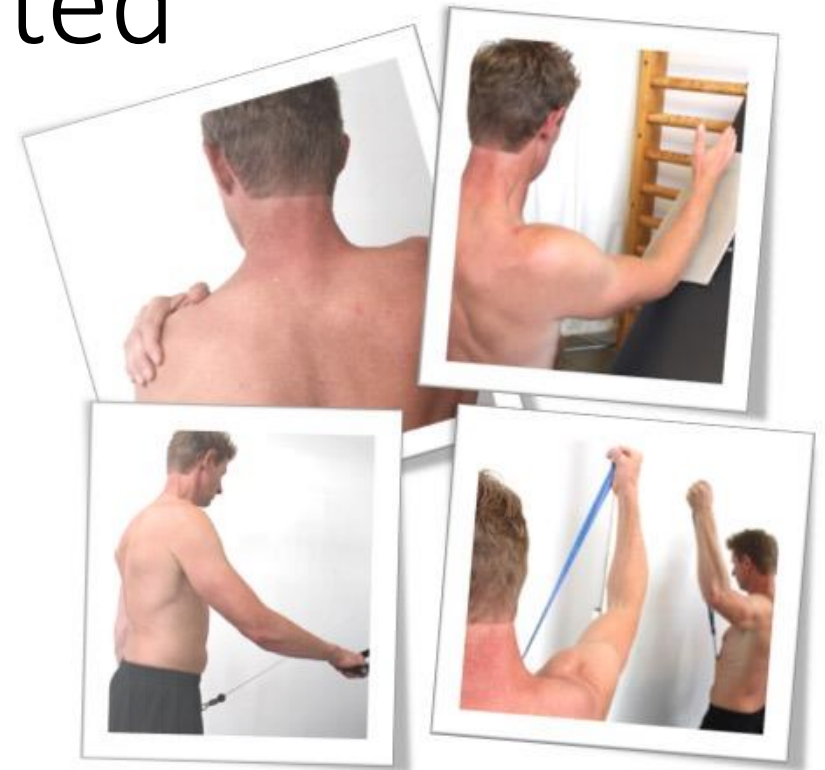


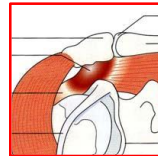
Physiotherapy rehabilitation for patients with rotator cuff related shoulder pain



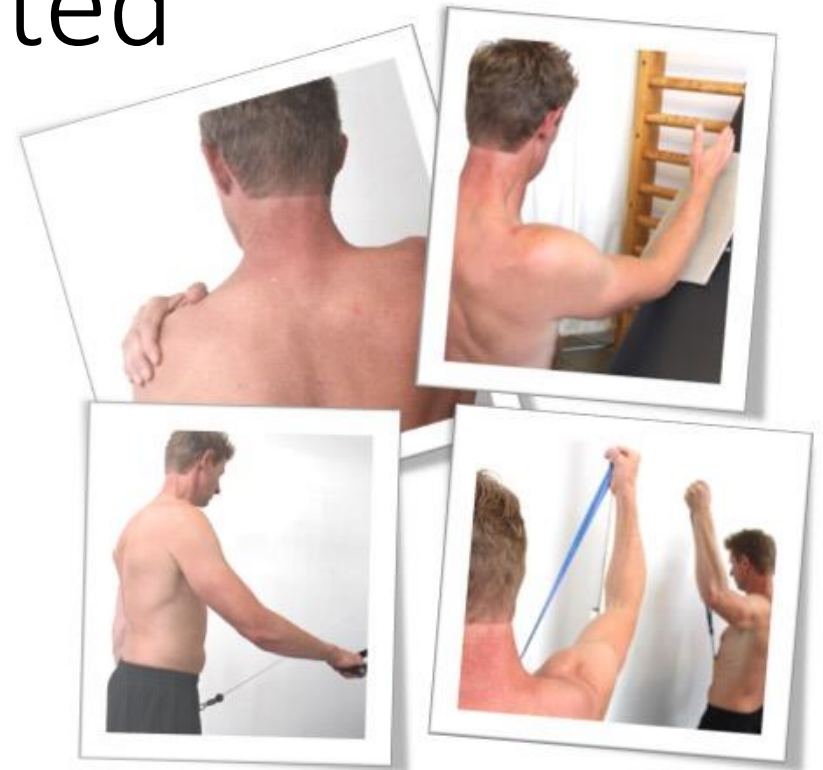
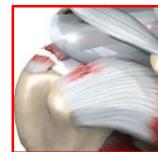
Birgitte Hougs Kjær, PT, PhD
Dept. of Physical and Occupational Therapy
Institute of Sports Medicine Copenhagen
Copenhagen University Hospital Bispebjerg and Frederiksberg
Birgitte.Hougs.Kjaer@region.dk

Physiotherapy rehabilitation for patients with rotator cuff related shoulder pain

The PASE trial (tendinopathy)



The CUT-N-MOVE trial (tear)





REVIEW ARTICLE

A systematic review and pooled analysis of the prevalence of rotator cuff disease with increasing age

Teun Teunis, MD, Bart Lubberts, BSc, Brian T. Reilly, BSc, David Ring, MD, PhD*

Orthopaedic Hand and Upper Extremity Service, Massachusetts General Hospital–Harvard Medical School, Boston, MA, USA

JOURNAL OF
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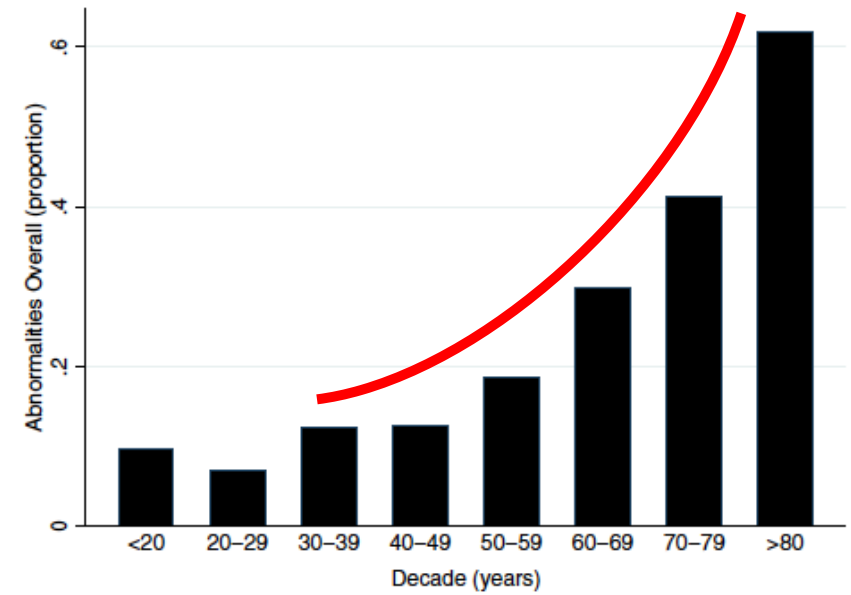
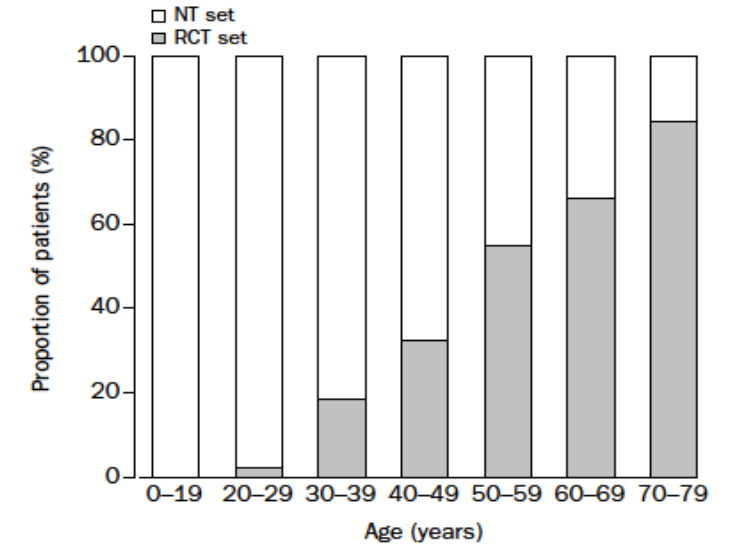


Figure 2 Histogram of rotator cuff abnormalities by age group across all studies.

