

# TENDINOPATHY

## *IS IT ALL OVERUSE?*

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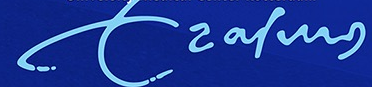
 @rj\_devos

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University Medical Center Rotterdam



# Conflicts of interest statement

Conflicts of interest	• None
Relations with companies	
Sponsorships of research projects as PI	           

# Topics of today

- Focus on Achilles tendinopathy
- Association between 'overuse' and onset of tendinopathy
- Factors inside the tendon – role of imaging
- Factors outside the tendon – a broader view



# Achilles Tendinopathy – important? <sup>1-4</sup>

"My whole social network is full of runners, so, rather than get cranky, I've stopped going, so, you're actually **withdrawing from the social networks.**"

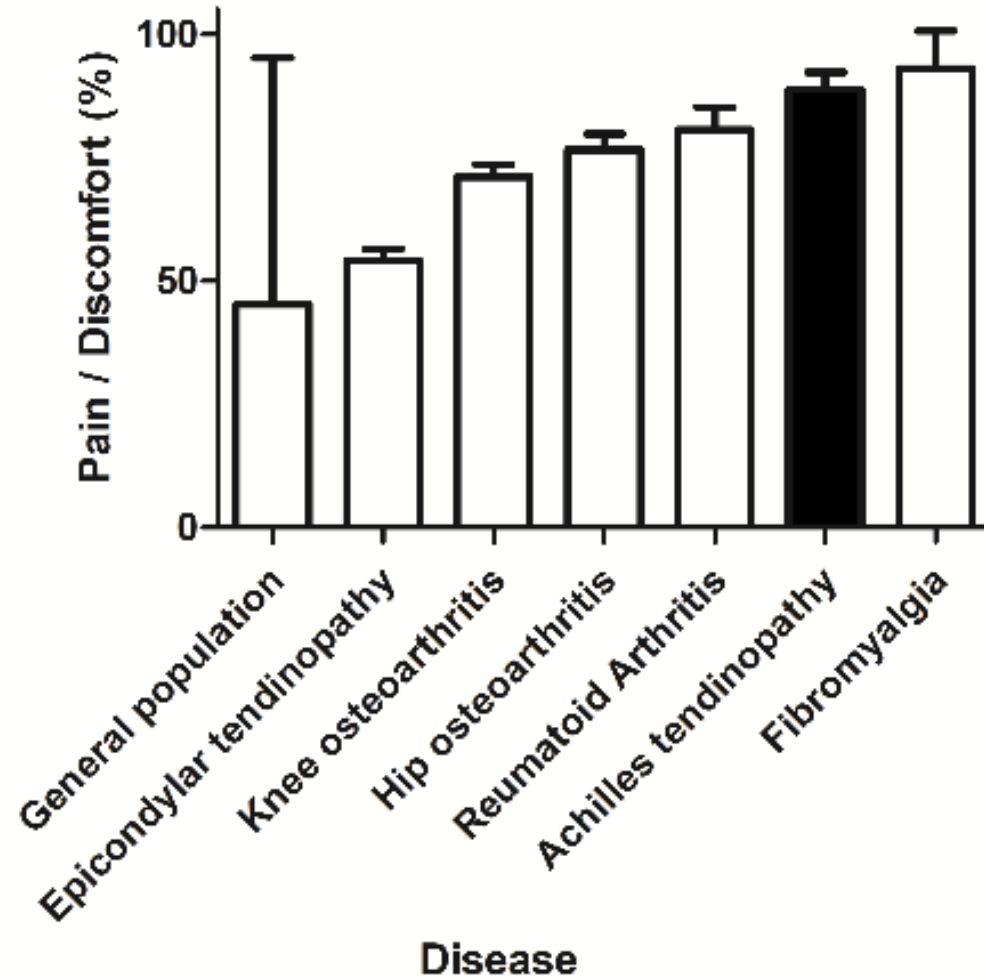
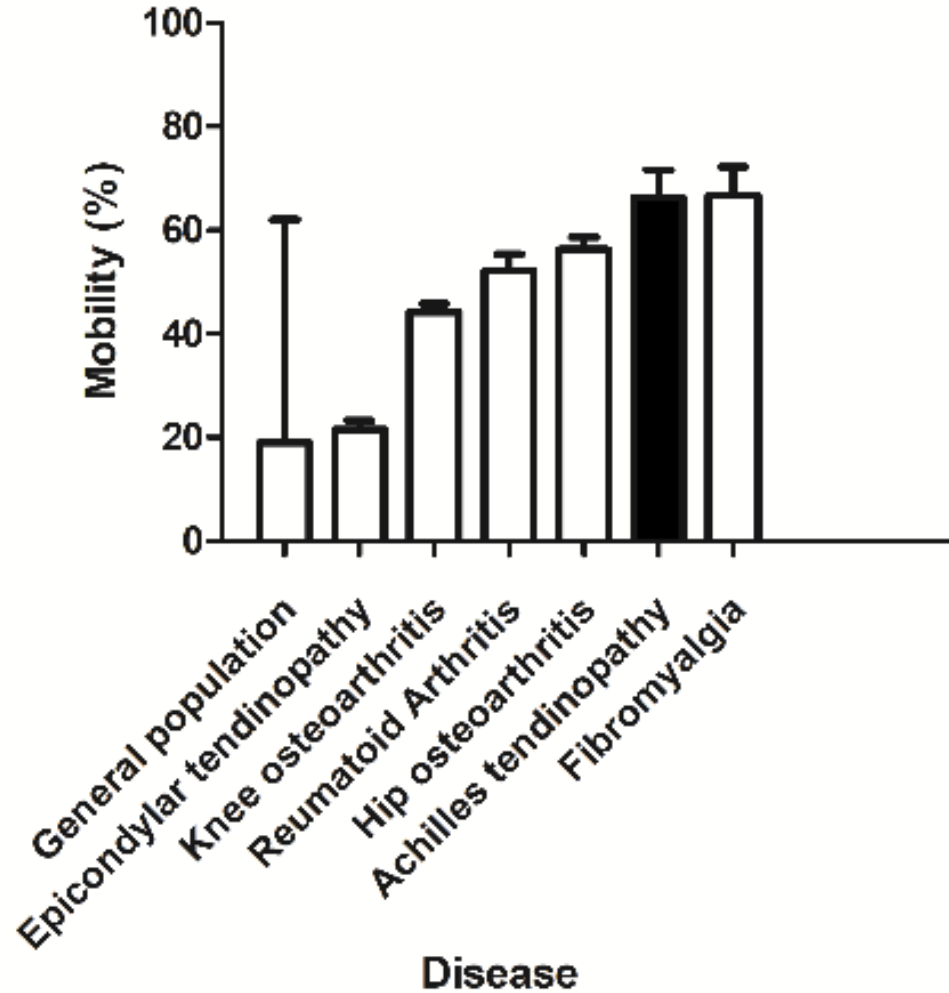
"There is the **fear of it reoccurring**...the fear of triggering an attack prevents you from doing stuff."

"So I just got back to that stage where I'm like - yeah, it's **almost like accepting you've got cancer.**"





# Achilles tendinopathy – important? 1-5



# Achilles tendinopathy – risk factors <sup>1</sup>

Review

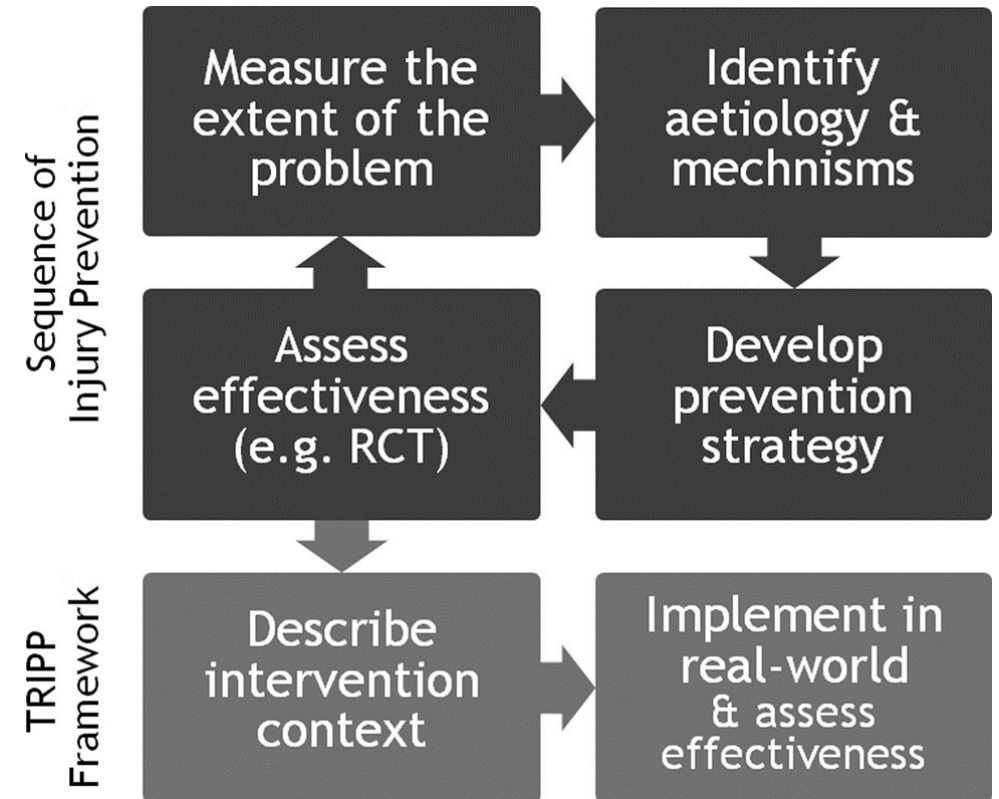
**BJSM**  
The Journal of Sport  
& Exercise Medicine  
BMJ Journals

Br J Sports Med 2019;0:1–11.

