont.) / Frozen Shoulder

15:00 - 15:15 Break



15:15 - 16:45

Frozen Shoulder

Theoretical and practical session investigating the latest research and evidence supporting the assessment & management of this intriguing condition. Included the role of injection therapy, non-surgical and surgical management options, and the supporting evidence.



16:45 - 17:00

Patient Presentations, Case Studies, Summary

Day 3 & 4

The 3- or 4-Day Courses includes the same theoretical and practical content as the 2 Day Course. The 3- & 4-Day Courses also includes real time patient assessment and management session and additional information as organised prior to the course. Three- and four-day courses are requested by host organisations.

Learning Outcomes

1. To develop a better understanding and knowledge of the clinical anatomy and biomechanics of the shoulder region.
2. To appreciate the importance of taking a biopsychosocial approach to patient management.
3. To develop a comprehensive subjective and physical evaluation strategy for the shoulder that considers local and referred sources of pain and directs the clinician to develop an appropriate management plan.
4. To develop greater confidence with the physical assessment of the shoulder region and a better understanding of the evidence for the use of the selected assessment techniques.
5. To develop a greater understanding and knowledge of various pathologies of the shoulder girdle.
6. To develop greater competency in the management of patients with a variety of shoulder pathologies.
7. To review the research evidence relating to the influence of posture and muscle imbalance and its relationship with shoulder pathology.
8. To review the evidence underpinning the pathology, and the assessment and management of various shoulder conditions, including rotator cuff related shoulder pain and frozen shoulder
9. To review the research evidence evaluating the use of diagnostic imaging as part of the management for musculoskeletal disorders of the shoulder.
10. To review the research evidence evaluating the use of injections as part of the management for musculoskeletal disorders of the shoulder.
11. To develop greater confidence in the use of exercise therapy and other techniques for managing shoulder conditions and evaluation of the efficacy of the techniques, balanced against the evidence base for using these techniques.

Participant's Comments

- *"Before I did this course the world was flat!"*
- *"Complete change to the way I think about shoulders. Best course I have ever done".*
- *"Fantastic course as example of how to treat within the biopsychosocial model. A very competent and relevant approach with respect to where physiotherapy is at currently. The shoulder provides the topic, but the clinical processing could be applied elsewhere. I don't think anyone is teaching such a balanced approach currently".*
- *"Many thanks again for an inspiring course. I loved it!"*
- *"Great explanations, very in-depth, great synthesis of research evidence".*
- *"Thank you, thank you, fantastic, great teaching style, great sense of humour".*
- *"Excellent rationale for phased rehabilitation".*
- *"One of the best courses I have ever done".*
- *"100% useful. Very inspirational. Best shoulder course yet".*
- *"One of the best courses I have been on, all courses should aim to be this good".*
- *"What an amazing course. Have had an unbelievable result this week I also have to say that I have never been able to sit solidly at a course where there is a lot of theory and not zone out at some point. I think you talk so well and you're so interesting that I was gripped the whole time! That's a first for me and only been qualified 20 years!!*
- *"Excellent information with references to support course content".*
- *"Excellent, I have changed how I treat the upper limb and neck pain and have had excellent results".*
[from participant who had re-attended]
- *"Brilliant presentation, extremely useful material and very appropriate for current practice"*
- *"Jeremy was relaxed and informative and gave us a lot of valuable information in a non-threatening way, the evidence base was excellent".*
- *"Excellent teacher". "Inspirational course".*
- *"Probably one of the most useful and reassuring courses I have been on".*
- *"By far the most informative, research based and thought-provoking course I have been on".*
- *"Course leader was excellent, and the course was very stimulating and thought provoking".*
- *"The tutor had great depth of knowledge, great sense of humour, was very relaxed and very approachable".*
- *"The presentation was excellent and the evidence base brilliant and relevant to me as a clinician and provided me with great ideas for rehabilitation".*
- *"Excellent presentation style. Enjoyed lectures and practical sessions. Very impressed with depth and breadth of knowledge and how well it relates to clinical practice".*
- *"Up to date research, excellent techniques, enlightening, holistic, course should be compulsory".*

The Shoulder: *Theory and Practice*

(22nd Edition - 2022)

Handbook Content

Section	Content	Page
	Course Program	4
	Learning Objectives	5
One	Introduction	7
Two	Function	13
Three	Assessment	23
Four	Rotator Cuff Related Shoulder Pain (#RCRSP)	53
Five	Shape-Up-My-Shoulder (#SUMS)	73
Six	Frozen Shoulder	115

Please read

Polite Notice: I love teaching this course and I update it whenever I find something new and relevant or we have published new research that may contribute to clinical practice.

In the interest of environmental sustainability this handout is provided digitally when possible.

It is yours, for your personal use, but not yours to share with anyone else, in any format. **Please** respect this request.

Thank you, and enjoy the course.

Section One: Introduction

Global Years Lived with Disability

1990

- 1 Low back pain
- 2 Headache disorders**
- 3 Dietary iron deficiency
- 4 Depressive disorders
- 5 COPD
- 6 Age-related hearing loss
- 9 Diabetes

2017

- 1 Low back pain
- 2 Headache disorders**
- 3 Depressive disorders
- 4 Diabetes
- 5 Age-related hearing loss
- 6 COPD†
- 7 Dietary iron deficiency

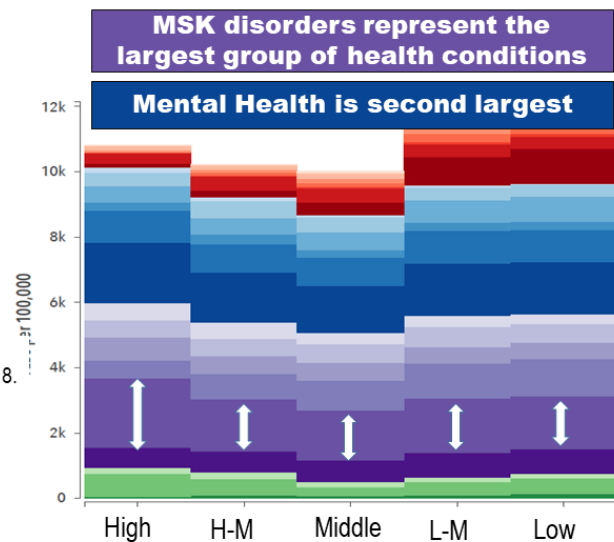
Global Burden of Disease Study 2017 Incidence, Prevalence, and Years Lived with Disability 1990-2017. Institute for Health Metrics and Evaluation (IHME), 2018.



Mean of 10 years lost to LBP disability!

vdW et al 2022 Chapter 3. Shoulder: T&P

Socio-Demographic Index (SDI = income, education & fertility) 2017



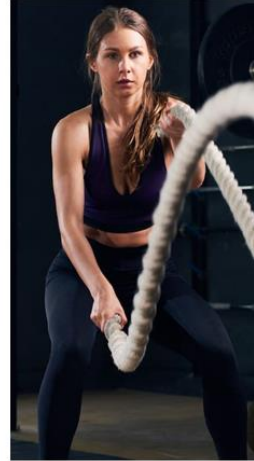
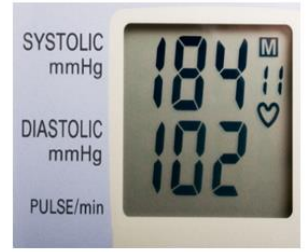
The Burden of Shoulder Pain & Disability



- ◆ Shoulder problems = 2nd - 4th most common MSK condition
- ◆ Up to 50% of adults experience shoulder pain over the course of a year
- ◆ 70% lifetime prevalence (LBP = 90%)
 - Arguably an unpleasant but normal life experience
- ◆ Women (up to 15%) greater prevalence than men
- ◆ Up to 34% of people > 65 years experience shoulder pain (point prevalence)
- ◆ 40% to 54% of people report on-going symptoms up to 1-3 years

Van der Windt, Lucas, Hegedus and Lewis (2022) The burden of shoulder pain and disability. Chapter 3 in Lewis J and Fernández-de-las-Peñas C (2022) The Shoulder: Theory and Practice. Handspring Publishing.

Chard et al 1991, Van der Windt et al 1996, Macfarlane et al 1998, Winters et al 1999, Bot et al 2005, Wofford et al 2005, Linsell et al 2006, Pribicevic 2012, Kooijman et al 2013, Paloneva et al 2013, Chen et al 2018



- Empathy
- Support
- Education
- Therapeutic alliance



as required

BMJ Journals Editorial

<http://dx.doi.org/10.1136/bjsports-2018-099198>

British Journal of
Sports Medicine

Is it time to reframe how we care for people with non-traumatic musculoskeletal pain? **FREE**

Jeremy Lewis Peter O'Sullivan

Statistics from Altmetric.com



-  Picked up by **6** news outlets
-  Blogged by **2**
-  Tweeted by **2167**
-  On **87** Facebook pages
-  Mentioned in **1** Google+ posts
-  **396** readers on Mendeley



[VIEWPOINT]

JEREMY S. LEWIS, PT, PhD, FCSP1-3 • CHAD E. COOK, PT, MBA, PhD, FAPTA4,5
TAMMY C. HOFFMANN, PhD6 • PETER O'SULLIVAN, PT, PhD7,8

The Elephant in the Room: Too Much Medicine in Musculoskeletal Practice



Advances in assessment and management of musculoskeletal conditions (eg, fracture management) have improved care for many people. We contend that there have been other, less beneficial developments in the provision of care for people with musculoskeletal pain conditions—one is the worrying tendency to provide too much medicine.

<https://www.jospt.org/doi/abs/10.2519/jospt.2020.0601>

JOSPT



TOO MUCH MEDICINE AND MEDICALISING NORMALITY
The elephant in the room in contemporary musculoskeletal practice.
Lewis J, Cook C, Hoffmann T, O'Sullivan P. The elephant in the room: Too much medicine in musculoskeletal practice. JOSPT 2019

EXAMPLES OF TOO MUCH MEDICINE

NON-SURGICAL INTERVENTIONS

- Misinformation that interventions such as acupuncture, manual therapy, injections, medication etc. will 'fix' the problem.

For example: the opioid epidemic

SURGICAL INTERVENTIONS

- Surgeries that perform no better than placebo (knee, shoulder, back, etc.).
- Surgery prioritised when equally effective and cheaper alternatives exist (e.g. graduated activity).

For example: subacromial decompression

EXAMPLES OF MEDICALISING NORMALITY

POSTURAL 'ABNORMALITIES'

- Pathologising 'abnormalities' that are variations of normal.
- Falsely attributing symptoms to variations in postural alignment.

For example: plumb-line assessment

IMAGING 'ABNORMALITIES'

- Imaging may be normal age-related changes and may not be associated with pain or symptoms.
- Injections and surgery to 'fix' the 'problem' may result in 'pro' being performed on bi-asymptomatic.

For example: Disc bulge

WHAT'S NEEDED

EDUCATE AND EMPOWER CLINICIANS AND PATIENTS
PATIENT CENTRED CARE
CARE WITH LANGUAGE
GOV TO SELF MANAGEMENT

SUGGESTED CHANGE

PATIENTS
Ask questions, discuss options, take an active role.

CLINICIANS
Discuss all options (harms, benefits), preferences, check understanding, avoid nocebo.

POLICY MAKERS
De-fund low value care. Fund high value care.

EDUCATORS
Be contemporary, teach appraisal skills, teach shared decision making.

HEALTHCARE INDUSTRY
Use common language, promote interprofessional practice.

MEDIA
Recognise and avoid the harm of 'sensationalist' (mis)reporting.

TOGETHER, WE NEED TO ACKNOWLEDGE THAT HEALTHCARE RESOURCES ARE FINITE

Is it time to reframe how we care for people with non-traumatic musculoskeletal pain?
Reference: J. Lewis & P. O'Sullivan, BJSM 2018 @JeremyLewisPT, @PeteOSullivanPT
Designed by eYMSportScience with docuform

OFFERING A CURE

result in the individual believing that their body is damaged, fragile and in need of protection

And a cascade of movement & activity avoidance behaviours

Treatment

Healthcare provider acting as a fixer

Are often biased to low value 'passive' therapies including high elective surgical rates

PROVIDING A PLAN

Musculoskeletal pain conditions are influenced by multiple interacting factors

Genetics, Psychological factors, Lifestyle, Social factors, Biophysical factors, Comorbidities

Management

Person centred care, Education

Relax, move, get strong and physically active

x Empathy x Honesty x Empower

Healthcare provider acting as a coach

To help individuals to change their mind-set, build self-efficacy and ultimately take charge of their own health

Psychosocial factors... & shoulder pain

BJSM



Psychological factors are associated with the outcome of physiotherapy for people with shoulder pain: a multicentre longitudinal cohort study

Chester R, Jerosch-Herold C, Lewis J, Shepstone L



<http://dx.doi.org/10.1136/bjsports-2016-096084> (2016) n = 1030

Best outcomes were associated with **high levels self-efficacy**

Poor outcomes were associated with **low levels of self-efficacy**

People who believe that are going to get better - do

People who believe that are not going to get better - don't

Also...

- ▶ **Number of comorbidities**
- ▶ **Level of education**

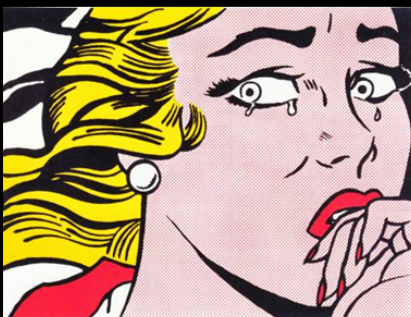
- ▶ **Social & environmental factors**
- ▶ **Duration of symptoms**

www.drjeremylewis.com

“...words are, of course, the most powerful drug ...”

Rudyard Kipling - Royal College of Surgeons (London, 1923)

...we've all heard



Lichtenstein Crying Girl 1963

www.drjeremylewis.com

“If we don't operate on your tear it will get bigger, and then we won't be able to repair it, you might not be able to use your arm”

“It's your posture - it isn't great & your shoulder blade is compressing into your tendon - we have to fix your posture!”

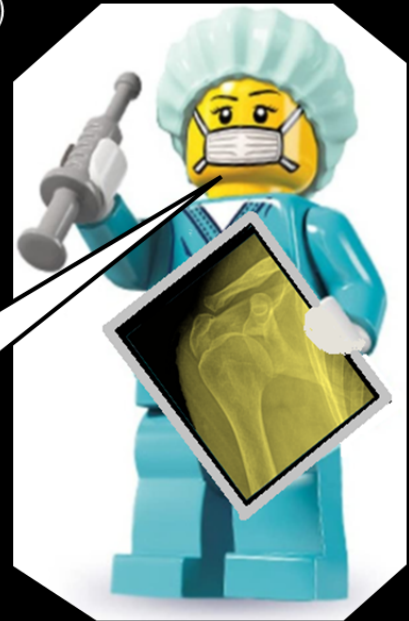
“Your acromion is causing your pain, it's ripping into your tendon”

“All you need to do is get strong”

“...words are, of course, the most powerful drug ...”

Rudyard Kipling - Royal College of Surgeons (London, 1923)

“We see these changes in most people. And we see them in many people without any symptoms at all. In fact we don't think they cause pain in most people. We know a well constructed exercise program generally works very well and I would recommend that you go and fully engage with your physiotherapist. It may take some time. And of course if you don't feel that you are improving, my door is always open.”



www.drjeremylewis.com

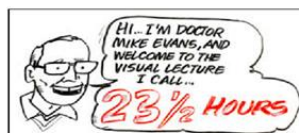
Health Literacy

Nearly half the European population are thought to have difficulties identifying, understanding and using health information. This has real and negative health consequences.

Investing in health literacy David McDaid POLICY BRIEF 19
http://www.euro.who.int/__data/assets/pdf_file/0006/315852/Policy-Brief-19-Investing-health-literacy.pdf?ua=1



Feelings about the quality of care you offer will be formed before you are seen



What was the most important message in this video?

What didn't you understand?



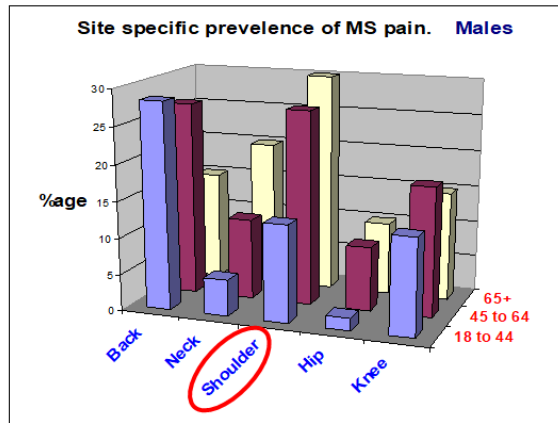
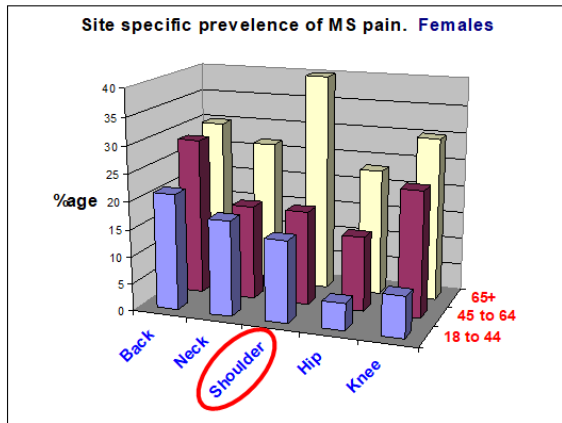
Improving Health Literacy: Clinician and Patient Resources



<https://www.youtube.com/watch?v=5bUf9VcYLml>

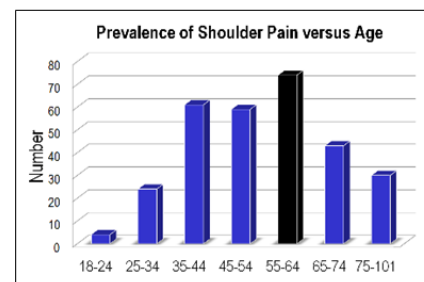
<https://www.youtube.com/watch?v=XEy5k6GBYZ4>

Make your own!



Taylor (2005)
NZ Med Journal 118

Parsons et al (2007)
Family Practice
n = 424 / 2494



Section Two: **Function**

Shoulder Function



What do shoulders do?

Push



Lift



Throw



Pull



& Carry



Precision



... all essential in rehabilitation



The shoulder is the **most mobile** region of the body

...& can **move faster** than any other joint in the body



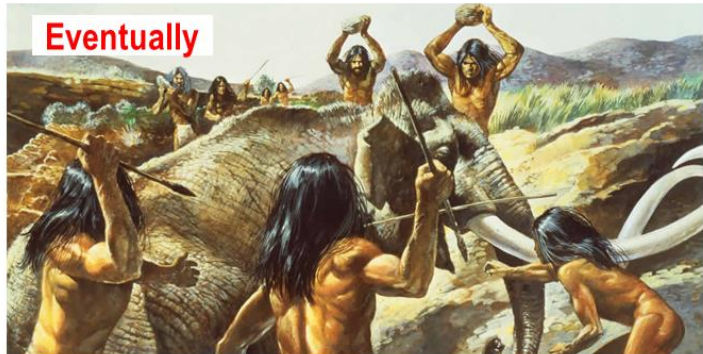
Dilliman et al 1993, Feltner 1989, Huijbregts 1998 Kibler & Chandler 1995, Seroyer et al 2010, Sciascia & Cromwell 2012



Jeremy Lewis #RCRSP  YouTube
<https://www.youtube.com/watch?v=5bUf9VcYLml>

Why the need for such a fast & mobile shoulder? ...Paleoanthropologists argue evolution

Protection and Predation



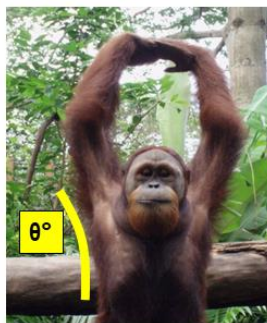
Lewis J and Fernánde-de-las-Peñas C (2022) *The Shoulder: Theory and Practice*. Edinburgh. Handspring Publishing.
 Roach et al (2013) Elastic energy storage in the shoulder & the evolution of high-speed throwing in Homo. *Nature*. 498: 483-486
 Lewis et al (2001) Subacromial Impingement Syndrome: Has evolution failed us? *Physiotherapy*. 87: 191-198.

Throwing

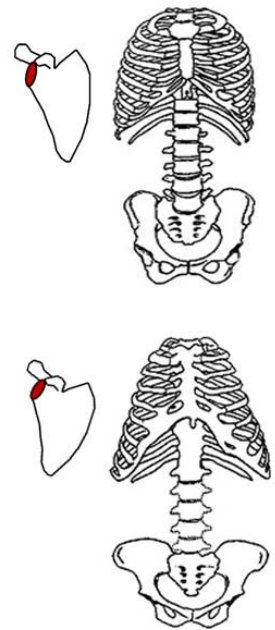


Can

Can't



Brachiating



Lewis J and Fernánde-de-las-Peñas C (2022) *The Shoulder: Theory and Practice*. Edinburgh. Handspring Publishing.
 Roach et al (2013) Elastic energy storage ... & the evolution of high-speed throwing. *Nature*.

www.drjeremylewis.com

Rotator Cuff Related Shoulder Pain¹

RISK FACTORS²

Level of Evidence

Strong



> 50 years of age



Diabetes

Moderate



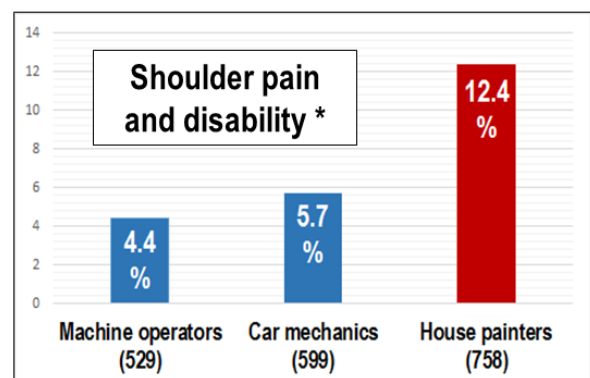
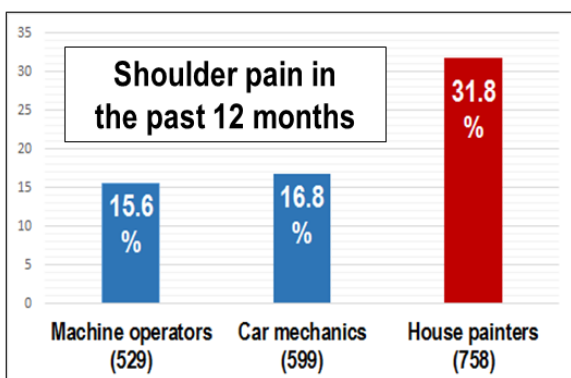
Overhead activities

¹ Lewis (2016) Rotator cuff related shoulder pain *Manual Therapy*

² Leong et al (2019) Risk factors for RC tendinopathy. *SR &MA J Rehab Med* <https://www.ncbi.nlm.nih.gov/pubmed/31489438>

Working above 90° elevation is associated with increased levels of shoulder pain

% of time / day > above 90°	
Machine operators	8 %
Car mechanics	8 %
House painters	22 %



Svendson et al (2004) Work related shoulder disorders: quantitative exposure-response relations with reference to arm posture. *Occup Environ Med.* 61: 844-853

Ergonomic considerations

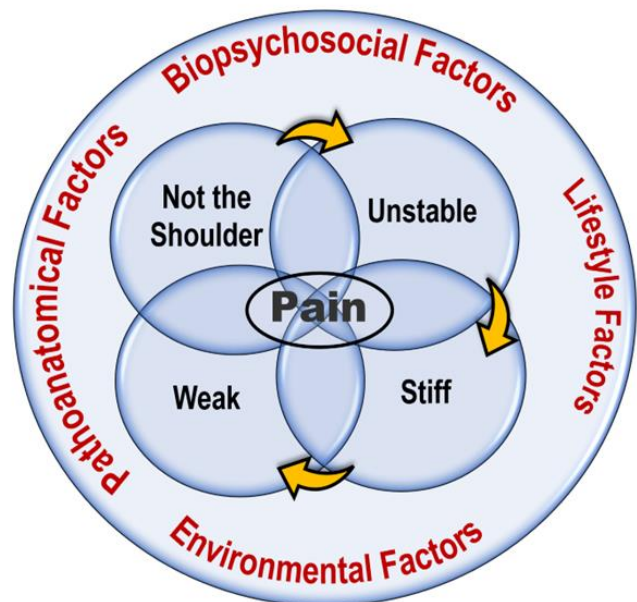
Is there an ergonomic suggestion that should be considered and part of the management strategy?



The Kinetic Chain BPS factors



Richardson, Lewis, Gibson et al (2020) Role of the kinetic chain in shoulder rehabilitation: SR of EMG studies. *BMJ Open Sport & Exercise Medicine*.



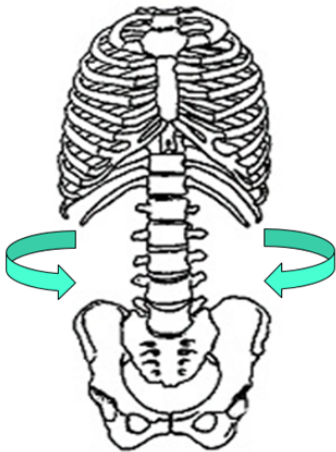
Lewis J and Fernandez-de-las-Peñas C (2022) *The Shoulder: Theory and Practice*. Edinburgh. Handspring Publishing. www.drjeremylewis.com

▶ What often appears to be arm elevation > than 90° is trunk side flexion

▶ Trunk side flexion and rotation are essential for shoulder and UL activities



Energy transfer from the lower limbs



Lewis J & Fernández-de-las-Peñas C (2022)
Roach et al (2013)
Lewis et al (2001)



Tennis Serve

Legs / Trunk	54%
Shoulder	21%
Elbow	15%
Wrist	10%

Kibler (1995)

Pitching

24% decrease at hips requires a **34% increase** at shoulder

Sciascia and Cromwell (2012)



Swimming

National & International Level

- Train twice daily, up to 7x / week
- 50-80 km / week
- Up to 11 months year
- 10 km day = 6060 strokes / day
- Up to 2,000,000 strokes per year
- Arms up to 90% of propulsion

Strength maximal resistance in 1 effort

Power speed the resistance can be moved

$Power = W (Work) / t (time)$

$Work = force \times distance$



Address ergonomics of swimming

Chapter 39

Rehabilitation in swimmers

Sally McLaine, Helen Walker, Craig Boettcher

Lewis J and Fernández-de-las-Peñas C (2022) The Shoulder: Theory and Practice. Edinburgh. Handspring Publishing.