	Age in years									Total
	No	Mean age	20-29	30-39	40-49	50-59	60-69	70-79	>80	
Yamamoto	1366	57.9	0%	3%	7%	13%	26%	46%	50%	20.7%
Minagawa	664	69.5	0%	0%	0%	11%	15%	27%	37%	21.3%

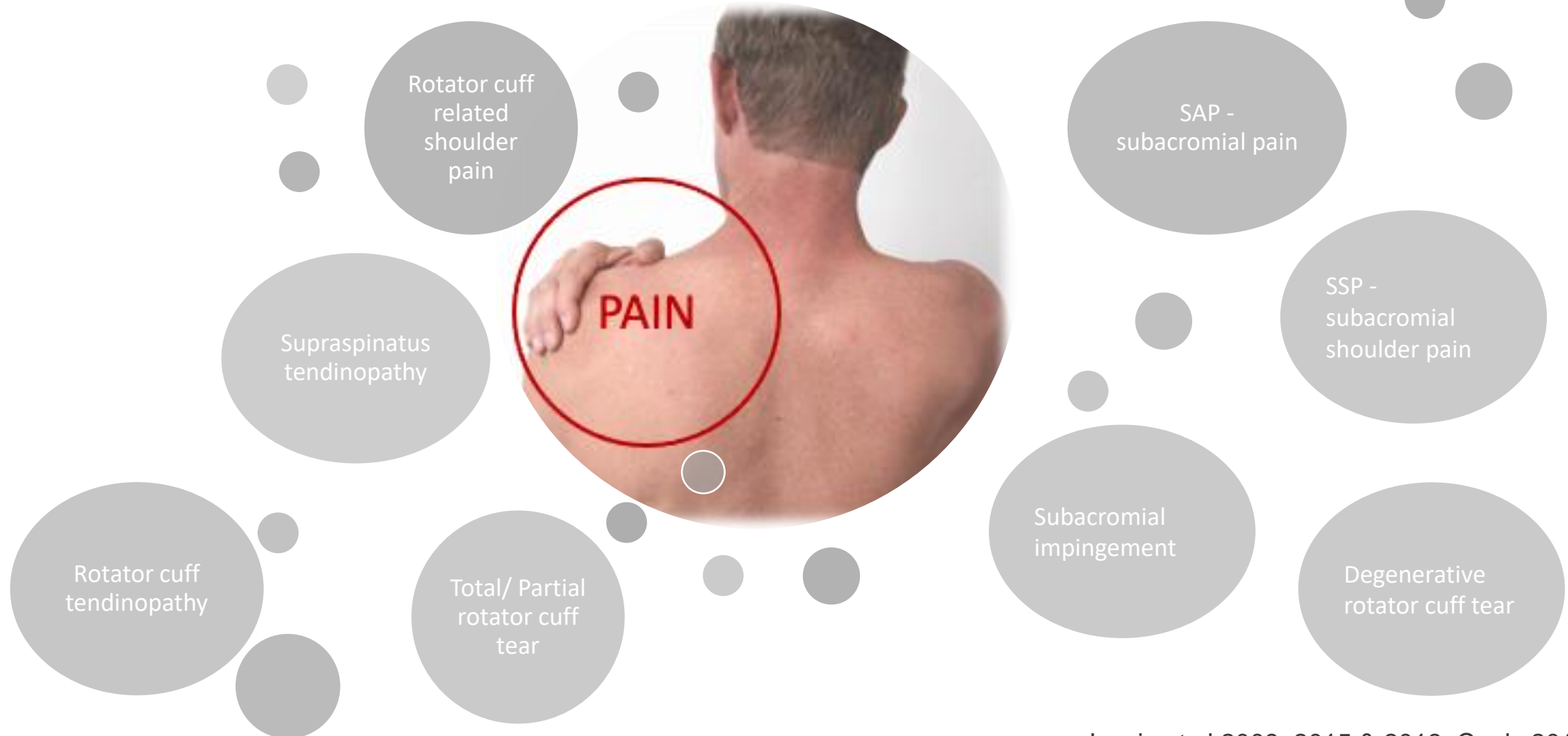
Population of symptomatic and asymptomatic rotator cuff tear examined by ultrasound