## Clinical risk factors for Achilles tendinopathy: a systematic review

Arco C van der Vlist,<sup>1</sup> Stephan J Breda,<sup>2</sup> Edwin H G Oei,<sup>2</sup> Jan A N Verhaar,<sup>1</sup> Robert-Jan de Vos<sup>1</sup>

- > 5,000 studies screened
- 10 cohort studies included
- Extraction potential risk factors
- Risk of Bias assessment (ROB)



# Achilles tendinopathy – risk factors <sup>1</sup>

*Previous tendinopathy*



*Winter training*



*Calf muscle strength*



*Abnormal gait*



*Fluoroquinolones*



**LIMITED EVIDENCE**

# Achilles tendinopathy – risk factors



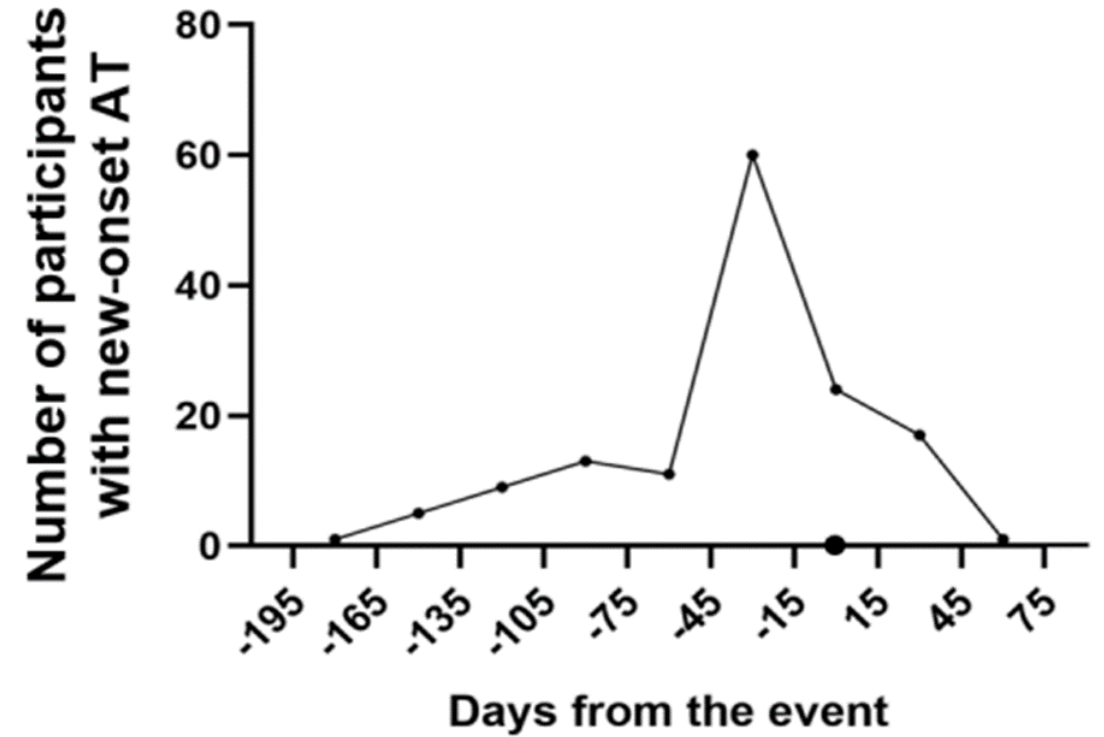
- Marathon runners most frequently Achilles tendinopathy (incidence 7.4%)<sup>1</sup>

<sup>1</sup> Lagas et al. 2020



# Achilles tendinopathy – risk factors <sup>1</sup>

Achilles  
tendinopathy  
≤12 months  
(OR=6.5)



# Achilles tendinopathy – risk factors <sup>1</sup>

- No data on change in tendon load as risk factor for Achilles tendinopathy
- Large cohort of runners (n=461) shows only weak association between change in load (GPS-based ACWR) and ‘overuse injuries’ <sup>1</sup>
- To be evaluated for tendons...

	Distance		Duration		Speed	
	HR <sup>a</sup> (95% CI)	p-value	HR (95% CI)	p-value	HR (95% CI)	p-value
<i>Unadjusted</i>						
ACWR <sup>b</sup>	1.32 (1.00-1.74)*	0.05	1.39 (1.07-1.79)*	0.01	1.31 (0.96-1.78)	0.09
<i>Adjusted</i>						
ACWR <sup>b</sup>	1.26 (0.95-1.68)	0.15	1.33 (1.02-1.74)*	0.04	1.25 (0.91-1.72)	0.17

<sup>1</sup> Cloosterman et al. Under review

# Diagnosis Achilles tendinopathy – classification<sup>1-3</sup>

Insertional  
Achilles  
Tendinopathy



Midportion  
Achilles  
Tendinopathy

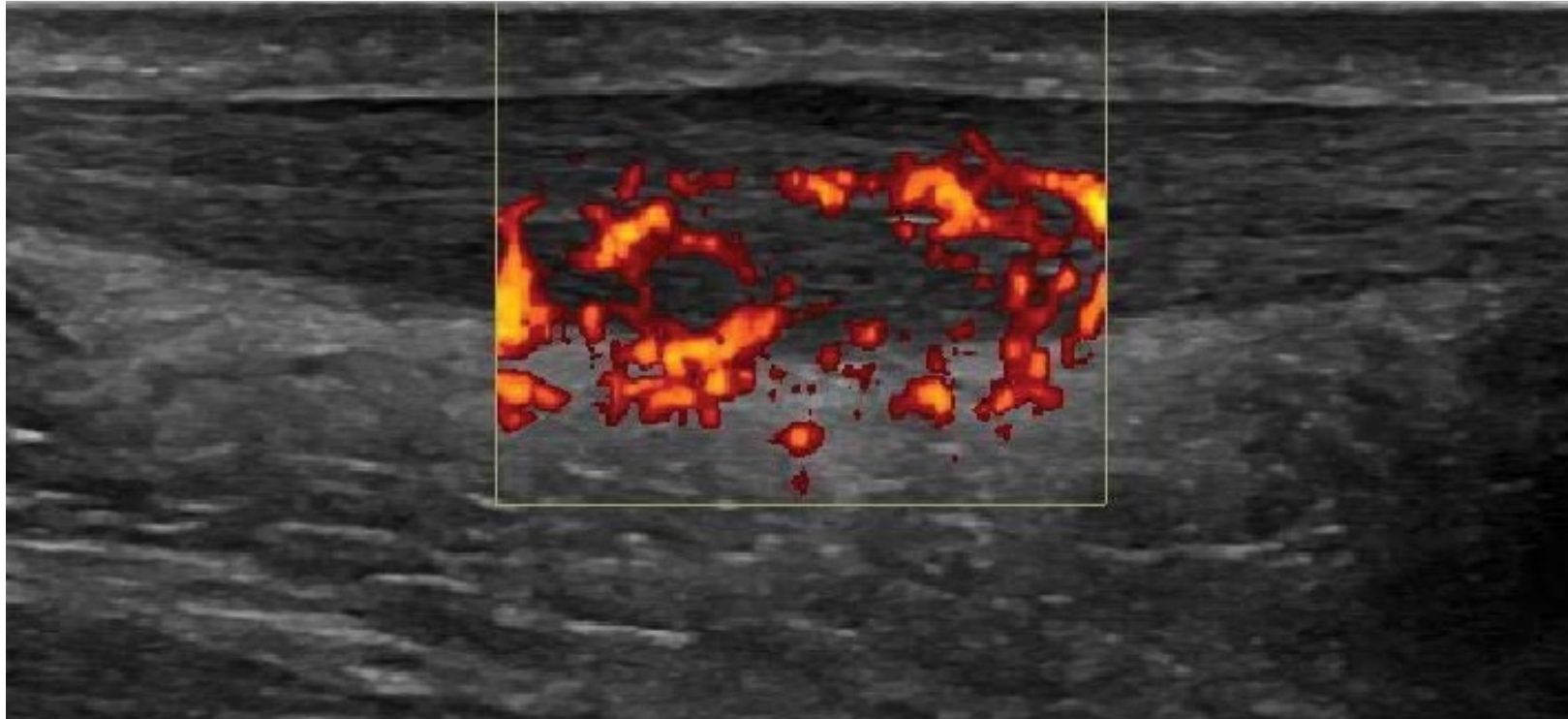


# Diagnosis Achilles tendinopathy – criteria <sup>1,2</sup>

- No diagnostic studies
- Data extraction from RCTs → 25 described criteria <sup>1</sup>

Clinical criteria	Number of studies
Pain on palpation	17/25
Tendon swelling	11/25
Pain related to sports	8/25
Pain in medical history	7/25
Morning stiffness	5/25
Functional limitations	4/25

# Achilles tendinopathy – role of imaging



- Diagnosis
- Prognosis
- Monitoring treatment



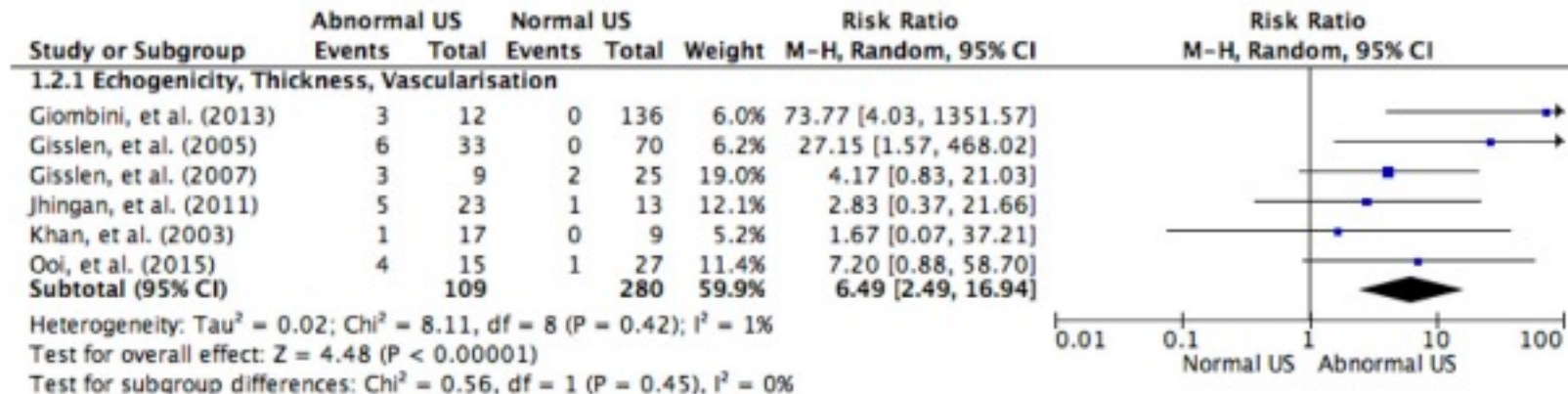
# Diagnosis Achilles tendinopathy – role of imaging <sup>1</sup>