Functional Tests

Rest of body screening* (as appropriate)

Walking on spot Arm raising as appropriate (time)		
Knee bends Arms supported on table, chair back as appropriate (number)		
Sit to stand Concentric and eccentric - no arm support		
Sit to stand - unilateral Concentric and eccentric - no arm support	Left:	Right:
Step ups (automatic) step height	Left:	Right:
Single leg stance - hip and knee flexed to 90° 10 seconds eyes open / 10 seconds eyes closed	Left:	Right:
In line lunge Knees flexed and opposite heel touching, back straight	Left:	Right:
Lunge Tibia perpendicular, 10 without fatigue	Left:	Right:
Standing forward hop Start feet together, measure distance (for LL power)	Left:	Right:
Heel raises - bilateral if unilateral not possible / not appropriate		
Heel raises - unilateral 10 without fatigue, no more than difference of 3 L to R	Left:	Right:
Deep squat - unilateral 90° flexion, aim to get to 90° knee flexion, 10 times	Left:	Right:
Decline squat - unilateral 25° decline, aim to get to 90° knee flexion, 10 times	Left:	Right:
Decline squat - bilateral - if unilateral not appropriate 25° decline, aim to get to 90° knee flexion, 10 times		
Bridge - bilateral Aim for thighs and trunk to be parallel		
Bridge - unilateral Aim for thigh and trunk to be parallel, contra-knee extended	Left:	Right:
Single leg press Start knee 90°; aim for 1.25x body weight	Left:	Right:
Bilateral leg press - if unilateral not appropriate Start knee 90°; aim for 1.5x body weight		
Abdominal knees flexed, elbows extended, semi out-up (yellow under head) touch patella. Number of reps	30 secs:	60 secs:
Other:		
Height (m)	Weight (kg)	BMI (kg / m ²) (18.5 under, 18.5-24.9 normal, 25-29.9 overweight, >30 obese)
Waist circumference (around umbilicus) Increased risk diabetes, cardiac disease, cancer		cm (Increased risk: men >94cm, women >80cm. Significant risk: >102cm, >88cm)

Left humeral head #



In line lunge



Download from www.drjeremylewis.com



Lifting cabin luggage (7-10 kgs) requires co-ordinated activity of trunk, upper & lower limbs (including foot planter flexion)

Shoulder rehab = whole body rehabilitation



And for some...
cognitive rehabilitation as well!



Physiotherapy

Physiotherapy 103 (2017)
446-452

Updated reliability and normative values for the standing heel-rise test in healthy adults

K. Hébert-Losier^{a,*}, C. Wessman^b, M. Alricsson^c, U. Svantesson^d



1 per 2 seconds

Age (years)	Male		Female	
	Left side	Right side	Left side	Right side
20	37.4 (15.8, 51.1)	37.5 (16.7, 55.3)	29.6 (13.2, 47.2)	30.7 (13.6, 49.4)
30	32.7 (12.7, 47.5)	33.0 (13.7, 50.4)	26.8 (10.6, 44.2)	28.0 (11.1, 46.0)
40	28.1 (9.6, 43.9)	28.5 (10.6, 45.6)	24.0 (8.0, 41.2)	25.3 (8.6, 42.5)
50	23.5 (6.5, 40.4)	24.0 (7.6, 40.7)	21.3 (5.5, 38.3)	22.6 (6.4, 39.1)
60	18.8 (3.4, 36.8)	19.5 (4.5, 35.9)	18.5 (2.9, 35.3)	19.9 (3.5, 35.7)
70	14.2 (0.3, 33.2)	14.9 (1.5, 31.0)	15.7 (0.3, 32.3)	17.2 (1.0, 32.2)
80	9.6 (0.0, 26.6)	10.4 (0.0, 26.2)	12.9 (0.0, 29.4)	14.5 (0.0, 28.8)



Time to complete 5 (five) sit to stands



Descriptive statistics for time (sec) for 5 sit-to-stand repetitions

Measurement (n)	Mean + SD	Minimum-Maximum
Mean: 19-49 years (39)	6.2 + 1.3	4.1 - 11.5
Mean: 50-59 years (15)	7.1 + 1.5	4.4 - 9.1
Mean: 60-69 years (18)	8.1 + 3.1	4.0 - 15.1
Mean: 70-79 years (16)	10.0 + 3.1	4.5 - 15.5
Mean: 80-89 years (6)	10.6 + 3.4	7.8 - 16.0

Community Dwelling Adults:

(Bohannon, 2007; n = community dwelling adults; mean age = 51 (20.8) years, Community-Dwelling Adults)

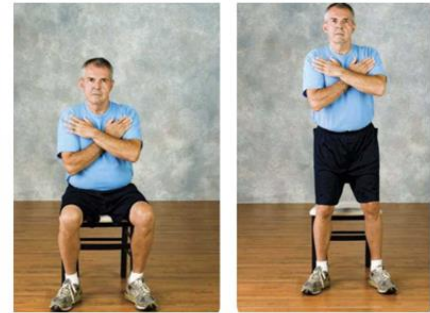


Time to complete 10 (ten) sit to stands



Age	Men	Women
<35 years	<10 seconds	<12 seconds
35-55 years	<13 seconds	<15 seconds
>55 years	<19 seconds	

How many complete sit to stands in 30 seconds



Moderately Active Older Adults:

Normative data published in Rikli and Jones 1999b

(Rikli and Jones, 2013; $n = 2140$ moderately active older adults)

Criterion fitness standards to maintain physical independence ←

Age	60-64	65-69	70-74	75-79	80-84	85-89	90-94
Women	15	15	14	13	12	11	9
Men	17	16	15	14	13	11	9

Hand grip strength is an indicator of overall strength and predictor of important outcomes



Age ^a	n	Hand ^b	Men (n=526)				Women (n=482)					
			Mean	SD	SEM	Min-Max	n	Hand	Mean	SD	SEM	Min-Max
20-24	55	D	54.4	9.4	1.27	33.7-77.7	44	D	28.5	6.2	0.93	15.3-42.5
		ND	51.9	8.0	1.08	32.3-70.0	ND	26.1	5.9	0.89	13.3-37.5	
25-29	43	D	50.9	10.2	1.56	33.3-71.7	42	D	29.6	4.6	0.71	19.0-38.7
		ND	49.9	9.6	1.46	31.3-70.0	ND	26.6	8.4	0.74	17.3-37.3	
30-34	37	D	52.6	8.1	1.33	37.7-69.7	42	D	29.4	5.2	0.80	17.0-41.2
		ND	49.4	7.5	1.23	37.3-71.0	ND	26.4	5.0	0.77	14.3-36.0	
35-39	40	D	48.9	7.7	1.22	31.7-72.3	42	D	29.7	4.5	0.70	21.0-39.7
		ND	46.5	7.1	1.13	32.7-66.7	ND	27.7	4.1	0.63	18.0-38.0	
40-44	39	D	48.2	7.3	1.17	32.7-66.3	42	D	29.4	4.6	0.72	21.0-40.3
		ND	45.9	6.1	0.98	31.1-56.7	ND	26.9	4.7	0.73	18.7-37.7	
45-49	43	D	47.2	7.5	1.14	31.7-71.3	43	D	29.1	5.9	0.89	19.2-50.0
		ND	44.8	7.0	1.07	29.3-69.7	ND	27.3	5.5	0.83	16.7-43.7	
50-54	51	D	43.7	7.0	0.97	30.2-58.7	44	D	26.5	5.1	0.77	16.3-38.3
		ND	41.4	6.9	0.97	27.5-61.3	ND	24.9	5.3	0.80	13.8-38.7	
55-59	41	D	42.2	6.7	1.04	28.0-58.7	39	D	24.9	4.8	0.77	13.3-35.3
		ND	40.2	5.8	0.90	28.7-53.0	ND	23.5	5.0	0.80	12.0-31.7	
60-64	46	D	41.4	6.9	1.01	29.7-57.7	40	D	24.6	4.2	0.66	17.0-33.7
		ND	39.4	5.9	0.87	27.3-50.7	ND	23.4	3.8	0.61	17.3-32.8	
65-69	39	D	35.9	7.9	1.27	16.0-56.0	37	D	22.0	4.9	0.81	10.7-32.7
		ND	35.9	6.6	1.06	18.3-54.3	ND	20.8	4.4	0.72	10.9-28.3	
70-74	46	D	34.0	6.3	0.93	17.7-45.0	34	D	22.4	4.5	0.77	16.5-34.3
		ND	32.3	6.0	0.89	16.7-44.0	ND	20.8	4.7	0.80	11.7-30.3	
75<	46	D	30.2	7.8	1.15	14.8-49.3	33	D	17.9	4.6	0.79	8.7-25.3
		ND	28.7	7.2	1.06	14.1-44.3	ND	17.2	4.1	0.71	7.3-26.3	
Total	526	D	44.1	10.8	0.47	14.8-77.7	482	D	26.5	6.1	0.28	8.7-50.0
		ND	42.2	9.9	0.43	14.1-71.0	ND	24.6	5.6	0.26	7.3-43.7	

^aYears/^bD, Dominant hand; ND, Non-Dominant hand

Normative Data of Grip Strength (in kg force) for all subjects by age and sex (n=1008)

Section Three: Assessment



The Shoulder: Theory & Practice Section 3: Shoulder Assessment



Which impairment tests?
ROM, Strength, Pain
Posture

Which Questionnaires?

Is imaging relevant?



Which orthopaedic tests should I use?

Should I request?

- ▶ Diagnostic Injections
- ▶ EMG
- ▶ Nerve conduction
- ▶ Blood tests

Are functional tests relevant?

“Involves making complex clinical decisions in *highly ambiguous situations*”
Lewis & Fernández-de-las-Peñas (2022) *The Shoulder: Theory & Practice*. Handspring Publishing

Where are the symptoms coming from?

Psychosocial Factors

Referred Pain

- Cervical
- Thoracic
- Abdomen



Pain Science

Stiff Shoulder

- Frozen Shoulder
- Osteoarthritis
- Locked dislocation
- Osteosarcoma

Posture

Hypermobility Instability

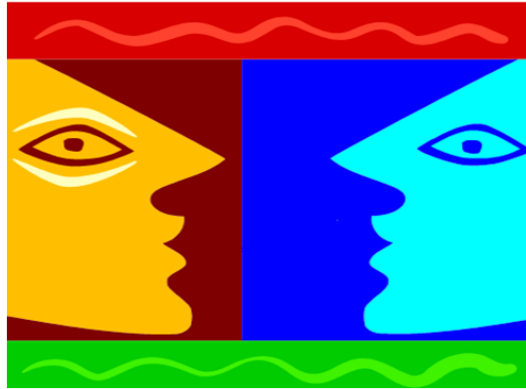
Soft tissue

- Rotator cuff
- Bursae
- Capsule & Ligaments
- Muscles & tendons

www.drjeremylewis.com

Interview

Inter (between us) **view** (we see)



William Miller

www.drjeremylewis.com

Patient Interview

No-one cares how much you know, until they know how much you care

- **Meet and greet**
 - The first walk
 - The first question



- **Initial introduction**
 - “Please call me...”
 - “How would you like to be addressed?”
- **Set the scene**



Mike Stewart et al (2018) Sticks and Stones: The Impact of Language in MSK Rehabilitation *JOSPT* 48:519-522 | Edith Eger “The Choice”
Zulman et al (2020) Practices to foster physician presence and connection with patients in the clinical encounter. *JAMA*: 323: 70-81
Prof. Tamar Pincus / Royal Holloway / University of London / Publications | Peter O’Sullivan Course + Publications + [ncbi.nlm.nih.gov/pubmed/30826805](https://pubmed.ncbi.nlm.nih.gov/30826805)

Patient Interview

No-one cares how much you know, until they know how much you care

- **Invite the patient to discuss their problem freely**

“Tell me your story” “Why have you come to see me today?”

Don't interrupt! Most patients complete their opening statement between 1 & 3 minutes. Doctors & physiotherapists reported to interrupt during opening sentence after 18-23 seconds. When interrupted patients may not report 2-3 health concerns!

- **Take a full history, screen for red flags & co-morbidities, life-style, location, behaviour and relationship of symptoms, prescribed & over the counter medications & supplements, etc**



Mike Stewart et al (2018) Sticks and Stones: The Impact of Language in MSK Rehabilitation *JOSPT* 48:519-522 | Edith Eger “The Choice”
Zulman et al (2020) Practices to foster physician presence and connection with patients in the clinical encounter. *JAMA*: 323: 70-81
Prof. Tamar Pincus / Royal Holloway / University of London / Publications | Peter O'Sullivan Course + Publications + [ncbi.nlm.nih.gov/pubmed/30826805](https://pubmed.ncbi.nlm.nih.gov/30826805)

Patient Interview – Questions to consider

- ▶ “How does living with this pain (problem) effect you?”
- ▶ “What are your concerns?”
- ▶ “Was there anything you used to really enjoy doing that you can't do now?”
- ▶ “What would you be doing if you didn't have this shoulder pain (problem)?”
- ▶ What will it take to be able to do achieve that again?”
- ▶ “How can I be of most use to you?”
- ▶ “While we work together how can I support you best to manage your shoulder problem?”



Mike Stewart et al (2018) Sticks and Stones: The Impact of Language in MSK Rehabilitation *JOSPT* 48:519-522 | Edith Eger “The Choice”
Zulman et al (2020) Practices to foster physician presence and connection with patients in the clinical encounter. *JAMA*: 323: 70-81
Prof. Tamar Pincus / Royal Holloway / University of London / Publications | Peter O'Sullivan Course + Publications + [ncbi.nlm.nih.gov/pubmed/30826805](https://pubmed.ncbi.nlm.nih.gov/30826805)

Patient Interview



Questions to consider

- ▶ “What do you think is causing your pain (symptoms)?”
- ▶ “What activity (posture or movement) causes you the most concern?”
- ▶ “How quickly do you expect to get better?”
- ▶ “What are you doing for your pain (symptoms)?”

- ▶ “Is there something else that might be important for me to know, to better understand how I may help?”

- ▶ “Would it be helpful to develop a plan if you have a flare-up?”



Mike Stewart et al (2018) Sticks and Stones: The Impact of Language in MSK Rehabilitation *JOSPT* 48:519-522 | Edith Eger “The Choice”
Zulman et al (2020) Practices to foster physician presence and connection with patients in the clinical encounter. *JAMA*: 323: 70-81
Prof. Tamar Pincus / Royal Holloway / University of London / Publications | Peter O’Sullivan Course + Publications + [ncbi.nlm.nih.gov/pubmed/30826805](https://pubmed.ncbi.nlm.nih.gov/30826805)

Patient Interview

- **Validation** Affirmation that feelings, experiences and opinions are respected, important & valid
- **Clarification** “Was there anything I said / did that didn’t make sense?”
“Is there anything that you would like to talk about further?”
- **Imaging findings** “How does this finding apply to you?”
- **Summarise back** “Let me make sure I have this right...”
- **Remain calm** Don’t panic, be confident and give hope
- **Social support** “Who will tell?”
- **Health literacy** “What will you say?” (K O’Sullivan Test)

Shared decision making should be an integral part of physiotherapy practice

Tammy C. Hoffmann • Jeremy Lewis • Chris G. Maher

Published: August 21, 2019 • DOI: <https://doi.org/10.1016/j.physio.2019.08.012>



SDM involves providing evidence-based information relating to tests and management options in an unbiased & understandable manner that evolves as new knowledge emerges



Shared decision making | Management

“What do you think about the treatment I have suggested?”
 “Here is what I can do” | “Here is what you can do”

www.drjeremylewis.com

SDM – Patient Decision Aid

Reported experiences at 2 years

Physiotherapy



89 people satisfied
 11 people not satisfied

Acromioplasty & Physiotherapy



95 people satisfied
 5 people not satisfied

Acromioplasty, Repair & Physiotherapy



94 people satisfied
 6 people not satisfied

Kinesither Rev 2020;20(217):9–21

Développement d'un outil d'aide pour la prise de décision partagée en cas de douleurs d'épaule associées à une déchirure non-traumatique de la coiffe des rotateurs

A patient decision aid to facilitate shared decision-making for patients with shoulder pain associated with a non-traumatic rotator cuff tear

Guillaume Deville
 Jo Gibson
 Jeremy Lewis
 Matthieu Guémann

www.drjeremylewis.com

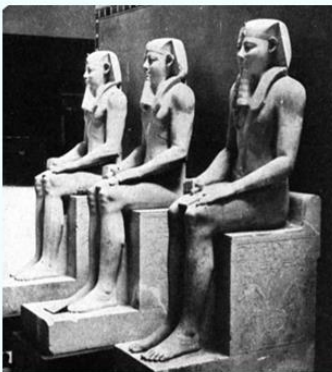
Physical Assessment:

Why wasn't posture on the list?

www.drjeremylewis.com

"It's your posture"

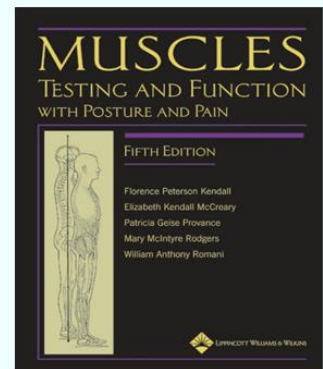
Good posture has always been associated with good health



Erect sitting posture
Ancient Egypt



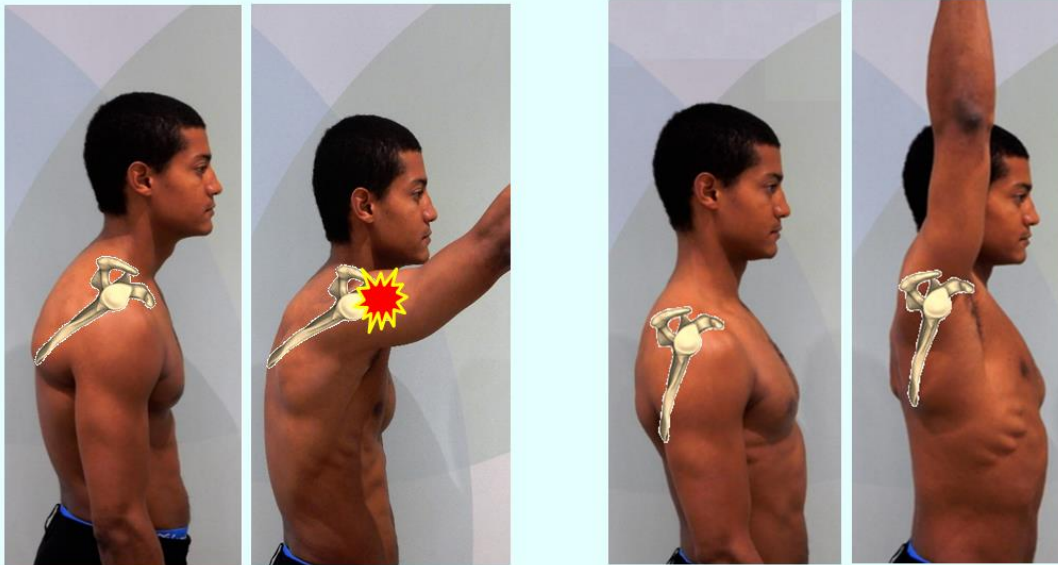
Winners of **Miss Perfect Posture** (1956)
Chiropractic Conference, Chicago, USA



Contemporary
texts

www.drjeremylewis.com

The hypothesis... *“It’s your posture”*



www.drjeremylewis.com

“It’s your posture!!!” ...is it?



Lewis J, Green A, Wright C

SIS: The role of posture & muscle imbalance.
JShES (2005) *“Upper body posture does not follow the postural patterns described in the literature”*



Lewis J and Valentine RE

The pectoralis minor length test
BMC Musculoskeletal Disorders (2007)
“The test is reliable but not valid”



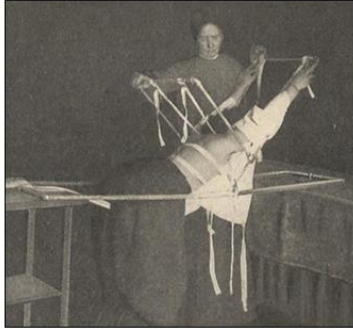
Ratcliffe L, Pickering S, McLean S, Lewis J

Is there a relationship between subacromial impingement syndrome and scapular orientation? A SR. *BJSM* (2015)
“No evidence to support definitive scapular posture with impingement syndrome”



Correcting 'poor' posture

Straightening the spine



Journal of Hand Therapy

2018, Volume 31, Issue 3, Pages 301-307

An evaluation of two types of exercise classes, containing shoulder exercises or a combination of shoulder and thoracic exercises, for the treatment of nonspecific shoulder pain: A case series

[Eva Barrett](#), PhD [Carmela Conroy](#), PT

[Marie Corcoran](#), PT [Kieran O' Sullivan](#), PhD

[Helen Purtill](#) PhD [Jeremy Lewis](#), PhD, FCSP

[Karen McCreesh](#), PhD

Discussion/Conclusion

Group exercise classes can improve shoulder pain and disability in people with NSSP.

Resting thoracic kyphosis did not change after either exercise intervention, which suggests that the treatment effect was not due to a change in static thoracic spine posture.

Physical Assessment:

Why weren't orthopaedic tests on the list?

www.drjeremylewis.com

Special Orthopaedic Tests: To use or not to use?

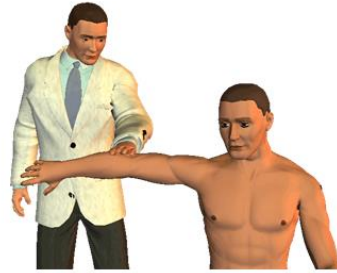
Special Orthopaedic Tests are used to clinically diagnose conditions or identify symptomatic tissues



Neer impingement sign



Hawkins impingement test



Rotator cuff tests

What do we know about these special tests?

Pictures: Tennent et al (2003). A review of the Special Tests... Part I. *AJSM* 31: 154-60.

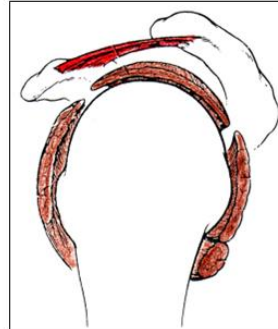


The 'empty' & 'full can' tests do not selectively activate supraspinatus

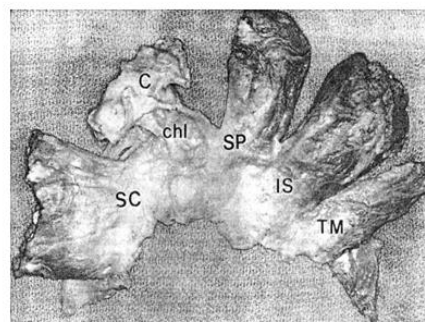
EMG activity from 13 muscles in 15 asymptomatic people

- ▶ FC = 8 shoulder muscles **equally activated**
- ▶ EC = 9 shoulder muscles **equally activated**

Boettcher, Ginn, Cathers *J Sci Med Sport*. 2009 12:435-439



Anatomical text books describe tendons as distinct structures
(Basmajian 1975, Williams et al 1995)

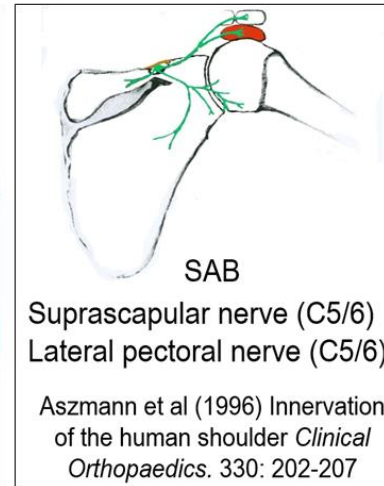
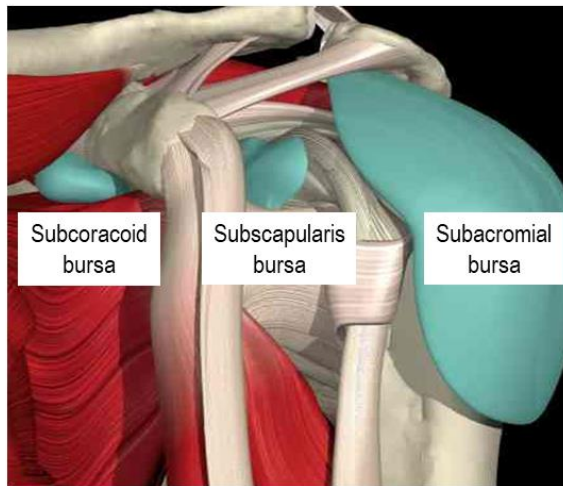


RC tendons fuse to form a common insertion (aponeurosis) on the humeral tuberosities
(Clark and Harryman 1992)

www.drjeremylewis.com

Why the Orthopaedic Tests cannot diagnose structures: **Bursae**

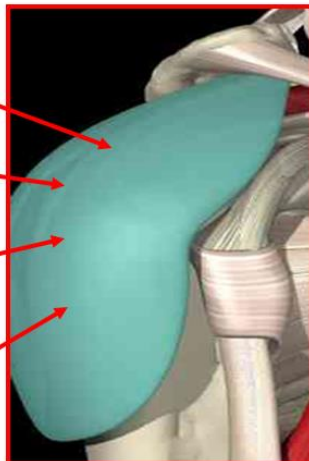
- ▶ 6-12 bursae around the shoulder
- ▶ Decrease friction during movement



www.drjeremylewis.com

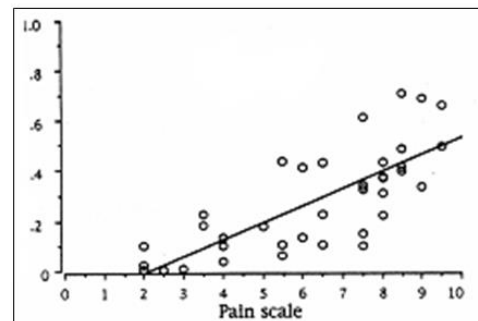
Multiple substances identified in the SAB that may stimulate SAB nociceptors & **may** result in pain

- **Substance P**
- **Cytokines**
IL-1 β , TNF- α , VEGF, IL-6
- **MMPs**
MMP1, MMP9
- **Cyclo-oxygenase enzymes**
Cox 1, Cox 2



Neuropeptides **Substance P**

- Higher levels of pain correlated with \uparrow concentrations of Substance P in the SAB
(Gotoh et al 1999, 2001)



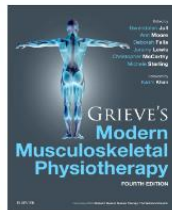
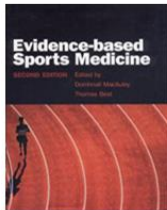
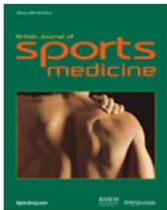
- Dean et al (2013) Why does my shoulder hurt? A review of the neuroanatomical and biochemical basis of shoulder pain. *BJSM*.
- Chillemi et al (2015) The role of tendon and SAB in RC tear pain: a clinical & histopathological study. *Knee Surg Sports Traumatol Arthrosc* DOI 10.1007/s/00167-015-3650-4

~~Special~~ Orthopaedic Tests are Not Special



Pictures: Tennent et al (2003). AJSM 31: 154-60.

