

Getting exercise AND education right

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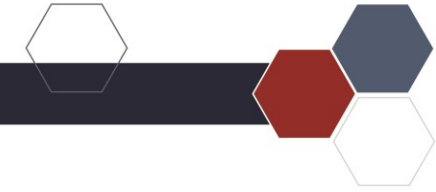
Clinical Director and Physiotherapist, Complete Sports Care, Melbourne, Australia



Disclosures



Medical Research
Future Fund



Teach courses related to running and knee injury management

Not-for-profit initiatives knowledge translation initiatives

- GLA:D[®] Australia
- TREK (Translating Research Evidence and Knowledge)



BMJ Journals

Associate Editor, Deputy Editor for Social Media



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Vicious cycle of persistent knee pain

adapted from the *'fear-avoidance model'*



Pain 85 (2000) 317–332

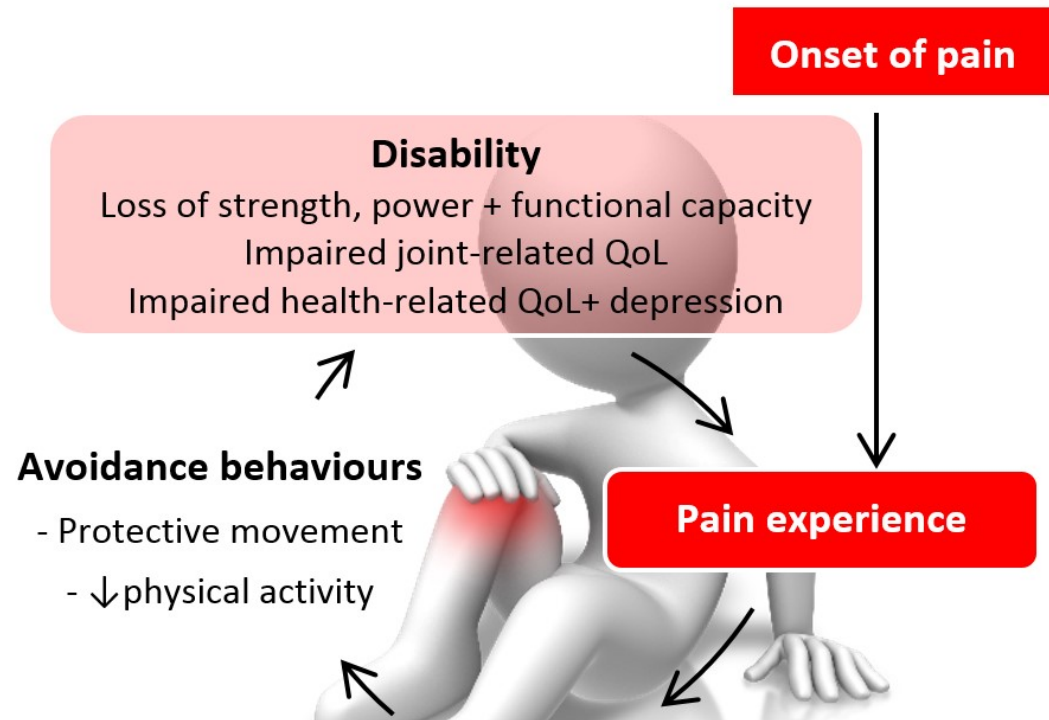
Review article

Fear-avoidance and its consequences in chronic musculoskeletal pain:
a state of the art

Johan W.S. Vlaeyen^{a,b,*}, Steven J. Linton^c

PAIN

www.elsevier.nl/locate/pain



#choosephysio?



The 'Best Practice Guide to Conservative Management of Patellofemoral Pain': incorporating level 1 evidence

Christian John Barton,^{1,2}
Dylan Morrissey^{1,5}

Consensus statement

2016 Patellofemoral pain consensus statement from the 4th International Patellofemoral Pain Retreat, Manchester. Part 1: exercise, taping and orthoses and combined interventions

2018 Consensus statement on exercise therapy and physical interventions (orthoses, taping and manual therapy) to treat patellofemoral pain: recommendations from the 5th International Patellofemoral Pain Research Retreat, Gold Coast, Australia, 2017

Kay M Crossley,¹ Marienke van Middelkoop,¹
Natalie J Collins,⁵ Michael Skovdal Rathleff¹

Natalie J Collins,^{1,2} Christian J Barton,^{2,3} Marienke van Middelkoop,⁴
Michael J Callaghan,⁵ Michael Skovdal Rathleff,⁶ Bill T Vicenzino,¹ Irene S Davis,⁷
Christopher M Powers,⁸ Erin M Macri,^{9,10} Harvi F Hart,^{2,11} Danilo de Oliveira Silva,^{2,12}
Kay M Crossley²

Consensus statement

CLINICAL PRACTICE GUIDELINES

RICHARD W. WILLY, PT, PhD • LISA T. HOGGLUND, PT, PhD • CHRISTIAN J. BARTON, PT, PhD
LORI A. BOLGLA, PT, PhD • DAVID A. SCALZITTI, PT, PhD • DAVID S. LOGERSTEDT, PT, PhD
ANDREW D. LYNCH, PT, PhD • LYNN SNYDER-MACKLER, PT, ScD, FAPTA • CHRISTINE M. MCDONOUGH, PT, PhD

Patellofemoral Pain

Clinical Practice Guidelines Linked to the International Classification of Functioning, Disability and Health From the Academy of Orthopaedic Physical Therapy of the American Physical Therapy Association

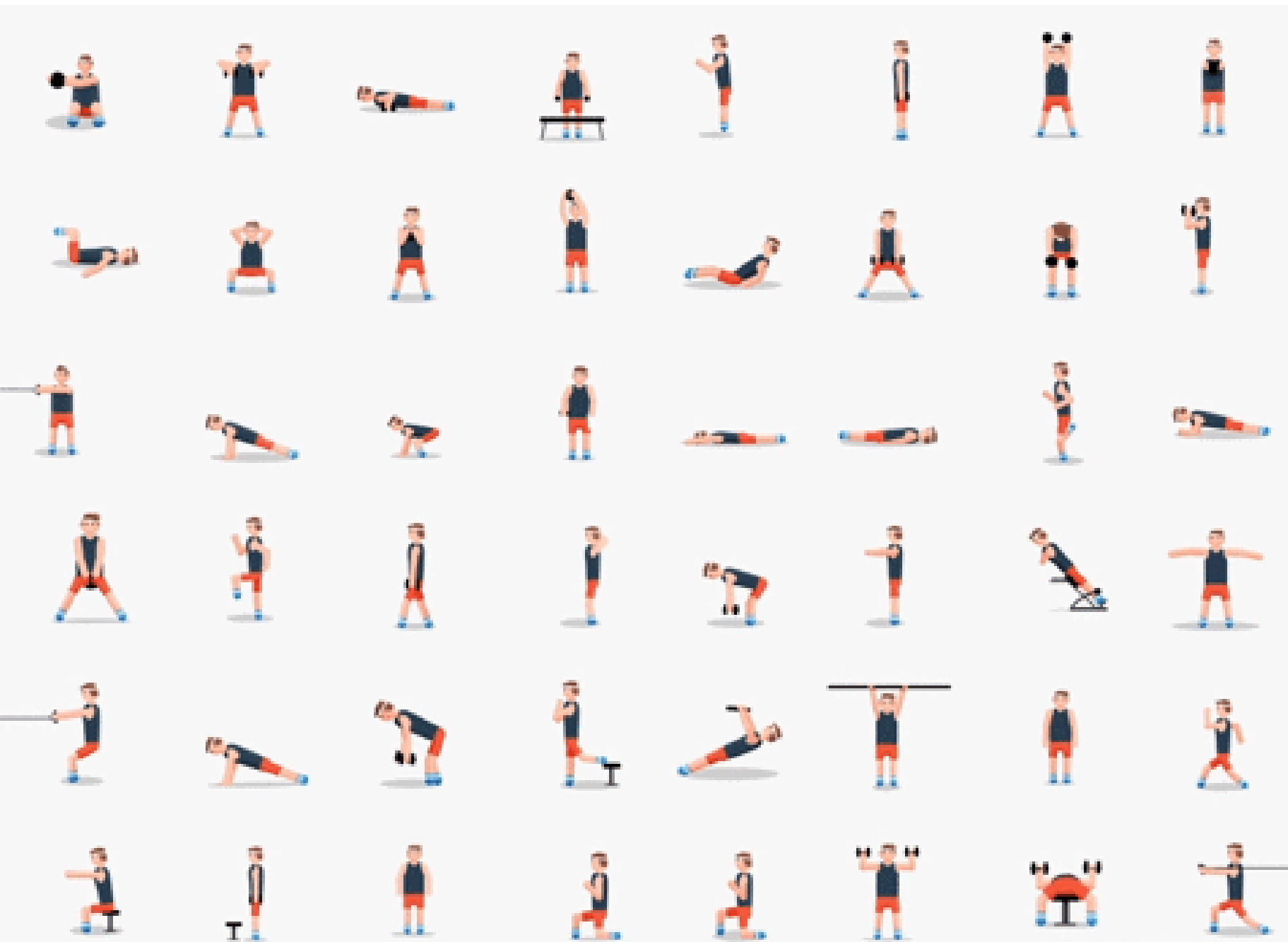
J Orthop Sports Phys Ther. 2019;49(9):CPG1-CPG95. doi:10.2519/jospt.2019.0302