<b>Q34: Achilles tendinopathy is the preferred term for persistent Achilles tendon pain and loss of function related to mechanical loading</b>	Agreed – 79%
<b>Q39: Imaging is necessary for a diagnosis of tendinopathy.</b>	<u>Dis</u> agreed – 74%

- Not necessary (wording of the statement)
- Data extraction from RCTs → 47% used imaging <sup>2</sup>

# Ultrasound (US) imaging – What is normal? <sup>1</sup>

- Abnormal findings in 11-18% of asymptomatic athletes <sup>1,2</sup>
- Abnormalities frequently bilateral <sup>3</sup>
- Abnormalities associated with future symptoms <sup>4</sup>



<sup>1</sup> Gisslèn et al. 2005 <sup>2</sup> Fredberg and Bolvig. 2002 <sup>3</sup> Rabello et al. 2018 <sup>4</sup> Matthews et al. 2018

# Ultrasound (US) imaging – What is normal? <sup>1</sup>

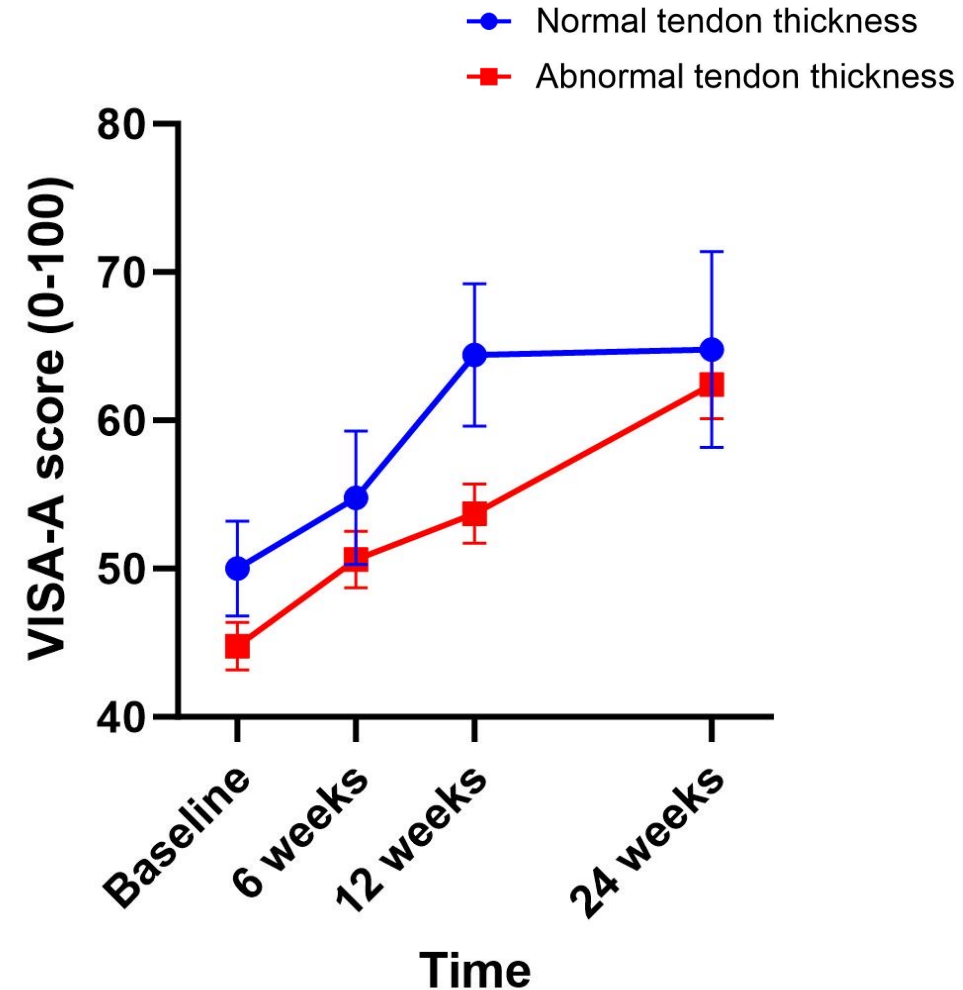


- REVEAL trial – 500 asymptomatic individuals
- [www.achillestendontool.com](http://www.achillestendontool.com)
- 100 patients with clinical criteria for Achilles tendinopathy
- 30% of the patients had an US thickness within normal range!
- **Role of imaging??**



# Ultrasound imaging – What does ‘normal’ mean? <sup>1</sup>

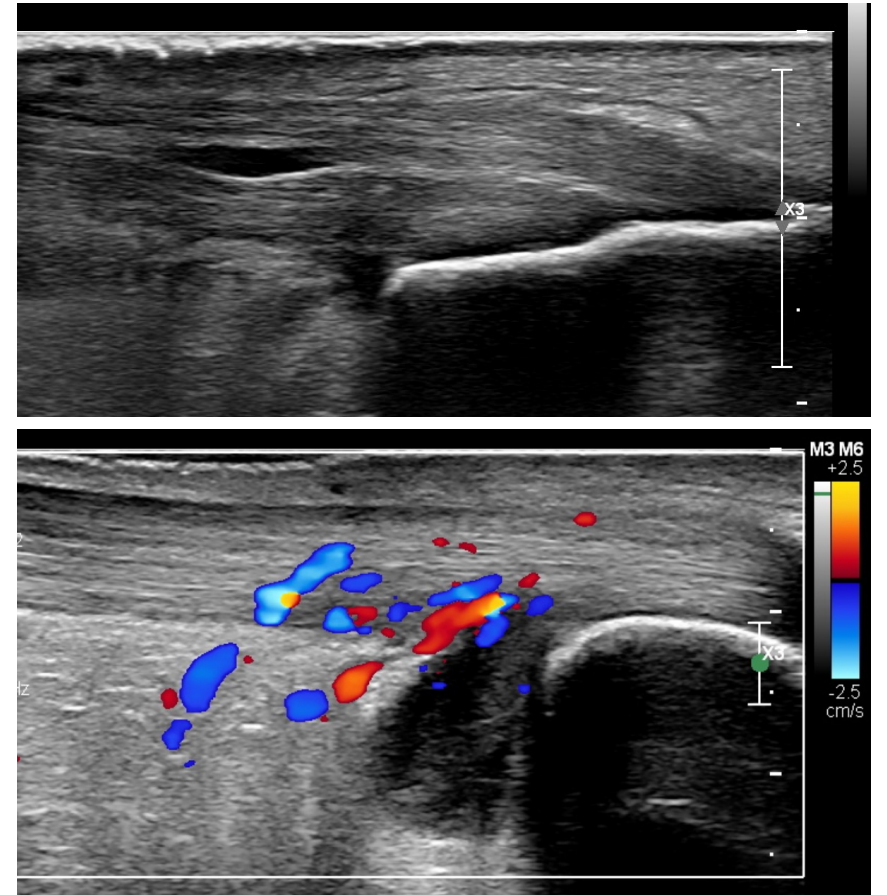
- What is the clinical relevance of this 30%? <sup>1</sup>
  - Other diagnosis?
  - ‘Reactive’ Achilles tendinopathy?
- No association between tendon thickness and course of symptoms during follow-up <sup>1,2</sup>



# Subclassification Achilles tendinopathy – role of imaging?

- Specific subgroups identified with **imaging** <sup>1,2</sup>

Should we treat these all the same?  
Do they all respond the same?