- Lewis & Tennent (2007) How effective are our diagnostic tests for the RC?
- Hegedus et al (2012) Which clinical tests ...the shoulder?
- Hegedus, Cook, Lewis, Wright, Park (2014) Combining tests.
- Hegedus & Lewis (2015) *Grieve's Modern MSK Physiotherapy*
- Lewis, Hegedus, Jones (2018) *Clinical Reasoning for Physiotherapists*



Patient defined 'functional test'



www.drjeremylewis.com

PAIN Science

Nociception



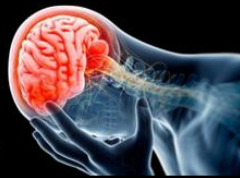
Pain = 'perception'

It's an 'output' produced in the brain



Pain serves to protect...from harm & damage & the threat of harm

"Pain may be perceived in the absence of tissue damage"



Pain neuroscience: where is my shoulder pain coming from?
Benjamin JF Dean, Derek Griffin

Pain = 'sensation'



A physical stimulus is necessary to experience pain

No substantial evidence that pain is a perception that can occur in the absence of stimulus / damage

Pain is a sensation influenced / modified by perception

In Lewis J and Fernández-de-las-Peñas C (2022) *The Shoulder: Theory and Practice*. Handspring.

Orthopaedic Tests

Due to poor convergent validity, unacceptably poor reference standards (ie imaging), new knowledge relating to pain science, we have recently argued...

— **JOSPT** — [VIEWPOINT] —
Journal of Orthopaedic & Sports Physical Therapy

PAUL SALAMH, PT, DPT, PhD¹ • JEREMY LEWIS, PhD, FCSP^{2,4}

It Is Time to Put Special Tests for Rotator Cuff-Related Shoulder Pain out to Pasture

<https://pubmed.ncbi.nlm.nih.gov/32272031/>

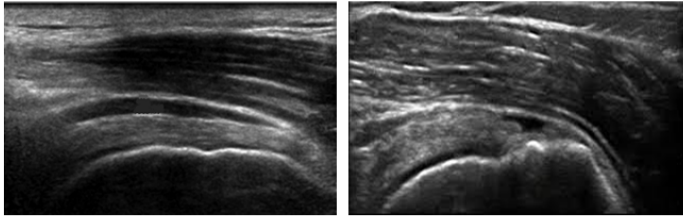
www.drjeremylewis.com

Assessment:

What about imaging?

www.drjeremylewis.com

Diagnostic Imaging & Symptoms



51 men without symptoms Age range 40-70 years

US scans: 25 - right shoulders / 26 - left shoulders

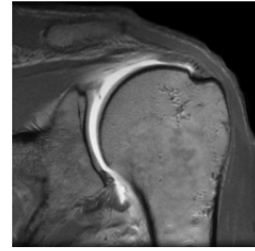
Findings:

- ▶ Subacromial bursal thickenings 78%
- ▶ Acromioclavicular joint degeneration 65%
- ▶ Supraspinatus tendinosis 39%
- ▶ Partial thickness tear supraspinatus 22%

Shoulder abnormalities in 96% of asymptomatic people

Girish et al (2011). AJR

MRI Scans



- ▶ Subacromial impingement (n=42)
- ▶ Age matched asymptomatic control (n=31)

Findings (pathology on MRI):

Impingement group: 22 / 42 (55%)

Control group: 16 / 31 (52%)

RC pathology related to age

RC pathology does not correlate with symptoms

Frost et al (1999) J Sh El Surg 8 (6) 565-568

@JeremyLewisPT

www.LondonShoulderClinic.com



Barreto et al
(2019)



Bilateral magnetic resonance imaging findings in individuals with unilateral shoulder pain

<https://doi.org/10.1016/j.jse.2019.04.001>

Table I Prevalence and comparison of MRI alterations in symptomatic vs. asymptomatic shoulders

MRI abnormalities	Radiologist		χ^2 or Fisher exact test	Shoulder surgeon		χ^2 or Fisher exact test
	Symptomatic shoulders (n = 123), n (%)	Asymptomatic shoulders (n = 123), n (%)		Symptomatic shoulders (n = 123), n (%)	Asymptomatic shoulders (n = 123), n (%)	
Rotator cuff tendinopathy	114 (92.7)	109 (88.6)	$\chi^2 = 0.76, P = .38$	92 (74.8)	89 (73.0)	$\chi^2 = 0.03, P = .85$
Partial-thickness tear	33 (26.8)	25 (20.3)	$\chi^2 = 1.10, P = .29$	38 (31.1)	27 (22.0)	$\chi^2 = 2.20, P = .13$
Full-thickness tear	7 (5.7)	1 (0.8)	$\chi^2 = 3.23, P = .06$	25 (20.5)	10 (8.1)	$\chi^2 = 6.66, P = .01^*$
Subacromial fluid	67 (54.5)	69 (56.1)	$\chi^2 = 0.00, P = .95$	75 (61.0)	65 (52.8)	$\chi^2 = 1.34, P = .24$
AC joint alterations	113 (91.9)	110 (89.4)	$\chi^2 = 0.05, P = .80$	98 (79.7)	90 (73.2)	$\chi^2 = 1.10, P = .29$
Labrum alterations	54 (43.9)	51 (41.5)	$\chi^2 = 0.09, P = .75$	81 (66.4)	82 (67.2)	$\chi^2 = 0.00, P > .99$
LHB alterations	14 (11.4)	7 (5.7)	$\chi^2 = 1.82, P = .17$	16 (13.1)	15 (12.2)	$\chi^2 = 0.00, P = .98$
Fatty infiltration	25 (20.3)	23 (18.7)	$\chi^2 = 0.02, P = .87$	8 (6.5)	3 (2.4)	$\chi^2 = 1.52, P = .21$
SST atrophy	1 (0.8)	1 (0.8)	$\chi^2 = 0.00, P > .99$	4 (3.3)	1 (0.8)	$\chi^2 = 0.81, P = .37$
Humeral tuberosity cysts	16 (13.0)	17 (13.8)	$\chi^2 = 0.00, P > .99$	29 (23.6)	23 (18.9)	$\chi^2 = 0.56, P = .45$
Glenohumeral OA	2 (1.6)	1 (0.8)	$\chi^2 = 0.00, P > .99$	13 (10.7)	4 (3.3)	$\chi^2 = 4.11, P = .04^*$
Acromial morphology						
Type I	9 (7.3)	14 (11.4)	$\chi^2 = 0.83, P = .36$	75 (61.0)	82 (66.7)	$\chi^2 = 0.63, P = .42$
Type II	88 (71.5)	87 (70.7)	$\chi^2 = 0.00, P > .99$	29 (23.6)	25 (20.3)	$\chi^2 = 0.21, P = .64$
Type III	15 (12.2)	14 (11.4)	$\chi^2 = 0.05, P = .81$	19 (15.4)	16 (13.0)	$\chi^2 = 0.13, P = .71$

MRI, magnetic resonance imaging; AC, acromioclavicular; LHB, long head of biceps; SST, supraspinatus muscle; OA, osteoarthritis.

* $P < .05$ when both sides were compared.

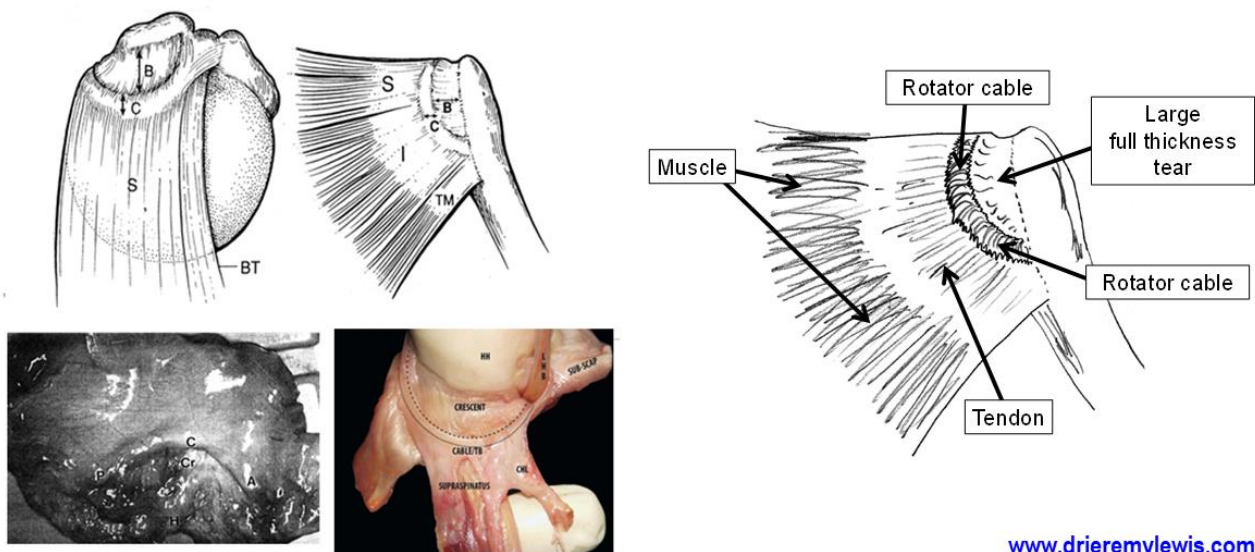
Bilateral magnetic resonance imaging findings in individuals with unilateral shoulder pain

Results: Abnormal MRI findings were highly prevalent in both shoulders. Only the frequencies of full-thickness tears in the supraspinatus tendon and glenohumeral osteoarthritis were higher (approximately 10%) in the symptomatic shoulder according to the surgeon's findings. Agreement between the musculoskeletal radiologist and shoulder surgeon ranged from slight to moderate (0.00-0.51).

Conclusion: Most abnormal MRI findings were not different in frequency between symptomatic and asymptomatic shoulders. Clinicians should be aware of the common anatomic findings on MRI when considering diagnostic and treatment planning.

Barreto et al (2019) *J S El Surg*

The Rotator Cable



www.drjeremylewis.com

Rahu et al (2016) RC tendon connections with the rotator cable *Knee Surg Sports Traum Arthrosc* DOI: 10.1007/s00167-016-4148-4



We have arrived at an uncertain & confusing professional cross-road

@JeremyLewisPT

Conundrum 1: We can't clinically differentiate tissues

Conundrum 2: Posture doesn't follow defined patterns

Conundrum 3: Imaging usually can't confirm a diagnosis

Lewis *et al* (2005, 2009, 2011, 2017, 2018, 2019, 2020) Ratcliffe *et al* (2015) Barrett *et al* (2016)

Is it time to consider a more useful clinical model?

Physical assessment:

Back to the list

- ◆ Observation
- ◆ Palpation
- ◆ Cervical & Thoracic regions | “Not a shoulder”
- ◆ Active & Passive ROM / VAS (pain)
- ◆ Muscle performance testing
- ◆ Procedures eg neurological tests / NMTs / etc
- ◆ Functional assessment

www.drjeremylewis.com

Physical Assessment: **Observation**

- ▶ Substantial atrophy
- ▶ Bruising, discolouration
- ▶ Dislocation, fracture
- ▶ Potential melanoma

Learn the signs!

- Asymmetrical
- Uneven borders
- Multiple colours
- > 5mm

www.drjeremylewis.com



Physical Assessment: **Palpation**

- ▶ Temperature
- ▶ Lumps & bumps
(hard or soft?)
- ▶ Swelling
- ▶ Abnormalities



www.drjeremylewis.com

Physical Assessment:

◆ Active & Passive ROM / VAS (pain)

Measure

- ▶ All active ROMs
- ▶ All passive ROMs



What are your hypothesis for any observed differences?

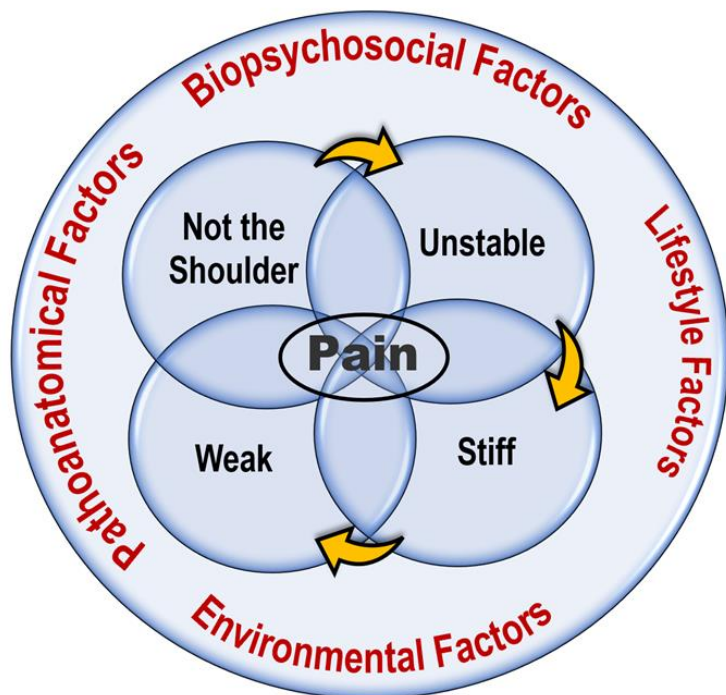
- eg. active = passive
passive >> active
passive slightly > active



Physical Assessment



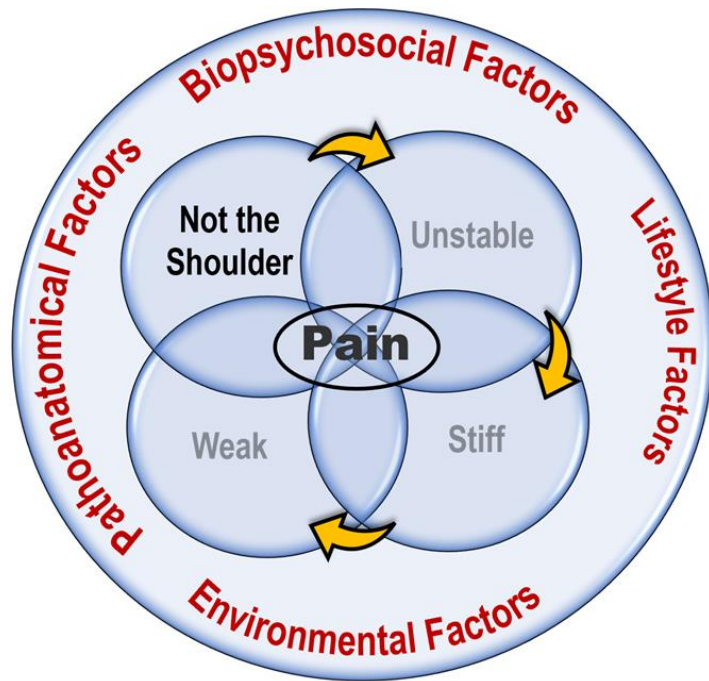
www.drjeremylewis.com



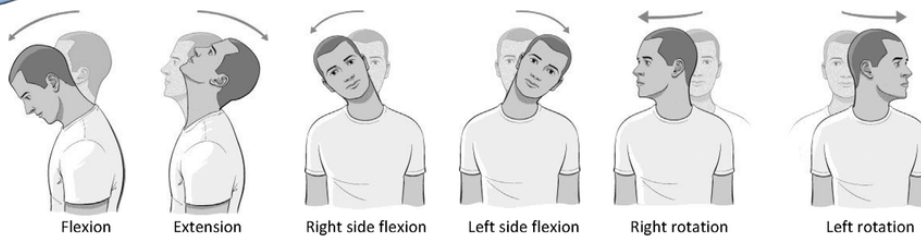
Physical Assessment



www.drjeremylewis.com



Not a Shoulder



Cervical active movements & combined movements

- ▶ Active cervical physiological movements reproducing local cervical region pain
- ▶ Active cervical physiological movements reproducing shoulder region pain
- ▶ Combined cervical physiological movements reproducing local and / or shoulder region pain

Not a
Shoulder



www.drjeremylewis.com

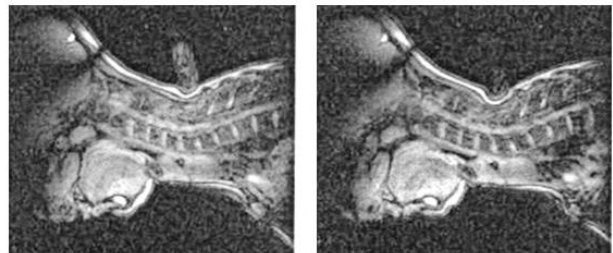
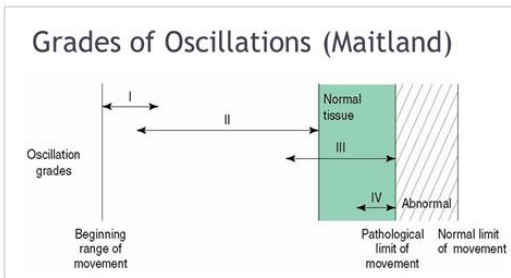
Maitland

Mulligan

McKenzie

- **M**any systems
- No certainty
- As long as your system starts with an **'M'**!

Manual Therapy



Grade I & IV PA mobilisations applied from C2 to C6 (n= 5)

- No intervertebral movement was observed
- Only soft tissue deformation

McGregor et al (2001) *Clinical Biomechanics*. 18 (1)

www.drjeremylewis.com

Manual Therapy



Lumbar spine:
Chiradejnant et al (2003) AJP



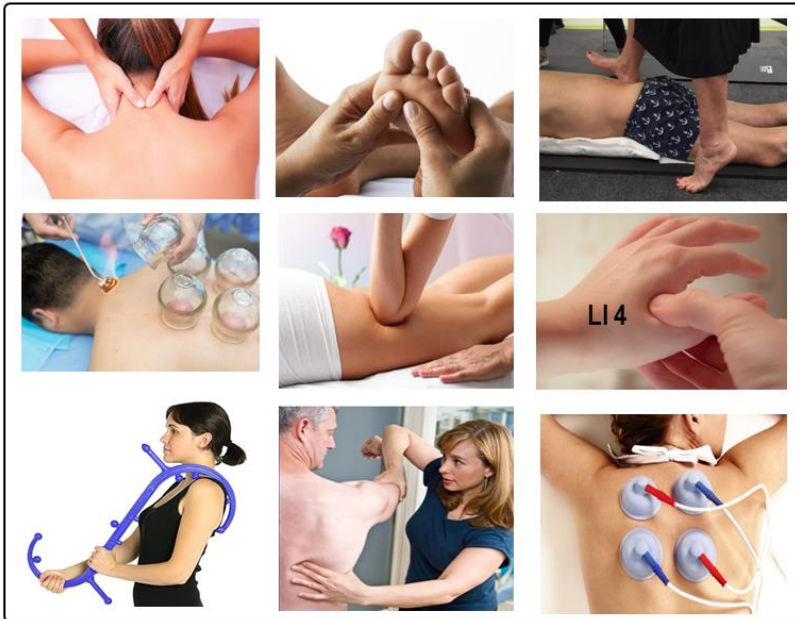
Mobilising (therapist chosen) symptomatic cervical level versus a randomly selected level [maybe asymptomatic] (chosen by a computer) has the same benefit for people with neck pain (n= 48).

Aquino et al (2009)
J M&ManipTher

www.drjeremylewis.com



Manual Therapy



Many cultures & schools of MSK education teach that pressure (touch) results in a (potential) short term reduction in pain

Maybe the only difference between the techniques is the philosophy underpinning why the 'touching / pressure' is being applied?

www.drjeremylewis.com

Using Manual Therapy in Management

UPDATE

An update of systematic reviews examining the effectiveness of conservative interventions for subacromial shoulder pain



Background:

Subacromial shoulder pain is common. It has also been called rotator cuff related shoulder pain #RCRSP. Non-surgical management typically involves exercise but may involve other treatments; manual therapy, electrotherapy, acupuncture, etc

What we did... We reviewed 16 systematic reviews, & analysed the findings for quality in order to make recommendations for the management of #RCRSP



What we found



Study quality was variable

No benefit for laser therapy or ultrasound



Strong recommendation for exercise therapy for pain, mobility & function



Strong recommendation for manual therapy in the initial phase



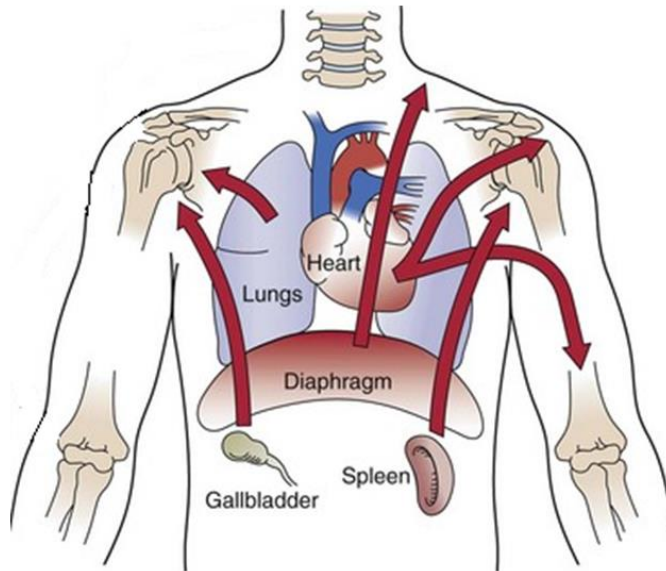
Louise Pieters, Jeremy Lewis, Kevin Kuppens, Jill Jochems, Twan Bruijstens, Laurence Joossens, Filip Struyf
<https://www.iospt.org/doi/abs/10.2519/jospt.2020.8498>



Read how we defined terms
 Strong recommendation ≠ large treatment effect

Not a Shoulder

Rocco *et al* (2016) Differential Diagnosis -Visceral Causes of Shoulder Pain, in Gurnina (Ed) *Rotator Cuff Tear: Pathogenesis, Evaluation and Treatment*. Springer. Chap 22, pg 163-168.



www.drjeremylewis.com

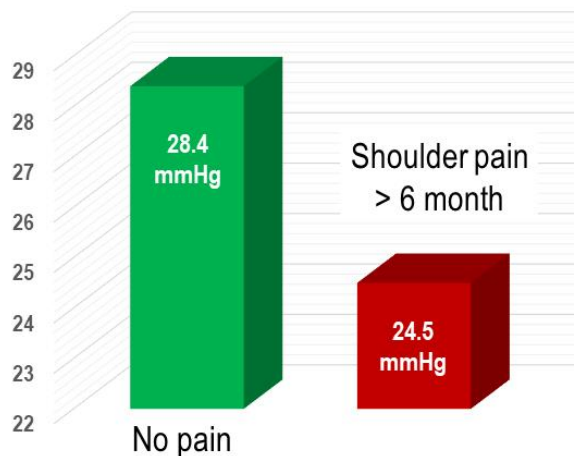
Not a Shoulder

Correlation between neck motor control impairment and shoulder pain in elite male handball players

Asker *et al* (2014) *Journal of Science & Medicine in Sport* 18 (Sup 1, p e76)



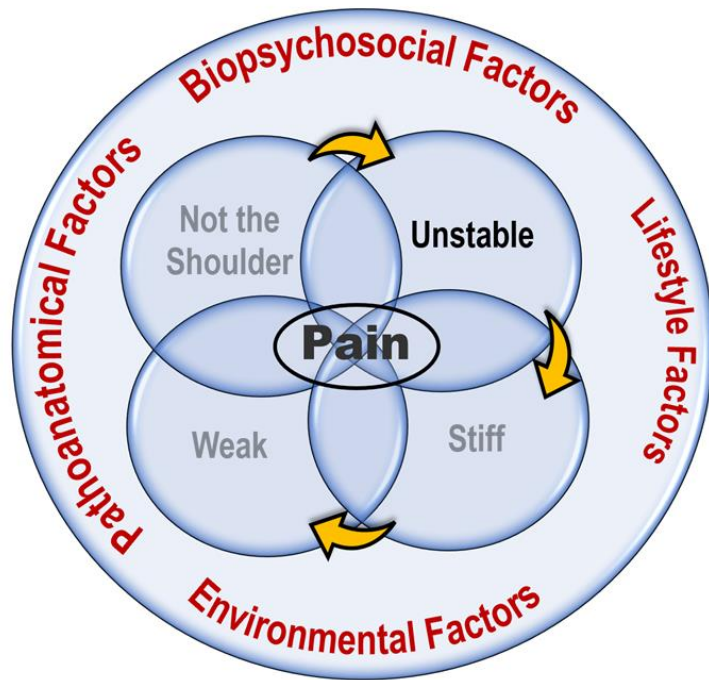
64 elite handball players (25.4 years SD=4.1)



Physical Assessment



www.drjeremylewis.com



Unstable

Most important is the patient description during the interview

- ★ "Feels unstable" ★ "Dislocated" ★ "Feels loose"
- ★ "Gives way" ★ "I don't trust my shoulder"
- ★ "No trauma but dislocated when I ..."
- ★ "Dislocated when I [*episode of trauma*]..."
- ★ "Feel my shoulder will give way (*apprehension*) in abduction and external rotation"

Stiff
(limited ROM)
+/- Painful



Measure

- ▶ All active ROMs
- ▶ All passive ROMs

Active = Passive

non exhaustive egs

- Frozen shoulder
- Severe osteoarthritis
- Avascular necrosis
- Locked dislocation
- Sarcoma
- Muscle guarding
- Fear

Passive > Active

non exhaustive egs

- Rotator cuff related shoulder pain
- Massive RC tear
- Neurological presentation
- Referred pain + fear
- Local pain + fear



www.drjeremylewis.com

Valentine and Lewis (2006) *Arch Phys Med Rehab*
Keogh et al (2019) *PLoS ONE*

Stiff
+/-
Painful

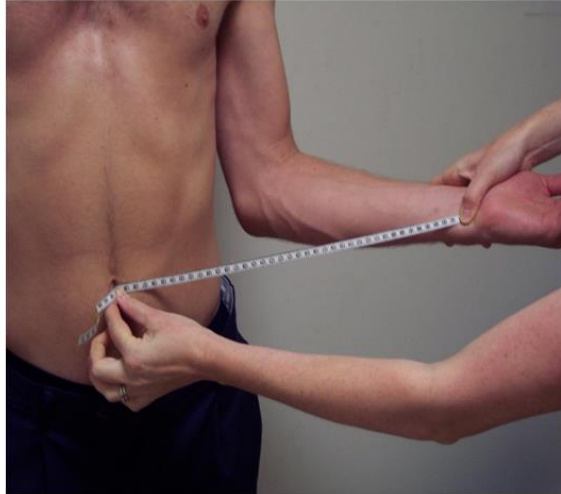
Key determinant is the variation between active & passive range



Stabilise scapula & passively abduct
Typical = 90° / Stiff eg FS ≈ 30°

**Stiff
+/-
Painful**

Key determinant is the variation between active & passive range



Valentine and Lewis (2006)
Arch Phys Med Rehab

Assessment & Hypothesis (Diagnosis)

To determine the reason for the observed clinical 'stiffness' an x-ray may be required



Frozen shoulder
x-ray essentially NAD



Severe
OA



Avascular
necrosis



Locked
dislocation



Osteo
sarcoma

Is all stiffness equal?

