Novel use of ultrasound for assessing Achilles tendon pathology in psoriatic arthritis

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Disclosure of interests

There are no potential conflicts of interest to declare.

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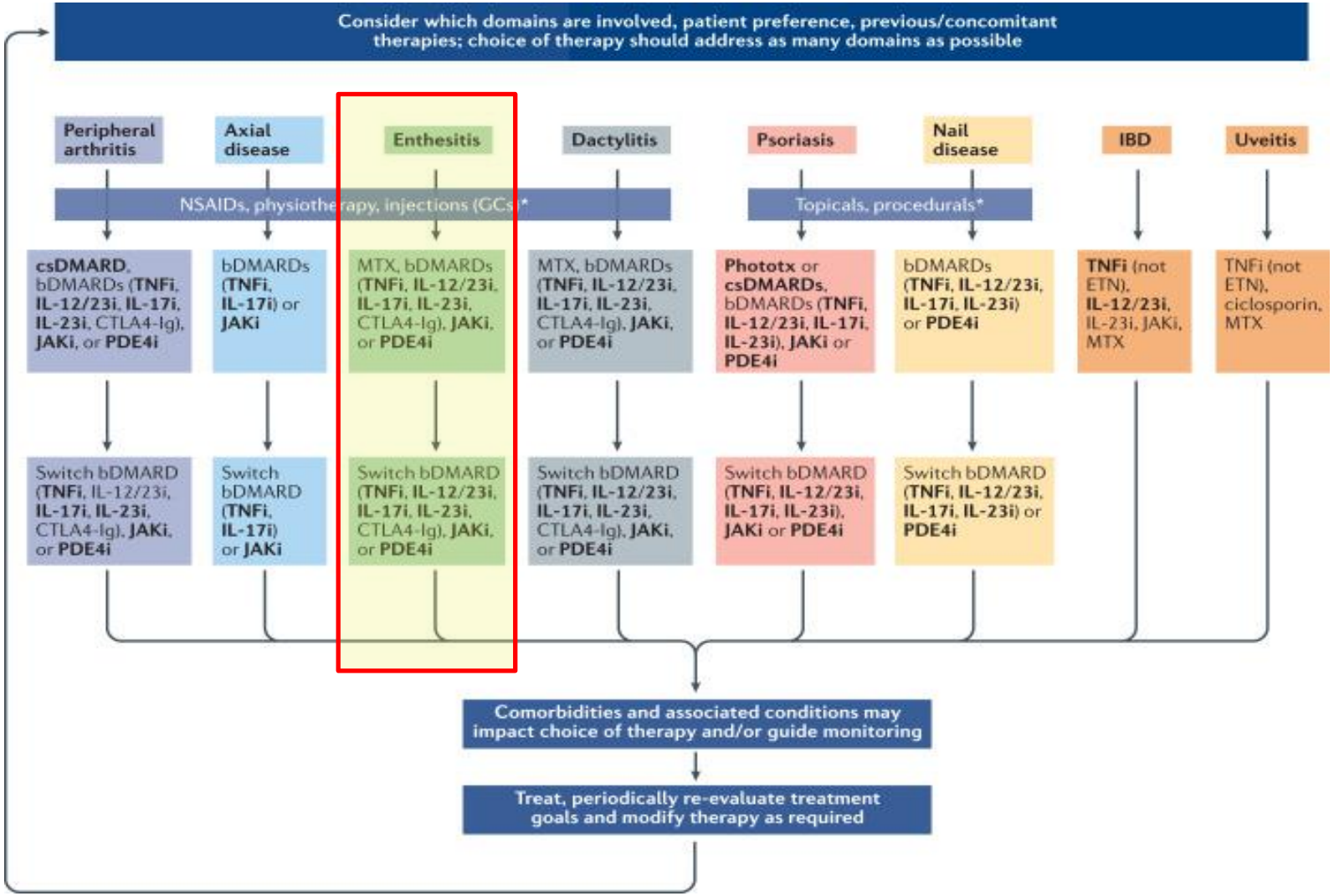
Background

- Achilles tendon (AT) insertion most common site of enthesitis
- Archetypal ‘enthesis organ’
- Mid-portion pathology in PsA?
- Lack of non-pharmacological management guidance

Image from Malliaras et al, 2022.