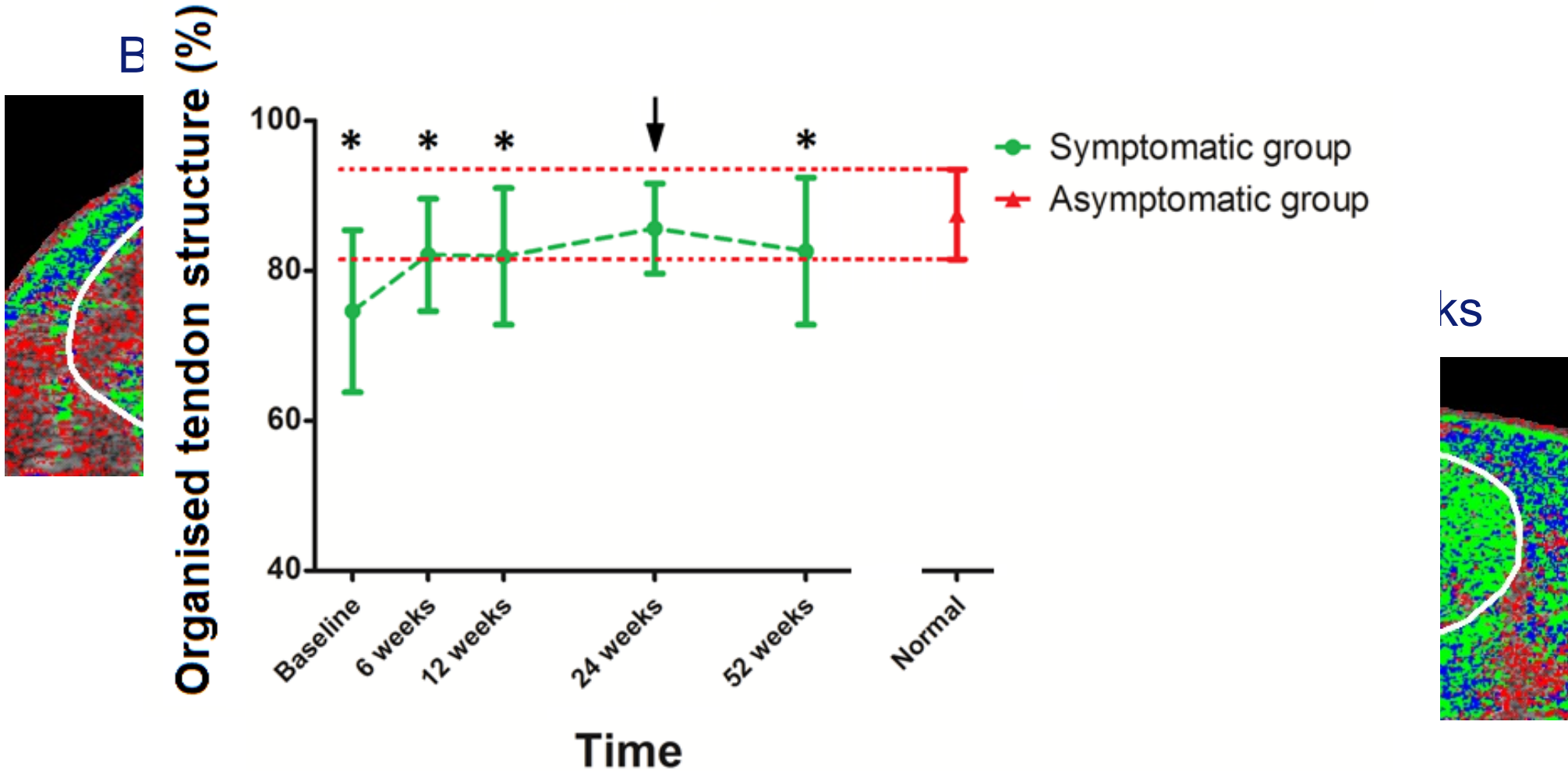


Erasmus MC

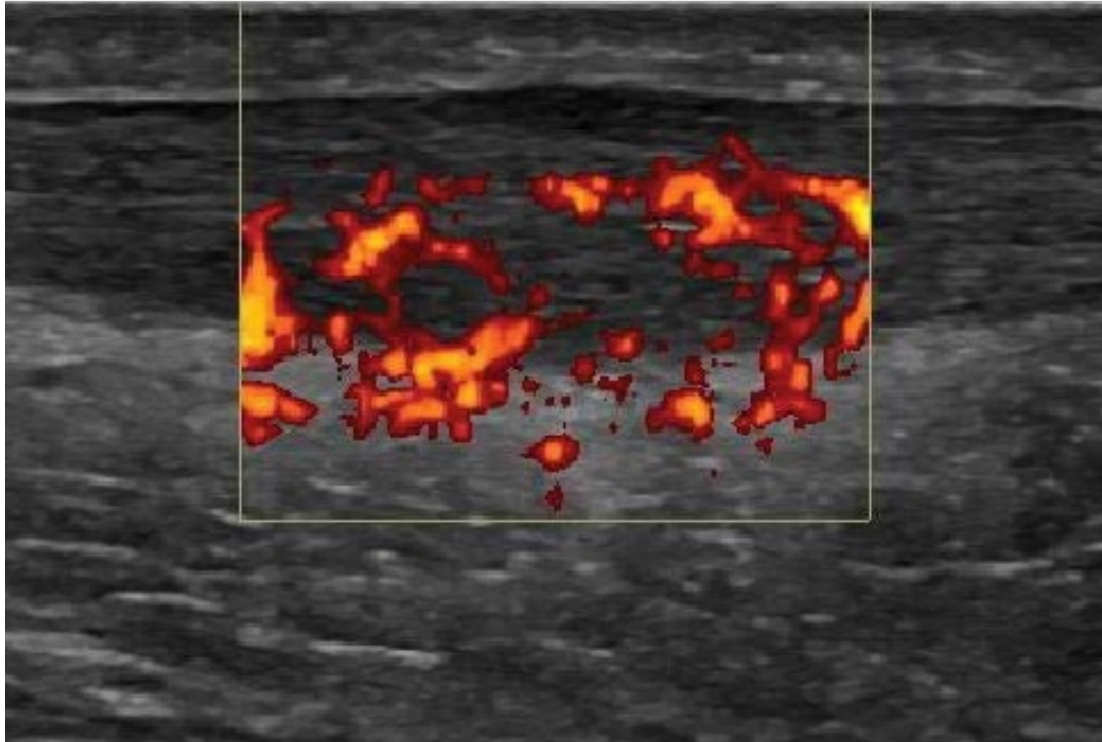
*Erasmus*



# Monitoring Achilles tendinopathy – role of imaging? <sup>1</sup>



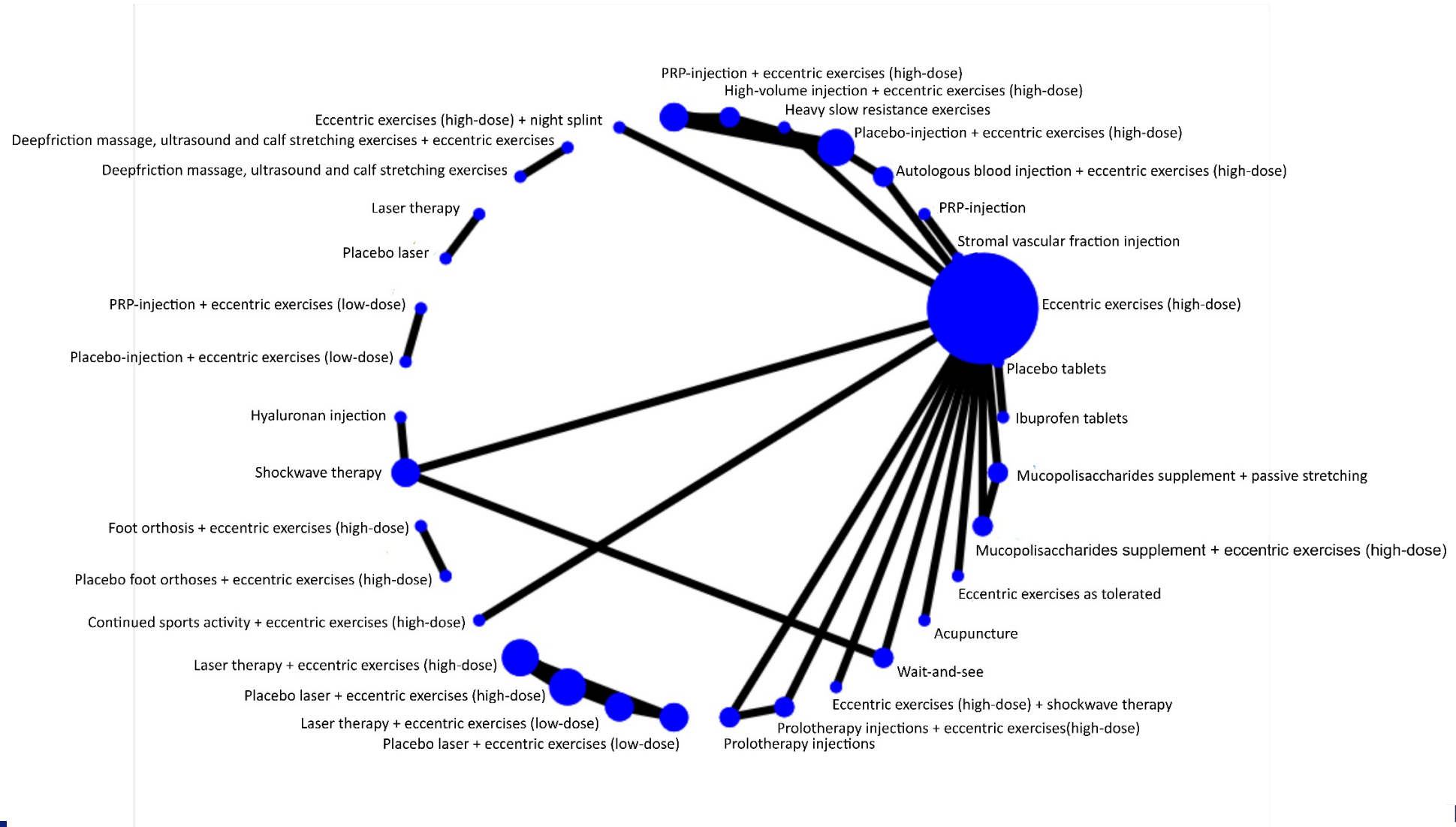
# Achilles tendinopathy – role of imaging



- Diagnosis
- Prognosis
- Monitoring treatment



# Treatment – midportion Achilles tendinopathy <sup>1</sup>





# Treatment Achilles tendinopathy at 3 months <sup>1</sup>

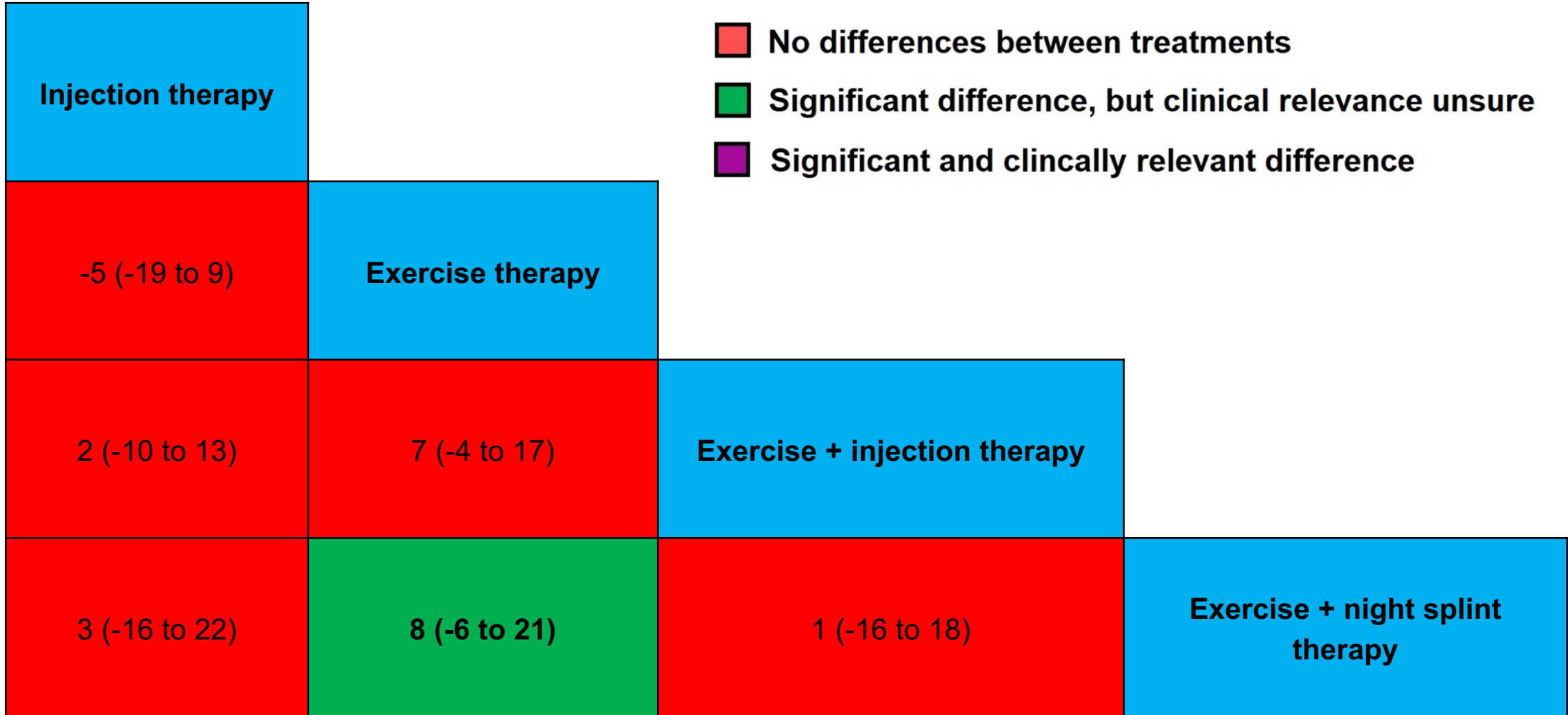


- No differences between treatments
- Significant difference, but clinical relevance unsure
- Significant and clinically relevant difference