Active muscle guarding



(discussed in more detail in Frozen Shoulder section)

Original Research:

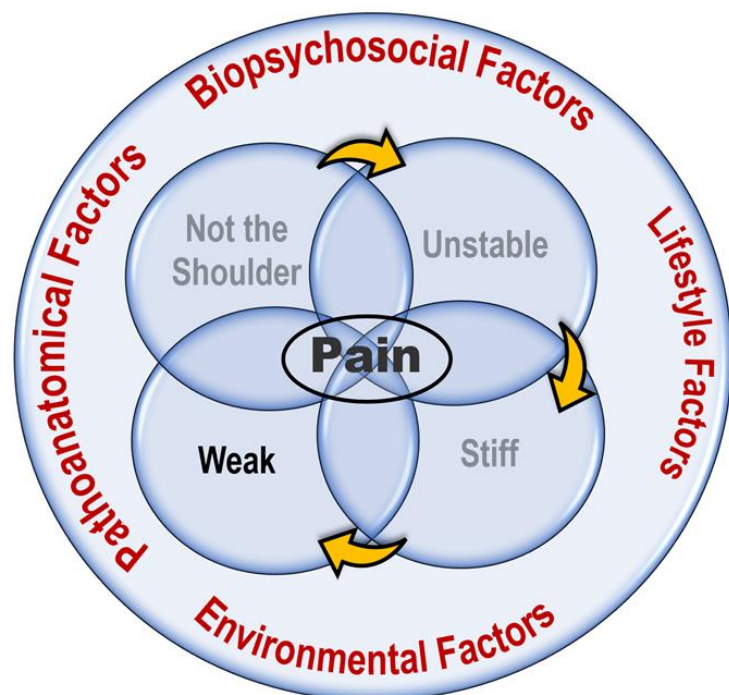
Luise Hollmann MSc, Australia

@LuiseHollmann

Physical Assessment



www.drjeremylewis.com



**Painful
+/- Weak**

Hypotheses:

(non exhaustive)



- Early frozen shoulder
- Cervical or thoracic referral
- Neurological compromise
- Rotator cuff related shoulder pain ★
- Biceps tendinopathy
- Calcific tendinopathy
- Acromioclavicular joint pain
- Sinister pathology
- Fear and anxiety

**Painful
+/- Weak**

Muscle Performance Testing



Aims: Identify painful +/- weak movements

Test positions: Standing, sitting, supine, prone, side-lying

- ▶ Not tests of individual muscles
- ▶ Tests of muscle groups
- ▶ Testing ability to perform & control position & movement under load

@JeremyLewisPT

Muscle Performance Testing

**Painful
+/- Weak**



Manual Muscle Testing (MMT) may under-estimate strength loss

Hayes et al 2002 *J Sh & El Surg*



Hand held dynamometers maybe more reliable & accurate than MMT



Dollings, Sandford, O'Conaire & Lewis (2012)
Shoulder & Elbow



Review Article

Considerations and Practical Options for Measuring Muscle Strength: A Narrative Review

Richard W. Bohannon

Hindawi
BioMed Research International
Volume 2019, Article ID 8194537, 10 pages
<https://doi.org/10.1155/2019/8194537>

Muscle Performance Testing

Select test position(s) (consider function | kinetic chain) & **Test:**

- Flexion
 - Extension
 - Abduction (scapular plane)
 - Rotation
 - ▶ Multiple planes – as able
 - ▶ If weak+ ± pain in IR (following trauma)
 - Assess belly press test
 - Consider complete rupture of subscapularis
 - Refer for early repair
 - Other
- Repetitions to pain
 - Repetitions to fatigue
 - (Repetitions to symptoms)



THE SHOULDER: *Theory & Practice*

ROTATOR CUFF
RELATED
SHOULDER PAIN
(#RCRSP)

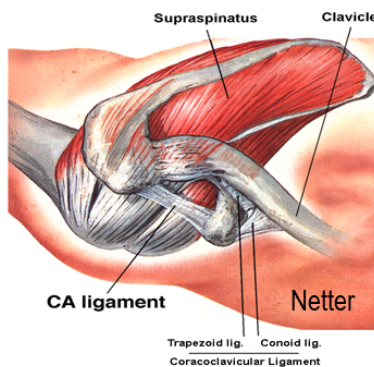


Jeremy Lewis PhD FCSP

Consultant Physiotherapist | Professor of Musculoskeletal Research | Independent Prescriber | MSK Sonographer

...So what is

ROTATOR CUFF RELATED SHOULDER PAIN (#RCRSP) ?



Lewis (2016) Rotator cuff related shoulder pain: Assessment, management and uncertainties. *Manual Therapy*. 23: 57-68.

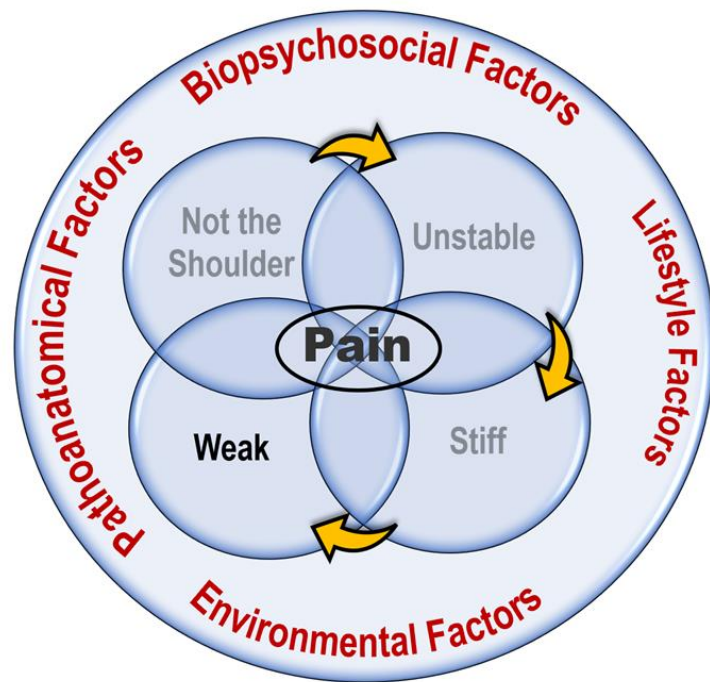


- Rotator cuff tendinopathy / tendinosis
- Supraspinatus tendinitis / opathy / osis
- Partial / Full thickness RC tears
- Subacromial bursitis
- Subacromial impingement syndrome
- Shoulder impingement syndrome
- Subacromial pain syndrome
- Shoulder pain syndrome, etc, etc.

Physical Assessment



www.drjeremylewis.com



Hypotheses:

(non exhaustive)



- Early frozen shoulder
- Cervical or thoracic referral
- Neurological compromise
- Rotator cuff related shoulder pain ★
- Biceps tendinopathy
- Calcific tendinopathy
- Acromioclavicular joint pain
- Sinister pathology
- Fear and anxiety

ROTATOR CUFF RELATED SHOULDER PAIN #RCRSP

Only ever a working hypothesis

- Non-traumatic RCRSP is principally associated with unaccustomed, excessive, rapid and detectable changes or increases in load

'A' is a 46 year old office worker who enjoys playing tennis

- Usually plays tennis 2 to 3 times week, always with same partner.
- Partner unwell and has stopped playing.
- During the break in playing 'A' purchased an oversized racquet which was more tightly strung than previous racquet
- Played last weekend, first time in 4 weeks, against a new more aggressive opponent
- Plays outside, had been raining overnight, court wet and ball heavier
- And also has a recurrence of long standing knee pain

www.drjeremylewis.com



Overload

Relative term & varies:

- ▶ Between individuals
- ▶ Within an individual

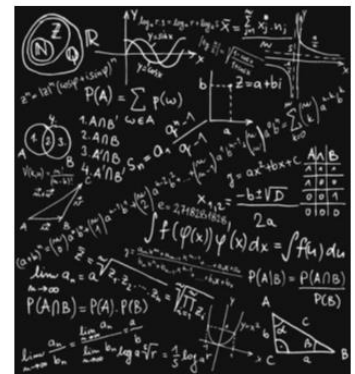


Load



±

- ▶ Age
- ▶ Genetics
- ▶ Co-morbidities
- ▶ Hormonal status
- ▶ Lifestyle influences
- ▶ Social factors
- ▶ Biopsychosocial factors



ROTATOR CUFF RELATED SHOULDER PAIN #RCRSP

Lifestyle factors may be the change in load



Lifestyle factors **5**
Graham Burne, Michael Mansfield, Lennard Voogt, Jessica Dukes, Jeremy Lewis

As a society we are not doing enough exercise
Inactivity: Inverse waist circumference to television width ratio

1950's






2020's



BMJ Open
Sport &
Exercise
Medicine

Is there an association between metabolic syndrome and rotator cuff-related shoulder pain? A systematic review 2019

Graham Burne  Michael Mansfield, Jamie E Gaida  Jeremy S Lewis 



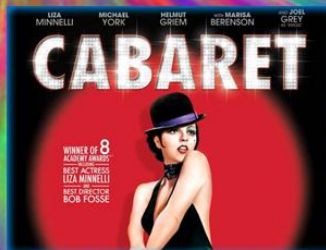
Because you're worth it
L'ORÉAL
 PARIS



1972



US \$27,600
 GB £7,400



1972



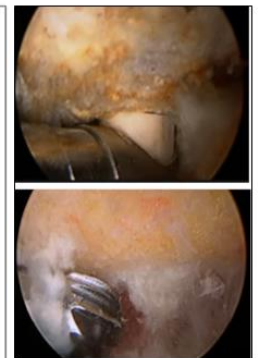
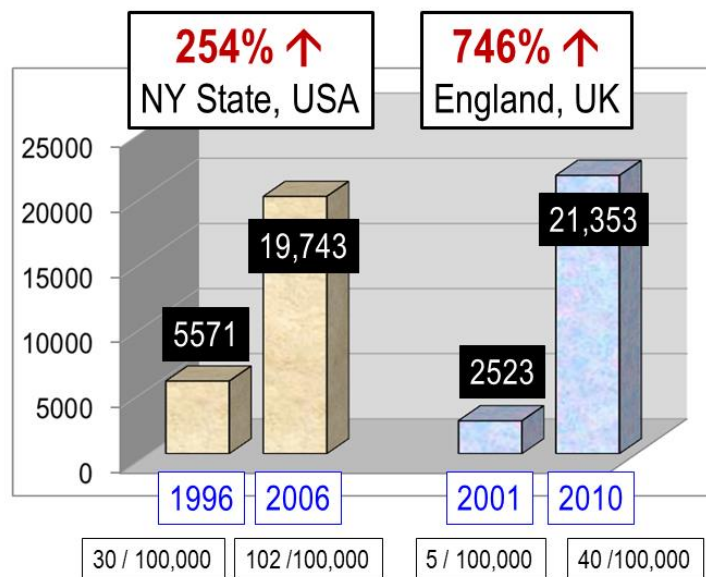
Tennent et al (2003). A review of the Special Tests... Part I. *AJSM* 31

95% of RC pathology caused by the acromion
Neer 1972

Blog



Increase in subacromial decompressions



Vitale et al (2010) *JBJS*; 92:1842-50.

Judge et al (2014) *JBJS*; 96-B:70-4.

Challenges to the subacromial impingement theory



Lewis (2011) SIS: A musculoskeletal condition or a clinical illusion? *PTR*. 16(5): 388-398

<https://doi.org/10.1179/1743288X11Y.0000000027>

Subacromial impingement syndrome: a musculoskeletal condition or a clinical illusion?

Jeremy S. Lewis



Lewis (2015) Bloodletting for pneumonia, prolonged bed rest for low back pain, is subacromial decompression another clinical illusion? *Br J Sports Med* ;49:280-281

<https://bjsm.bmj.com/content/49/5/280.info>

Editorial

Bloodletting for pneumonia, prolonged bed rest for low back pain, is subacromial decompression another clinical illusion?

Jeremy Lewis

Challenges to the subacromial impingement theory



Lewis (2011) SIS: A musculoskeletal condition or a clinical illusion? *PTR*. 16(5): 388-398

<https://doi.org/10.1179/1743288X11Y.0000000027>

Subacromial impingement syndrome: a musculoskeletal condition or a clinical illusion?

Jeremy S. Lewis



Lewis (2015) Bloodletting for pneumonia, prolonged bed rest for low back pain, is subacromial decompression another clinical illusion? *Br J Sports Med* ;49:280-281

<https://bjsm.bmj.com/content/49/5/280.info>

Editorial

Bloodletting for pneumonia, prolonged bed rest for low back pain, is subacromial decompression another clinical illusion?

Jeremy Lewis



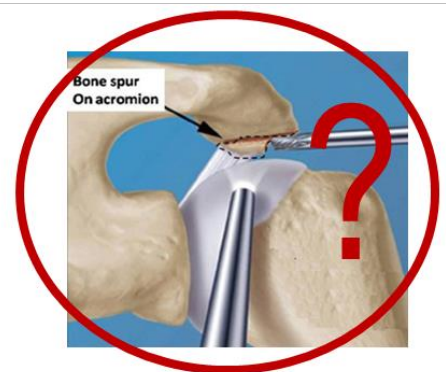
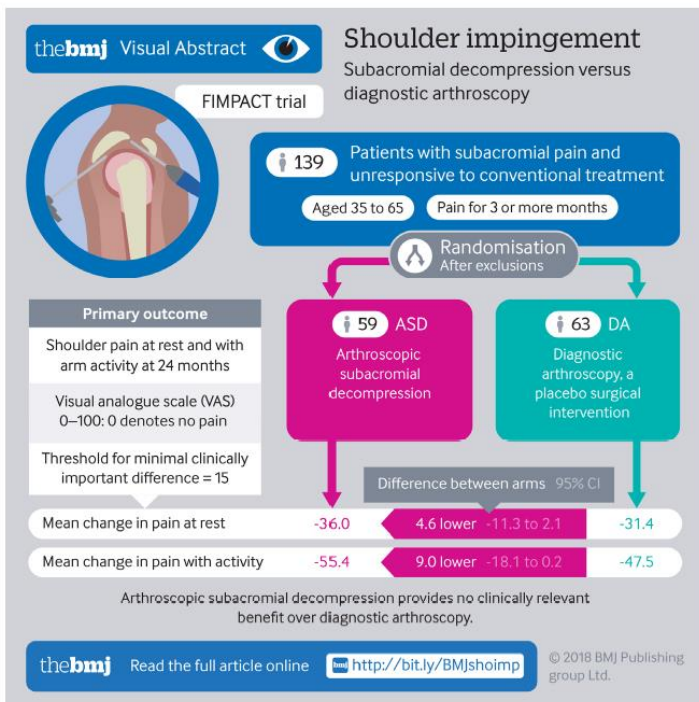
Arthroscopic subacromial decompression for subacromial shoulder pain (CSAW): a multicentre, pragmatic, parallel group, placebo-controlled, three-group, randomised surgical trial

Beard et al

www.thelancet.com Published online November 20, 2017
[http://dx.doi.org/10.1016/S0140-6736\(17\)32457-1](http://dx.doi.org/10.1016/S0140-6736(17)32457-1)

Conclusions:

- ★ Subacromial decompression for RCRSP offers no benefit over arthroscopy only.
- ★ Improvement may be due to placebo, post-operative physiotherapy, or time.



Subacromial decompression versus diagnostic arthroscopy for shoulder impingement: randomised, placebo surgery controlled clinical trial

Mika Paavola,¹ Antti Malmivaara,² Simo Taimela,^{1,3} Kari Kanto,⁴ Jari Inkinen,⁵ Juha Kalske,⁶ Ilkka Sinisaari,⁷ Vesa Savolainen,⁸ Jonas Ranstam,⁹ Teppo L N Jarvinen^{1,3} for the Finnish Shoulder Impingement Arthroscopy Controlled Trial (FIMPACT) Investigators

BMJ 2018;362:k2860

<http://dx.doi.org/10.1136/bmj.k2860>

OPEN ACCESS

Challenges to the subacromial impingement theory

JOSPT

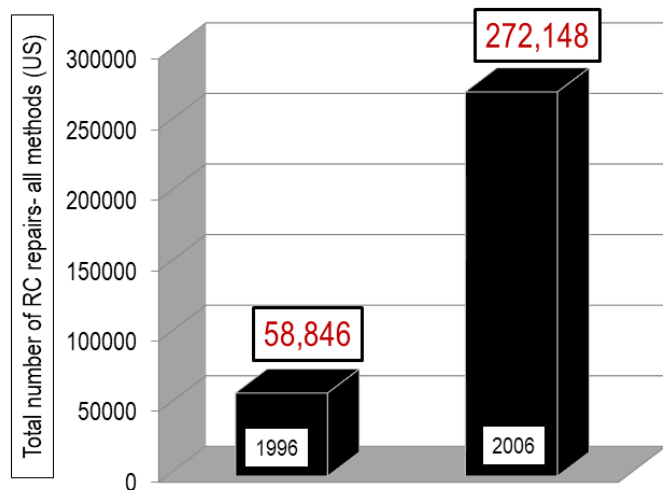
Lewis (2018) The End of an Era?
JOSPT 48(3):127–129.

doi:10.2519/jospt.2018.0102

The End of an Era?

JEREMY LEWIS

Increase in rotator cuff repairs



Colvin et al (2012) National trends in RC repair. *JBJSurg* (Am)



Open & arthroscopic repair for full thickness tears of the RC

Carr et al (2015) HTA Carr et al (2017) Bone & Joint Journal 99B 1: 107-115

N=273 randomised to surgery 162 [77%] underwent surgery
50 (22%) withdrew due to improvement in symptoms | development of other conditions

Oxford Shoulder Score (0-48)

From baseline to 2 years

Open: (Baseline): 25.0 (SD 8.0) to (24/12): 41.5 (SD 7.9)
Arthroscopic: (Baseline): 26.3 (SD 8.2) to (24/12): 41.7 (SD 7.9)

No significant difference

Re-tear rate at 2 years: Open: 38.6% Arthroscopic: 46.4%

Outcomes of intact *versus* failed repairs (OSS at 12/12)

Arthroscopic	(intact)	44.5 (SD 4.1)	} 2.7 points
Arthroscopic	(failed)	41.8 (SD 8.8)	
Open	(intact)	43.6 (SD 5.8)	} 2.8 points
Open	(failed)	40.8 (SD 7.6)	



Is the majority of elective surgery for #RCRSP, principally placebo?

Open Access

Research

BMJ Open To what extent are surgery and invasive procedures effective beyond a placebo response? A systematic review with meta-analysis of randomised, sham controlled trials

BMJ Open 2015;5:e009655. doi:10.1136/bmjopen-2015-009655

Wayne B Jonas,¹ Cindy Crawford,¹ Luana Colloca,^{2,3} Ted J Kapchuk,⁴ Bruce Moseley,⁵ Franklin G Miller,⁶ Levente Kriston,⁷ Klaus Linde,⁸ Karin Meissner⁹

A SURGEON CUTS THROUGH THE EVIDENCE

SURGERY,
THE ULTIMATE
PLACEBO

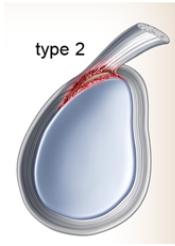


IAN HARRIS

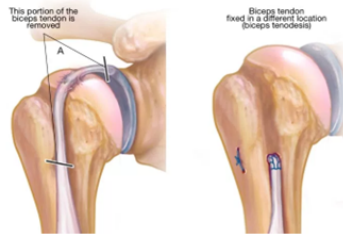
Conclusions:

- The non-specific (ie placebo) effects of surgery and other invasive procedures are generally large.
- **Particularly in relation to pain-related conditions.**
- More evidence from randomised placebo-controlled trials are needed to avoid continuation of ineffective treatments.

Labral repairs (SLAP type II)
n=40



Biceps tenodesis
n=39



Sham (placebo) surgery
(n=39) (arthroscope & scar)

All groups underwent rehabilitation:
Sling: 3 weeks. Massage, stretching, general scapular, shoulder, functional and biceps exercises, sports specific and functional rehabilitation

Outcome Measures: 1°: Rowe Score, WOSI, Patient Satisfaction 2°: OISS, EQ-5D

Results: At all follow-ups, up to 2 years, labral repairs (SLAP type II) & biceps tenodesis were **no more effective** than sham surgery

Average age: 40 years Further studies needed to establish outcome in young active people



Sham surgery versus labral repair or biceps tenodesis for type II SLAP lesions of the shoulder: a three-armed randomised clinical trial

Cecilie Piene Schrades,¹ Øystein Skare,¹ Olav Reikerås,^{2,3} Petter Mowinckel,² Jens Ivar Brox^{4,3}

<http://bjsm.bmj.com/content/bjsports/early/2017/05/12/bjsports-2016-097098.full.pdf>

www.drjeremylewis.com



**Is the main benefit of surgery
Relative Rest**



Return to work:

- Non manual workers 6/52
- 85% manual workers 12/52

Return to driving:

- Average – 29 days (range 2-220)

McClelland et al 2005 ANZ J Surg



Return to work:

- Non manual workers 9 days (2-39)
- Manual workers 3/52 (range 2-72)

Return to driving:

- Median – 13 days (range 2-53)

Codeine phosphate 30mg + paracetamol
1gm 4x/day for 2/52

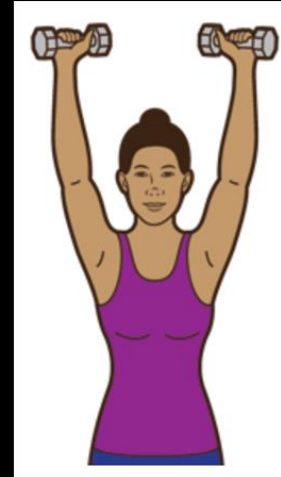
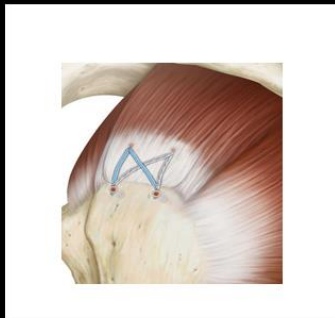
Charalambos et al 2010 Shoulder & Elbow



www.drjeremylewis.com

What treatment for #RCRSP?

Shared Decision Making-



RCRSP: To inject or not to inject?



798 THE LANCET] [Oct. 15, 1955

HYDROCORTISONE IN PAINFUL SHOULDER A CONTROLLED TRIAL

G. F. MURNAGHAN
M.B. Edin., F.R.C.S.E.
SURGICAL REGISTRAR

DONALD McINTOSH
M.D. Edin., F.R.C.S.E., F.R.C.S.
SURGEON

ROYAL INFIRMARY, EDINBURGH

PAIN arising in the shoulder-joint is difficult to diagnose and to treat. The diagnosis is not rendered any easier or more accurate by the lack of general agreement about the cause (Moseley 1953). Treatment has usually been unsatisfactory, and has tried the patience of patient and surgeon alike. As a rule the pain seems to subside of itself within about two years leaving various degrees of limitation of movement.

Successful treatment with intra-articular or peri-articular hydrocortisone has been reported by Hollander (1953), Crisp and Kendall (1955), and Quin (1955). But, apart from a reference by Crisp and Kendall to previous control experiments with procaine, we have not noted anything approximating to a controlled trial, and many of the cases reported have been treated by the injection of hydrocortisone with the addition of a local anaesthetic.

1955.

Present Investigation


We report here the results of treating 24 painful shoulders with hydrocortisone and compare them with the results of treating 27 painful shoulders with lignocaine ('Xylocaine') injections. We included in the trial only those patients who had a functional disability resulting from what we believed would generally be accepted as a periarthritis. We selected from among the recent records and from referred cases patients who complained of shoulder pain with or without a history of trauma. We excluded from the trial all cases in which we believed that the supraspinatus tendon had been completely ruptured, all cases of painless stiff shoulder, and all cases with old or recent injury of bone. The cases selected proved singularly free from limitation of flexion and extension sufficient to cause functional embarrassment.

Method of Injection

The needle was inserted under the tip of the acromion.

Summary

A comparative trial of the effects of the local injection of hydrocortisone and of lignocaine in the treatment of painful shoulder did not show any great advantage in either substance over the other. Both produced benefit.

It seems doubtful whether hydrocortisone has any specific effect in this condition. 



Are corticosteroid injections more beneficial than anaesthetic injections alone in the management of rotator cuff-related shoulder pain? A systematic review

Tim Cook, Catherine Minns Lowe, Mark Maybury, Jeremy S Lewis

What are the findings?

- ▶ Corticosteroid injections may confer superior benefit compared with anaesthetic-only injections in the short term (up to 8 weeks).
- ▶ Beyond 8 weeks, corticosteroid and anaesthetic-only injections had the same therapeutic effect for rotator cuff-related shoulder pain.
- ▶ It is unknown if improvement over time is due to placebo, natural history or a therapeutic effect of the medicines used in the published research.

<http://bjsm.bmj.com/content/52/8/497>

[VIEWPOINT]

Rotator Cuff-Related Shoulder Pain: To Inject or Not to Inject?