Exercise is considered the cornerstone of treatment

Successful outcome at 1 year = 41 – 67% (Collins 2008; van Linschoten, 2009)

Favorable outcomes at 5-8 years = 43% (Lankhorst 2016)





BMJ Open The experience of living with patellofemoral pain – loss, confusion and fear-avoidance: a UK qualitative study

Benjamin E Smith,^{1,2} Fiona Moffatt,³ Paul Hendrick,³ Marcus Bateman,¹ Michael Skovdal Rathleff,^{4,5} James Selfe,⁶ Toby O Smith,⁷ Pip Logan²

“When I did get the physiotherapy it kinda didn’t really do anything anyway. She did say your knees will feel sore, but it went back to how it was anyway, so, it just seemed like a pointless process.”

“When I started the physio at work and he told me that I shouldn’t walk or that I shouldn’t swim because he just wanted to obviously manipulate it and get me pain-free before I did anything that could possibly aggravate it. So I stopped.”



BMJ Open The experience of living with patellofemoral pain – loss, confusion and fear-avoidance: a UK qualitative study

Benjamin E Smith,^{1,2} Fiona Moffatt,³ Paul Hendrick,³ Marcus Bateman,¹ Michael Skovdal Rathleff,^{4,5} James Selfe,⁶ Toby O Smith,⁷ Pip Logan²



“My heels have maybe gone in which has then pulled my kneecap out of alignment. So instead of going smoothly over the joint where it’s supposed to, that it’s probably moving over the bone and that’s the sharp pain that I’m feeling.”

“I don’t know if he [doctor] was trying to scare me into doing some exercise or something, but he basically said the only thing they could do is break both of my thighs and twist them a bit and then heal them back together.”

“They’re saying that I’m a grandma. They say, ‘Yeah. If you were a horse, they’d put you down.’”





Observational study

Liam R. Maclachlan, Mark Matthews, Paul W. Hodges, Natalie J. Collins and Bill Vicenzino*

The psychological features of patellofemoral pain: a cross-sectional study

- Those with more-severe PFP-related disability have higher levels of psychological impairment (kinesiophobia, catastrophising, anxiety and depression)

Kinesiophobia (pain-related fear)

- Elevated in the PFP group
- Differs between high and low disability subgroups
- Helps explain level of disability





'Managing My Patellofemoral Pain': the creation of an education leaflet for patients

Christian J Barton,^{1,2,3,4} Michael S Rathleff^{5,6,7}

Patient education in patellofemoral pain: potentially potent and essential, but under-researched

Michael Skovdal Rathleff,¹ Janus Laust Thomsen,¹ Christian J Barton²

KEY FACTORS AND TREATMENT OPTIONS

(See inside for greater details)

KEY BIOMECHANICAL FACTORS TO ADDRESS

1. Poor function and weakness of hip muscles
2. Poor function and weakness of thigh muscles
3. Too much foot roll (pronation)

KEY TREATMENT OPTIONS

1. Exercises to improve strength and function of the hip and thigh muscles
2. Taping of the knee cap to reduce pain in the short term
3. Foot orthotics if you have too much foot roll (pronation)

PATELLOFEMORAL PAIN

Patellofemoral pain (pain around, behind or under the knee cap) is very common, and affects both males and females of all activity levels. It often results in pain during simple daily activities such as walking, running, sitting, squatting and walking up and down stairs.

Patellofemoral pain has many causes, and as such there are a lot of treatment options available. The information contained within this leaflet will help guide you on the most appropriate treatment for your knee pain. It is recommended you see an appropriately qualified health care professional to guide your treatment further.

PRIORITIES TO MANAGE YOUR PATELLOFEMORAL PAIN

1. If you think you have patellofemoral pain, you should seek help as early as possible – this will improve your chances of a successful recovery.
2. There are many effective treatment options which you should discuss with your treating therapist.
3. Your recovery will be best if you actively participate in your rehabilitation.
4. Appropriately modifying your physical activity level is often the first step towards successful recovery.
5. Ensure you slowly and safely build up your physical activity levels (Figure 5).

Figure 5 Gradual and safe build up in physical activity levels

This information brochure has been created as part of a not for profit endeavour by Dr Christian Barton and Michael Rathleff.

Patient education in PFP:

- Under-researched
- Lack of comprehensive evidence-based educational resources
- Current resources don't cover patient needs

<https://patellofemoral.trekeeducation.org/education-2/>



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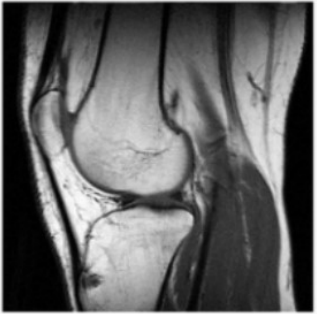
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Sp
Res



Addressing pain-related fear

**NO DIFFERENCES BETWEEN KNEE
CAP PAIN AND HEALTHY KNEES
ON MRI OR X-RAY!**



TAKE HOME MESSAGE

Scans can be costly and may not assist health professionals to reach a diagnosis or treat knee cap pain better

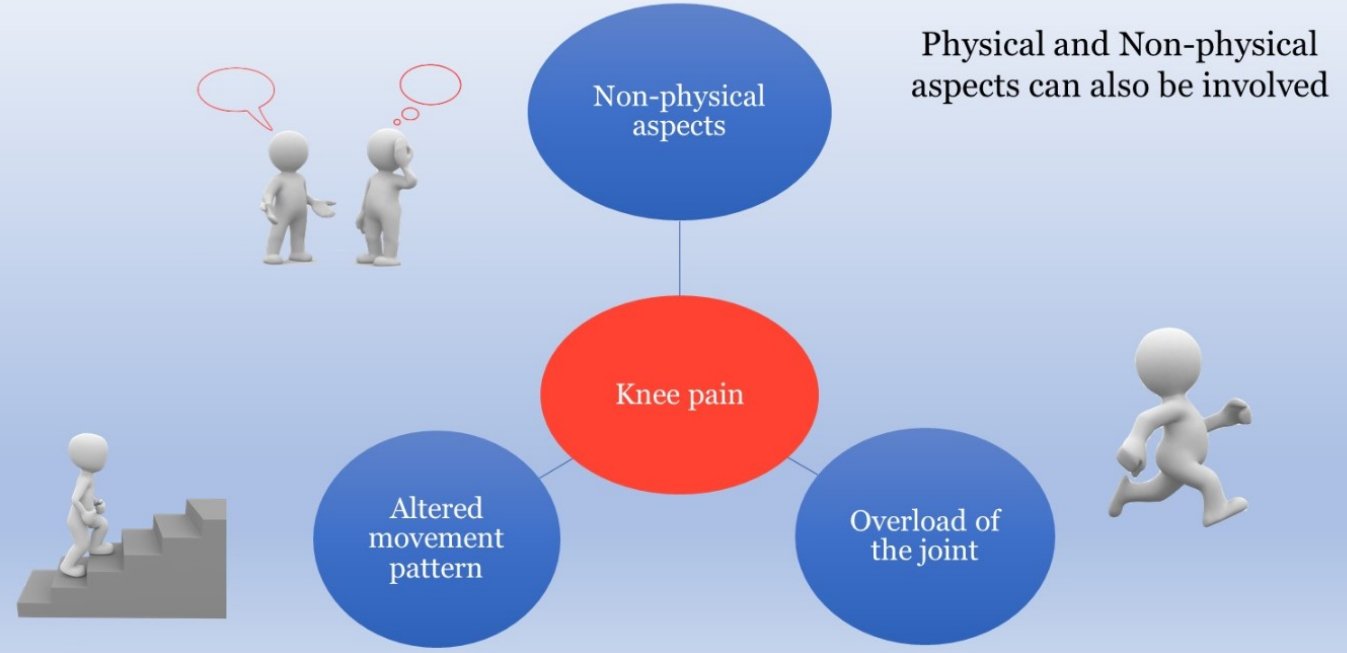
FOR MORE INFORMATION READ:

[HTTPS://WWW.NCBI.NLM.NIH.GOV/PUBMED/26471209](https://www.ncbi.nlm.nih.gov/pubmed/26471209)

[HTTPS://WWW.NCBI.NLM.NIH.GOV/PUBMED/27206691](https://www.ncbi.nlm.nih.gov/pubmed/27206691)



Pain is complex



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Take a look at the short video below to get some tips on **how you can manage your exercise and physical activity loads** (it's less than two mins)!



Managing physical activity level with knee cap pain

Watch later Share

Try it!!!



Gradual and safe build up to exercise. The time to reach 100% of your goals will vary depending on each your characteristics including how long you have had pain for.

MORE VIDEOS

1:29 / 1:51

YouTube



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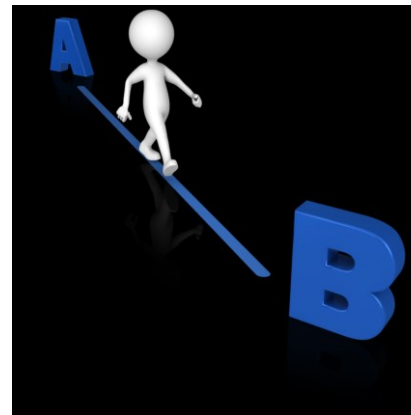
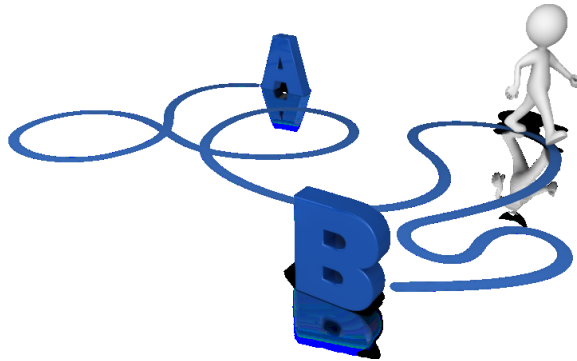
@DrChrisBarton



A few lessons from this work

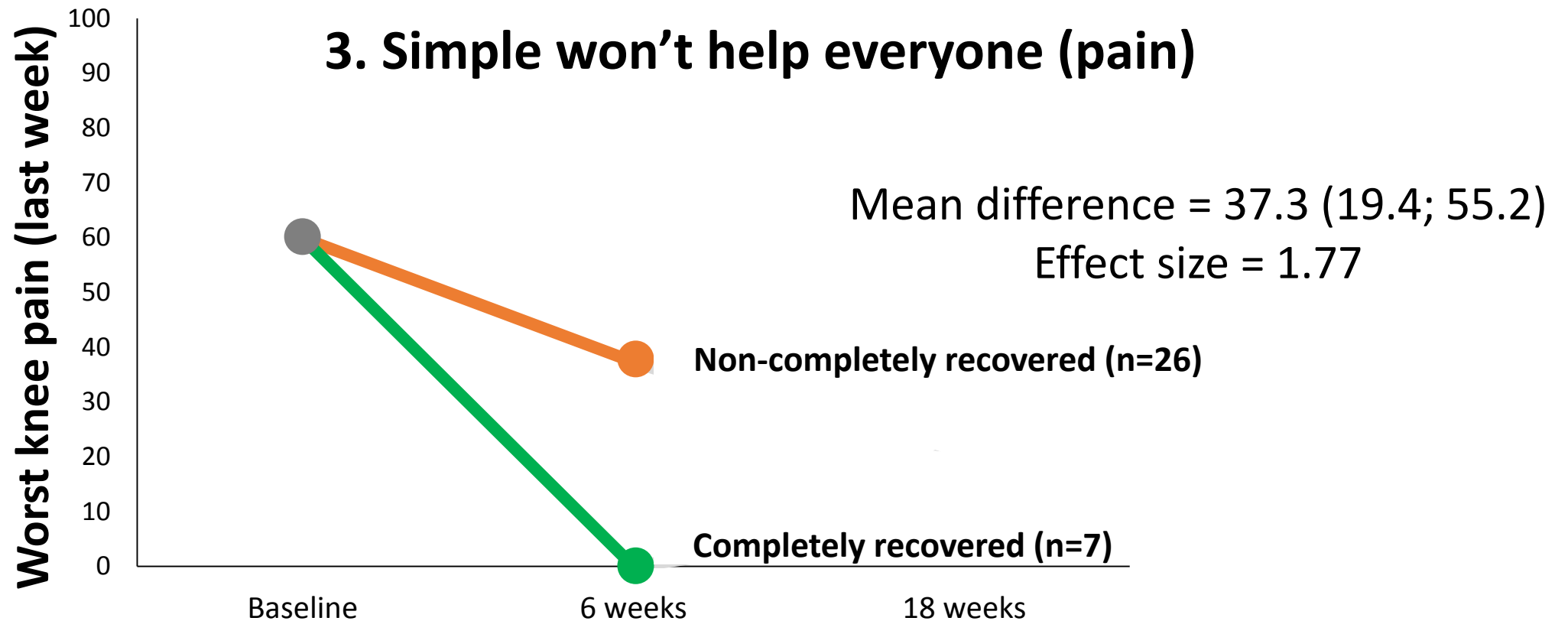
1. Addressing pain-related fear seems quite important – education target?