Prevalence in the general population increase with age

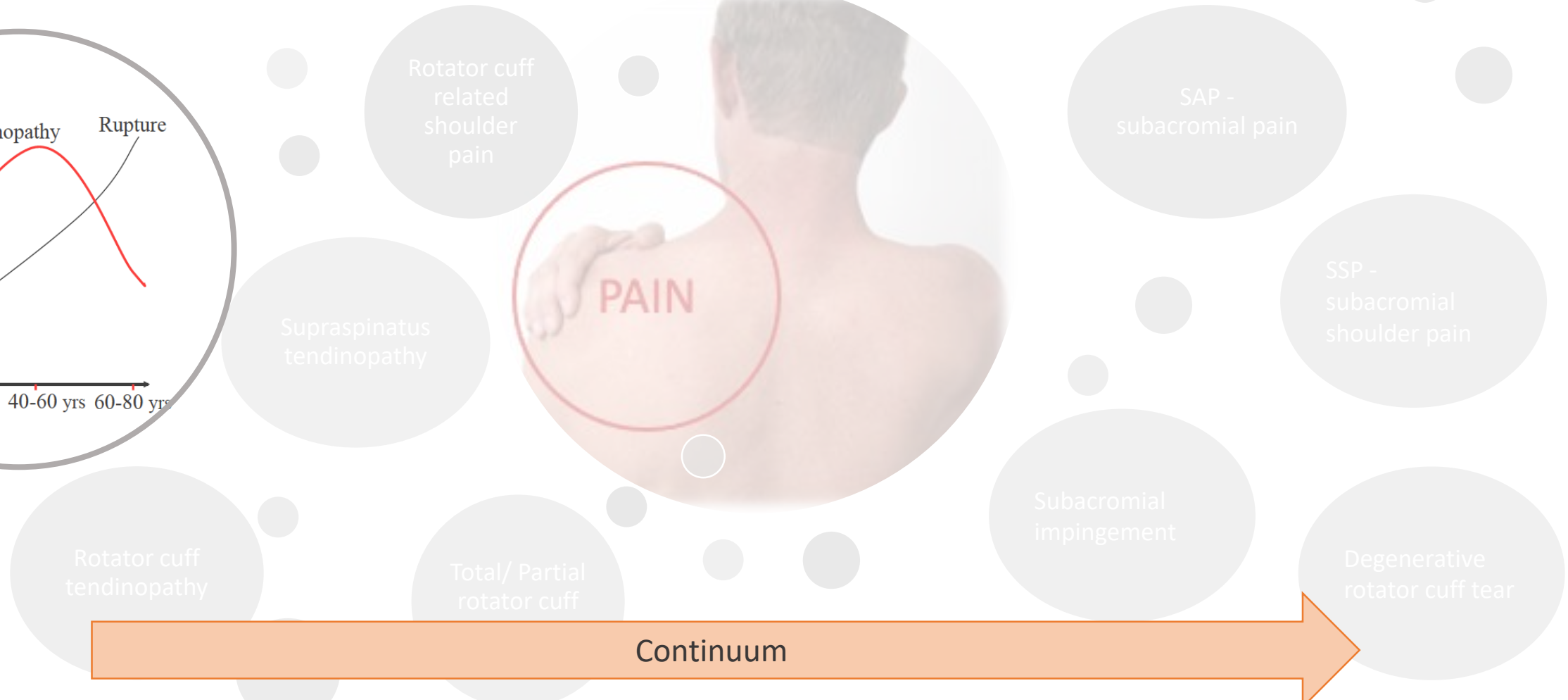
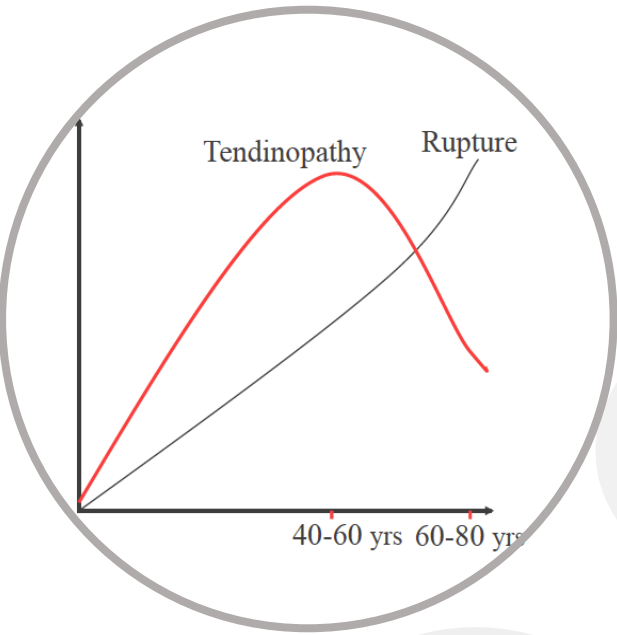


Rate of rotator cuff tear per 10-year age-group
RCT=rotator cuff tear; NT=no tear.

Rotator cuff related shoulder pain or subacromial shoulder pain ?



Rotator cuff related shoulder pain or subacromial shoulder pain ?



When the physiotherapist meets the patient with rotator cuff related shoulder pain

Clinical presentation:

Reduced shoulder function

Reduced ROM + strength

Pain (elevation + ext. rotation)

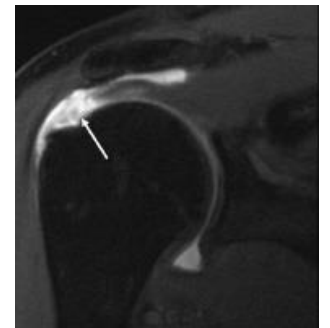
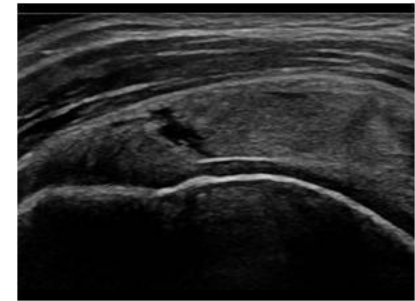
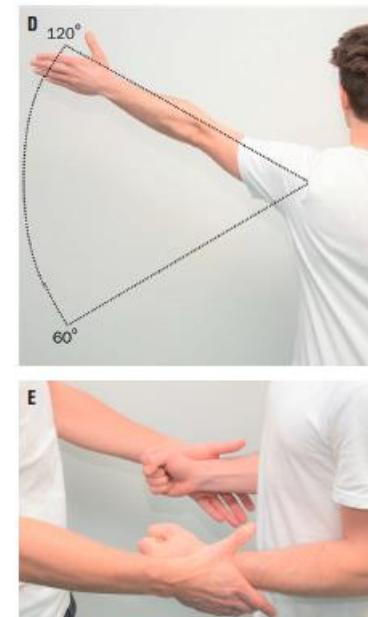
Reduced quality of life

Reduced work capacity

Hawkins et al., 1999, Fehringer et al., 2008, Lewis, 2009, van der Windt et al., 1995, Smith et al., 2000

Diagnosing:
Anamnesis
Clinical examination
Incl. special tests

Paraclinical examination:
(ultrasound and MRI)



When the physiotherapist meet the patient with rotator cuff related shoulder pain

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journal homepage: www.elsevier.com/locate/jses

 ELSEVIER

Associations between shoulder symptoms and concomitant pathology in patients with traumatic supraspinatus tears

Birgitte H. Kjær, PhD, PT ^{a,b,*}, Birgit Juul-Kristensen, PhD, PT ^b, Susan Warming, PhD, PT ^a, S. Peter Magnusson, PhD, PT ^{a,c,d}, Michael R. Krosgaard, PhD, MD ^e, Eleanor Boyle, PhD ^b, Marius Henriksen, PhD, PT ^{a,f}



Arthritis Care & Research

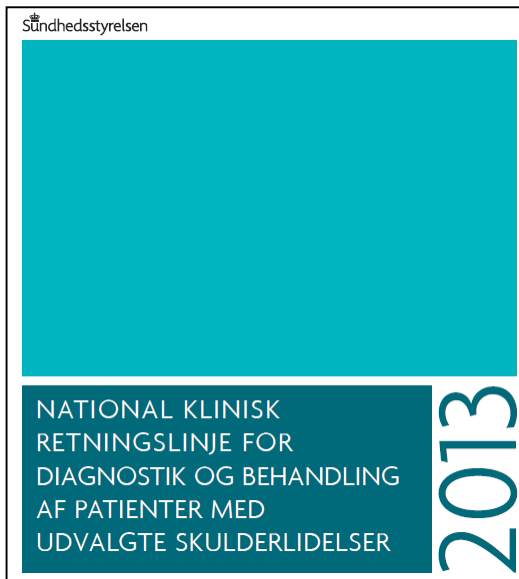
AMERICAN COLLEGE of RHEUMATOLOGY
Empowering Rheumatology Professionals

Subgroup to choose right treatment strategy

What Imaging-D Associated With Persistence? A Systematic Literature Review

GUI TRAN,¹ PAUL COWLING,² TOBY SMITH,³ JULIE BURY,⁴ ADAM LUCAS,¹ ANDREW BARR,¹ SARAH R. KINGSBURY,¹ AND PHILIP G. CONAGHAN⁵

Exercise therapy as treatment



Danish National Clinical Guidelines RECOMMENDATIONS

Træningsterapi bør være førstevalg

Superviseret træning (patienten instrueres, superviseres og monitoreres af en fysioterapeut)

Træningsforløb af mindst 3 måneders varighed

Stabiliserende øvelser

Styrketræning af den skapulære muskulatur

Styrketræning af rotatorcuff muskulaturen

Genlære/ relæring/ uddannelse i hensigtsmæssige bevægelser i arbejdssituationer og sport

Holdningskorrigerende øvelser

Træningen bør progredieres med stigende intensitet.