Achilles enthesitis in PsA



GRAPPA 2021 treatment schema. Coates et al, 2022.

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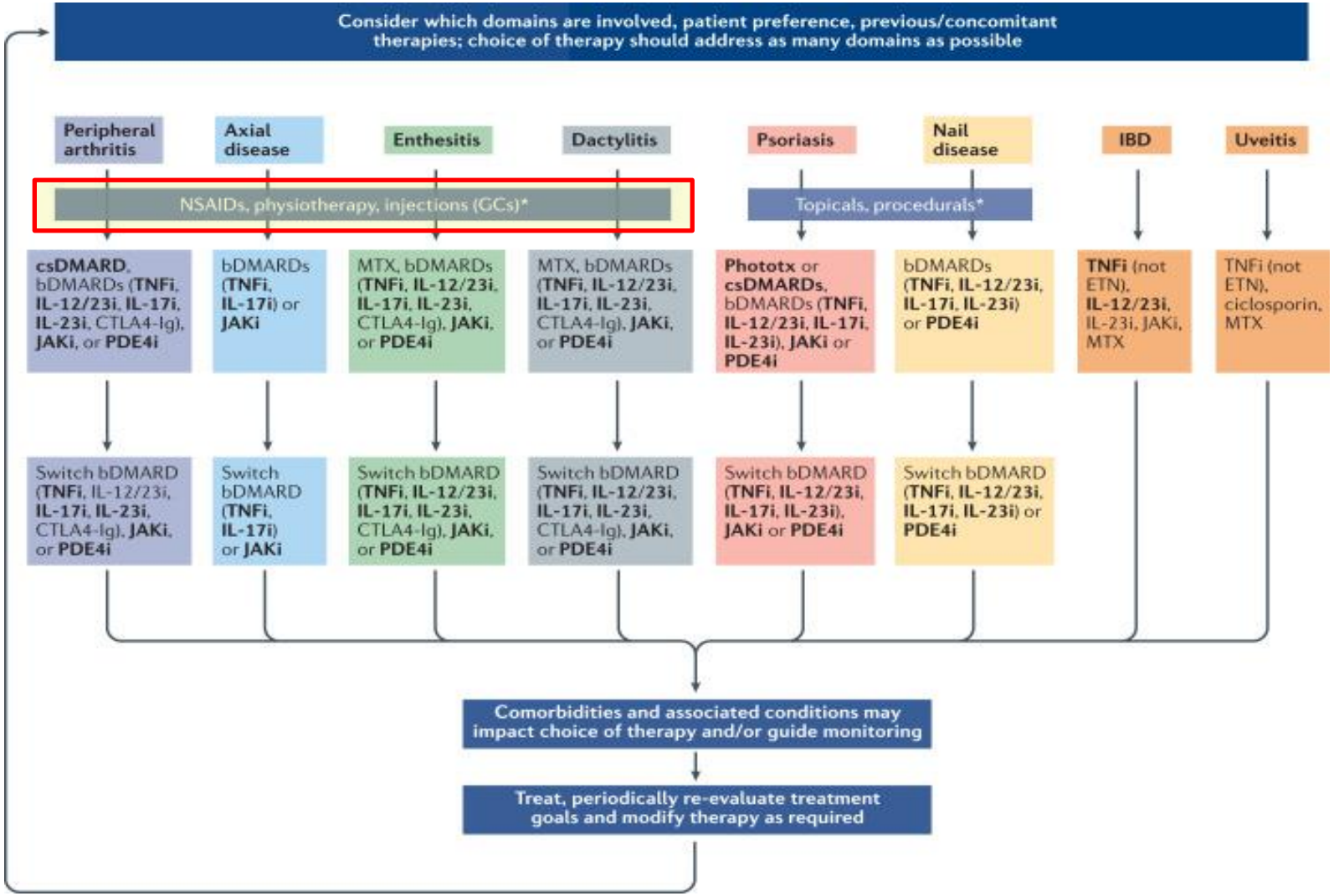
Achilles enthesitis in PsA



GRAPPA 2021 treatment schema. Coates et al, 2022.