2. Don't complicate things more than you need to





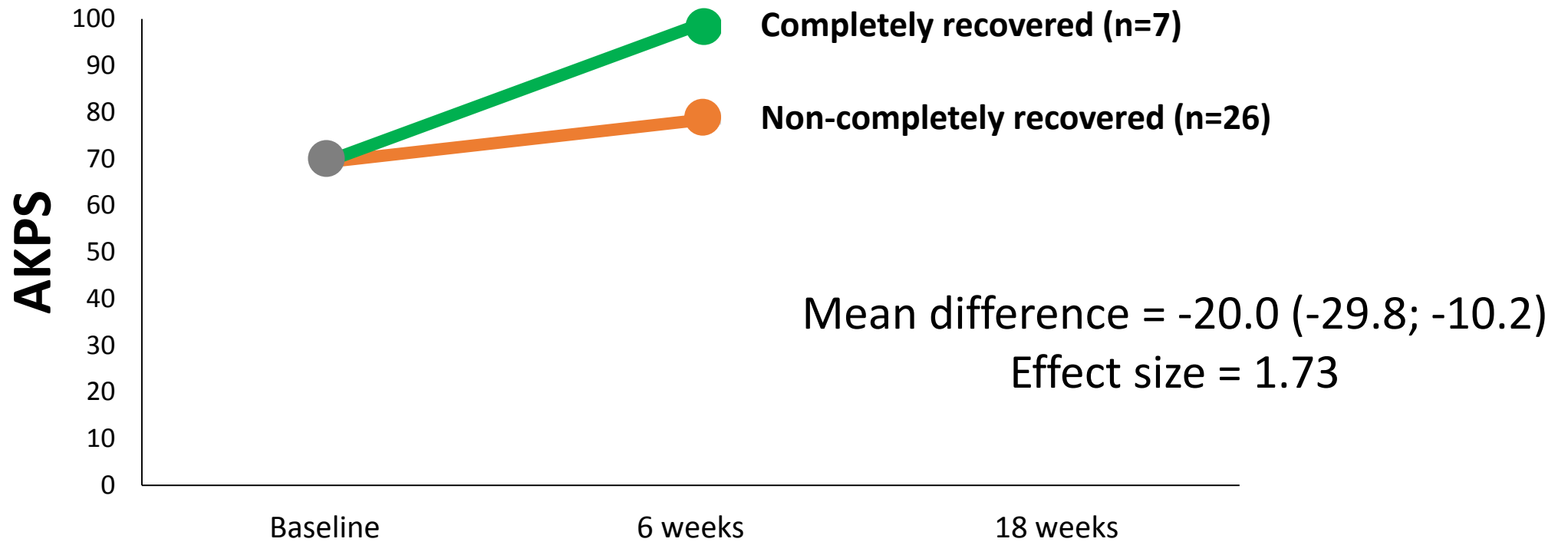
A few lessons from this work

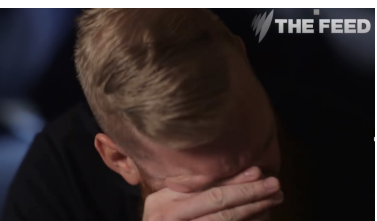




A few lessons from this work

3. Simple won't help everyone (disability)





Vicious cycle of persistent knee



Pain 85 (2000) 317–332

Review article

Fear-avoidance and its consequences in chronic musculoskeletal pain:
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Johan W.S. Vlaeyen^{a,b,*}, Steven J. Linton^c

PAIN

www.elsevier.nl/locate/pain

Disability

Loss of strength, power + functional capacity

Impaired joint-related QoL

Impaired health-related QoL+ depression

Avoidance behaviours

- Protective movement
- ↓ physical activity

Pain experience

Targeted exercise- therapy + physical activity participation

Pain-related fear

Catastrophising

Concerns about imaging, crepitus, damage

Education to
reduce pain-related
fear + promote
behaviour change

RECOVERY



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Proximal muscle rehabilitation is effective for patellofemoral pain: a systematic review with meta-analysis

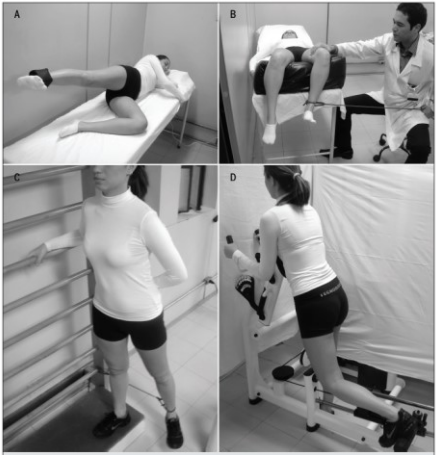
Simon Lack,¹ Christian Barton,^{1,2,3,4} Oliver Sohan,¹ Kay Crossley,⁵ Dylan Morrissey^{1,6}

How can we implement exercise therapy for patellofemoral pain if we don't know what was prescribed? A systematic review

Sinead Holden,^{1,2} Michael Skovdal Rathleff,^{1,3} Martin Bach Jensen,¹ Christian J Barton⁴

Hip and knee focused exercise seems to help

Hip targeted more beneficial in short term



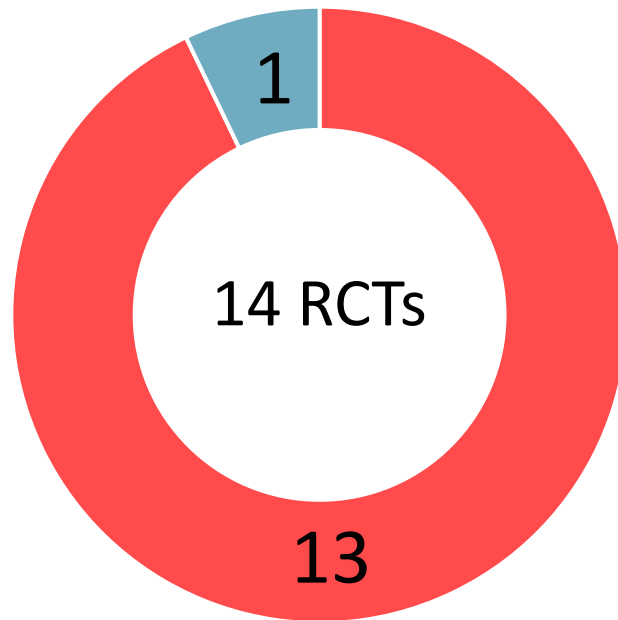
What prescription principles?



Proximal muscle rehabilitation is effective for patellofemoral pain: a systematic review with meta-analysis

Simon Lack,¹ Christian Barton,^{1,2,3,4} Oliver Sohan,¹ Kay Crossley,⁵ Dylan Morrissey^{1,6}

Type of exercise reported according to studies' titles



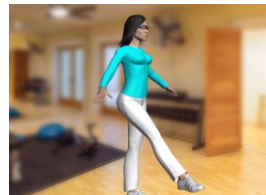
■ Neuromuscular

■ Strength

■ Endurance

■ Power

■ Undetermined



Original research

Hip rate of force development and strength are impaired in females with patellofemoral pain without signs of altered gluteus medius and maximus morphology

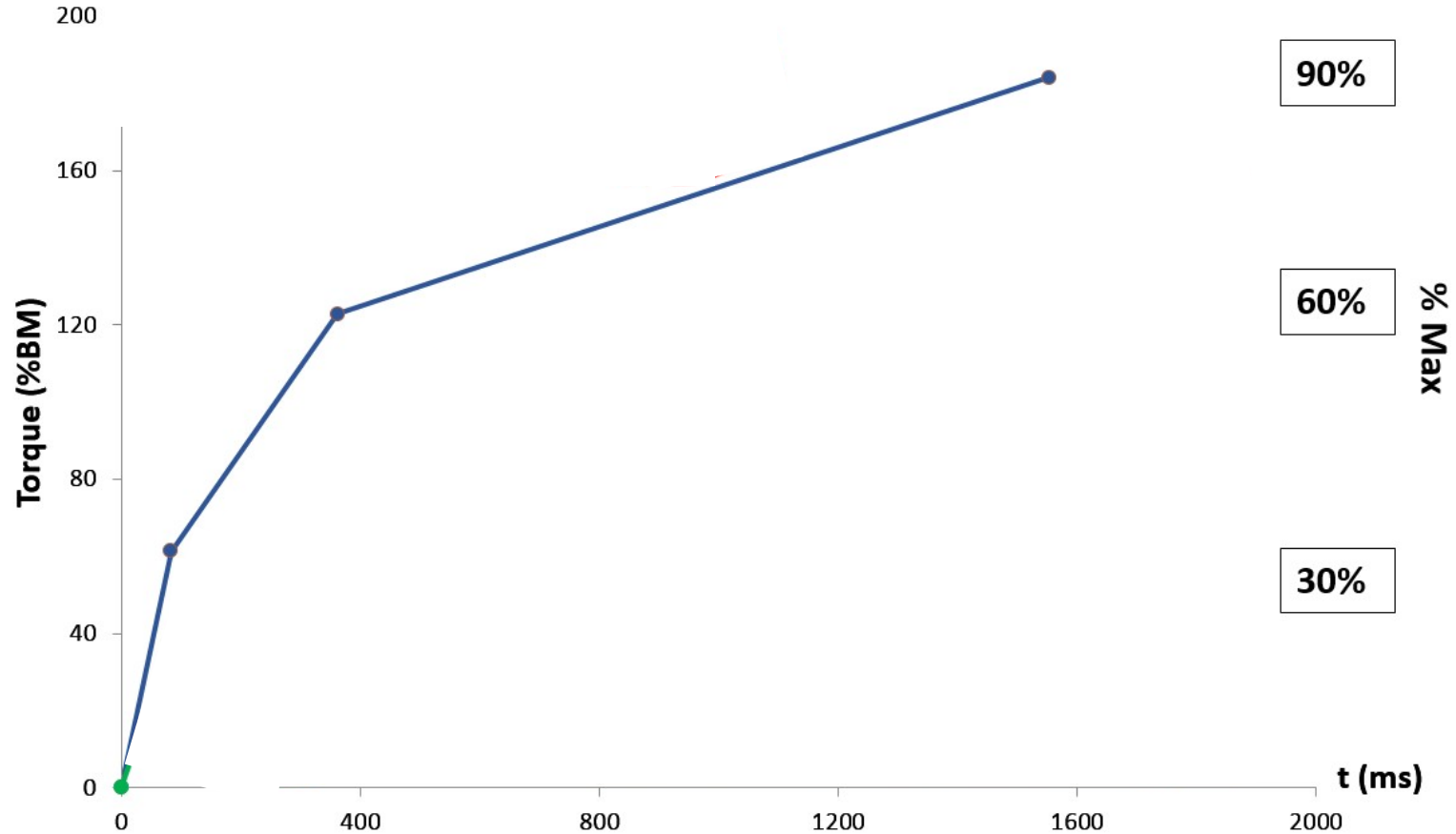
Guilherme S. Nunes^{a,b,*}, Christian John Barton^b, Fábio Viadanna Serrão^a