Selvtræning efter instruktion i et individuelt tilrettelagt træningsprogram kan overvejes til nogle patienter (præferencer, erfaringer og mulighed for at gennemføre træningen)

Physiotherapy rehabilitation – primary literature

Does adding heavy load eccentric training to rehabilitation of patients with unilateral subacromial impingement result in better outcome? A randomized, clinical trial

Annelies G. Maenhout · Nele N. Mahieu ·
Martine De Muynck ·
Ann M. Cools

Three Months of Progressive High-Load Versus Traditional Low-Load Strength Training Among Patients With Rotator Cuff Tendinopathy

Primary Results From the Double-Blind Randomized Controlled RoCTEx Trial

Physiotherapy 98 (2012) 101–109

Systematic review

Exercise for rotator cuff tendinopathy: a systematic review

Chris Littlewood^{a,*}, Jon Ashton^b, Ken Chance-Larsen^c, Stephen May^c, Ben

LOUISE PIETERS, PT¹ • JEREMY LEWIS, PT, PhD^{2,4} • KEVIN KUPPENS, PT¹ • JILL JOCK
TWAN BRUIJSTENS, PT¹ • LAURENCE JOOSSENS, PT¹ • FILIP STRUYF, PT, PhD

An Update of Systematic Reviews Examining the Effectiveness of Conservative Physical Therapy Interventions for Subacromial Shoulder Pain

scion.

Treatment



CLINICAL SCIENCE

Non-surgical and surgical treatments for rotator cuff disease: a pragmatic randomised clinical trial with 2-year follow-up after initial rehabilitation

Sanna Cederqvist¹, Tapio Flinkkilä², Markus Sormaala³, Jari Ylinen⁴,
Hannu Kautiainen^{5,6}, Tero Irmola¹, Heidi Lehtokangas^{1,7}, Juho Liukkonen⁸

Pain or No Pain?

Therapeutic exercise for rotator cuff tendinopathy: a systematic review of contextual factors and prescription parameters

Chris Littlewood^a, Peter Malliaras^b and Ken Chance-Larsen^c

Littlewood 2015

Maenhout 2013, Ingwersen 2017, Littlewood 2012, Pieters 2020, Cederqvist 2020



PAin during Shoulder Exercise

#PASE-trial

Does pain matter in the effectiveness of an exercise program in patients with rotator cuff tendinopathy?

A randomized clinical trial comparing two exercise programs:
allowing pain vs. avoiding pain

MAIN DIFFERENCE

Population

Adults aged 18 to 55 years *

Shoulder symptoms lasting for a minimum of 3 months

Clinical diagnosis of rotator cuff (supraspinatus and/or infraspinatus) tendinopathy

Diagnosis verified by ultrasound

Recruiting from

Occupational Medicine Clinic of the Capital Region and
Sports Medicine Clinic of the Capital Region,

Copenhagen University Hospital Bispebjerg and Frederiksberg



[RESEARCH REPORT]

PETER K. EDWARDS, MSc¹ • JAY R. EBERT, PhD¹ • CHRIS LITTLEWOOD, PhD²
TIM ACKLAND, PhD³ • ALLAN WANG, FRACS, PhD^{1,4}

A Systematic Review of Electromyography Studies in Normal Shoulders to Inform Postoperative Rehabilitation Following Rotator Cuff Repair

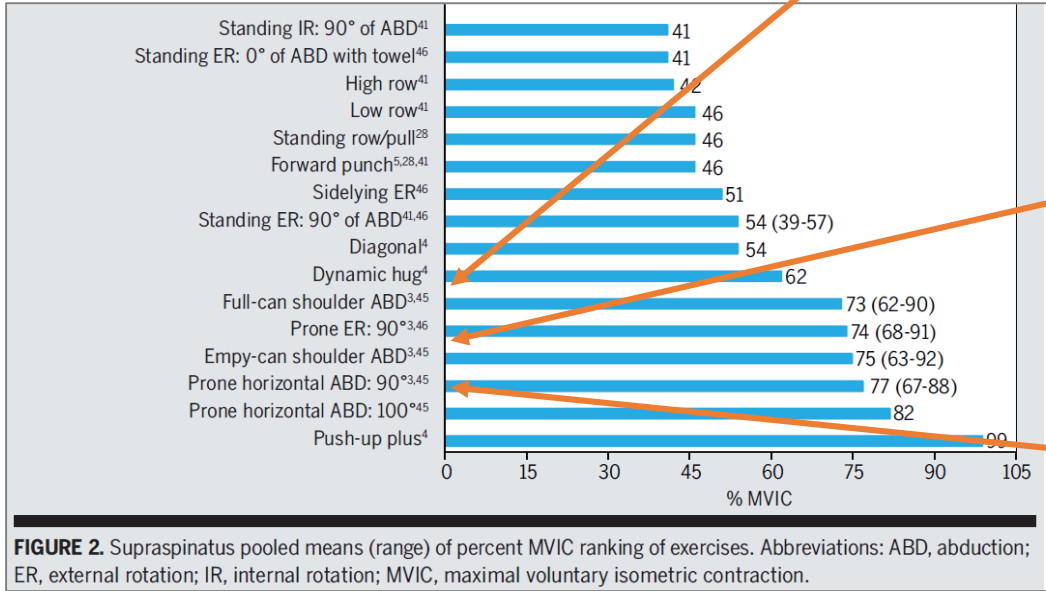
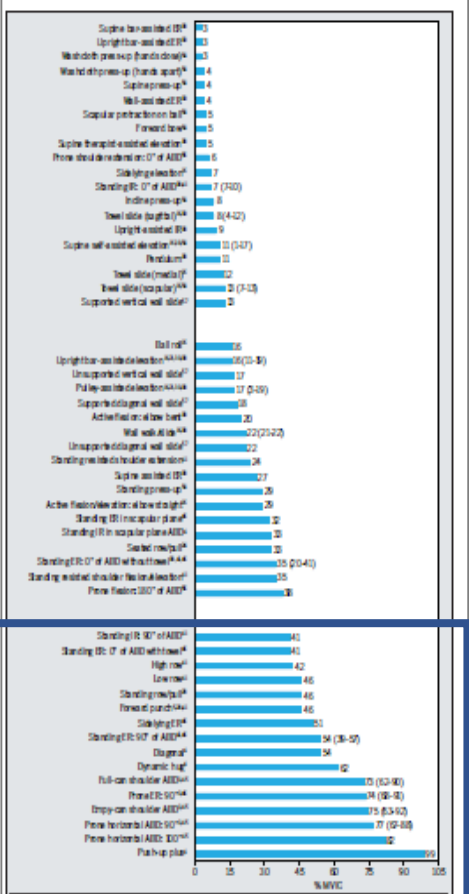


FIGURE 2. Supraspinatus pooled means (range) of percent MVIC ranking of exercises. Abbreviations: ABD, abduction; ER, external rotation; IR, internal rotation; MVIC, maximal voluntary isometric contraction.