• **TIM COOK** • **JEREMY LEWIS**, PhD, FCSP

Key Points

- As a result of a paucity of high-quality research in this area, it is not possible to make strong recommendations regarding the type, location, and technique of injection therapy in the management of RCRSP.
- There is no clear consensus on the possible negative effects of corticosteroid injections on rotator cuff tissue.
- When compared to local anesthetic injections alone, corticosteroid injections may provide mild short-term pain relief for some patients with RCRSP. There is no evidence to suggest a difference between injection types in the mid to long term. ●

JOSPT May 2019

Shared Decision Making - Management / Injections

Clinical Orthopaedics and Related Research®

Mohamadi et al 2017



Conclusions

- Multiple injections no more beneficial than a single injection
- No better effect than analgesic after 3 months | Small and transient benefit from 4 to 8 weeks
- Numbers Needed to Treat = 5 and benefit mild
- Corticosteroid Injections are not a quick fix and use needs to be kept to minimum
- May accelerate tendon and cartilage degeneration

<https://www.ncbi.nlm.nih.gov/m/pubmed/27469590/> (2017)



The Impact of Injections

Sophia A. Traven, MD; Daniel Brinton, MHA, MAR; Kit N. Simpson, DrPH; Zachary Adkins, MD; Alyssa Althoff, BS; John Palsis, MD; William Ashford, MD; and Harris S. Slone, MD

June 2018

<https://www.aaos.org/AAOSNow/2018/Jun/Clinical/clinical01/>

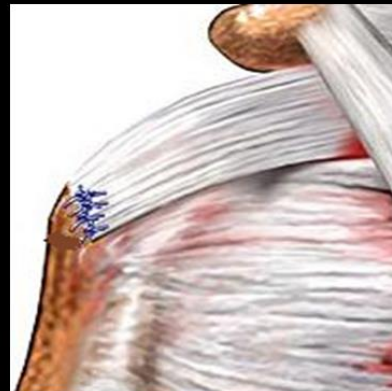


Conclusions

- In a retrospective analysis (multivariate logistic regression) of n= 4959 from 2011 to 2014 who had undergone RC repairs (limitations noted)
- 553 required revision surgery
- Older people (>52.7 years), males, diabetics and smokers were more likely to require revision surgery
- Those that had undergone a CS injection within a year prior to surgery were at more risk of requiring revision surgery [43.5% higher odds (p=0.0002)]

Shared Decision Making – Management

Surgical or Non-Surgical ?



#RCRSP Surgical versus Non-Surgical Management

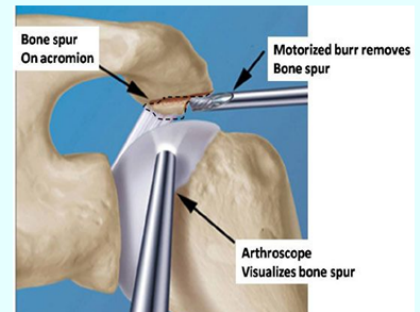
Subacromial Impingement Syndrome

Exercise is as effective as Surgery

...at 1, 2, 4, 5 and 10 year follow-ups

...at a fraction of the cost of surgery

& exercise reduces the need for surgery by 80%



Haahr et al (2005) 1 year follow up

Ketola et al (2009) 2 year follow up

Ketola et al (2017) 10 year follow up

Haahr & Andersen (2006) 4 year follow up

Ketola et al (2013) 5 year follow up

Holmgren et al (2012) 80% reduction in surgery

www.drjeremylewis.com



SHOULDER AND ELBOW

Arthroscopic decompression not recommended in the treatment of rotator cuff tendinopathy

A FINAL REVIEW OF A RANDOMISED CONTROLLED TRIAL AT A MINIMUM FOLLOW-UP OF TEN YEARS

S. Ketola, J. T. Lehtinen, I. Arnala

Conclusion

The natural history of rotator cuff tendinopathy probably plays a significant role in the results in the long-term. Even though the patients who underwent operative treatment had a stronger belief in recovery, which is likely to be surgical and the effect of placebo, the exercise group obtained similar results. In the future, an optimum exercise regime should be searched for, as the most clinically and cost-effective conservative treatment for rotator cuff tendinopathy.

Cite this article: *Bone Joint J* 2017;99-B:799-805.

Lewis (2011) Subacromial impingement syndrome: A musculoskeletal condition or a clinical illusion? *Physical Therapy Reviews*. 16(5): 388-398.

Lewis (2015) Bloodletting for pneumonia, prolonged bed rest for low back pain, is subacromial decompression another clinical illusion? *British Journal of Sports Medicine*. 49 (5): 208-281. doi:10.1136/bjsports-2014-094367.

Lewis (2016) Rotator cuff related shoulder pain: Assessment, management and uncertainties. *Manual Therapy*. 23: 57-68

www.drjeremylewis.com



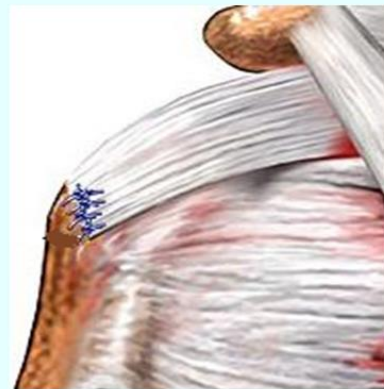
#RCRSP Surgical versus Non-Surgical Management

Non-traumatic Partial Thickness Tears Supraspinatus (< 75%)

Treatment of non-traumatic RC tears
n=180 shoulders / 167 available at 1 year

- Group I** Physiotherapy (10 sessions and progressive HEP)
- Group II** Acromioplasty & physiotherapy (ISQ)
- Group III** Acromioplasty, RC repair & physiotherapy

Constant Score = Primary Outcome Measure
Mean age 65 years (55-79)

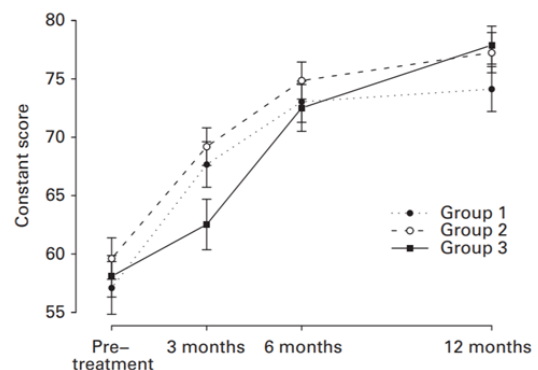


Kukkonen et al (2014) *B&J Journal*

www.drjeremylewis.com

Kukkonen et al 2014

RCT (random sequence)	✓	
Allocation concealment	✓	envelopes
Intention to Treat	✓	
> 80% (full data sets)	✓	(92.8%)
Blinded assessment	✓	
Long term follow-up	?	1 year



Group I	€2417
Group II	€4765
Group III	€5709

“Results suggest at 1 year no difference between the groups for non traumatic PTT supraspinatus and non-surgical management should be primary method”

www.drjeremylewis.com

TWO-YEAR FOLLOW-UP

Kukkonen et al 2015

RCT (random sequence)	✓	
Allocation concealment	✓	
Intention to Treat	✓	
> 80% (full data sets)	✓	
Blinded assessment	✓	
Long term follow-up	✓	2 year

“No difference between the groups”

www.drjeremylewis.com

Tendon repair compared with physiotherapy in the treatment of rotator cuff tears: a randomized controlled study in 103 cases with a **five-year follow-up**

Moosmayer et al (2014) *JBJS Am* <https://pubmed.ncbi.nlm.nih.gov/25232074/>

Results and Conclusion

Repair (n= 52) Physiotherapy (n=51)

Follow-up rate: 98%

Primary Outcome: Constant Score

No clinically important differences between the groups

www.drjeremylewis.com

At a **10-Year** Follow-up, Tendon Repair Is Superior to Physiotherapy in the Treatment of Small and Medium-Sized Rotator Cuff Tears

Moosmayer et al (2019) *JBJS Am* <https://pubmed.ncbi.nlm.nih.gov/31220021/>

Results and Conclusion

Repair (n= 52) Physiotherapy (n=51)

Follow-up rate: 88%

Primary Outcome: Constant Score

Results clinically and statistically favour the repair group

www.drjeremylewis.com

Moosmayer et al (2019) *JBJS Am*
At a **10-Year** Follow-up, Tendon Repair Is Superior to Physiotherapy in
the Treatment of Small and Medium-Sized Rotator Cuff Tears.

What did they find?

Constant Score: 9.6 points better in the tendon repair group

VAS (pain): 1.8cm better on 10cm VAS

Pain-free abduction: 19.6° better

Pain-free flexion: 14.3° better

- Study provides a very important contribution
- The 9.6 point change in the Constant Score is the mean difference between the groups
- A 10 point change in the Constant Score is meaningful, as such 9.6 points is important
- The reported 95% CI was 9.6 points (3.6 -15.7)

www.drjeremylewis.com

Moosmayer et al (2019) *JBJS Am* At a 10-Year Follow-up, Tendon Repair Is Superior to Physiotherapy in the Treatment of Small and Medium-Sized Rotator Cuff Tears.

How should the mean change of 9.6 points and the 95% CI (3.6-15.7) be explained to people considering surgery for RC-PTT?



“Most people undergoing this surgery experience less pain and better movement. This isn’t the case for everyone.

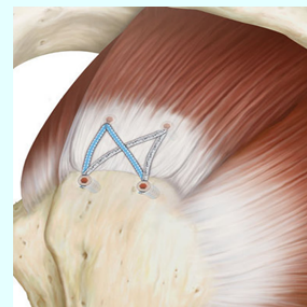
When compared to physiotherapy, for some people having surgery, the difference is barely noticeable (3.6) and for others, the difference could be slightly more than exercise (15.7). It is difficult to predict what change you may experience.

It is also important to discuss the risks, time of work, etc...”

#RCRSP Surgical versus Non-Surgical Management

(Atraumatic) Full Thickness Rotator Cuff Tears

Exercise significantly reduces the need for **Surgery (up to 75%)**
- at 2 year follow up

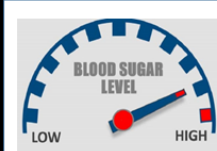
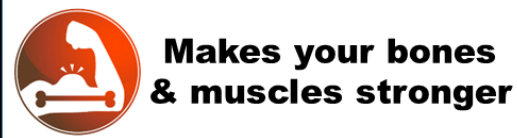


Kuhn et al (2013) Effectiveness of PT in treating atraumatic FT RC tears: a multicentre prospective cohort study. *JShEISurg*.

www.drjeremylewis.com

As outcomes with exercise are comparable to surgery, & as exercise is associated with less harm, contributes to healthcare sustainability & has other substantial health benefits... exercise should be prioritised first

Exercise ...



Helps control your blood sugar, weight & blood pressure



...& supports your immune system to help you fight infection

www.drjeremylewis.com

SHAPE UP MY SHOULDER (#SUMS) REHABILITATION PROGRAM



Jeremy Lewis PhD FCSP

Consultant Physiotherapist | Professor of Musculoskeletal Research | Independent Prescriber | MSK Sonographer

Section Five: **Shape-Up-My-Shoulder Rehabilitation**

**SHAPE - UP - MY
SHOULDER (#SUMS)
REHABILITATION
PROGRAM**



Jeremy Lewis PhD FCSP

Consultant Physiotherapist | Professor of Musculoskeletal Research | Independent Prescriber | MSK Sonographer

Shape-Up-My-Shoulder (#SUMS) Rehabilitation Program

**What is the best
rehabilitation program for
MSK shoulder conditions?**



**...it's frustrating,
but we just don't know**

www.drjeremylewis.com

Shape-Up-My-Shoulder (#SUMS) Rehabilitation Program

We have papers accepted and on-going research that suggest both:

- Motor Control programs, and
- Resistance programs are beneficial

With improvement starting earlier and having slightly better outcomes in the MC programs than in the strengthening / resistance programs

PTJ, Physical Therapy & Rehabilitation Journal | Physical Therapy, 2021;101:1-11
<https://doi.org/10.1093/ptj/pzab072>
 Advance access publication date February 19, 2021



Motor Control Exercises Compared to Strengthening Exercises for Upper- and Lower-Extremity Musculoskeletal Disorders: A Systematic Review With Meta-Analyses of Randomized Controlled Trials

Simon Lafrance, PT, MSc^{1,2}, Philippe Ouellet, PT, MSc², Reda Alaoui², Jean-Sébastien Roy, PT, PhD^{3,4}, Jeremy Lewis, PT, PhD^{5,6,7}, David Hoyrup Christiansen, PT, PhD^{8,9}, Blaise Dubois, PT¹⁰, Pierre Langevin, PT, MCISc^{3,4}, François Desmeules, PT, PhD^{1,2,*}

Open access

Protocol

BMJ Open Rotator cuff-related shoulder pain: does the type of exercise influence the outcomes? Protocol of a randomised controlled trial

Marc-Olivier Dubé^{1,2}, François Desmeules,^{3,4} Jeremy Lewis,^{5,6,7} Jean-Sébastien Roy^{1,2}

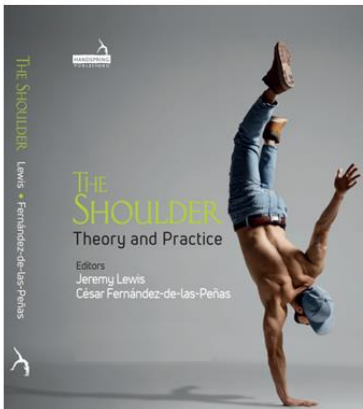
Now submitted

Musculoskeletal shoulder rehabilitation: motor control or strengthening?

35

Pain

Jean-Sébastien Roy, Matthew Low, Marc-Olivier Dubé, Simon Lafrance, François Desmeules



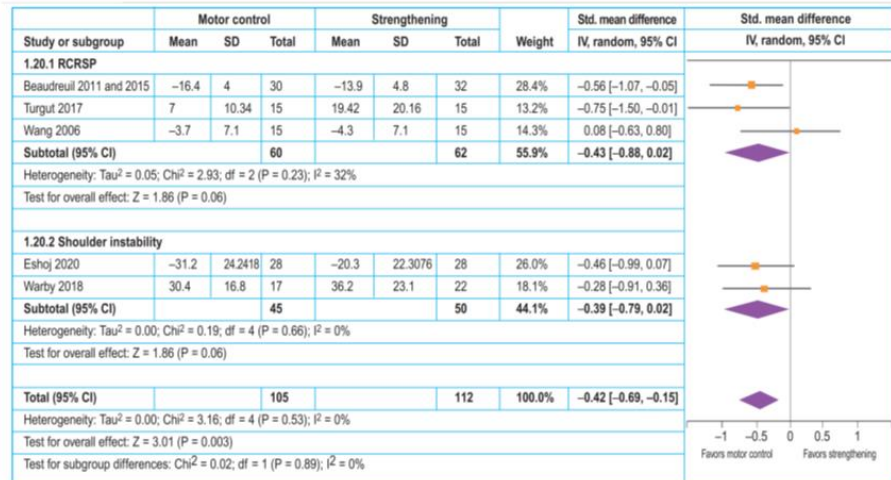
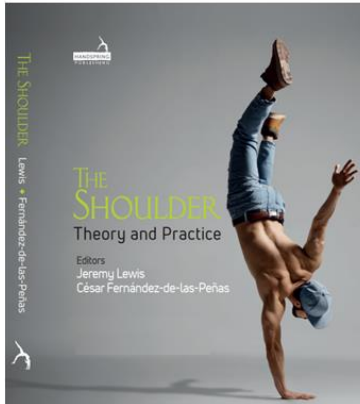
Study or subgroup	Motor control			Strengthening			Weight	Mean difference IV, random, 95% CI	Mean difference IV, random, 95% CI	
	Mean	SD	Total	Mean	SD	Total				
1.19.1 RCRSP										
Turgut 2017	0.38	1.01	15	1.26	2.78	15	20.4%	-0.88 [-2.38, 0.62]		
Wang 2006	-3.48	2.7	15	-2.72	2.68	15	12.3%	-0.76 [-2.69, 1.17]		
Subtotal (95% CI)			30			30	32.7%	-0.83 [-2.02, 0.35]		
Heterogeneity: Tau ² = 0.00; Chi ² = 0.01; df = 1 (P = 0.92); I ² = 0%										
Test for overall effect: Z = 1.38 (P = 0.17)										
1.19.2 Shoulder instability										
Eshoj 2020	-2.4	2.321	28	-1.9	2.1921	28	32.6%	-0.50 [-1.68, 0.68]		
Warby 2018	-2.9	1.8098	18	-1.87	1.9194	23	34.7%	-1.03 [-2.18, 0.12]		
Subtotal (95% CI)			46			51	67.3%	-0.77 [-1.60, 0.05]		
Heterogeneity: Tau ² = 0.00; Chi ² = 0.40; df = 1 (P = 0.53); I ² = 0%										
Test for overall effect: Z = 1.84 (P = 0.07)										
Total (95% CI)			76			81	100.0%	-0.79 [-1.47, -0.12]		
Heterogeneity: Tau ² = 0.00; Chi ² = 0.41; df = 3 (P = 0.94); I ² = 0%										
Test for overall effect: Z = 2.30 (P = 0.02)										
Test for subgroup differences: Chi ² = 0.01; df = 1 (P = 0.93); I ² = 0%										

Musculoskeletal shoulder rehabilitation:
motor control or strengthening?

35

Jean-Sébastien Roy, Matthew Low, Marc-Olivier Dubé,
Simon Lafrance, François Desmeules

Disability



[VIEWPOINT]

JARED K. POWELL, DPhy, BExSc/BBus¹ • JEREMY S. LEWIS, PhD, FCSP^{2,3}

Rotator Cuff-Related Shoulder Pain: Is It Time to Reframe the Advice, “You Need to Strengthen Your Shoulder”?

Main findings:

- ▶ You don't need to get strong to report a reduction in symptoms
- ▶ Any treatment benefit is governed by more than simple mechanical changes
- ▶ The clinical message must go beyond the idea that the patient's weak, deconditioned, or frail shoulder is the basis for pain, and all the patient needs to do is to get strong

Rotator cuff-related shoulder pain (RCRSP):
Is it time to reframe the advice, “You need to STRENGTHEN your shoulder?”
J.Powell & J.Lewis, JOSPT 2021
@jaredpowell12 @shoulder_physio
@jeremylewispt @jeremylewis

Strength deficits of up to: **43%** Have been measured in people with RCRSP

Does it follow that the clinical message becomes: “Your shoulder pain is due to weakness - you must simply get strong!?”

A substantial increase in shoulder strength is **not** required for pain and function to significantly improve **WHAT!?**
N.B. This does **NOT** diminish the role of resistance exercise, rather adds nuance to it

RCRSP is **multifaceted**. Resistance exercise can mediate reductions in pain and improvement in function. This **may** or **may not** involve strength increases or other changes in shoulder mechanics.

The clinical message must go beyond “you are weak and all you must do is get strong”

We need to think of exercise as a biopsychosocial & not just a bio (“you need to get strong”) intervention

Mechanisms may include (non-exhaustive):

▶ Neuromuscular

Strength, motor control, biomechanics eg AH distance, ROM, proprioception, posture

▶ Psychological

Self-efficacy, coping, reassurance, motivation

Reduced- kinesiphobia / disability / catastrophising

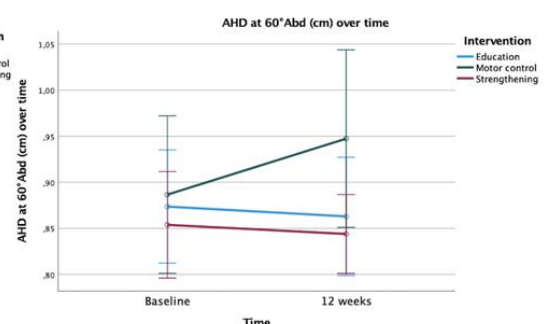
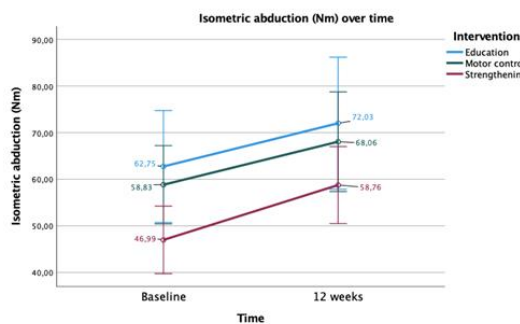
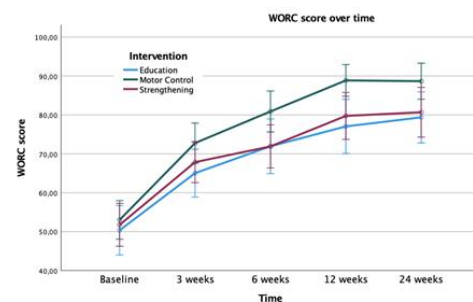
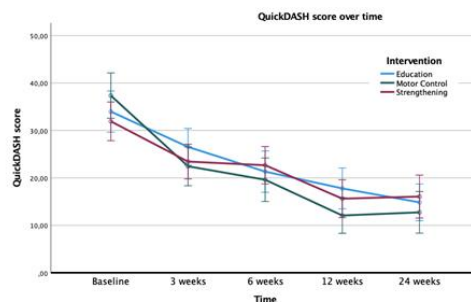
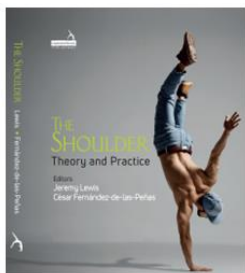
▶ Neuro-endocrine-immune

Inflammation, exercise induced hypoalgesia, hormonal, biochemical

▶ Placebo

▶ Marking time

www.drjeremylewis.com

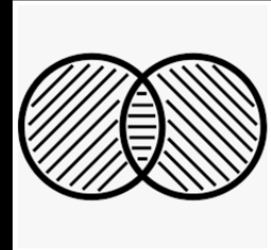


Shape-Up-My-Shoulder (#SUMS) Rehabilitation Program

Shape-Up-My-Shoulder (#SUMS) Rehabilitation Program

aims to combine both –

Motor Control & Strengthening



www.drjeremylewis.com

Shape-Up-My-Shoulder (#SUMS) Rehabilitation Program

Shape-Up-My-Shoulder (#SUMS)

What else is needed?



www.drjeremylewis.com

Shape-Up-My-Shoulder (#SUMS) Rehabilitation Program

Empathy, understanding,
education, advise, support,
therapeutic alliance,
shared decision making

Use language carefully!



www.drjeremylewis.com

Shape-Up-My-Shoulder (#SUMS) Rehabilitation Program

We need to stop saying: **“I can fix you”**



www.drjeremylewis.com

Shape-Up-My-Shoulder (#SUMS) Rehabilitation Program

Take a **BioPsychoSocial** Approach

Don't just think about the condition, think about the *person* with the condition and all the factors (BPS) that may influence outcome



Behavioural change is complex !

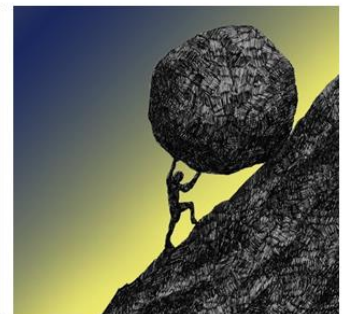


Physiotherapy 112 (2021) 158–162

Physiotherapy

This is the day your life must surely change [11]
Prioritising behavioural change in musculoskeletal practice☆

Jeremy Lewis^{a,b,c,*}, Colette Ridehalgh^d, Ann Moore^d, Kevin Hall^{d,e}



[11]

“This is the day”

<https://www.youtube.com/watch?v=HXaEAoRUKfE>

- Sources of behaviour
- Intervention functions
- Policy categories



Stages of behavioural change



Coaching behavioural change

- G** **Goals:** What do you need to achieve?
- R** **Reality:** What is happening now?
- O** **Options:** What could you do?
- W** **Will:** What will you do?
- T** **Tactics:** How will you do it? When?
- H** **Habits:** How will you maintain your success?



www.drjeremylewis.com

Consider the patient's environment !

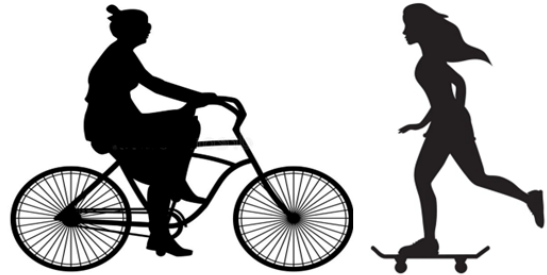


Physical Therapy Reviews



Prescribing active transport as a planetary health intervention - benefits, challenges and recommendations

Adam Toner , Jeremy S. Lewis , Jessica Stanhope & Filip Maric



ABSTRACT

A high proportion of people are insufficiently physically active. The reasons for this are complex and in part relate to social determinants of health, lifestyle choices, and deleterious environmental conditions like climate change, loss of green and outdoor environments and a concomitant loss of biodiversity. Physiotherapists, and other health professionals, may have a positive impact on these global issues, through the encouragement of active transport, and advocacy to reduce barriers to its uptake and optimize exposure to health-giving outdoor spaces. In this paper, we demonstrate how physiotherapists can promote active transport as a planetary health intervention, and provide insight into the benefits and challenges of this planetary health intervention, with direct implications to physiotherapy practice.