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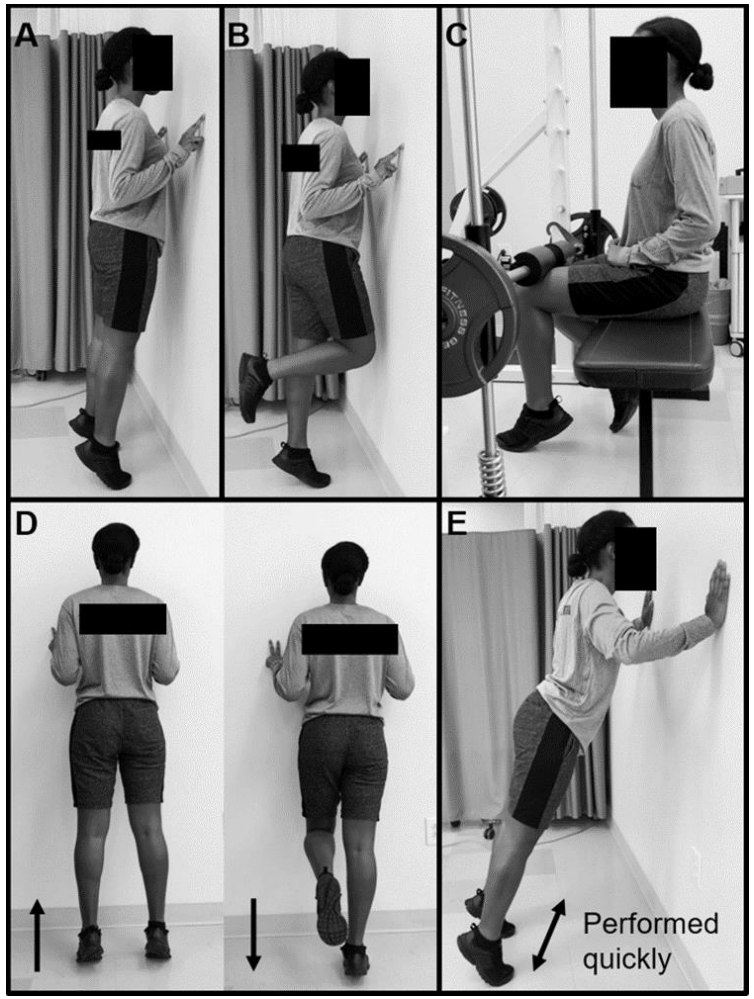
Management of Achilles tendinopathy (NICE)

Refer to physiotherapy if symptoms persist >7 days

Physiotherapy/secondary care

- Eccentric or concentric/eccentric exercises (good evidence)
- Extracoproreal shock-wave therapy (ESWT) (conditional)
- No response → surgery



Examples of AT eccentric loading programmes from Silbernagel et al, 2020

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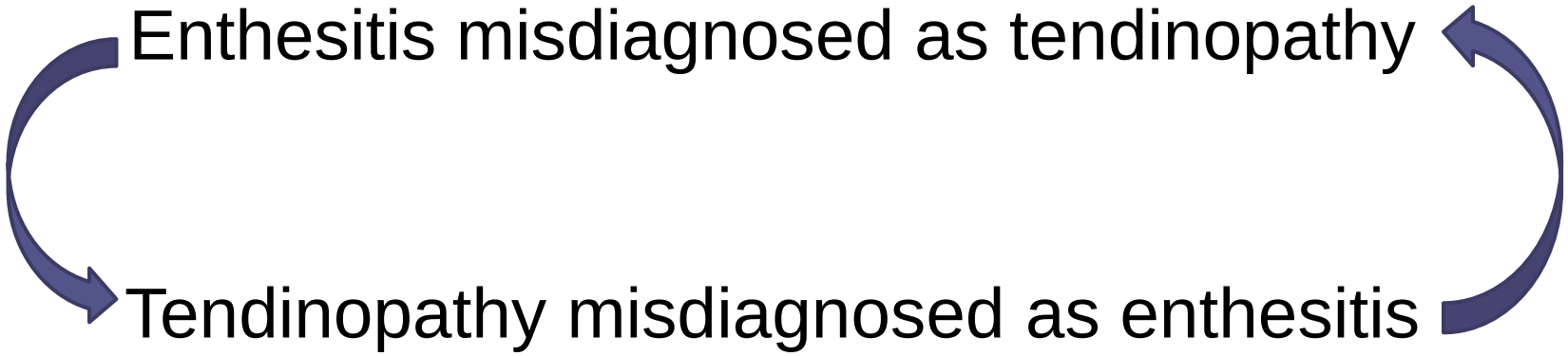
NICE National Institute for Health and Care Excellence