^a Department of Physiotherapy, São Carlos Federal University, Brazil

^b Sport and Exercise Medicine Research Centre, School of Allied Health, La Trobe University, Australia



Hip extensor rate of force development



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Original research

Hip rate of force development and strength are impaired in females with patellofemoral pain without signs of altered gluteus medius and maximus morphology

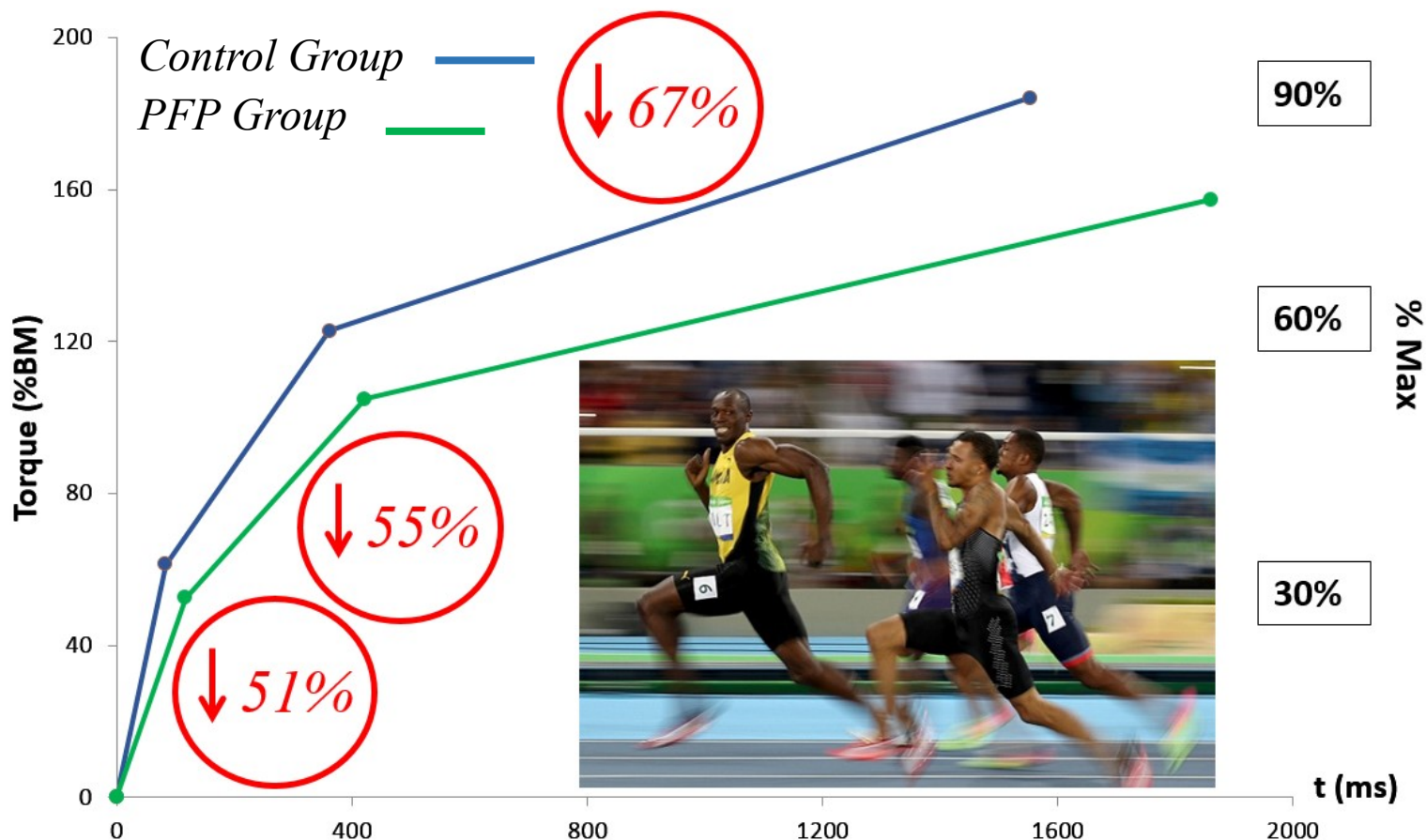
Guilherme S. Nunes^{a,b,*}, Christian John Barton^b, Fábio Viadanna Serrão^a

^a Department of Physiotherapy, São Carlos Federal University, Brazil

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Hip extensor rate of force development



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Original Research

Clinically measured hip muscle capacity deficits in people with patellofemoral pain



Guilherme S. Nunes ^{a, b, *}, Danilo de Oliveira Silva ^{a, c}, Tania Pizzari ^a,
Fábio Viadanna Serrão ^b, Kay M. Crossley ^a, Christian John Barton ^{a, d}



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	PFP group (n=16)	Control group (n=16)	Mean difference (95% CI)	p value	Effect size (95% CI) and % of difference*	
Strength (%BM)						
Isometric – hip abductors	117.9 (23.4)	149.9 (38.7)	32.0 (8.9 to 55.1)	<0.01		21%
Isometric – hip extensors	82.3 (33.1)	110.3 (31.0)	28.0 (4.9 to 51.1)	0.02	↓ 15-25%	25%
10 RM – hip abductors	53.1 (13.9)	62.1 (10.3)	9.0 (0.2 to 17.9)	0.05		15%
10 RM – hip extensors	58.2 (14.7)	70.8 (14.1)	12.6 (2.2 to 23.0)	0.02		18%
Power (W/kg)						
Squat	14.2 (4.0)	18.6 (5.4)	4.4 (1.0 to 7.8)	0.01	↓ 24-31%	24%
Hip abduction	1.9 (0.8)	2.6 (0.9)	0.8 (0.2 to 1.4)	0.02		31%
Hip extensors	2.9 (1.2)	4.1 (1.3)	1.2 (0.3 to 2.1)	0.01		29%