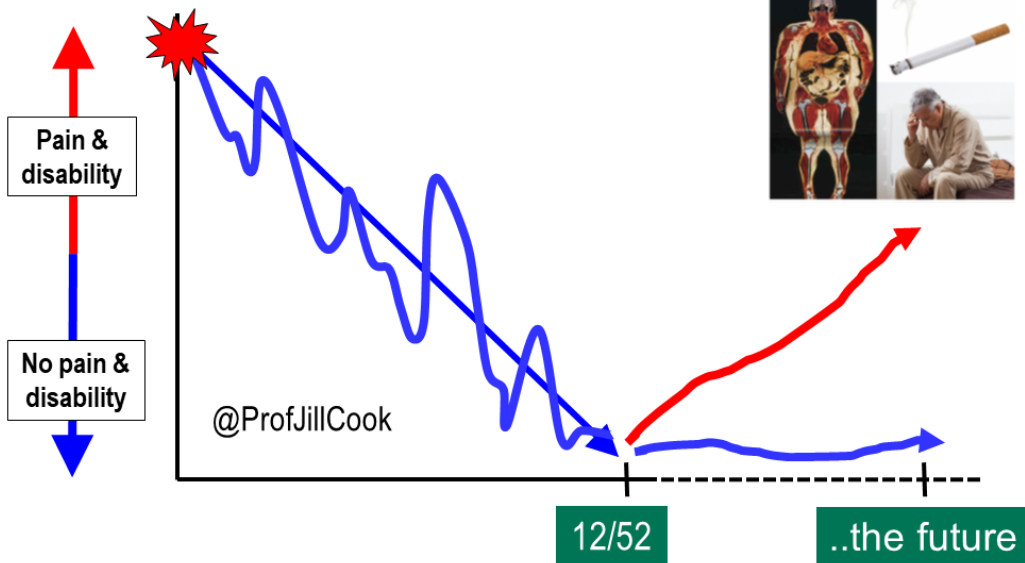
Shape-Up-My-Shoulder (#SUMS) Rehabilitation Program

Explain time frames



www.drjeremylewis.com

Shape-Up-My-Shoulder (#SUMS) Rehabilitation Program



Discussion Points

- ◆ Improvement is not usually linear
- ◆ Expect ups & downs & setbacks
- ◆ Monitor 24 hour symptoms
- ◆ Typically formal rehabilitation is 12 weeks
- ◆ Ongoing for...ever
- ◆ Lifestyle influences outcome

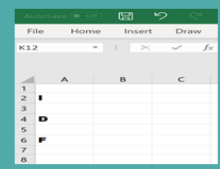
Shape-Up-My-Shoulder (#SUMS) Rehabilitation Program

**Unload
as required**



www.drjeremylewis.com

Shape-Up-My-Shoulder (#SUMS) Unloading as required



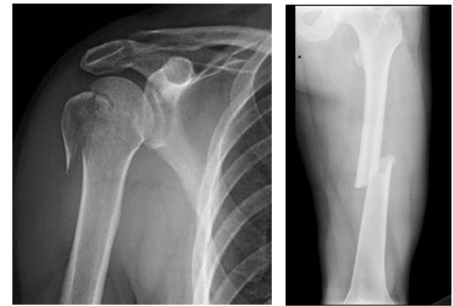
Intensity
Duration
Frequency

Reduce **intensity / speed** by 1/4, 1/3, 1/2
Reduce **duration / distance** by 1/4, 1/3, 1/2
Reduce **frequency**

Example:
Triathlete swimming **1500m / day** with shoulder pain
Lap time: 30 seconds/lap **Laps: 30**

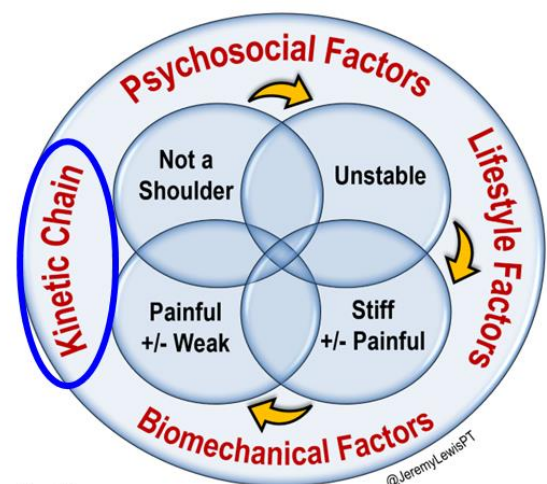
△	Speed	Distance	←→	Frequency
1/4	37.5 secs/lap	22 laps	↔	Every 2 nd day
1/3	40.0 secs/lap	20 laps	↔	Every 3 rd day
1/2	45.0 secs/lap	15 laps	↔	Every 4 th day

Fracture analogy



www.drjeremylewis.com

Shape-Up-My-Shoulder (#SUMS) Rehabilitation Program



Richardson, Lewis, Gibson et al (2020) Role of the kinetic chain in shoulder rehabilitation: SR of EMG studies. *BMJ Open Sport & Exercise Medicine*.

Impact of inactivity

Be frightened! Be very frightened!!



Inactivity due to lifestyle and pain will have an effect on the muscle-tendon units

- Inactivity → atrophy and a loss of muscle strength at a rate of 12% a week
After 3 to 5 weeks of bedrest, almost 50% muscle strength is lost (Jiricka 2008)
- One week of bed rest in healthy men ($n=10$ | 23 ± 1 years)
→ 1.4 kg loss of total muscle mass → 3.2% decrease in quadriceps CSA
→ 6.9% decrease in 1RM (Dirks et al 2015)
- Disuse weakness is reversed at a rate of 6% per week with exercise (Nigum 2009)
- More significant loss in older people (Kortbein et al 2008)

Think marathon! Aim to find a safe entry point into rehabilitation

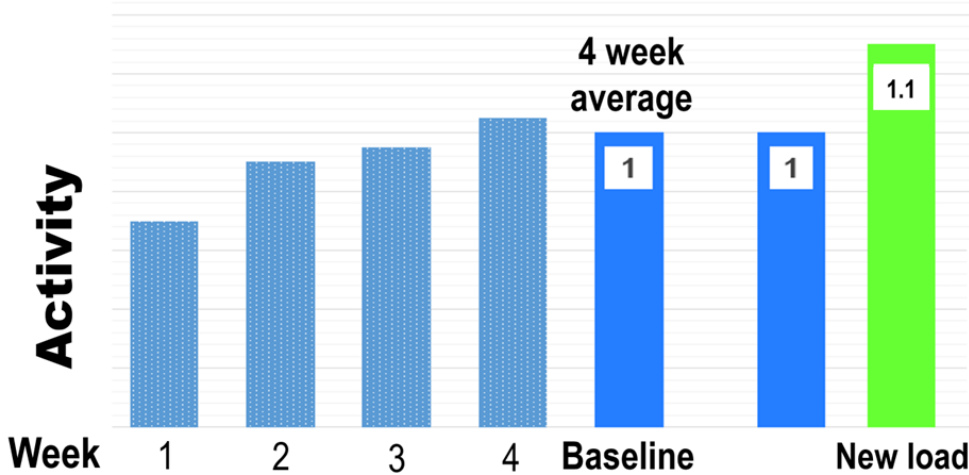
Shape-Up-My-Shoulder (#SUMS) Rehabilitation Program

Find a 'safe' entry point
into rehabilitation &
progress incrementally



www.drjeremylewis.com

Shape-Up-My-Shoulder (#SUMS) Rehabilitation Program



Aim for 10% increase per week

No 'off season' ...if I.D.F stopped or reduced will need to start again or recalibrate *

* Great way to educate patients

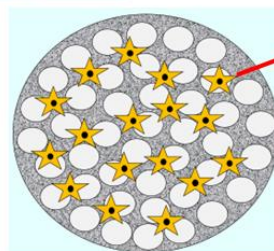
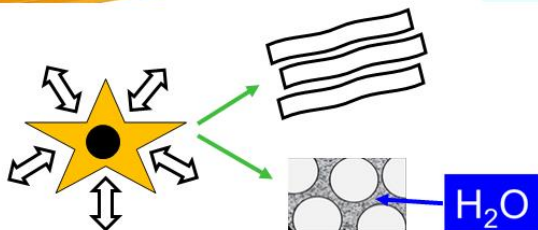
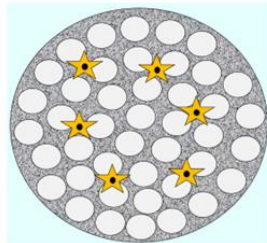
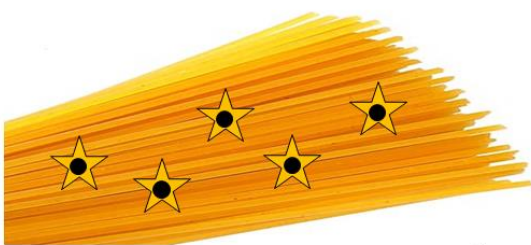
Suggestion based on Gabbett (2016) *BJSM* and Hulin et al (2016) *BJSM*

Shape-Up-My-Shoulder (#SUMS) Rehabilitation Program



Normal tendon

- Type I collagen & 50% water
- 'Doesn't like' abrupt change in loading behaviour

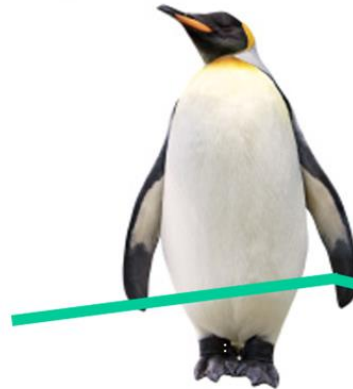


www.drjeremylewis.com

Shape-Up-My-Shoulder (#SUMS) Rehabilitation Program

Appropriate rehabilitation strategy

“Set your scapula & keep your elbow by your side”



www.drjeremylewis.com

Shape-Up-My-Shoulder (#SUMS) Rehabilitation Program

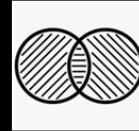
Aim to exceed your patient's expectations

“I never would have believed I could do that”



www.drjeremylewis.com

The Shape-Up-My-Shoulder (#SUMS) Rehabilitation Program



- **Understanding** (Health Literacy)
- **Self-management**
- **Condition self-efficacy**
- **Lifestyle behavioural change**

- **Interwoven with...**

www.drjeremylewis.com

Shape - Up - My - Shoulder Rehabilitation Program (#SUMS)

www.drjeremylewis.com

SSMP + ESR

HSR

Functional: Mixed, ballistic, 'chaotic' loads

Formal program: 12 to 26 weeks

Lifetime program



Shape-Up-My-Shoulder

Rehabilitation Program (#SUMS)

SUMS Stage 1 Early

- SSMP

Clinically

- Early stage rehabilitation
- New to exercise
- ± Irritable

SUMS Stage 2 Middle

- HSR

SUMS Stage 3 Advanced

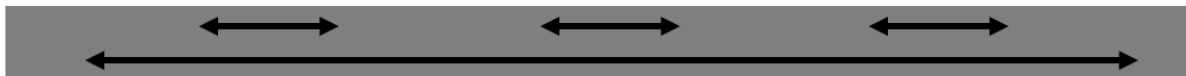
- Mixed

eg weight, duration & speed

- Ballistic
- Chaotic
- Precision

SUMS Nuanced

- Severe OA
- Inoperable RC tears



@JeremyLewisPT

Shape-Up-My-Shoulder

Rehabilitation Program (#SUMS)

SUMS Stage 1 Early

- SSMP

Clinically

- Early stage rehabilitation
- New to exercise
- ± Irritable

SUMS Stage 2 Middle

- HSR

SUMS Stage 3 Advanced

- Mixed

eg weight, duration & speed

- Ballistic
- Chaotic
- Precision

SUMS Nuanced

- Severe OA
- Inoperable RC tears



@JeremyLewisPT

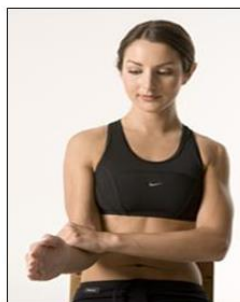
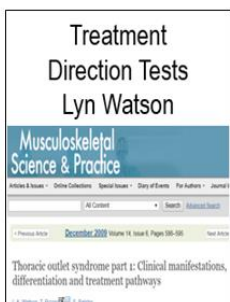
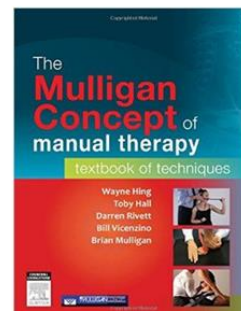
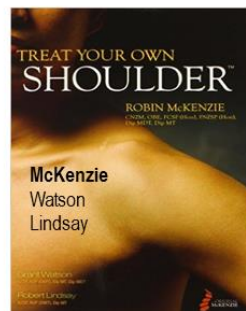
Shape-Up-My-Shoulder Rehabilitation Program (#SUMS)

SUMS Stage 1 Early

- **Shoulder Symptom Modification Procedure (SSMP)**
- **Early stage rehabilitation**

@JeremyLewisPT

What is Symptom Modification?



Everyone is doing it!

Philosophies differ but the desired outcome is a reduction in symptoms
Is it a common link in contemporary MSK practice?

www.drjeremylewis.com

What is Symptom Modification?



2-3 minutes of clinical time

Instead of time used for orthopaedic tests

Clinical Experiments

Aiming to positively 'mess with the brain'
Break pain memories and the 'threat / fear'
associated with a movement or posture



www.drjeremylewis.com

What is Symptom Modification?

Reasons for improvement are not known



- Mechanical
- Fear reduction (reduced threat)
- Movement confidence
- "Circuits that fire apart - *depart*" (LG)
- Placebo effect
- Distraction
- **Not designed to change posture**

www.drjeremylewis.com

What is Symptom Modification?



No hypervigilance!

Concerns over hypervigilance
(state of ↑ anxiety)

- You (hopefully) don't tell a person before performing an orthopedic test, "***I'm going to hurt you***" you just ascertain the test response.
- If you use SSMP techniques, do the same, just establish the response. Don't pre-empt by saying I'm doing techniques to reduce your symptoms!

www.drjeremylewis.com

What is Symptom Modification?



Practically

- If a reduction in symptoms is achieved
...link immediately to (functional) movements
- At the very worst, the associated movement
= **scapular & RC exercise!**
- SSMP is only a **very small part** of the rehabilitation program

www.drjeremylewis.com

Symptom Modification:
Prognostic Factors

NHS
National Institute for Health Research



Psychological factors are associated with the outcome of physiotherapy for people with shoulder pain: a multicentre longitudinal cohort study
Rachel Chester, Christina Jerosch-Herold, Jeremy Lewis, Lee Shepstone

Multicentre cohort study (n=1030 at baseline | n = 811 at 6 months)

Psychological variables were identified as the major prognostic factors

Scapular manual facilitation

(Kibler 2003, Lewis 2009)



At baseline:

- ★ 41% (n= 426) participants ↓ in symptoms and / or ↑ in shoulder ROM
- ★ 12% (n=122) demonstrating near complete or complete reduction in pain and / or restoration of shoulder elevation



Was the most **consistently positive prognostic biomechanical factor at 6 months**

www.drjeremylewis.com

What is Symptom Modification?

Idea developed due to the difficulty making a clinical diagnosis & if helpful may be used to start rehabilitation

www.drjeremylewis.com

British Journal of Sports Medicine  

An international peer-reviewed journal of sport and exercise medicine

Rotator cuff tendinopathy/subacromial impingement syndrome: is it time for a new method of assessment?

Lewis J (2009) *BJSM*. 43 (4): 259-264

Journal of Orthopaedic & Sports Physical Therapy

JOSPT

Lewis, McCreesh, Roy, Ginn (2015) Rotator cuff tendinopathy: Managing the diagnosis-management conundrum. *JOSPT*. 45 (11): 923-937.

Manual Therapy

An international journal of musculoskeletal science and practice

Lewis (2016) Rotator cuff related shoulder pain: Assessment, management and uncertainties. *Manual Therapy*. 23: 57-68.

SSMP: Description of Techniques

BMJ Open
Sport &
Exercise
Medicine

Inter-rater reliability of the Shoulder Symptom Modification Procedure in people with shoulder pain #openaccess

Jeremy S Lewis, Karen McCreesh, Eva Barratt, Eric J Hegedus, Julius Sim

Krippendorff's alpha: Ranging from 0-1 (1 = perfect)
Results ranged from **0.76** to **1.0** suggesting
very good to excellent to perfect reliability

Partial to complete improvement in 68% of participants

Encouraging findings...but much more needed before
SSMP should be considered acceptable alternative



Assessment: Impairment

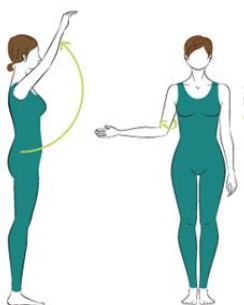
When to consider attempting symptom modification?



During movements associated with symptoms

During patient identified functional movements

- Try as many or as few as you feel appropriate.
- Incorporate techniques from other courses as well as your own ideas



Change / improvement:

None	Worse	Partial	Complete
------	-------	---------	----------

Comment

Change / improvement:				Comment
None	Worse	Partial	Complete	

Shape-Up-My-Shoulder (#SUMs)

Stage 1: Shoulder Symptom Modification Procedure [SSMP] v8

Name:	DoB:	Date:
-------	------	-------

Symptomatic movement, activity, or posture (PiC – patient identified concern)

PiC #1:

PiC #2:

Change / improvement:

Consider:

Metronome / virtual reality / counting backwards / other

None	Worse	Partial	Complete
------	-------	---------	----------

Comment

[1] Group 1

Finger on sternum						
Other						

[2A] Group 2

Scapular 'elevation'						
Scapular 'posterior tilt'						
Other e.g., 'depression' combinations						

[2B] Winging Scapula n/a

Combined elevation & posterior tilt						
'Squash' technique						
Taping						
Other						

[3] Group 3

Long to short lever lifts						
Squeeze ball (try either hand)						
Open hand (symptomatic side)						
Step forward / with resistance						
Step up						
'Humeral head' depression						
Eccentric elevation						
External rotation with resistance						
Internal rotation with resistance						
AP pressure						
PA pressure						
Other						

About the SSMP

- ▶ Stage 1 of a multistage graduated rehabilitation program. If not benefit move to Stage 2. (can re-visit SSMP at later stage)
- ▶ **2-3 minutes** of clinical time - instead of time used in past for orthopaedic tests
- ▶ **Do not** say aim is to change symptoms, i.e. **same** as when performing an orthopaedic test, just ascertain response
- ▶ **Clinical experiments** aiming to disrupt / **break pain memories / associations**
- ▶ **Not designed to change posture** & reason for change in symptoms not known (distraction, placebo, mechanical, other)
- ▶ May lead to a reduction in movement avoidance behaviours & improved self-efficacy & reduce 'threat' posed by that movement
- ▶ If a reduction in symptoms is achieved then link immediately to (functional) movements - At **worst**, the movement = **scapular & RC exercise**

Patient defined 'functional test'



www.drjeremylewis.com



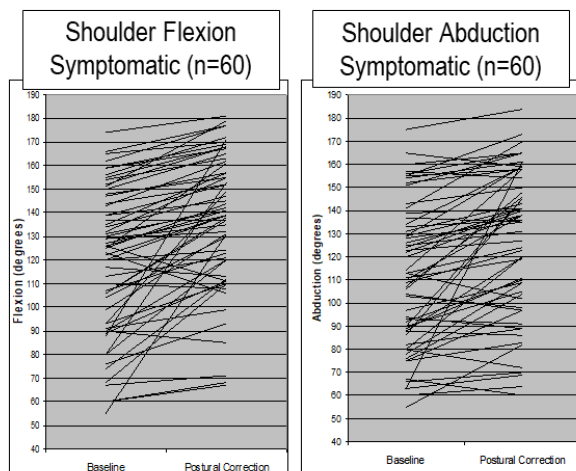
Assessment:
Impairment

Symptom modification
Procedures / techniques to consider

"Finger on sternum technique"



www.drjeremylewis.com

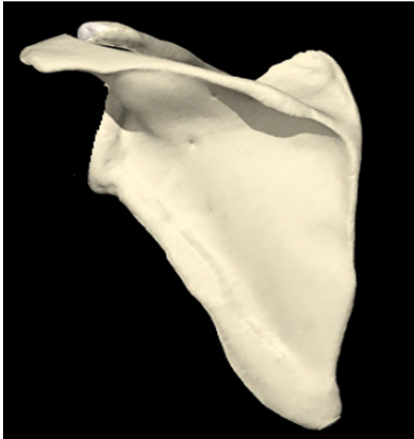


Lewis et al (2005) SIS: the effect of changing posture on shoulder range of movement. *JOSPT* 35(2):72-87.



Symptom modification

“Scapula”



www.drjeremylewis.com

- Elevation (upward rotation)
- Posterior tilt
- Combination

Examples of exercise

- Technique and repeated movements
- Resistance band around scapula bilaterally and arm elevation
- Resistance band over clavicle & around foot



Symptom modification

“Winging scapula” Scapular dyskinesis



Can't determine relevance from observation

Often not related or 'escape' from symptoms (ie 'limp')

★ Assess effect of reducing 'winging' on symptoms

- Combination of scapular elevation & posterior tilt
- “Squash technique”
- Taping

www.drjeremylewis.com



Symptom modification

“Winging scapula” Scapular dyskinesis

Management

- Taping
- Compression garment
- **Exercise program**



I'm worse

- ‘Limp’
- Osteochondroma(?)

Kuhn et al (1998)
J Am Acad Orthop Surg 6: 267-273



Main causes of winging: Long thoracic nerve palsy (C5,6,7 anterior rami) | Muscle weakness / injury

Aetiology: Compression and / or Traction of the long thoracic nerve from:
 strenuous work / sport | trauma | idiopathic | infection | posture | post partum

- Brachial neuritis (neuralgic amyotrophy) (2+ years to recover)

Gooding et al (2014) Scapular winging.
Shoulder & Elbow: 6(1):4-11

Symptom modification

During movement



- Long lever to short lever
- Squeeze ball / JAMAR / Open fingers
- Step up / resistance
- Add ER / IR moment
- “Humeral head depression”
- AP - PA pressure



Sporrong et al (1996) *Acta Orthop Scand*. 67:485-90
 Horsley et al (2016) *Shoulder & Elbow*. 8:124-129
 Coldham, Lewis, Lee (2006) The reliability of 1 v. 3 grip trials in symptomatic & asymptomatic subjects. *J Hand Therapy*.

www.drjeremylewis.com



Symptom modification

During movement

External rotation and internal rotation

- Manual resistance
- With resistance bands
- Polishing cloths / plastic bags against doors
- Polishing cloths / plastic bags against walls
- Ball (eg small Swiss ball / soccer ball)

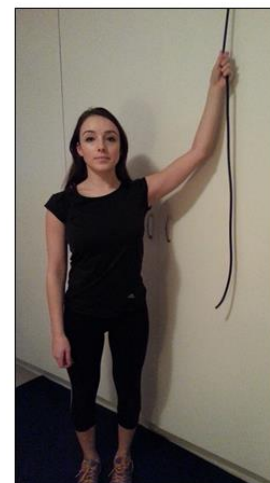


www.drjeremylewis.com



Symptom modification

“Humeral head depression”



Isometric contractions

Isometric, concentric, & eccentric contractions

www.drjeremylewis.com

Other suggestions for positively 'messing' with the brain



www.drjeremylewis.com

SUMS Stage 1- Early

★ Relaxed Diaphragmatic Breathing (R.D.B., visualise movement, then move)

Ma et al (2017) The effect of diaphragmatic breathing...*Frontiers in Psychology*. <https://doi.org/10.3389/fpsyg.2017.00874>

Jafari et al (2017) Pain & Respiration: A SR. *Pain* 158 (6): 995-1006



★ Exercise contralateral side (increases ROM, strength, may not influence pain)

Fermin et al (2016) The effect of contralateral exercise on patient pain and range of motion.

Journal of Sport Rehabilitation. <http://journals.humankinetics.com/doi/pdf/10.1123/jsr.2016-0181>

★ Hand gripping

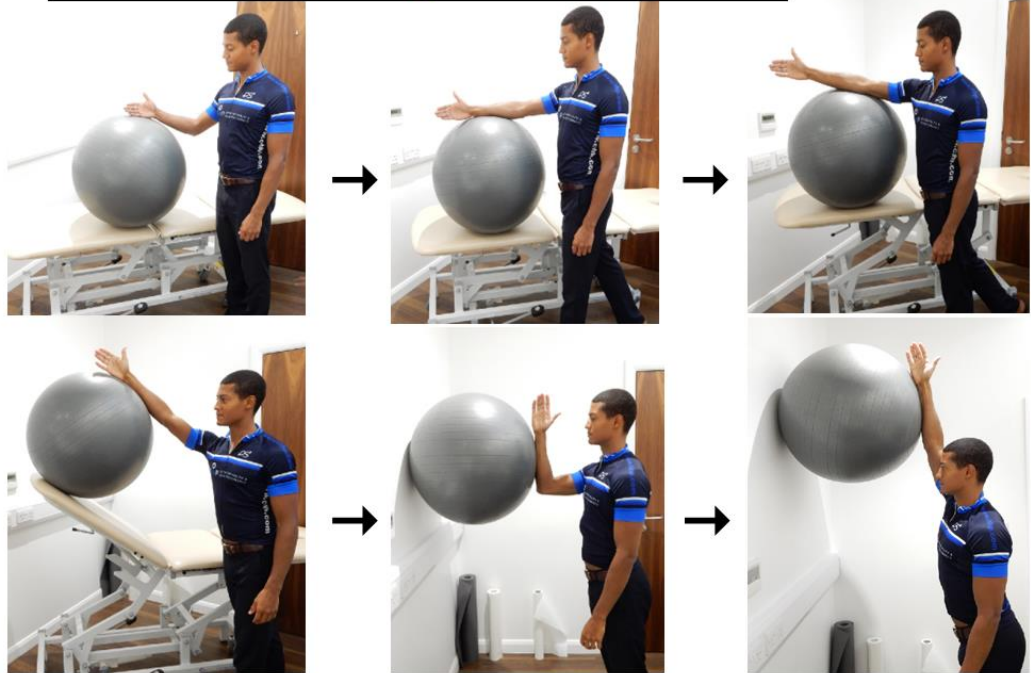


★ 'Short lever' lifts (if highly irritable side lying slides)



SUMS Stage 1- Early

★ Graduated reloading
(consider rolling a ball)

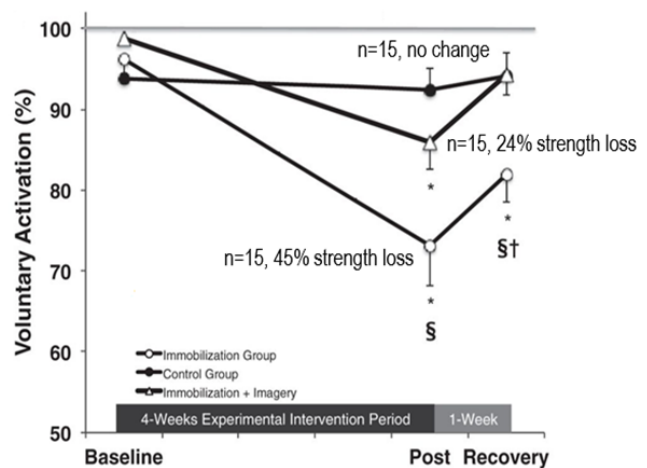


SUMS Stage 1- Early (to advanced)

★ Mental Motor Imagery
Imagine Movements &
Think Strong

[52 (4 x 13) imagined maximal contractions
5 secs, 5 sec rest / 5x/week]

Clark et al (2014)
J of Neurophysiology 112: 3219-26



Shape-Up-My-Shoulder

Rehabilitation Program (#SUMS)

SUMS Stage 1 Early

▪ SSMP

Clinically

- Early stage rehabilitation
- New to exercise
- ± Irritable

SUMS Stage 2 Middle

▪ HSR

SUMS Stage 3 Advanced

▪ Mixed

eg weight, duration & speed

- Ballistic
- Chaotic
- Precision

SUMS Nuanced

- Severe OA
- Inoperable RC tears



@JeremyLewisPT

Shape-Up-My-Shoulder

Rehabilitation Program (#SUMS)

SUMS Stage 2 HSR

- **Isometrics (bridge to...)**
- **Heavy Slow Resistance (HSR)**

www.drjeremylewis.com

#SUMS Pain During Exercise



Should exercises be painful in the management of chronic musculoskeletal pain? A systematic review and meta-analysis

Smith BE, et al. *Br J Sports Med* 2017;0:1–10. doi:10.1136/bjsports-2016-097383

Pain during exercise may offer small benefit in short term.
No difference mid or long term.
Pain during exercise shouldn't be a barrier to successful outcome.