<b>Wait-and-see</b>							
<b>Exercise + placebo injection</b>							
<b>Injection</b>							
<b>Exercise</b>							
<b>ESWT</b>							
<b>Exercise + injection</b>							
<b>Exercise + ESWT</b>							
<b>Acupuncture therapy</b>							
19 (-3 to 34)	23 (8 to 38)	20 (11 to 30)	15 (6 to 24)	22 (7 to 36)	34 (21 to 47)	35 (25 to 45)	
4 (-11 to 19)	1 (-10 to 15)	-2 (-14 to 9)	-4 (-19 to 13)	4 (-2 to 8)	15 (1 to 31)	16 (4 to 30)	
-2 (-14 to 9)	-5 (-15 to 5)	7 (-8 to 22)	12 (-2 to 27)	1 (-9 to 11)			
11 (-4 to 26)	14 (5 to 23)	19 (5 to 32)	13 (2 to 25)				
13 (0 to 25)	15 (11 to 19)	20 (9 to 31)					

<sup>1</sup> van der Vlist et al. 2021

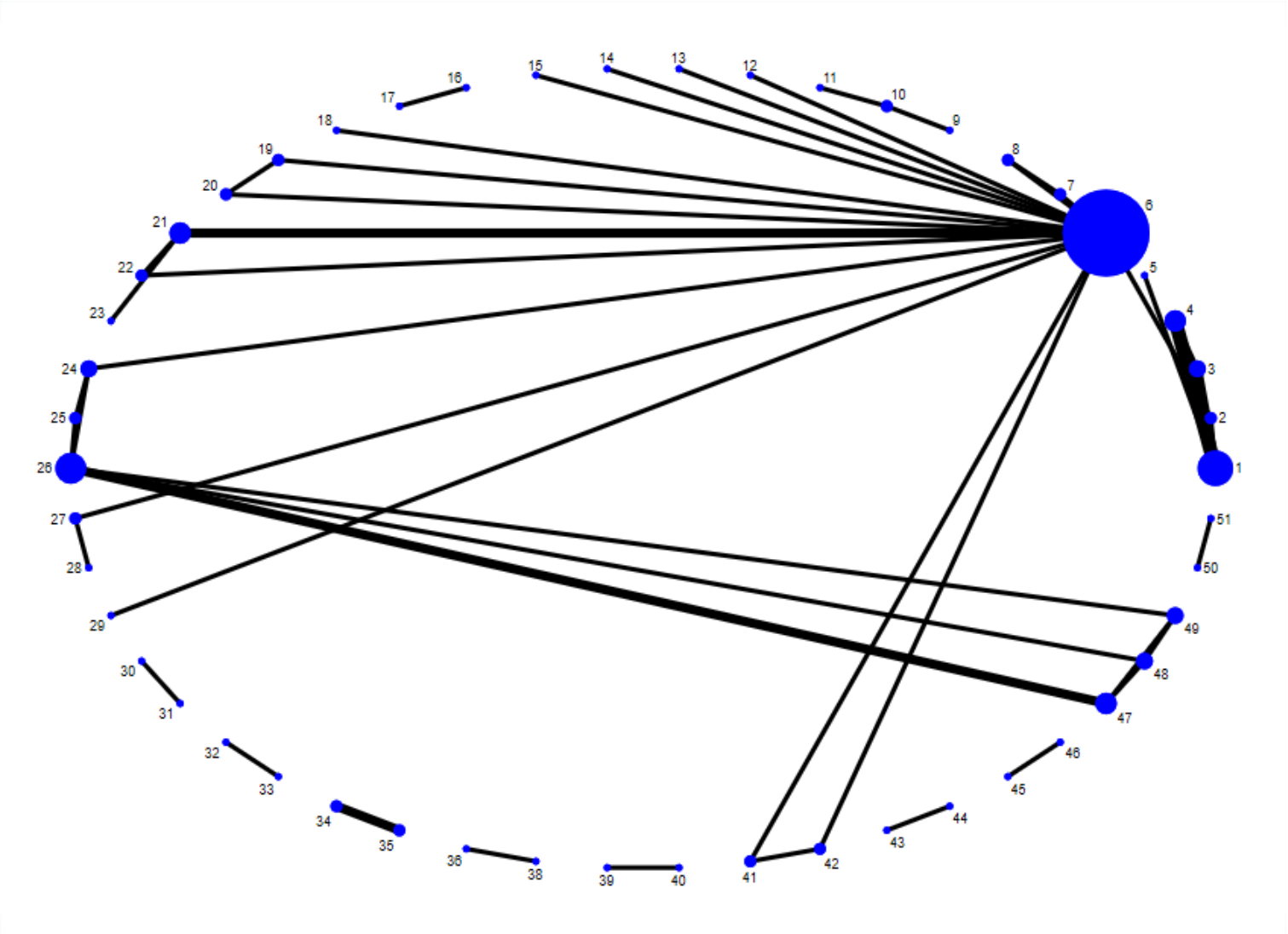
# Treatment Achilles tendinopathy at 12 months <sup>1</sup>



<sup>1</sup> van der Vlist et al. 2021



# Update 2023



# Update 2023

Study	Randomization process	Deviations from intended interventions	Missing outcome data	Measurement of the outcome	Selection of the reported result	Overall Bias
<i>Midportion AT</i>						
Rabusin et al., 2021	+	+	?	-	+	-
Benli et al., 2022	?	?	-	-	?	-
Boesen et al., 2019	+	+	+	+	?	?
Abdelkader et al., 2021	?	?	+	-	?	-
Romero-Morales et al., 2020	?	?	+	-	-	-
Habets et al., 2021	?	+	+	+	?	-
Hasani et al., 2021	+	-	-	-	?	-
Kearney et al., 2021	+	+	+	+	+	+
Stefansson et al., 2019	-	-	-	-	?	-
Solomons et al., 2020	+	+	+	-	?	-
Johannsen et al., 2022	+	+	?	-	-	-
Kaalund et al., 2021	+	+	+	+	?	?
Kishmishian et al., 2019	?	?	+	?	?	-
Malmgaard-Clausen et al., 2012	+	+	?	+	?	-
Thermann et al., 2020	?	+	+	+	?	-
Van der Vlist et al., 2020	+	+	+	+	+	+

<i>Insertional AT</i>						
Mansur et al., 2021	+	+	+	?	+	?
<i>Mixed at population level</i>						
Chimenti et al., 2023	+	+	+	+	+	+
Gatz et al., 2021	+	?	?	-	?	-
Bussin et al., 2021	+	+	+	+	+	+