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Research aim

To compare the structure and function of the AT in people with PsA (with and without AT pain) and healthy controls.

Assessment includes:

- Clinical examination for enthesitis/tendinopathy
- B-mode and Doppler ultrasound (US) imaging
- Strain elastography
- Performance-based testing
- Patient-reported outcome measures

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Methods

- Cross-sectional observational study (n=33)
- 3 groups:
  - PsA with self-reported AT pain (PsA +AT)
  - PsA with no self-reported AT pain (PsA –AT)
  - Sex and age-matched healthy controls

AT pathology
- Clinical exam for enthesitis & tendinopathy
- B-mode US
- Doppler US
- Strain elasto

AT function
- VISA-A
- Heel raise test
- 10-metre walk
- Achilles VAS

Global health
- PsAID-12
- HAQ-DI
- ASES

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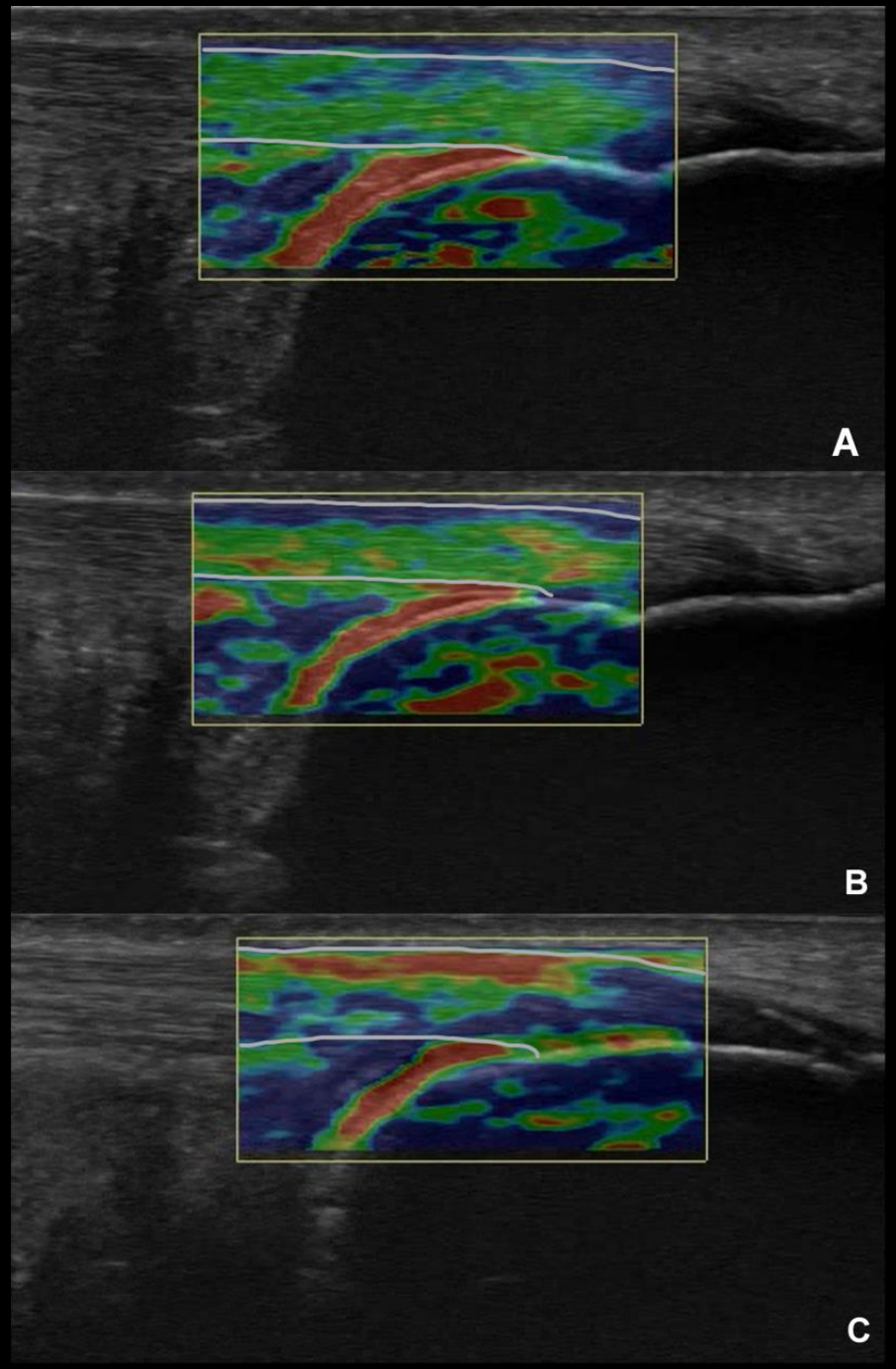
Strain elastography