[RESEARCH REPORT]

PETER K. EDWARDS, MSc¹ • JAY R. EBERT, PhD² • CHRIS LITTLEWOOD, PhD²
TIM ACKLAND, PhD¹ • ALLAN WANG, FRACS, PhD^{1,4}

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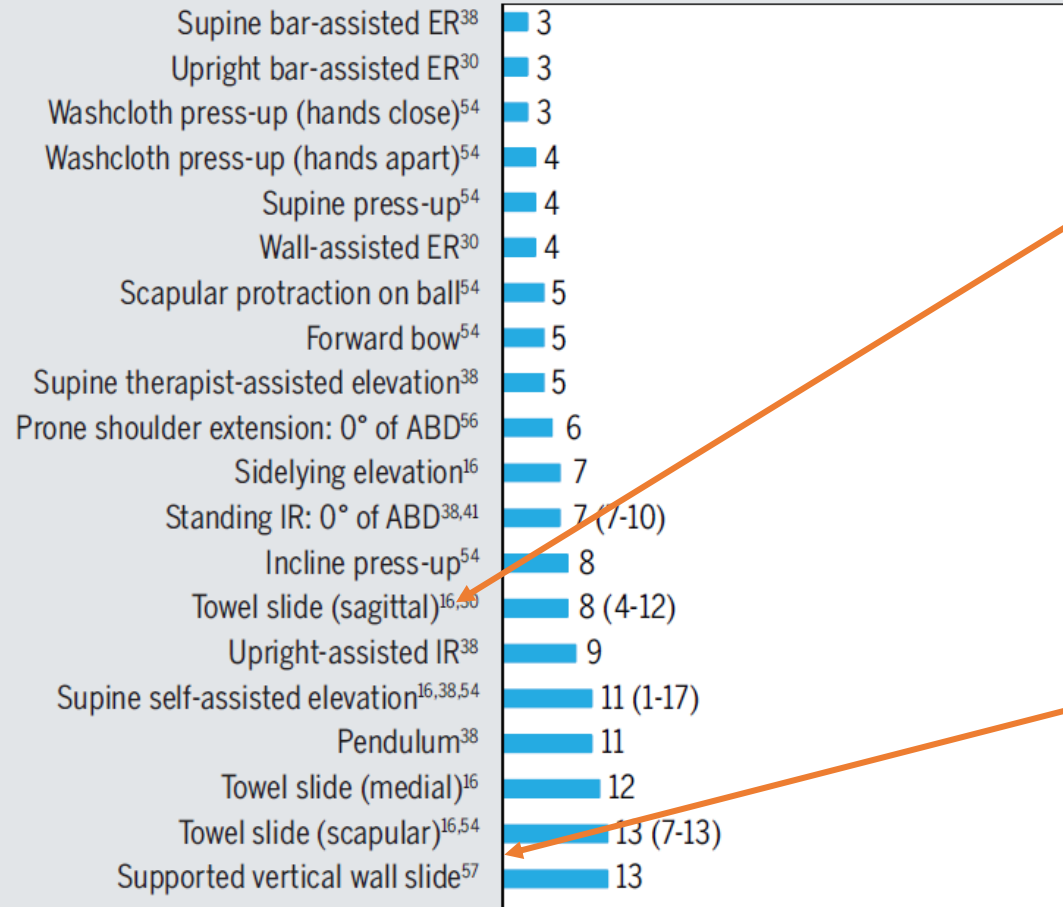
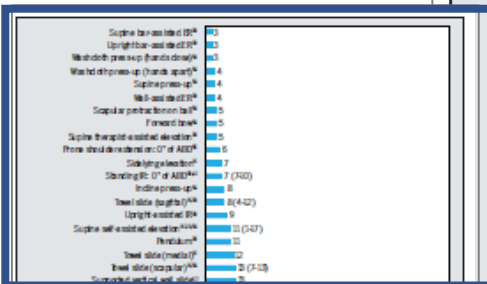
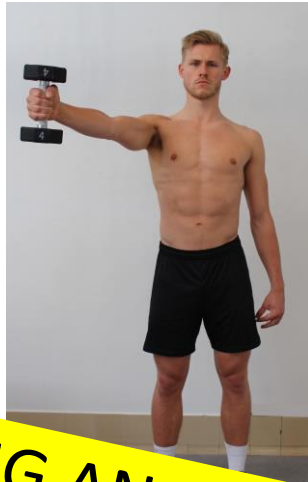
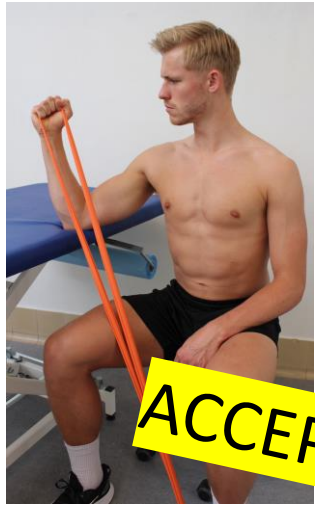


FIGURE 2. Significance of the mean (range) of percent MVIC rankings of exercises. Abbreviations: ABD, abduction; IR, internal rotation; ER, external rotation; MVIC, maximal voluntary isometric contraction.