Original Research

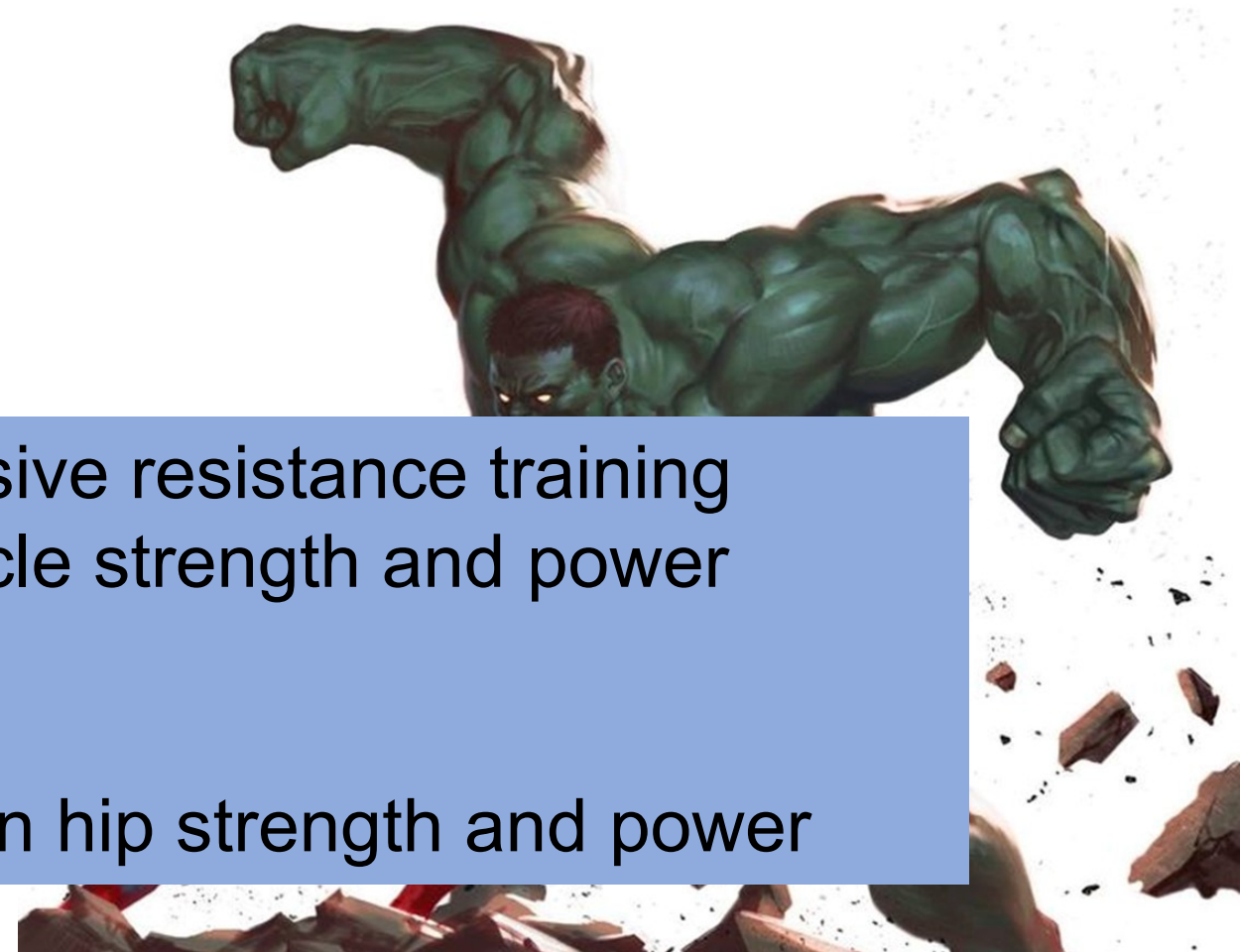
A proximal progressive resistance training program targeting strength and power is feasible in people with patellofemoral pain



Christian J. Barton^{a,b,*}, Danilo de Oliveira Silva^{a,c}, Brooke E. Patterson^a,
Kay M. Crossley^a, Tania Pizzari^a, Guilherme S. Nunes^{a,d}

Study aims

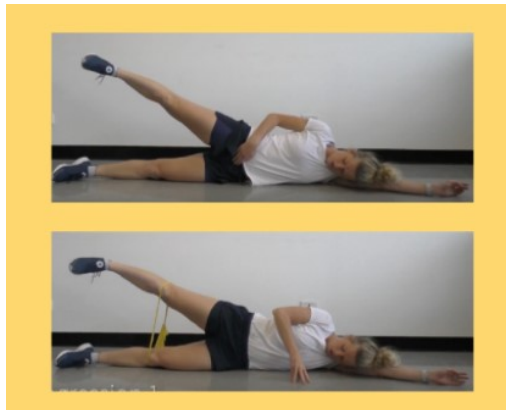
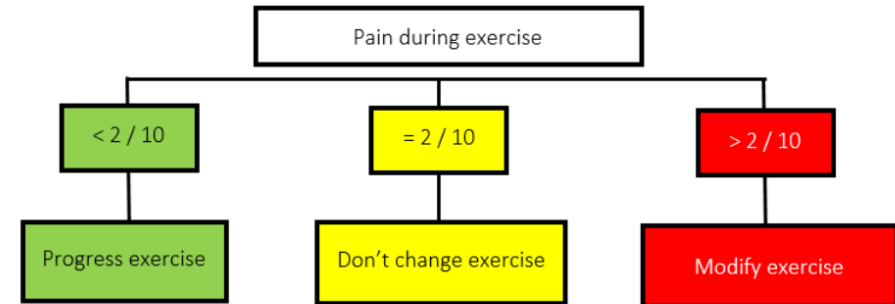
1. Feasibility of a 12-week progressive resistance training program targeting proximal muscle strength and power
2. Clinical outcomes and changes in hip strength and power



Exercise program

- 12-week (3 x per week)
- 3-5 exercises targeting hip and trunk and tailored to individual
- 5-8 physiotherapy consultations (exercise only)

GUIDANCE RELATED TO PAIN MONITORING



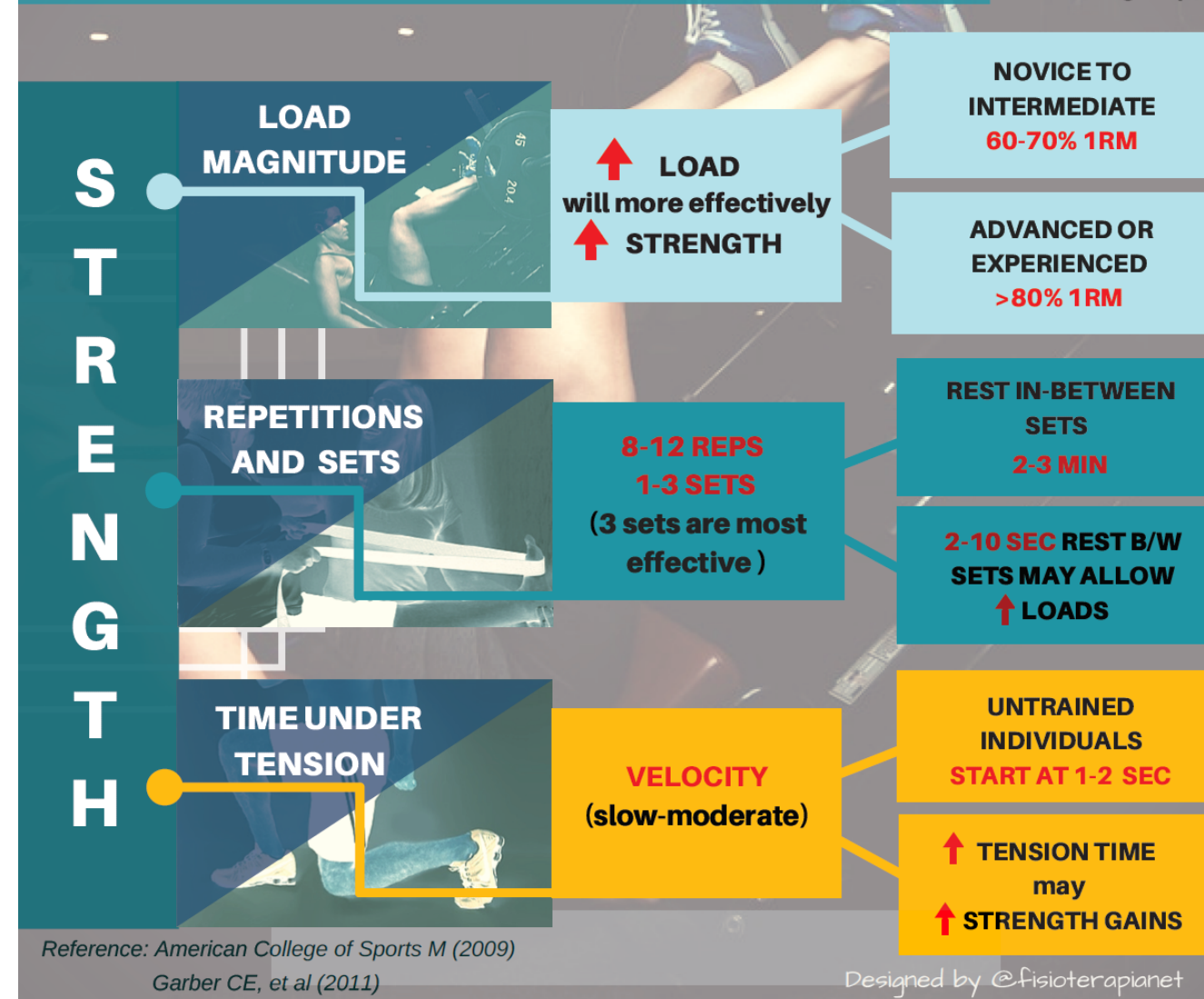
EXERCISE PRESCRIPTION



The muscles ability to move against resistance

Greater resistance is needed for about 8-12 repetitions in a slower controlled manner