Level of Pain

- Intolerable
- Borderline
- Tolerable

Traffic Light Pain Control

Pain during shoulder exercise isn't harmful

It may help you improve faster

The level of pain should be tolerable

Pain shouldn't increase at night or the next day

www.drjeremylewis.com

Isometric exercises:

Stand-alone and Bridge to HSR

use RPE (rating perceived exertion of 5-6, 7-9, 10 = maximum)

- ▶ Perform in a variety of positions, progress to most provocative
 - ▶ 55% MVC (increase in muscle strength and size)
 - ▶ 90% MVC (increase in tendon strength through increased stiffness)
 - ▶ Aim for the strongest contractions possible (75% to 90% MVC - isometric)
-
- Bonello C, Girdwood M, De Souza K, Trinder NK, Lewis J, Lazarczuk SL, Gaida JE, Docking SI, Rio EK (2021) Does isometric exercise result in exercise induced hypoalgesia in people with local musculoskeletal pain? A systematic review. *Physical Therapy in Sport*. 49: 51-61
 - Dupuis, Barrett, Dubé, McCreesh, Lewis, Roy (2018) Cryotherapy or gradual reloading exercises in acute presentations of rotator cuff tendinopathy: a randomised controlled trial. *BMJ Open Sport & Exercise Medicine*
 - Parle, Riddiford-Harland, Howitt, Lewis (2016) Acute rotator cuff tendinopathy: does ice, low load isometric exercise, or a combination of the two produce an analgaesic effect? *BJSM*

Isometric exercises:

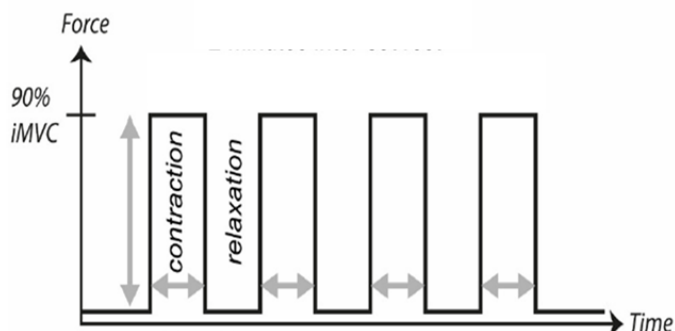
Stand-alone and Bridge to HSR

Assess:

- ▶ 3 seconds on, 3 seconds off, x 2
- ▶ Use RPE (rating perceived exertion of 7-9, 10 = maximum)

Management:

- ▶ 4 repetitions, 3 sec. on 3 sec. off
- ▶ 2 minutes rest
- ▶ 5 times (at 50-60%, at 90%)
- ▶ Aim for most provocative position
- ▶ Can try longer contractions
- ▶ 3 times/ week



Mersmann et al (2017) *Frontiers in Physiology*



Metronome: 60 beats / minute

Stage 2: Heavy Slow Resistance (HSR)

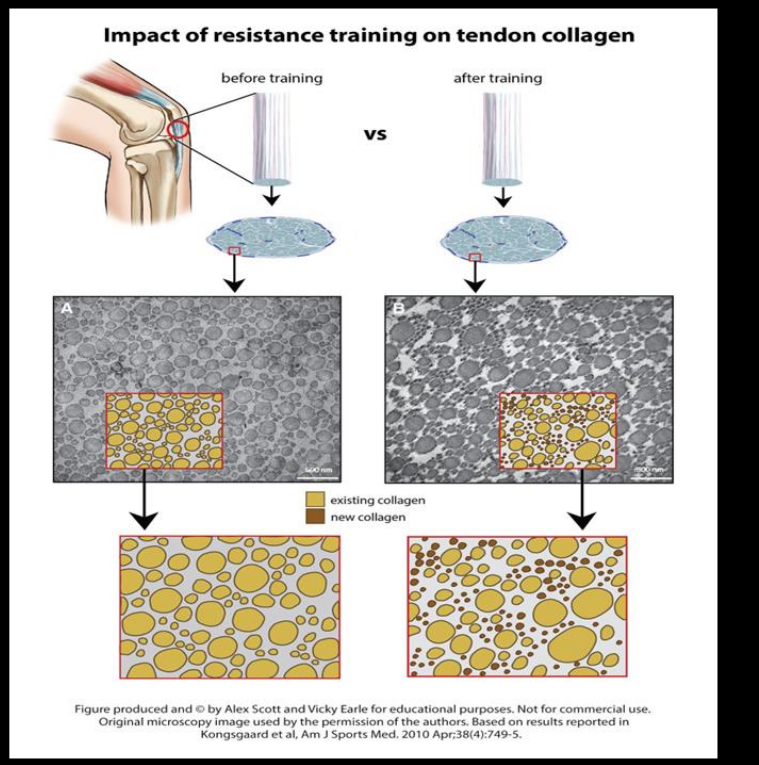
Eccentric contractions

- ▶ Higher mechanical loads on the musculotendinous units
- ▶ Greater loads when muscles lengthen than when they shorten
- ▶ More tensile force in tendon
- ▶ Less energy cost than concentric contractions
(ie resulting in a greater volume of work)
- ▶ Superior to watch and wait
- ▶ Not superior to other types of strengthening (ie need all types)
- ▶ Weights best but also consider resistance tube loops



Stage 2: Heavy Slow Resistance (HSR)

Alex Scott @alex_scott_ubc



Shape-Up-My-Shoulder Rehabilitation Program (#SUMS)

SUMS Stage 1 Early	SUMS Stage 2 Middle	SUMS Stage 3 Advanced	SUMS Nuanced
<ul style="list-style-type: none"> SSMP <p><u>Clinically</u></p> <ul style="list-style-type: none"> Early stage rehabilitation New to exercise ± Irritable 	<ul style="list-style-type: none"> HSR 	<ul style="list-style-type: none"> Mixed eg weight, duration & speed Ballistic Chaotic Precision 	<ul style="list-style-type: none"> Severe OA Inoperable RC tears

←→ ←→ ←→ ←→

www.drjeremylewis.com

Functional Program



Push



Lift

& Carry



Throw



Pull



Precision

... all essential in rehabilitation

“Are you the sort of person who prefers a more formal or less formal exercise program?”

(& validate)

RESEARCH ARTICLE

BMC Musculoskeletal Disorders



Open Access



Specific or general exercise strategy for subacromial impingement syndrome—does it matter? A systematic literature review and meta analysis

Alison R. Shire^{1†*}, Thor A. B. Stæhr^{1†}, Jesper B. Overby¹, Mathias Bastholm Dahl^{1†}, Julie Sandell Jacobsen¹ and David Høytrup Christiansen²

Shire et al. *BMC Musculoskeletal Disorders* (2017) 18:158
DOI 10.1186/s12891-017-1518-0

SUMS - Less formal - Use everyday / Valued activities

(Aim for **3000-4000** metabolic equivalent (MET) minutes / week)

The metabolic equivalent of a task (MET) is a way of measuring physical activity

Kyu et al (2016) Physical activity & risk of breast cancer, colon cancer, diabetes, IHD & ischaemic stroke events: SR & dose response MA for the clinical burden of disease study 2013. *BMJ*

**Doesn't
have to
be in the
gym!**



Gardening



Cleaning



Walking



Cycling



Carrying



Climbing

★ Exercise with your partner / friend ★ Join a group or class ★ Make it fun!!!

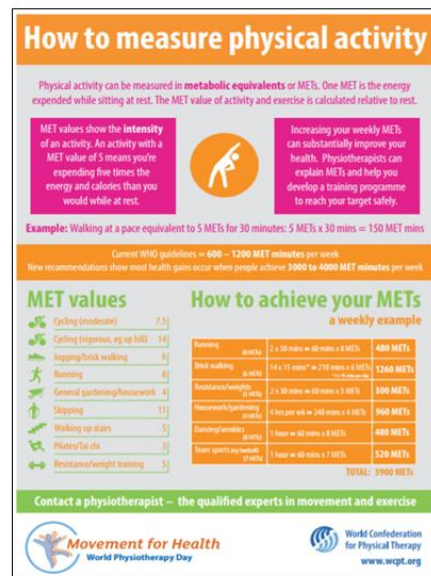
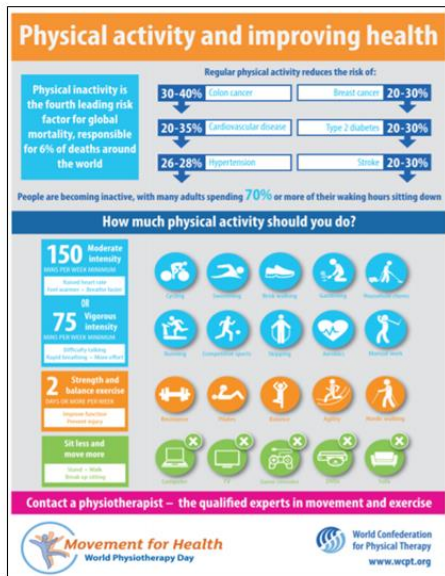
Developing a 3000-4000 METs / week program

- ★ **Walk** briskly & swing arms (6.5km/h) = (6 MET activity) 5 x/week for 30 minutes/session
= 5 x 6 x 30 = **900 MET-minutes**
- ★ **Bike** (15km/h) = (6 MET activity) 3 x/week for 30 minutes/session
= 3 x 6 x 30 = **540 MET-minutes**
- ★ **Cleaning** vacuuming, mopping, etc = (6 MET activity) 3 x/week for 60 minutes/session
= 3 x 6 x 60 = **1080 MET-minutes**
- ★ **Mowing lawn** pushing 1 x/week = (6 MET activity) for 30 minutes
= 1 x 6 x 30 = **180 MET-minutes**
- ★ **Gardening** 1 x / week = (6 MET activity) for 120 minutes
= 1 x 6 x 120 = **720 MET-minutes**
- ★ **Carrying** 3 x / week moderate weight = (6 MET activity) for 10 minutes
= 3 x 6 x 10 = **180 MET-minutes**

Total MET-minutes / week = 900 + 540 + 1080 + 180 + 720 + 180 = 3600 MET-minutes

Graduate slowly and add more upper limb activities / Faster (more vigorous) = increased MET

http://www.wcpt.org/wptday-infographics



SUMS – More formal programs

- ▶ Introduce multi-stage pushing, pulling, lifting and carrying, throwing / bouncing & placing, & precision program
- ▶ Initially consider end of working day and once every 3 days / then 2 days
- ▶ Mixed loads, mixed durations, mixed speeds (faster later) and always bilaterally
- ▶ Include kinetic chain
- ▶ 'Chaos'
- ▶ Exercise to **fatigue** with light or heavy loads (then try one more just to be sure!)

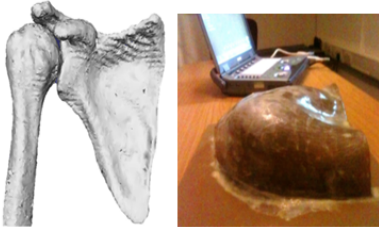
Numbers not necessary, but if easier for individual, may consider:

<u>No external to light loads</u>	<u>Moderate loads</u>	<u>Heavy loads</u>
(eg 10 - 40% of 1RM)	(eg 50 - 70% of 1RM)	(eg 90 - 95% of 1RM)
eg: 15 repetitions, (active rest 2-3 mins), 2-3 sets	eg: 70% -12 repetitions, (active rest 2-3 mins), 2-3 sets	eg: 90% (5) – 95% (3) repetitions, (active rest 2-3 mins), 1-3 sets
Instead of 1 RM, may also use <u>subjective RPE</u> of 7-8 (rating perceived exertion, 10 = maximum)		

Recommendation for once / day

Development of a validation model to measure AHD

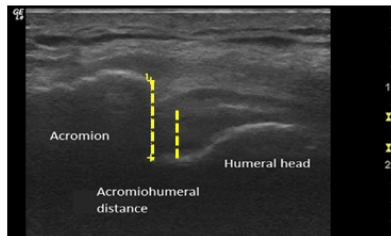
McCreech, Adusumilli, Evans, Riley, Davies, Lewis (2014) Validation of ultrasound measurement of the SAS using a novel shoulder phantom model. *US in Medicine & Biology* 40(7)



Reliability

Acromio-Humeral Distance
Supraspinatus tendon thickness

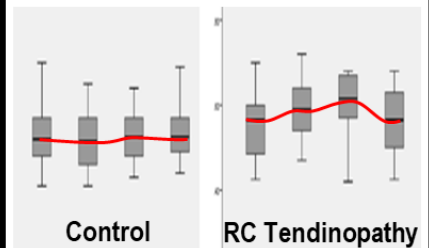
McCreech, Anjum, Crotty, Lewis (2015) US measures of SSTT & AHD in RC tendinopathy are reliable. *J Clin Ultrasound*.



Response to RC loading

McCreech, Donnelly, Lewis (2014) Immediate response of the Supraspinatus Tendon to loading in RC Tendinopathy. *BJSM* 48:A42-A43 doi:10.1136/bjsports-2014-094114.65

Pre - 1 - 6 - 24 hours



Dr Karen McCreech, Purtill, Donnelly, Lewis (2017) Increased supraspinatus tendon thickness following fatigue loading in rotator cuff tendinopathy. *BMJ Open SEM*. <http://dx.doi.org/10.1136/bmjsem-2017-000279>

What do shoulders do?



... all essential in rehabilitation

#SUMS Stage 3

Example of a push-up progression



Shape-Up-My-Shoulder (#SUMS): Precision and Accuracy



✓ Precision
✗ Accuracy



✓ Precision
✓ Accuracy



✗ Precision
✗ Accuracy



✗ Precision
✓ Accuracy

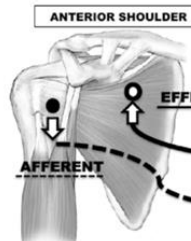
PROPRIOCEPTION PATHWAY

MUSCLE SPINDLES

- Change in muscle length & velocity
- Initial stretch reflex
- Gross motor movements

GOLGI TENDON ORGANS (GTOs)

- Muscle junctions & tendons
- Muscle force
- Stimulate reflexes opposing stretch reflex



PACINIAN CORPUSCLES

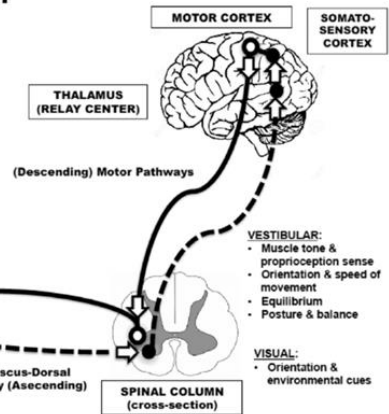
- Connective tissue / Fascia
- Muscle tension & joint pressure

RUFFIN'S CORPUSCLES

- Deep tendons, muscles, tissues, folds of skin
- Rate & direction of movement

MEISSNER AND MERKEL ENDINGS

- Cutaneous tissue
- Deformation / stretch / compression
- Curvatures & vibrations



VESTIBULAR:

- Muscle tone & proprioception sense
- Orientation & speed of movement
- Equilibrium
- Posture & balance

VISUAL:

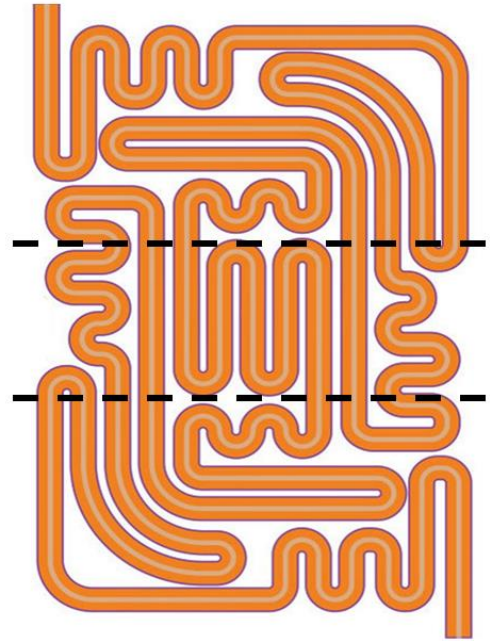
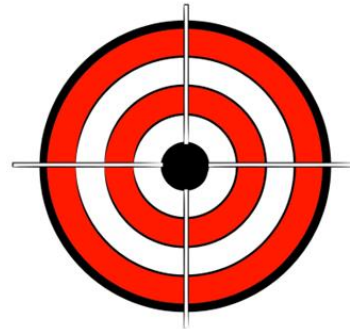
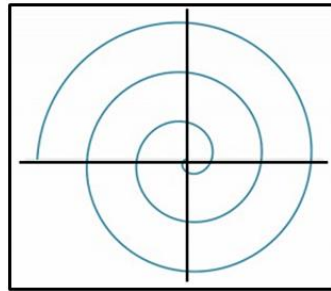
- Orientation & environmental cues

TACTILE / CUTANEOUS:

- Protective & discriminatory sense
- Learning environment

Shape-Up-My-Shoulder (#SUMS): Precision and Accuracy

- ▶ Pursuit
- ▶ Joint repositioning
- ▶ Hold



www.drjeremylewis.com

Shape-Up-My-Shoulder (#SUMS): Precision and Accuracy



Shape-Up-My-Shoulder (#SUMS): SSM | Precision and Accuracy
Virtual Reality: Is seeing, believing & achieving?



www.drjeremylewis.com

Shape-Up-My-Shoulder
 Rehabilitation Program (#SUMS)

SUMS Stage 1
Early

- **SSMP**
- Clinically
- Early stage rehabilitation
- New to exercise
- ± Irritable

SUMS Stage 2
Middle

- **HSR**

SUMS Stage 3
Advanced

- **Mixed**
 eg weight, duration & speed
- **Ballistic**
- **Chaotic**
- **Precision**

SUMS
Nuanced

- **Severe OA**
- **Inoperable RC tears**

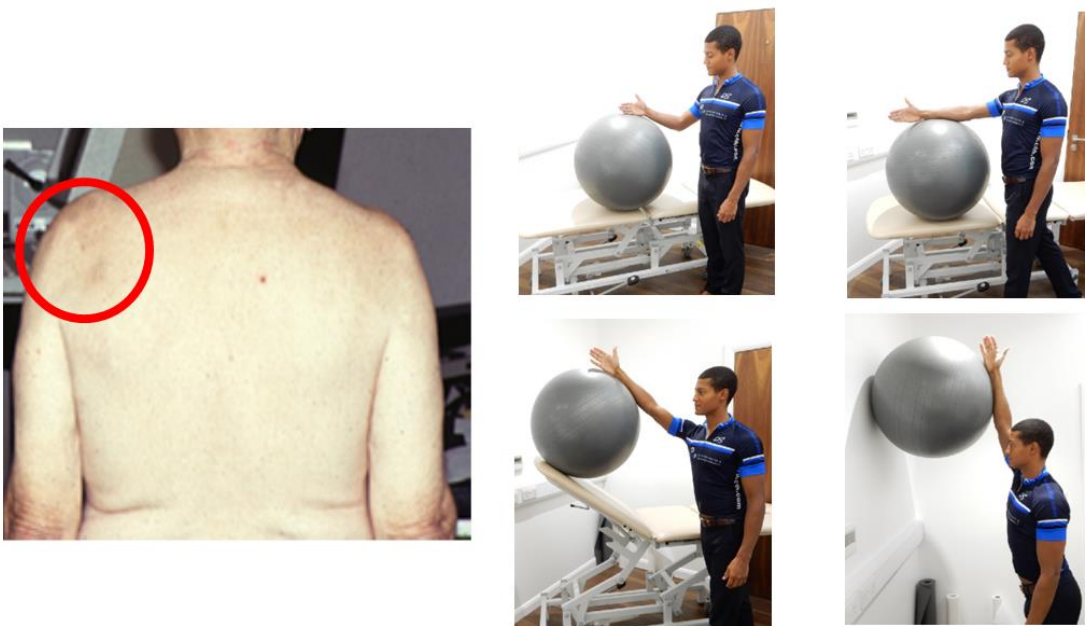


www.drjeremylewis.com

Shape-Up-My-Shoulder (#SUMS): Nuanced - Massive RC Tear



Shape-Up-My-Shoulder (#SUMS): Nuanced - Massive RC Tear



Shape-Up-My-Shoulder (#SUMS): Nuanced - Massive RC Tear



Ainsworth R & Lewis J

Exercise therapy for the conservative management of full thickness tears of the rotator cuff: a systematic review. *British Journal of Sports Medicine* (2007) 41(4):200-10



Ainsworth R, Lewis J & Conboy V

A prospective placebo controlled RCT rehabilitation programme for patients with a diagnosis of massive rotator cuff tears. *Shoulder and Elbow* (2009) 1(1): 55-60



Sealey P & Lewis J

Rotator cuff tears: is non-surgical management effective?
Physical Therapy Reviews (2016) <http://dx.doi.org/10.1080/10833196.2016.1271504>



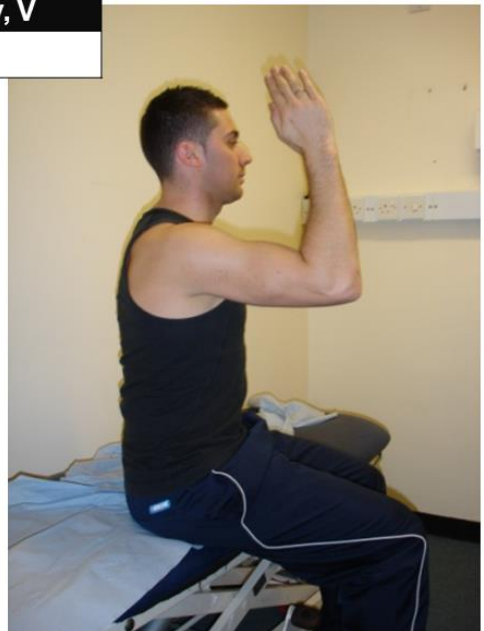
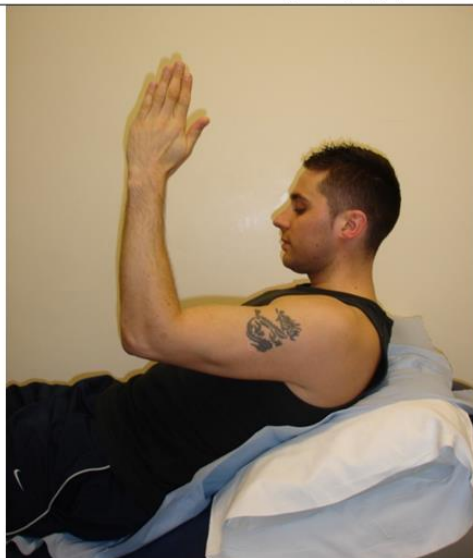
Shepet et al

Nonoperative Treatment of Chronic, Massive Irreparable RC Tears: SR with Synthesis of a Standardized Rehabilitation Protocol. *Journal of Shoulder & Elbow Surgery* (2020)

Shape-Up-My-Shoulder (#SUMS): Nuanced - Massive RC Tear

Ainsworth R, Lewis JS and Conboy, V

Shoulder and Elbow (2009) 1(1): 55-60



Section Six: **Frozen Shoulder**

FROZEN SHOULDER



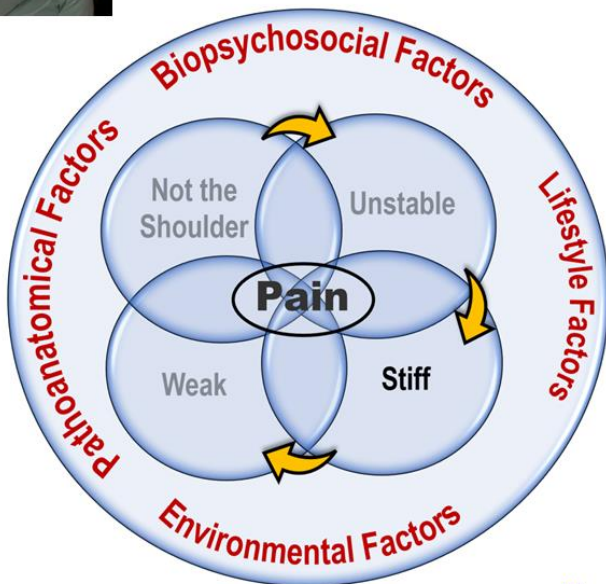
Jeremy Lewis PhD FCSP

Consultant Physiotherapist | Professor of Musculoskeletal Research | Independent Prescriber | MSK Sonographer

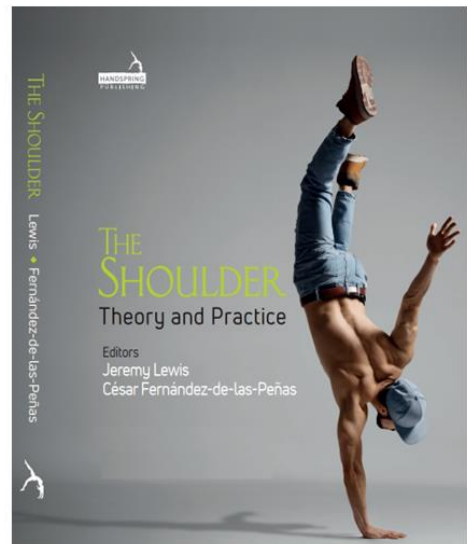
www.drjeremylewis.com



FROZEN SHOULDER



www.drjeremylewis.com



Stiff
+/- Painful

FROZEN SHOULDER: Terminology

▪ Périarthrite scapula-humérale	Duplay	1872
▪ Frozen shoulder	Codman	1934
▪ Bicipital tenosynovitis	Lippmann	1943
▪ Adhesive capsulitis	Neviaser	1945
▪ 50-year old shoulder	China / Japan	
▪ Frozen shoulder syndrome	Lungberg	1969
▪ Contracture of the shoulder	Bunker	2009
▪ Frozen shoulder contracture syndrome	Lewis	2014
▪ (Non-permanently) Frozen Shoulder	Lewis	2020

www.drjeremylewis.com

FROZEN SHOULDER: Terminology

Frozen Shoulder

Primary / Idiopathic FS

No identifiable reason for onset, or association with other health concerns

Secondary FS

- Intrinsic (eg RCRSP / calcific tendinopathy)
- Intrinsic iatrogenic (eg shoulder surgery)
- Extrinsic (eg ipsilateral fractures - breast surgery)
- Systemic (eg diabetes, thyroid)