Exercises loading the tendon

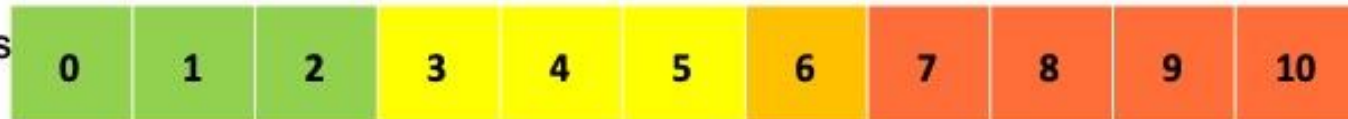


ACCEPTING AN INCREASE IN PAIN DURING TRAINING

EMG muscle activity of > 40% MVC

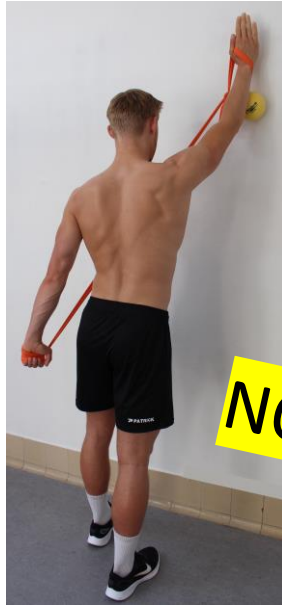


No symptoms



Worst imaginable symptoms

Exercises not loading the tendon

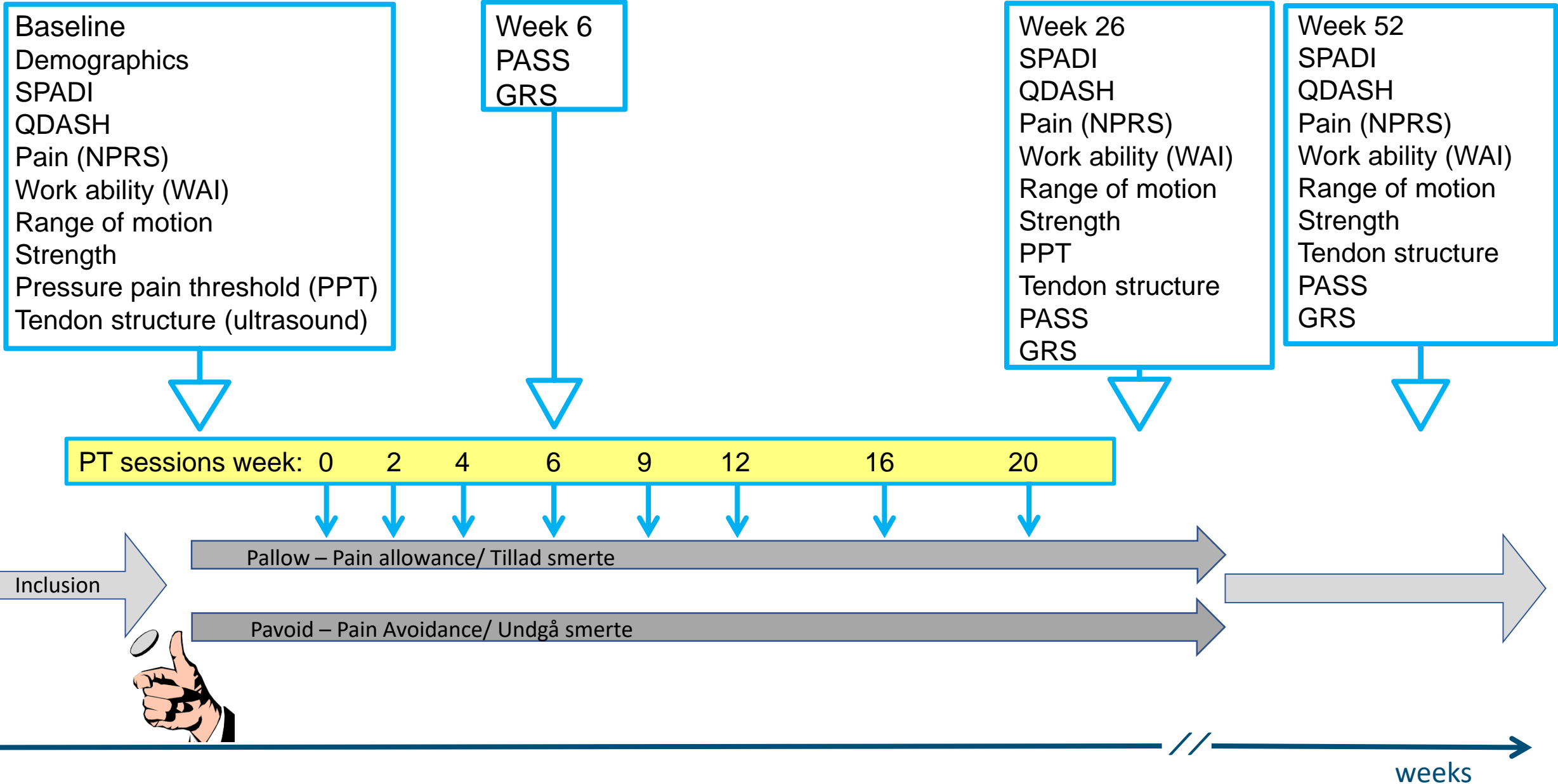


NOT ACCEPTING AN INCREASE IN PAIN DURING TRAINING

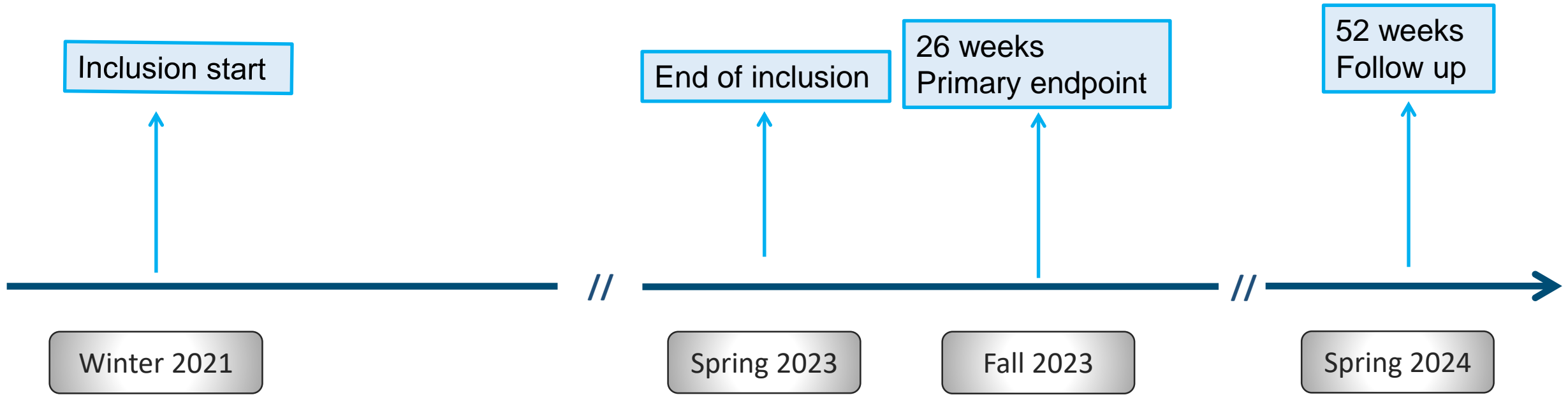
EMG muscle activity of <20% MVC

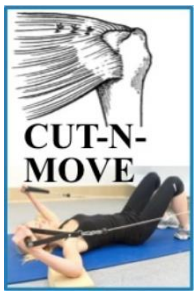


Flow diagram and outcome measures

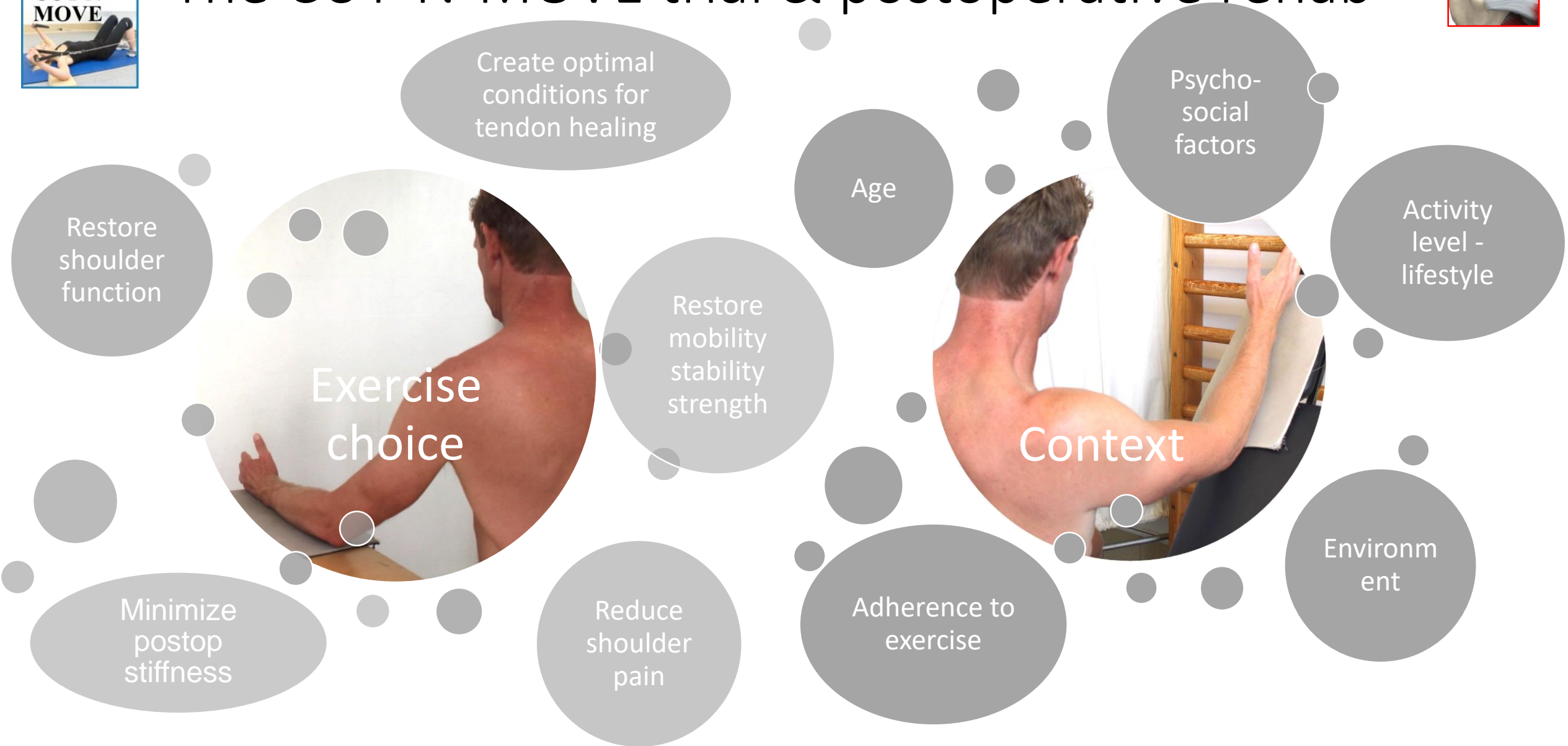
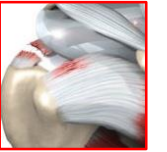