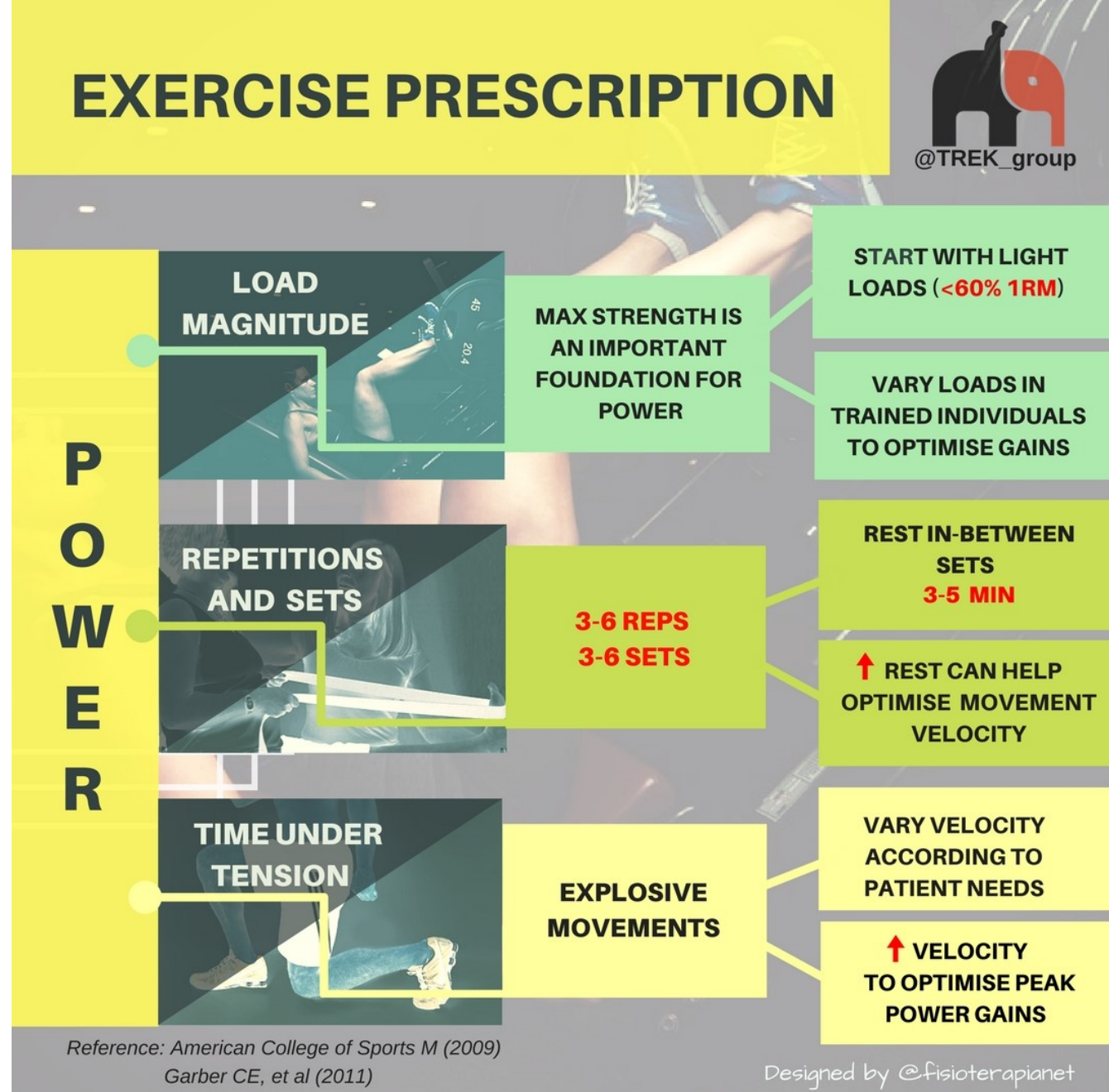
Generally the rest time is about 2-3 minutes between sets



How quickly a given load can be moved or force generated

Exercise against heavy resistance in an explosive manner for a low number of repetitions and 3-6 sets

An extended rest (3-5 minutes) is often needed to fully recover



Original Research

A proximal progressive resistance training program targeting strength and power is feasible in people with patellofemoral pain

Christian J. Barton ^{a,b,*}, Danilo de Oliveira Silva ^{a,c}, Brooke E. Patterson ^a, Kay M. Crossley ^a, Tania Pizzari ^a, Guilherme S. Nunes ^{a,d}

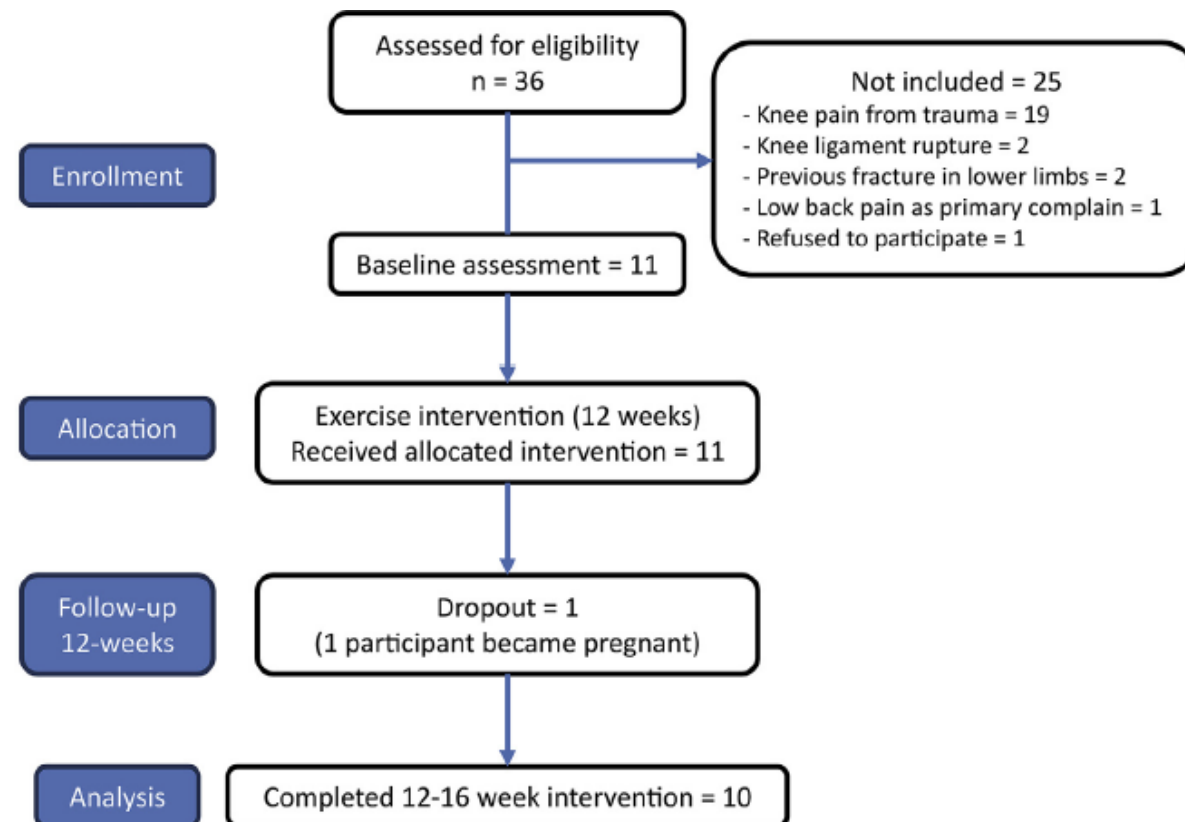


	All sample (n = 11)	Men (n = 5)	Women (n = 6)
Age (y)	33 (10)	35 (9)	32 (11)
Height (m)	1.69 (0.13)	1.80 (0.05)	1.59 (0.09)
Body Mass (kg)	66 (16)	79 (9)	56 (12)
BMI (kg/m ²)	23.0 (3.0)	24.3 (1.5)	21.9 (3.6)