## Results ROB 2023

- 65% High ROB
- 15% Some ROB
- 20% Low ROB

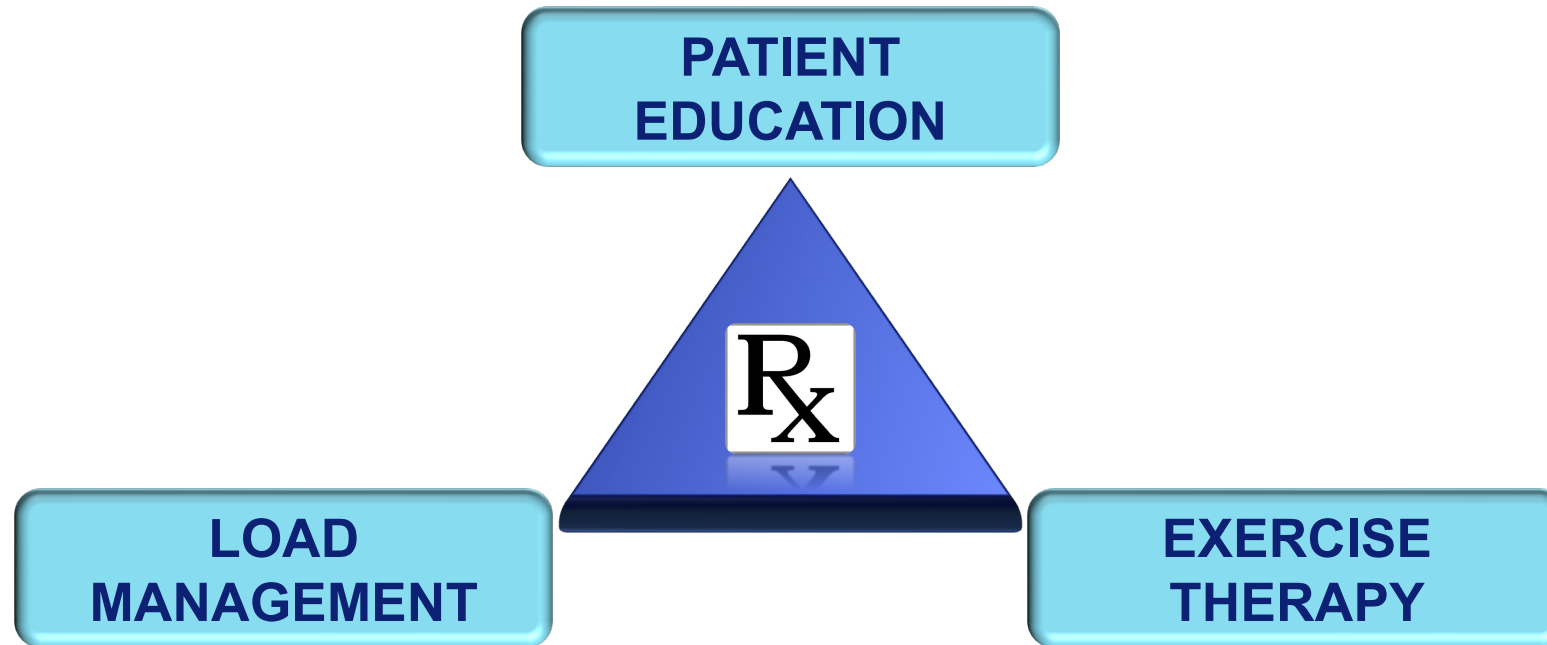


# From evidence to recommendations for practice <sup>1</sup>

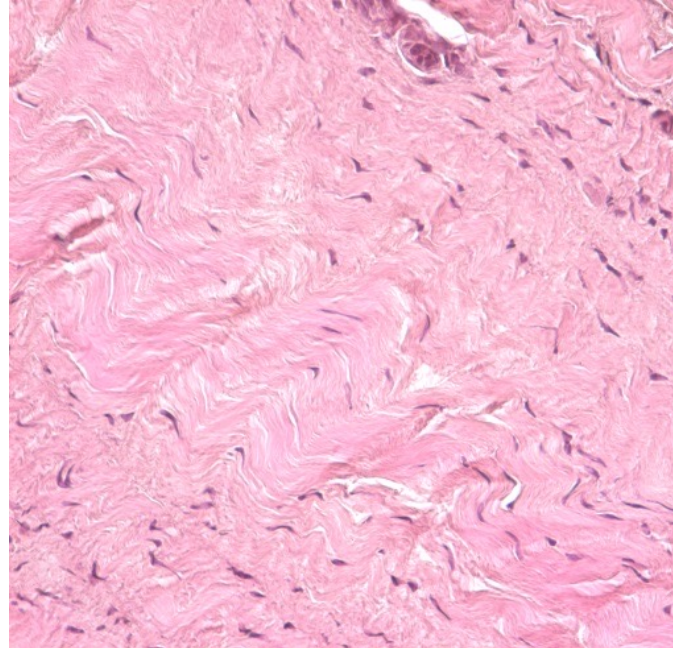
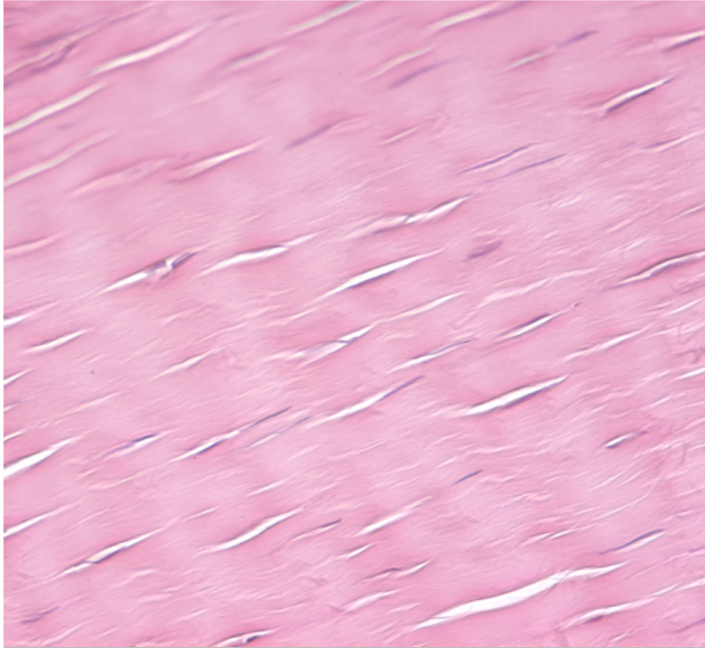
- Considerations
  - Quality of scientific evidence
  - Patient values and preferences
  - Expertise of the working group members
  - Safety of an intervention
  - Availability of an intervention
  - Healthcare costs



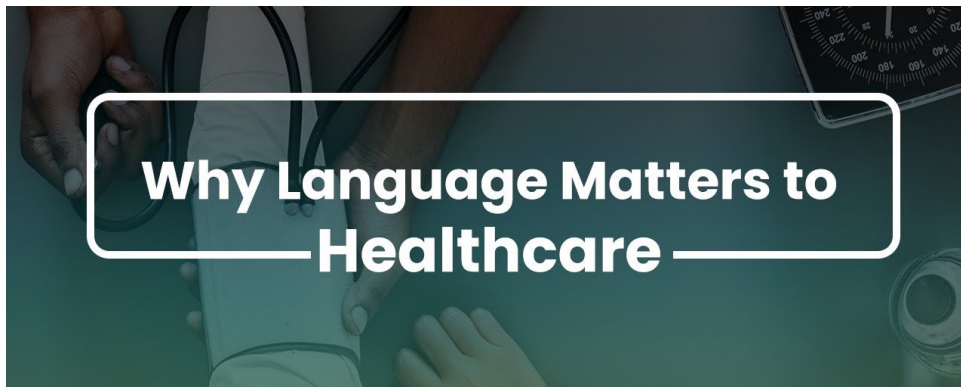
# From evidence to recommendations for practice <sup>1</sup>



# Explanation condition 1-2



- There are different models on pathogenesis <sup>3</sup>
- We need to take this into account for **credible explanations** to patients <sup>4</sup>



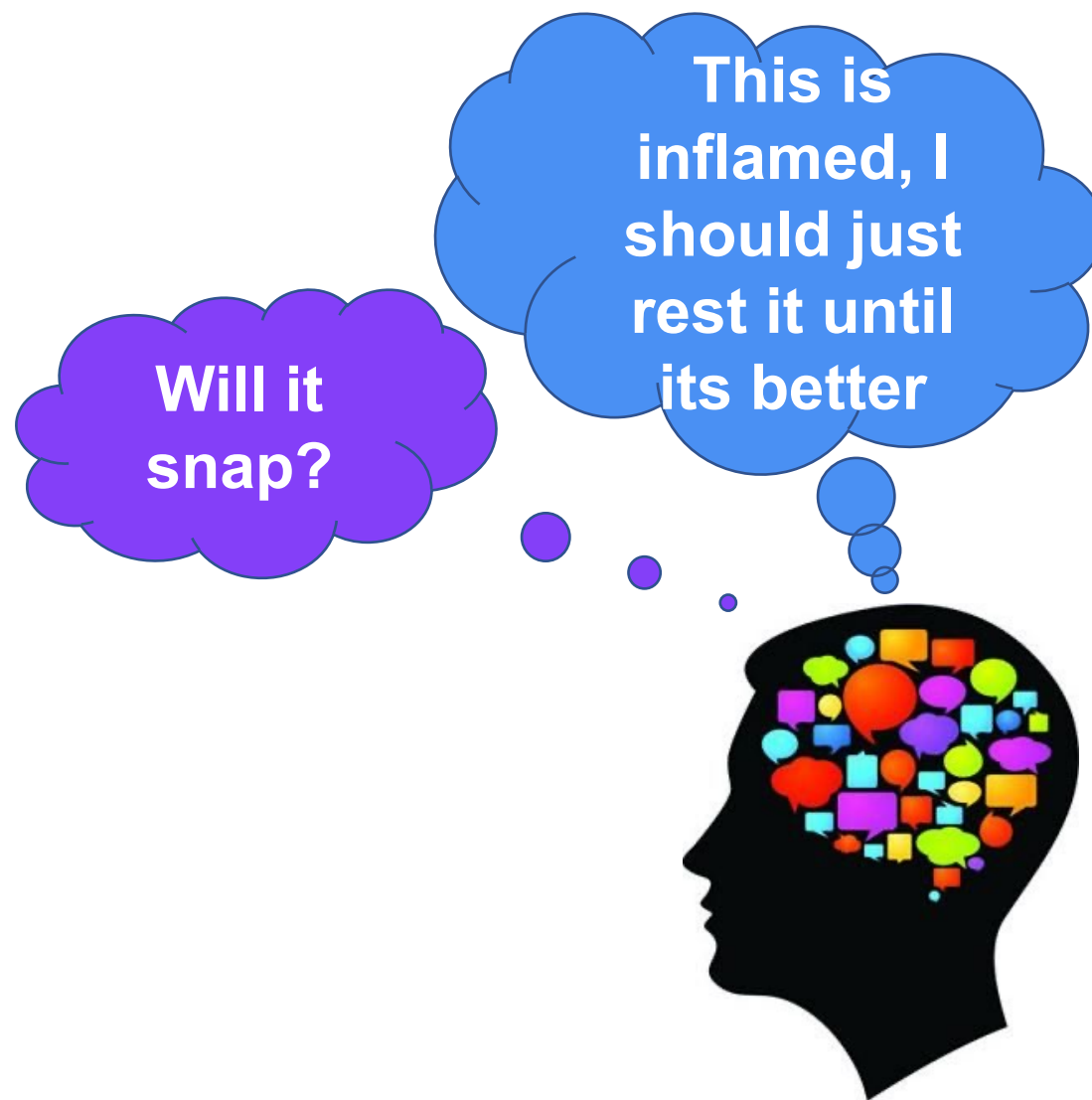
<sup>1</sup> Vicenzino et al. 2018 <sup>2</sup> McAuliffe et al. 2017 <sup>3</sup> Millar et al. 2021 <sup>4</sup> Djurtoft and Mantzios et al. 2023 (OSF protocol)