Cause of stiffness: Possible contraction / adhesions / muscle guarding

www.drjeremylewis.com

FROZEN SHOULDER

Pathology



FROZEN SHOULDER: Pathology

Ryan et al. *BMC Musculoskeletal Disorders* (2016) 17:340
DOI 10.1186/s12891-016-1190-9

BMC Musculoskeletal
Disorders

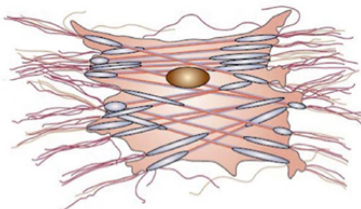
RESEARCH ARTICLE



The pathophysiology associated with primary (idiopathic) frozen shoulder: A systematic review

Victoria Ryan, Hazel Brown, Catherine Minns Lowe, Jeremy Lewis

Myofibroblast

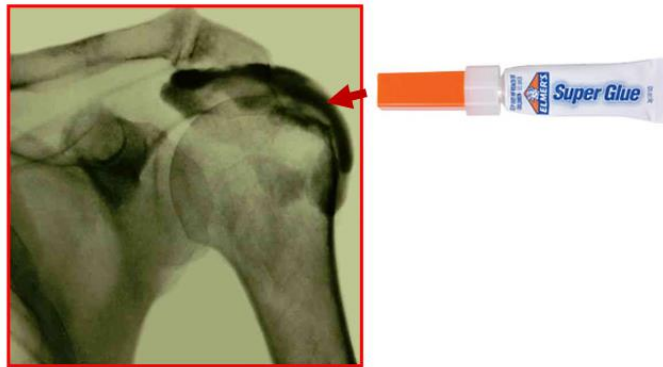


- Proliferation of myofibroblasts (MFB) stimulated by proinflammatory cytokines
- Myofibroblasts lead to contraction in first months of FS
- CS injections may inhibit myofibroblast proliferation
- Stretching in **pain stage** may lead to \uparrow myofibroblasts
- In **stiff phase** stretching may \uparrow MMPs (enzymes) and lead to MFB breakdown

Hettrich et al 2016 The effect of myofibroblasts and corticosteroid injections in adhesive capsulitis *JShEISurg*

FROZEN SHOULDER: Pathology

Périarthrite scapula-humérale

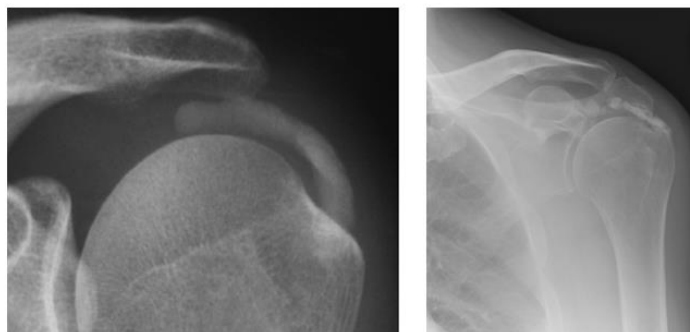


Duplay (1872, 1896)

Duplay, S (1872) De la périarthrite scapula-humérale. Archives générales de médecine. No 11
Duplay, S (1896) De la périarthrite scapula-humérale. La semaine médicale. No 25

FROZEN SHOULDER: Pathology

Caused by calcification



Baer 1907

Baer WS (1907) Operative treatment of subdeltoid bursitis.
Bull John Hopkins Hospital; 18: 282-4

FROZEN SHOULDER: Pathology



Frozen Shoulder:

- Not bursa or calcification

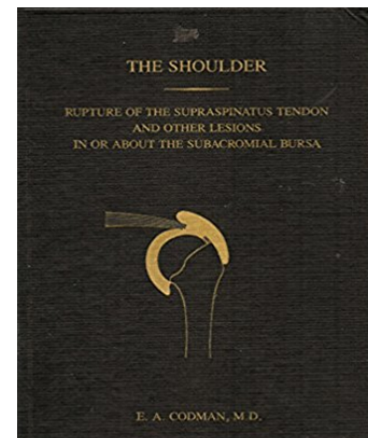
Frozen shoulder is ***certain to resolve***
(Codman 1934)

FROZEN SHOULDER: Codman



Codman EA (1934) The Shoulder.
Boston: Thomas Todd Company

<https://www.shoulderdoc.co.uk/article/776>

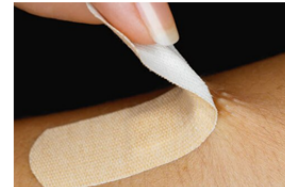
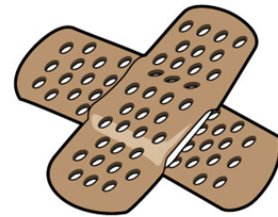


- Based on observation of **4 people** over 1 year
- **Treatment:** Hospitalisation with arm constrained in elevation for one to two weeks. Up out of bed once a day for pendular exercises

FROZEN SHOULDER: Pathology

Adhesive capsulitis

- Case series of 10 people
- Inflammation leading to fibrosis
- Axillary fold becoming adherent to the humerus
- Like adhesive plaster (band-aid) applied to the skin
- **Treatment:** Rotation and manipulation of the humerus to separate the adherent capsule from the humeral head



Neviaser J (1945) Adhesive capsulitis of the shoulder. A study of the pathological findings of periartthritis of the shoulder. JBJS Am; 27: 211

FROZEN SHOULDER: Pathology

Later findings

- Thickening and contraction of capsule
 - Tissue similar to Dupuytren's contracture
 - Uncertainty regarding inflammation
 - No adhesions
- Adhesive capsulitis ?*
- Adhesive capsulitis does not appear to appropriately describe the condition and arguably term should be abandoned

Lundberg (1969), Bunker (1997, 2009), Hand et al (2007), Smith et al (2012)

FROZEN SHOULDER: Assessment & Diagnosis

- ▶ Approximately 50 years old
- ▶ GHJ movement ↓ by **AT LEAST 25% in 2 or more planes** with AROM = PROM
- ▶ External rotation AROM = PROM and ↓ by **AT LEAST ≤ 50%** of other side ★
- ▶ **At least 1 month duration**
- ▶ **X-ray normal**

Kelley et al (2013)



Valentine and Lewis (2006)
Arch Phys Med Rehab

Assessment & Hypothesis (Diagnosis)

To determine the reason for the observed clinical 'stiffness' an x-ray may be required



Frozen shoulder
x-ray essentially NAD



Severe
OA



Avascular
necrosis



Locked
dislocation



Osteo
sarcoma

And does it always get better?

7 year follow up (n=62)

- 31 (50%) mild shoulder pain & shoulder stiffness
- 37 (60%) had restricted range of movement

Shaffer et al (1992) FS- a long term follow-up *JBJS-Am.*

At 4.4 years

41% experiencing symptoms (range 2-20 years)

- 94% mild symptoms ■ 6% severe symptoms (Hand et al 2008)

Average duration 30.1 months

(range 12 - 42 months / 1-3.5 years) (Reeves 1975)

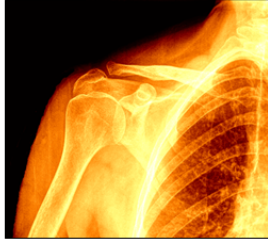
And does it always get better?

Natural history of frozen shoulder: fact or fiction? SR

Wong et al (2017) *Physiotherapy* 103: 40-47

No evidence supported the theory of recovery to full resolution without treatment

...complete resolution without treatment is unfounded



Living with a Frozen Shoulder: What are patients saying?

N=12 diagnosed with Primary Frozen Shoulder

Jones et al (2013) Living with Frozen Shoulder. *BMJ Open*

Pain:

- Unguarded movements would lead to severe pain
- Sleep badly disturbed
- Sleep deprivation was substantial on-going problem

Inconvenience:

- Typically lasted 1 to 3 years and this was hugely disruptive
- Once understood accepted the situation but **hoped for the earliest possible resolution**

Confusion:

- Difficult to obtain diagnosis
- Treatments (& risks & benefits) not clearly presented
- Advice often contradictory

Treatment:

- Patients main priority was pain-free freedom of movement
- Commonly reported delays getting specialist care

www.drjeremylewis.com

What are patients saying?

FS: living with uncertainty and being in “no-man’s land” (n= 6)

King, W. V. and C. Hebron (2022). "Frozen shoulder: living with uncertainty and being in “no-man’s land”." *Physiotherapy Theory and Practice*: 1-15.

- ▶ People living with FS struggle to maintain a normal life
- ▶ Living with the significant pain, physical restriction, sleep loss and disability
- ▶ Attempts to cope and adapt made more difficult by the healthcare journey
- ▶ The uncertainty of these experiences was conveyed as being in “no man’s land”
Reflecting the personal crisis face by the individual

www.drjeremylewis.com

FROZEN SHOULDER: Stages



Musculoskeletal Science & Practice

February 2015 Volume 20, Issue 1, Pages 2-9

Frozen shoulder contracture syndrome – Aetiology,
diagnosis and management [Jeremy Lewis](#)

Pain > Stiffness

Stiffness > Pain

www.drjeremylewis.com

Lewis 2015

Non-surgical management

Journal of Rehabilitation Medicine



CLINICAL EFFECTIVENESS OF NON-SURGICAL INTERVENTIONS FOR PRIMARY FROZEN SHOULDER: A SYSTEMATIC REVIEW

Catherine MINNS LOWE, PhD¹, Eva BARRETT, PhD², Karen MCCREESH, PhD³, Neasa DE BÚRCA, MSc⁴
and Jeremy LEWIS, PhD^{1,5}

<https://www.medicaljournals.se/jrm/content/abstract/10.2340/16501977-2578>

Pain > Stiff Phase

**CS intra-articular injection (symptoms < 6/12)
& home exercise program**

FS Management: **Pain > Stiffness**

Examples:

- Techniques for early SUMS
- Relaxed Breathing
- Ball Rolling + Metronome
- Exercise Contralateral Side & 'Mirror' / Imagery
- Ainsworth Program
- Massage
- Virtual Reality



If not coping consider **injection therapy**
(with Risks & Benefits !) early **(<6 months)**

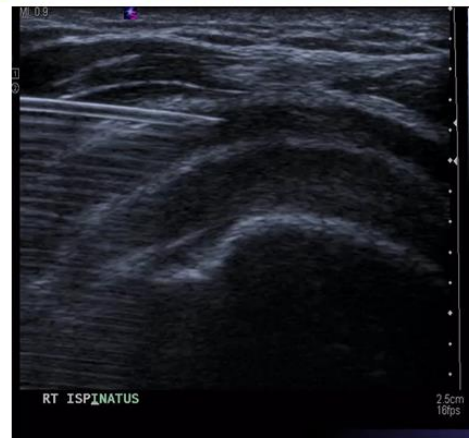
Frozen Shoulder: **Pain > Stiffness**

Injection therapy

Glenohumeral Joint



Subacromial Bursal



Frozen Shoulder: **Pain > Stiffness**

Findings from RCTs of low risk of bias

GHJ - intra-articular corticosteroid injection **Ultrasound guided** (non-diabetic population)

2mL of 10mg/mL triamcinolone acetonide & 3mL of 1% lidocaine & home exercise program:

Codman exercises, 'wall-climbing' exercises, shoulder external & internal rotation- with a bar, posterior shoulder stretching.

Exercises: 10 minutes, 3 times/ day.

Results:

Short term: 12 / 52

- ▶ **Improved function**
- ▶ **Improved ROM**
- ▶ **Decreased pain**

Yoon et al (2013). Optimal dose of intra-articular corticosteroids for adhesive capsulitis. *AJSM*. 41(5):1133-9.

www.drjeremylewis.com

Frozen Shoulder: **Pain > Stiffness**

Ultrasound guided CSI: **Glenohumeral v subacromial v GHJ + SAB** **& home exercise program 3x/day** (diabetic & non-diabetic populations)

Results: Short term: 12 / 52

All groups improved function & ROM, and decreased pain

Slightly better in GHJ + SAB group for hand behind back

Cho et al (2016) Injection site for idiopathic FS - RCT *Joint Bone Spine*

Limitations

- ★ Short term follow up
- ★ Outcome measures
- ★ No control group
- ★ Lack of blinding
- ★ Compliance of exercise

www.drjeremylewis.com

FROZEN SHOULDER: Stages



Musculoskeletal Science & Practice

February 2015 Volume 20, Issue 1, Pages 2-9

Frozen shoulder contracture syndrome – Aetiology, diagnosis and management
Jeremy Lewis

Pain > Stiffness

Stiffness > Pain

www.drjeremylewis.com

Lewis 2015

Non-surgical management

Journal of Rehabilitation Medicine



CLINICAL EFFECTIVENESS OF NON-SURGICAL INTERVENTIONS FOR PRIMARY FROZEN SHOULDER: A SYSTEMATIC REVIEW

Catherine MINNS LOWE, PhD¹, Eva BARRETT, PhD², Karen MCCREESH, PhD³, Neasa DE BÚRCA, MSc⁴ and Jeremy LEWIS, PhD^{1,5}

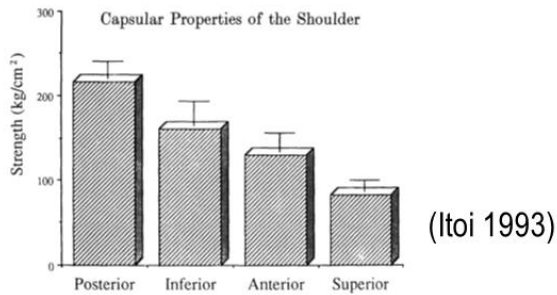
<https://www.medicaljournals.se/jrm/content/abstract/10.2340/16501977-2578>

Stiff > Pain Phase

Exercise, manual therapy and stretching

But is the stiffness always a capsular contraction?

- ▶ Posterior GHJ capsule (strongest) = **216.6 ± 58.2 kg/cm²**
- ▶ Posterior GHJ capsule modulus of elasticity (resistance to being deformed elastically) = **683 ± 228.8 kg/cm²**



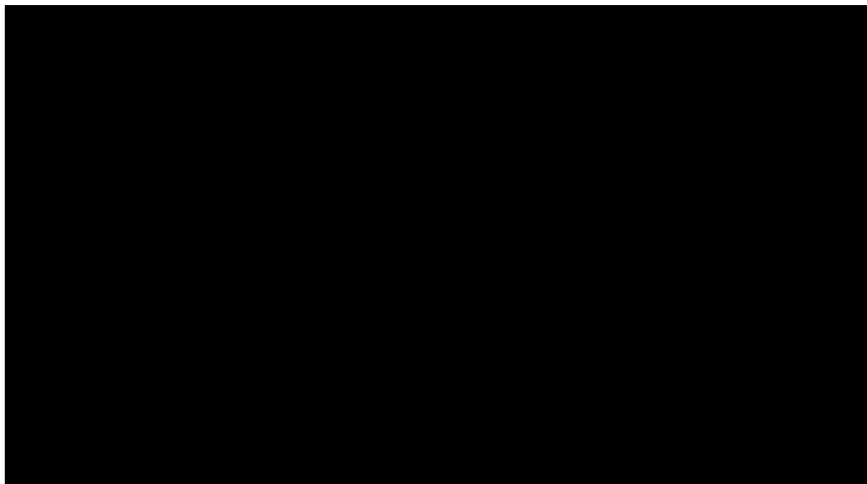
Strength was significantly different between the four sites of the capsule ($p=0.0008$): the strength of the posterior capsule was greater than those of the inferior and anterior portions of the capsule, which were greater than that of the superior capsule. The histograms show the means ± s.e.

- ▶ Forces during inferior GH mobilisations: **3 to 14 kilograms** (Witt 2016)



www.drjeremylewis.com

But is the stiffness always a capsular contraction?



Original Research:
Luise Hollmann
@LuiseHollmann

Additional classification: **Muscle Guarding Stiff (Frozen) Shoulder**

Frozen Shoulder: **Stiffness > Pain**

Findings from RCTs of low risk of bias

Joint mobilisation, stretching & home exercise

(non-diabetic population)

3 sessions per week for 6 weeks (18 in total)

Stretching:

Total 20 minutes for: flexion, abduction (POS), IR, ER

Mobilisation:

30 minutes involving; lateral, inferior, anterior and posterior pressure techniques directed to the GHJ

Home Exercise:

Self-stretching and strengthening

Results:

Long Term at 1 year

- ▶ **Significant improvement in function (Constant) & in passive abduction & external rotation**

Celik et al (2016) Does adding mobilization to stretching improve outcomes for people with frozen shoulder? A RCT. *Clinical Rehabilitation*. 30(8):786-94.

www.drjeremylewis.com

Frozen Shoulder: **Stiffness > Pain**

Findings from RCTs of low risk of bias

Joint mobilisation & upper limb ergometer

(non-diabetic population)

2-3 sessions per week (10 in total)

Ergometer and mobilisation:

15 minutes upper extremity cycle ergometer

Mobilisation: Supine with shoulder in 30°- 40° abduction and ER (at 'the end range of available motion'); glenohumeral axial 'distraction' Kaltenborn type III followed by a posterior glide without oscillations for 1 minute, one-minute rest, repeated 15 times.

Results:

Short Term (end of Rx)

- ▶ **Significant improvement in function (Constant), & increased ROM (passive)**

Gutiérrez Espinoza et al (2015) Glenohumeral posterior mobilization versus conventional physiotherapy for primary adhesive capsulitis: a RCT. *Medwave*. 15(8).

www.drjeremylewis.com

Frozen Shoulder: **Stiffness > Pain**

Findings from RCTs of low risk of bias

Static progressive stretching and a multimodal program

(non-diabetic population)

3 sessions / week for 4 weeks (12 in total)

Multimodal: (Heat, movements and MT)

Heat packs: (10 minutes)

Physiological movements and accessory caudad 'glides'. 3 times over a 10-minute treatment.

Home program: pulley, wand & pendulum exercises (10 reps of each, 3x/day)

Static progressive stretch device:

- ▶ One 30-minutes session per day for week 1
- ▶ Two 30-minute sessions per day for weeks 2 and 3
- ▶ Three 30-minute sessions per day for week 4

Results:

Long Term at 1 year

- ▶ **Significant improvement in function (DASH), reduction in pain, and increased ROM (active & passive)**

Ibrahim et al (2014). Efficacy of a static progressive stretch device as an adjunct to physical therapy in treating adhesive capsulitis. *Physiotherapy*. 100(3):228-34.

www.drjeremylewis.com

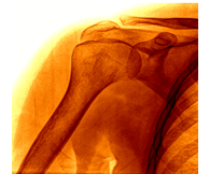
FS: Is there a role for strengthening exercises?

Rawat et al (2017) *Journal of Hand Therapy* 30: 235-241

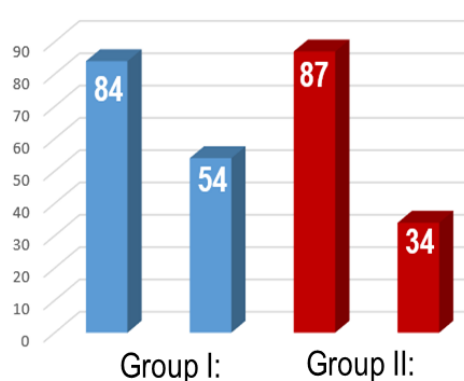
Group I: Joint mobilisation & TENS (n= 21)

Group II: (Group I) and strengthening (n= 21)

Each group 3 Rx/week for 4/52 = 12 treatments



SPADI



RCT (random sequence)	✓
Allocation concealment	✓
Intention to Treat	✓
>80 allocated (full data sets)	✓
Blinded assessment	✓
Long term follow up	✗

www.drjeremylewis.com

Conclusion

In the short term **strengthening:**

- ★ Improves function
- ★ Reduces pain
- ★ Increases range of movement

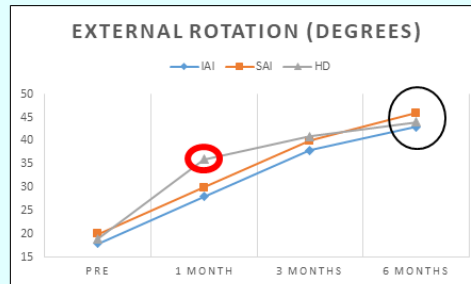
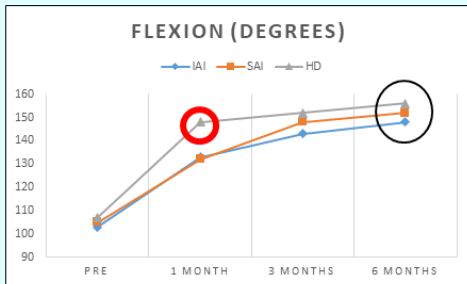
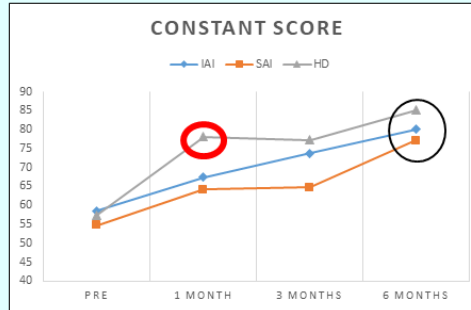
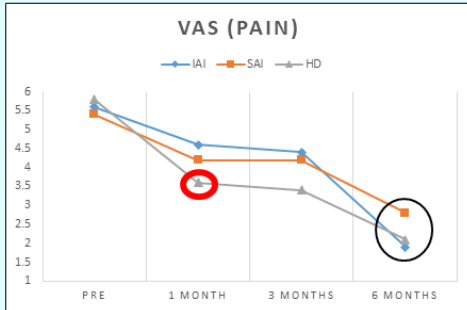
What else?

FROZEN SHOULDER: Hydrodistension



www.drjeremylewis.com

Hydro-distension procedure



Hydrodilataion: ● Improvement faster
 At 6 months: ● No difference between groups

Yoon et al (2016)
 Intra-articular injection, subacromial injection, and hydrodilataion for primary frozen shoulder: a randomized clinical trial.
Journal of Shoulder and Elbow Surgery 25(3):376-83.

www.drjeremylewis.com

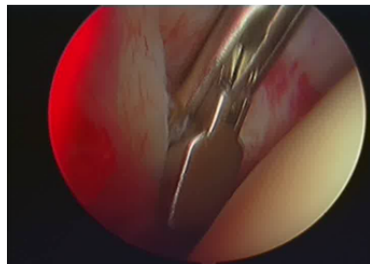
UK FROST TRIAL: Rangan et al (2020) *The Lancet*. Vol 396. 977-89

MUA



Group I: (n= 201)

Capsular Release



Group II: (n= 203)

CSI + Rehabilitation

- Pain education
 - Mobilisation
 - Home exercises including stretching
- Up to 12 sessions over 12 weeks

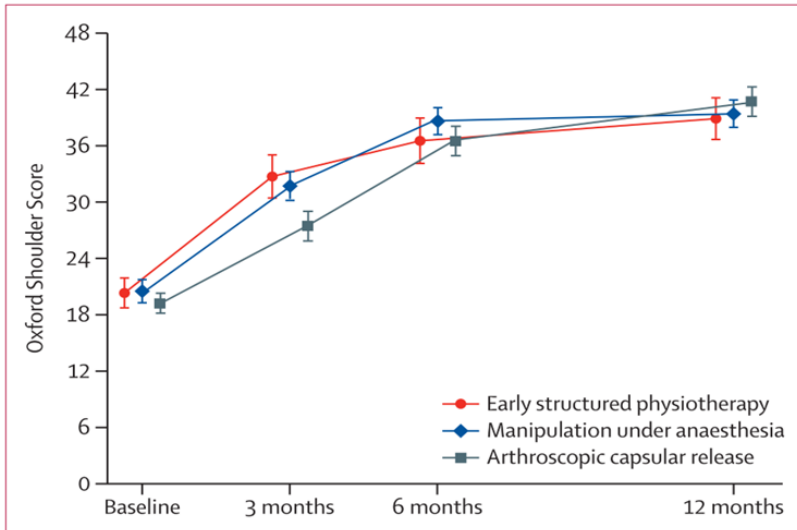
Group III: (n= 99)

Findings:

None of the 3 interventions were clinically superior

www.drjeremylewis.com

UK FROST TRIAL: Rangan et al (2020) *The Lancet*. Vol 396. 977-89



Primary outcome: Oxford Shoulder Score
Data points show means and error bars represent 95% CIs.

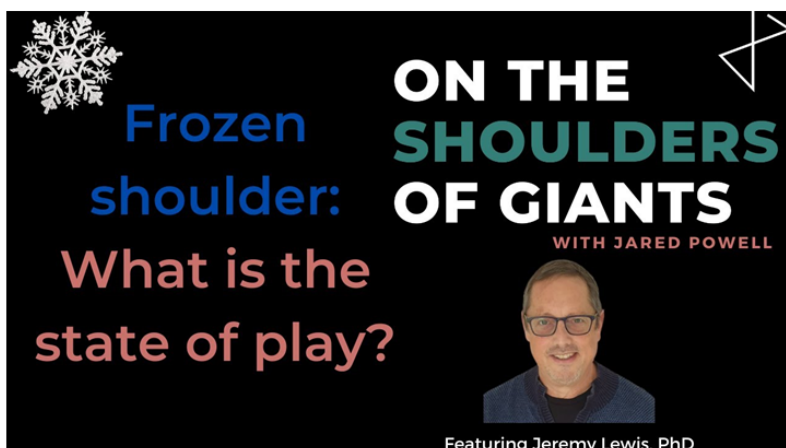
Interpretation

Primary OM = OSS
At the primary endpoint of 12 months none of the three interventions were clinically superior

Arthroscopic capsular release carried higher risks, and MUA was the most cost-effective.

www.drjeremylewis.com

Additional Resource and Video



<https://www.youtube.com/watch?v=tBZKDaT7xgc>

www.drjeremylewis.com

Thank you



Travel
home safely

www.drjeremylewis.com