1 Adverse outcome (pain flare)

Typically progressed well
(strength 3-5 weeks; power 4-8 weeks)

Very poor exercise adherence **data** after
first 3-4 weeks (Physitrack)



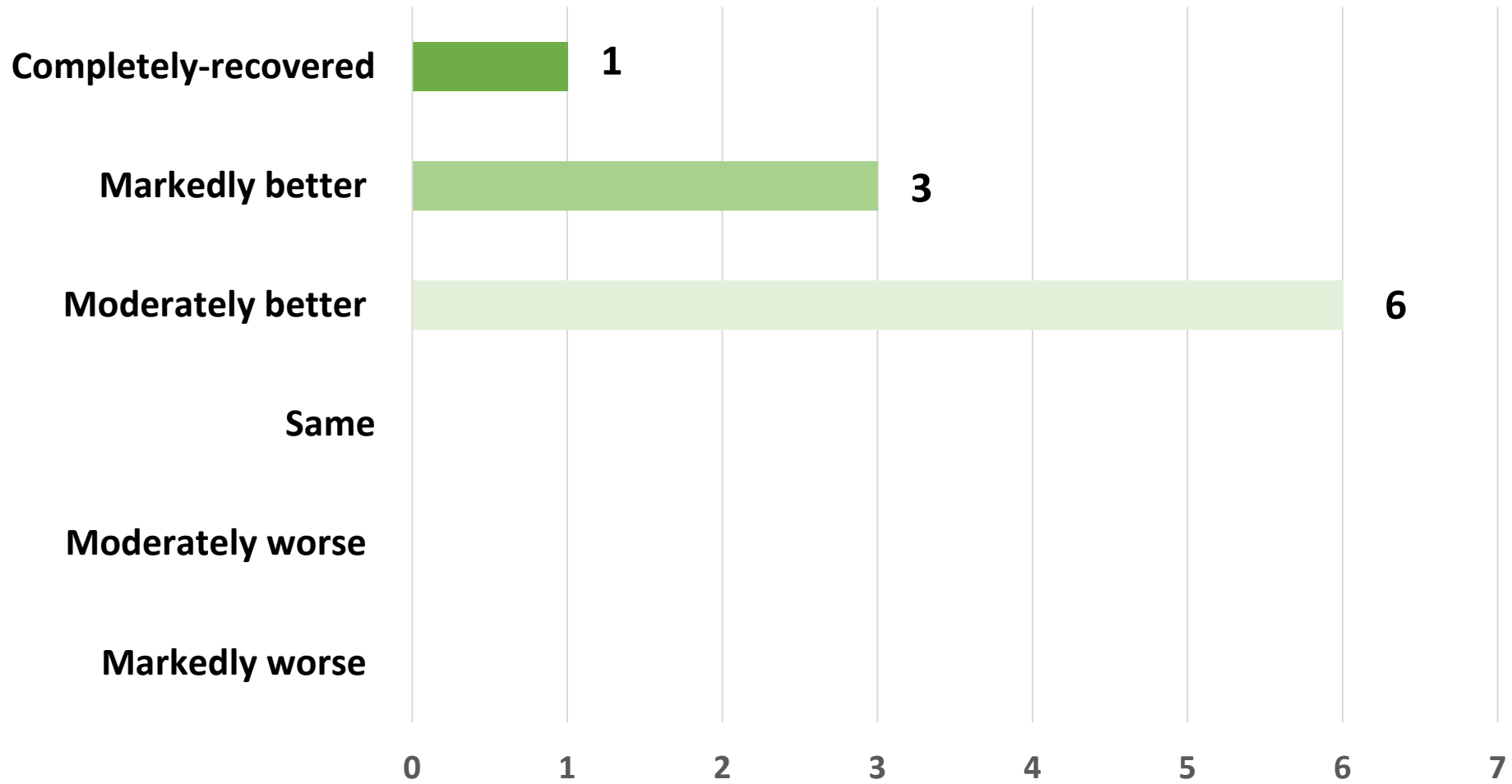


	Pre Mean (SD)	Post Mean (SD)	Mean difference (95%CI)	Effect size (95%CI)	
				Favours improvement	Favours worsening
Isometric strength					
Hip abduction	123 (20)	136 (31)	-13 (-26; -1)*		11-16%
Hip extension	83 (34)	96 (34)	-13 (-28; 1)		
10 Repetition Maximum					
Hip abduction	54 (14)	72 (12)	-19 (-25; -12)*	34-35%	
Hip extension	55 (15)	74 (7)	-19 (-28; -10)*		22-28%
Power					
Hip abduction	2.0 (0.9)	2.5 (1.2)	-0.6 (-1.1; -0.1)*		
Hip extension	3.0 (1.4)	3.6 (1.2)	-0.65 (-1.3; 0.00)*		

	Pre Mean (SD)	Post Mean (SD)	Mean difference (95%CI)	Effect size (95%CI)	
				Favours improvement	Favours worsening
Worst pain last week	5.7 (1.57)	1.0 (1.3)	4.7 (3.7; 5.7)*		
AKPS	76 (12)	90 (9)	-14 (-20; -8)*		
KOOS-PF	74 (18)	89 (10)	-15 (-24; -5)*		
Kinesiophobia	34 (8)	29 (6)	5 (-1; 10)		
Physical activity level	3,567 (5,092)	5,944 (5,955)	-2,376 (-6,606; 1,853)		



Global scale of perceived recovery





A few lessons from this work

1. Prescribing strength and power is feasible
2. Moderate-large improvements in strength + power
3. Associated with large improvements in pain + function

>>>> Lets build on this to develop a better exercise and education program (BEEP)



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**Recruitment:**

Social media
University

Participants Screening*

Baseline assessment
N = 35

6-weeks of self-directed online
education and exercise-therapy

Follow-up assessment
(6-weeks)
N = 33

Completely-recovered
N = 7

Not completely-recovered
N = 26

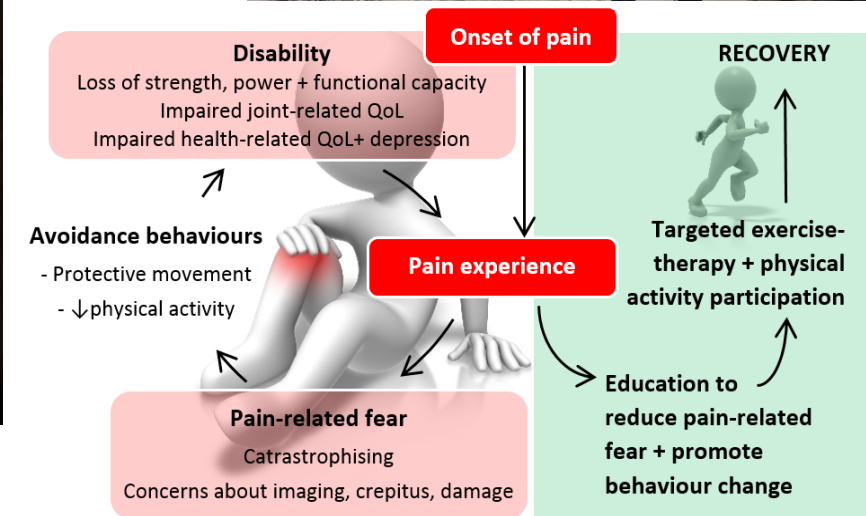
Physiotherapist-delivered
Education and exercise-therapy
(face-to-face)
12 weeks – 8 sessions (N = 13)

Physiotherapist-delivered
Education and exercise-therapy
(online)
12 weeks – 8 sessions (N = 13)

Follow-up assessment
(18-weeks)
N = 31



Back to Rhys



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A screenshot of a web browser's address bar. The address bar shows navigation icons (back, forward, refresh), a security indicator (Not secure), and the URL "patellofemoral.treeducation.org". On the right side, there are search and star icons, followed by several extension icons.



TAKE HOMES

1. Consider what you are really trying to achieve with exercise and education
2. Pain-related fear is important – your words and reassurance matter
3. Can we improve longer term outcomes through better exercise and education?

Today's slides: <http://bit.ly/2OkVexZ>



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