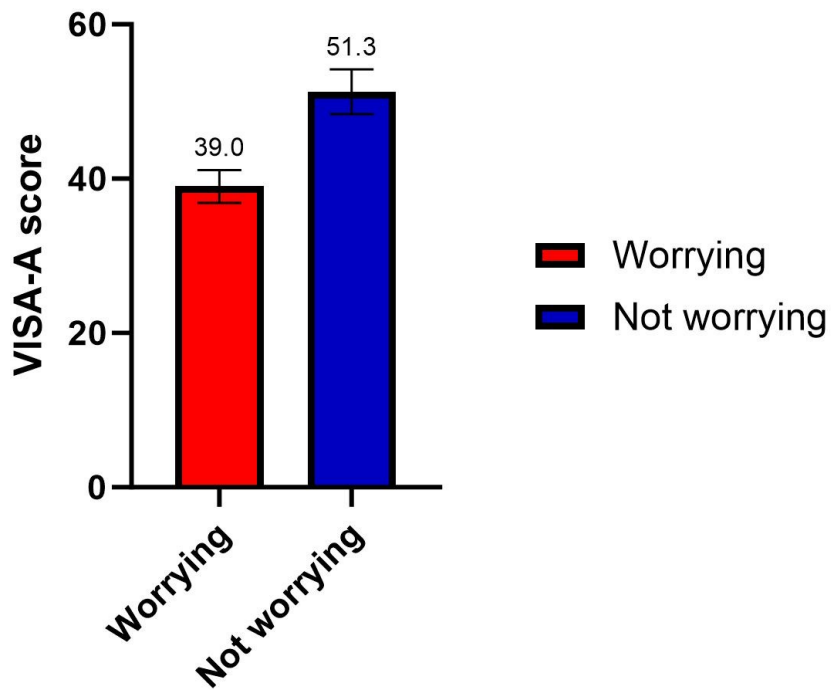
# Psychosocial factors

## Psychosocial factors <sup>1-3</sup>

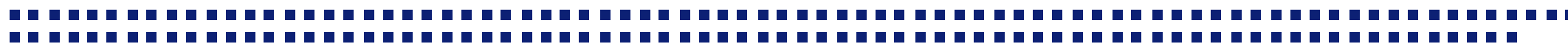
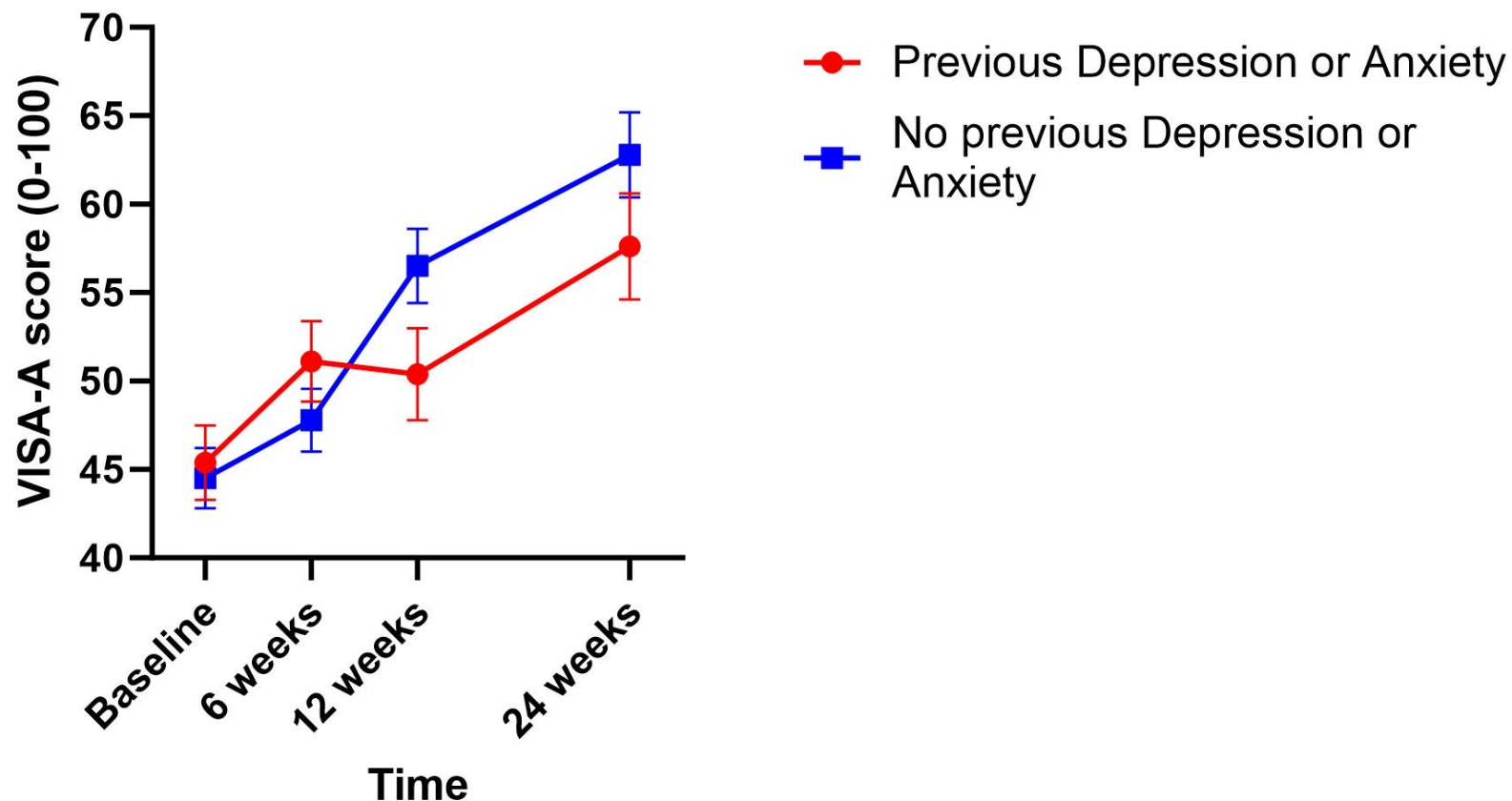
- Fear Avoidance
- Catastrophising
- Worrying



# Psychosocial factors

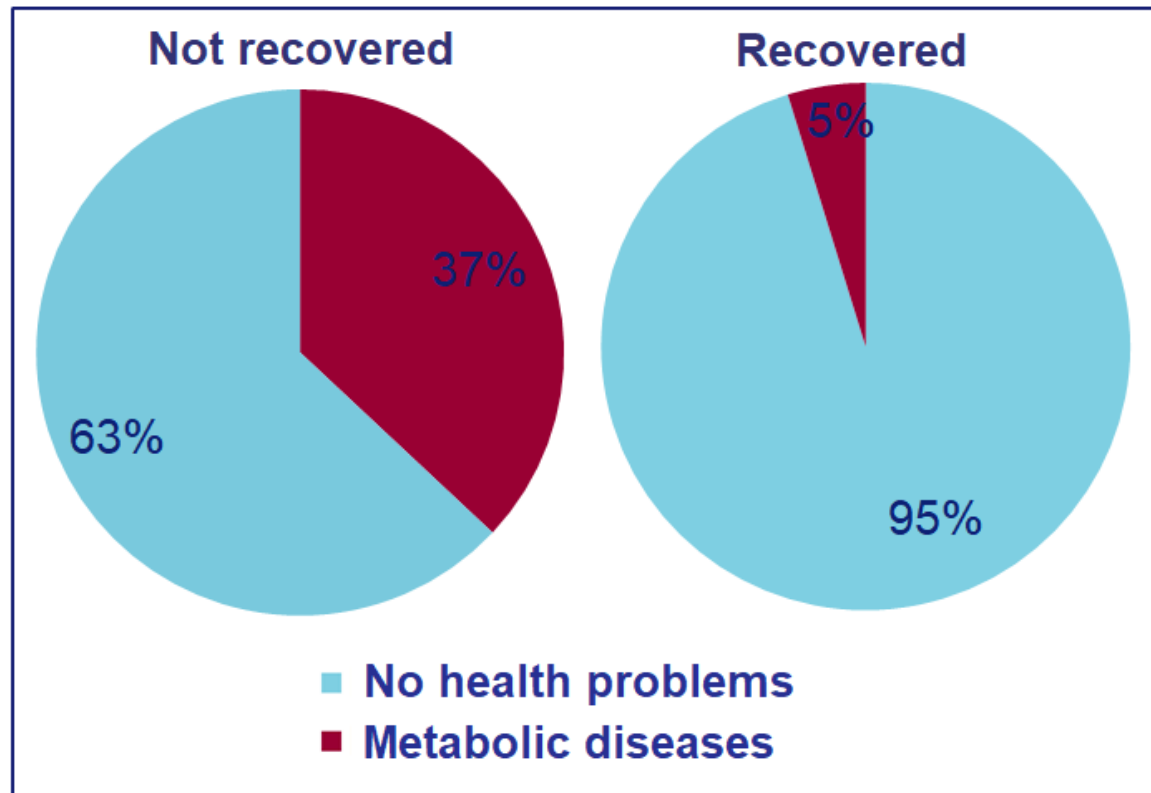


Baseline data (n=200)