Timeline



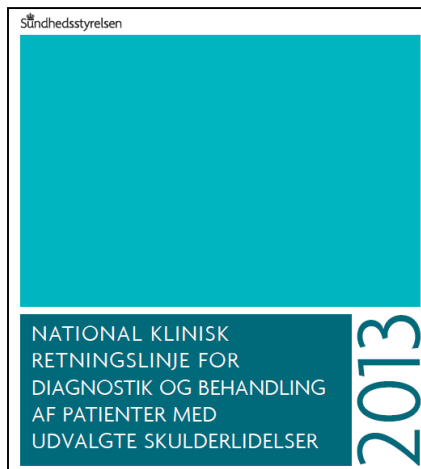


The CUT-N-MOVE trial & postoperative rehab



Postoperative rehabilitation

- Patients should have early supervised rehabilitation
- Shoulder should be immobilized prior to postoperative rehabilitation



Postoperative rehab parameters

- Immobilized 3-5 weeks
- Adhere to the restrictions for the subscapularis and infraspinatus
- Active ROM < 90 elevation the first 5 weeks

Tirefort 2019, Sheps 2019, Shen 2014, Cuff 2012, Arndt 2012, Kim 2012

- Early passive (unloaded) exercises already during the immobilization period (resulting in significantly better shoulder ROM and function)
- No evidence of increased tendon healing, BUT
- DOES NOT compromise tendon healing
- NOT increased re-tear rate

Cuff 2012, Keener 2014, Kim 2012, Arndt 2012, Chan 2014, Shen 2014, Littlewood et al. 2015, Saltzman 2017, Mazuquin 2018, Hurley 2019



Postoperative rehab parameters

When can we introduce loading & active exercises?



Baseline Patient characteristics

Pain (NPRS)
Disability (WORC)
Range of motion
Strength



6 weeks post op

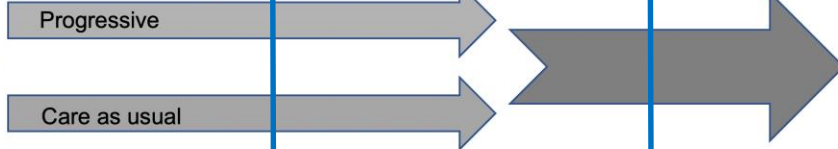
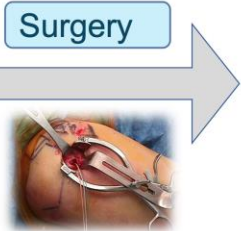
Pain (NPRS)
Disability (WORC)
Range of motion

12 weeks post op

Pain (NPRS)
Disability (WORC)
Range of motion
Strength

12 months post op

Pain (NPRS)
Disability (WORC)
Range of motion
Strength



Ultrasound re-tear

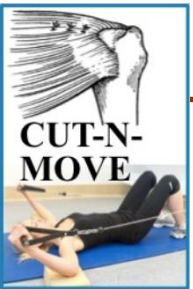
STUDY PROTOCOL

Open Access

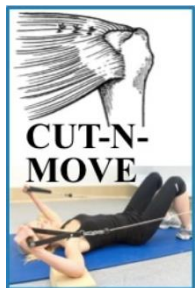


Progressive early passive and active exercise therapy after surgical rotator cuff repair – study protocol for a randomized controlled trial (the CUT-N-MOVE trial)

Birgitte Hougs Kjær^{1,2*}, S. Peter Magnusson^{1,3}, Susan Warming¹, Marius Henriksen^{1,5}, Michael Rindom Krogsgaard⁴ and Birgit Juul-Kristensen²



Aim: To evaluate whether there was superior effect of twelve-weeks of progressive active exercise therapy on shoulder function, pain, and quality of life, compared with usual care.



Results

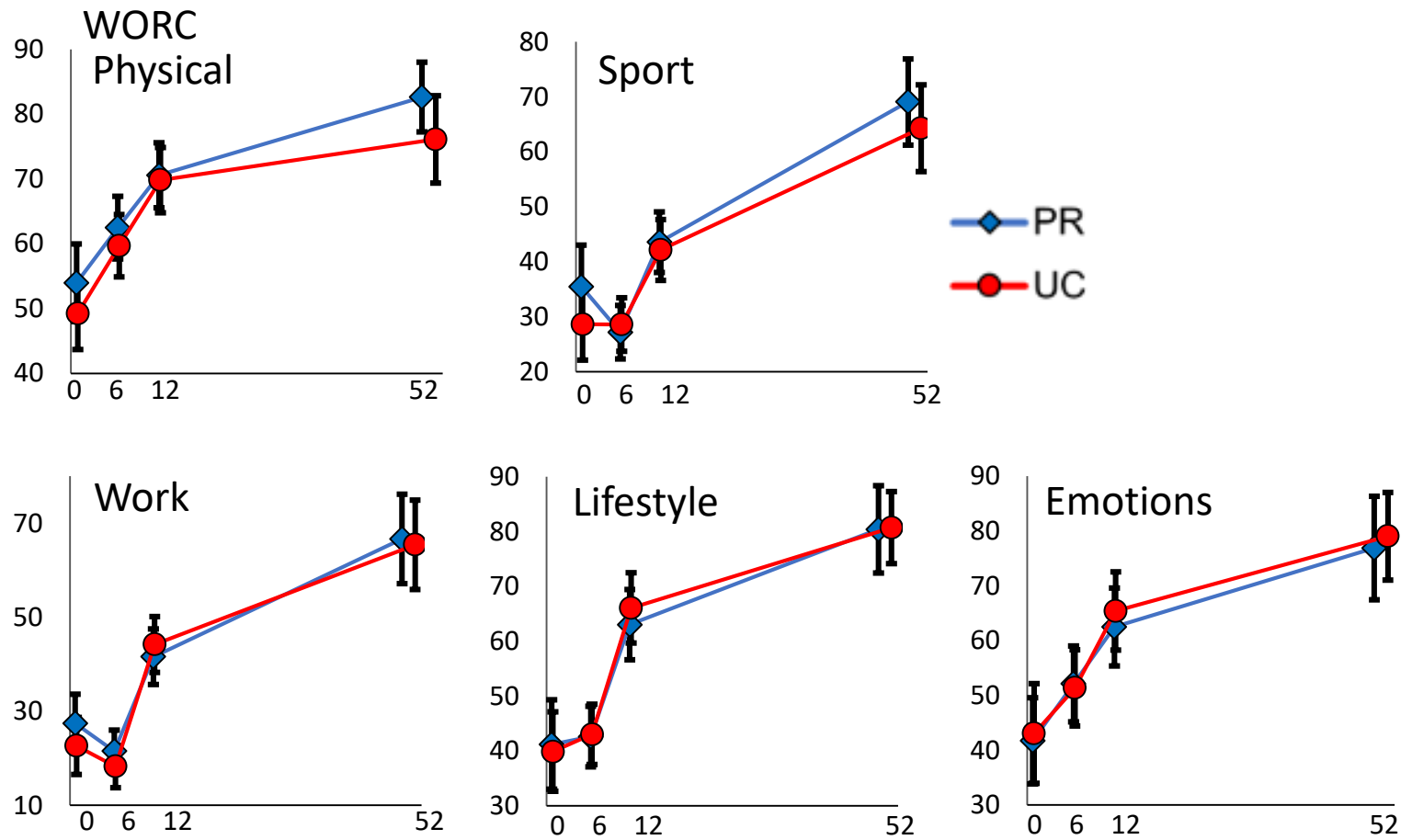
- no significant between group difference
- significant improvements over time