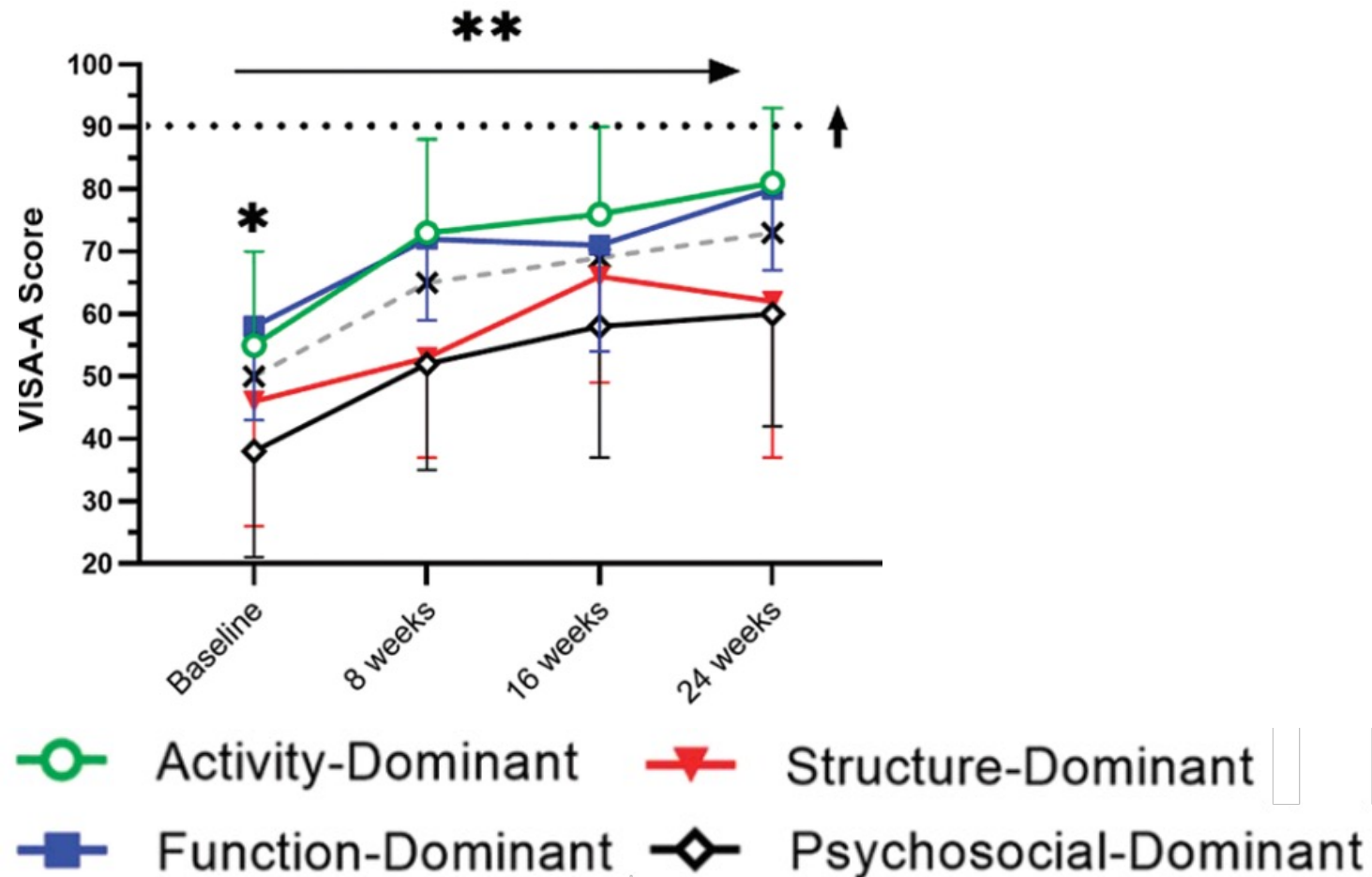
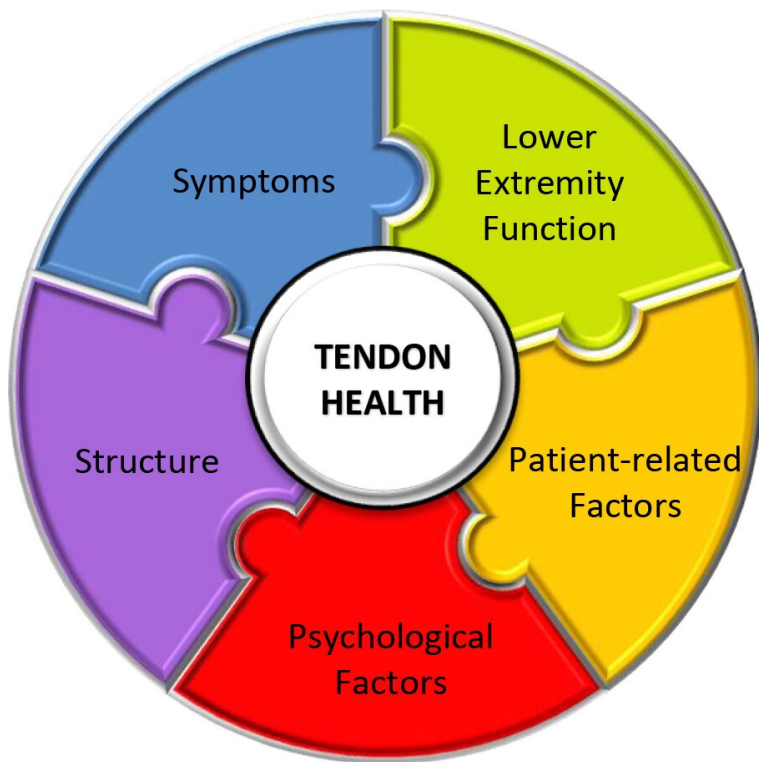
# Metabolic factors

1 year follow-up <sup>1</sup>

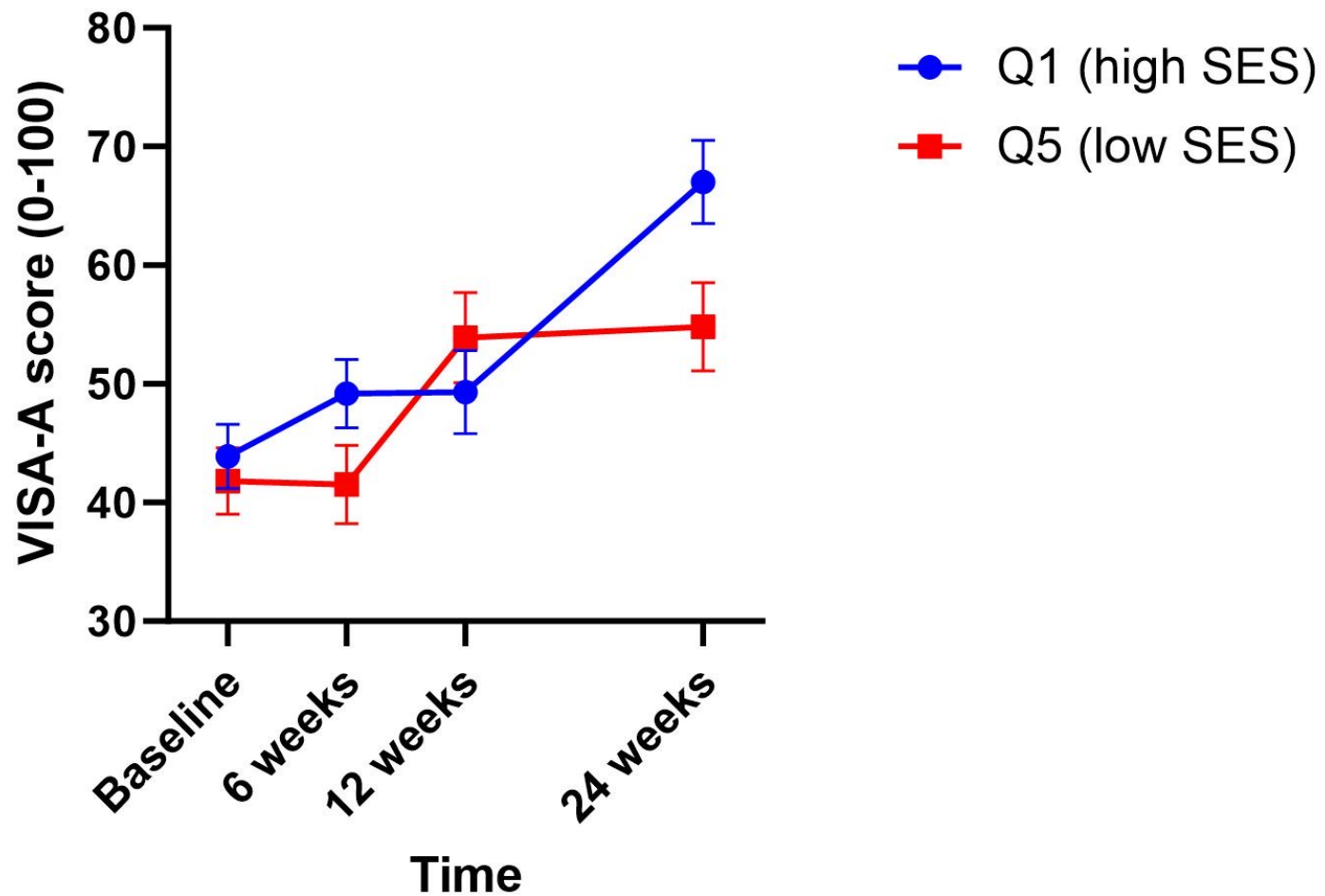


<sup>1</sup> Lagas et al. 2021

# Metabolic factors



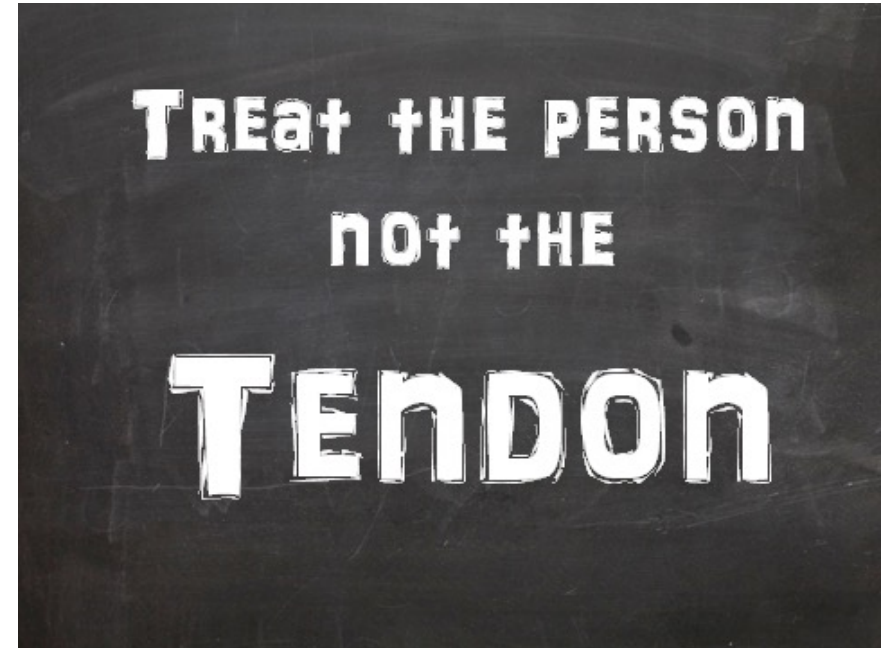
# Socio-economic factors



<sup>1</sup> Sleeswijk Visser et al. under review

## Take home

- Change in activity (**'overuse'**) is not a proven risk factor for tendinopathy
- Tissue does not seem to be the major issue on **imaging**
- Most relevant prognostic factors might be in **psychosocial context**





# DISCUSSION



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