Effects of 12 Weeks of Progressive Early Active Exercise Therapy After Surgical Rotator Cuff Repair

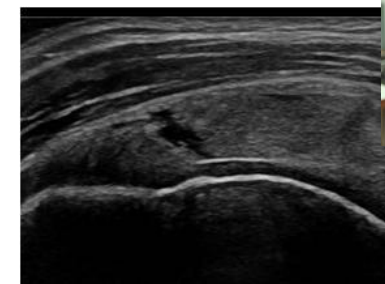
2021

12 Weeks and 1-Year Results From the CUT-N-MOVE Randomized Controlled Trial

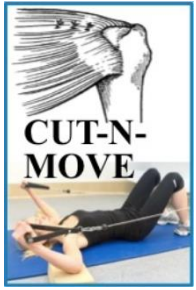
Birgitte Hougs Kjær,^{*,†‡} PT, PhD, S. Peter Magnusson,^{§||} PT, DMSci, Marius Henriksen,^{†¶} PT, PhD, Susan Warming,[†] PT, PhD, Eleanor Boyle,[‡] PhD, Michael Rindom Krogsgaard,[#] MD, PhD, Ali Al-Hamdani,^{**} MD, and Birgit Juul-Kristensen,[‡] PT, PhD
 Investigation performed at Copenhagen University Hospital Bispebjerg Frederiksberg and Herlev Gentofte, Copenhagen, Denmark



N= 82 (12 weeks) N= 79 (1 year)



	6 weeks	1 year
Postoperative Ultrasound re-tear		
Early active group	6	6
Usual care group	3	7



Effects of 12 Weeks of Progressive Early Active Exercise Therapy After Surgical Rotator Cuff Repair

2021

12 Weeks and 1-Year Results From the CUT-N-MOVE Randomized Controlled Trial

Birgitte Hougs Kjær,^{*,†‡} PT, PhD, S. Peter Magnusson,^{§||} PT, DMSci, Marius Henriksen,^{†¶} PT, PhD, Susan Warming,[†] PT, PhD, Eleanor Boyle,[‡] PhD, Michael Rindom Krogsgaard,[#] MD, PhD, Ali Al-Hamdani,^{**} MD, and Birgit Juul-Kristensen,[‡] PT, PhD
Investigation performed at Copenhagen University Hospital Bispebjerg Frederiksberg and Herlev Gentofte, Copenhagen, Denmark

Conclusion and clinical implications CUT-N-MOVE trial

- No disadvantage to progress faster in the rehabilitation
- Future patients should be allowed more activity and thereby integrate the arm more in daily activities immediately postoperatively



Effectiveness of early versus delayed rehabilitation following rotator cuff repair: Systematic review and meta-analyses

2021

Bruno Mazuquin^{1*}, Maria Moffatt¹, Peter Gill^{1,2}, James Selfe¹, Jonathan Rees³, Steve Drew⁴, Chris Littlewood¹

1 Department of Health Professions, Faculty of Health, Psychology and Social Care, Manchester Metropolitan University, Manchester, United Kingdom, **2** Northern Care Alliance NHS Group, Manchester, United Kingdom, **3** Nuffield Department of Orthopaedics, Rheumatology and Musculoskeletal Science, University of Oxford and NIHR Oxford Biomedical Research Centre, Oxford, United Kingdom, **4** University Hospitals Coventry and Warwickshire, Coventry, United Kingdom

Effects of 12 Weeks of Progressive Early Active Exercise Therapy After Surgical Rotator Cuff Repair

2021

12 Weeks and 1-Year Results From the CUT-N-MOVE Randomized Controlled Trial

Birgitte Hougs Kjær,^{**†‡} PT, PhD, S. Peter Magnusson,^{§||} PT, DMSci, Marius Henriksen,^{†¶} PT, PhD, Susan Warming,[†] PT, PhD, Eleanor Boyle,[‡] PhD, Michael Rindom Krogsgaard,[#] MD, PhD, Ali Al-Hamdani,^{**} MD, and Birgit Juul-Kristensen,[‡] PT, PhD
Investigation performed at Copenhagen University Hospital Bispebjerg Frederiksberg and Herlev Gentofte, Copenhagen, Denmark

Supervised physiotherapy rehabilitation
Individualize and stratify by tendon quality, age, comorbidity
Introduce early movement and progressive loading by integrating arm in ADL
Adhere to the interdisciplinary agreements
Follow evidence-based clinical guidelines



Clinical Guidelines: Vandvik et al. 2019, Jung et al. 2018, Thigpen et al. 2016, van der Meijden et al. 2012

Düzgün et al. 2011, Kluczynski et al. 2016, Mazzocca et al. 2017, Kjær et al. 2021, Mazuquin et al 2021

Risk factors & Prognostic factors



Rehabilitation



Rehabilitation

Diabetes

Psycho-social factors

Expectations

Age

Activity level - lifestyle

Motivation self-efficacy

Generalised pain → increased inflammation

Obesity
Smoking

Adherence to exercise

Environment



Thanks to collaborators and foundations



**Region
Hovedstaden**



Chief physician Finn Johannsen, BFH

Professor Peter Magnusson, BFH

Professor Ann Cools, BFH & UGent

Assoc. prof. Birgit Juul-Kristensen, SDU

Senior researcher Susan Warming, BFH

Professor Marius Henriksen, BFH

Biostat. Eleanor Boyle, SDU

Professor Michael Krogsgaard, BFH



Gigtforeningen
for alle med ondt i led, ryg og muskler

GANGSTEDFONDEN



SDU



**Bispebjerg og Frederiksberg
Hospital**



Thank you