- Assessment of tissue elasticity
- Measurement of tissue displacement
- Apply a repetitive pressure using the transducer
- Large strain = soft
- Small strain = hard
- Colour map (blue = hard, red = soft)

A) Grade 1 blue/green = hard
B) Grade 2 yellow = average
C) Grade 3 red = soft



Participant characteristics

	PsA +AT	PsA -AT	Controls	*p* value
Sex (female)	7/11 (64%)	6/11 (55%)	6/11 (55%)	*0.887*
Age	49 (23)	54 (16)	52 (14)	*0.347*
BMI	29.6 (12.3)	25.4 (5.1)	24.9 (8.3)	*0.164*
PsA disease duration (years)	7.4 (6.3)	20.1 (13.1)	-	***0.019***
Currently smoking	1 (9.1%)	0 (0%)	0 (0%)	-
Previous smoking	4 (36.4%)	6 (54.5%)	2 (18.2%)	-
NSAIDs	0 (0%)	1 (9.1%)	-	-
csDMARDs	3 (27.3%)	4 (36.4%)	-	-
bDMARDs	6 (54.5%)	6 (54.5%)	-	-
Combination bDMARD/csDMARD	1 (9.1%)	0 (0%)	-	-

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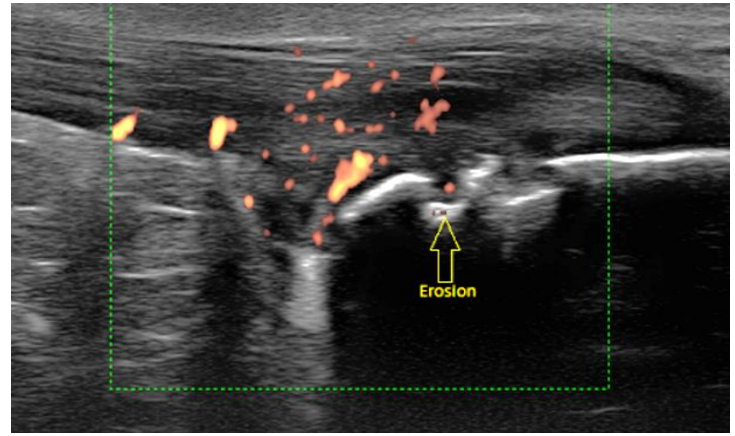
Ultrasound enthesitis features



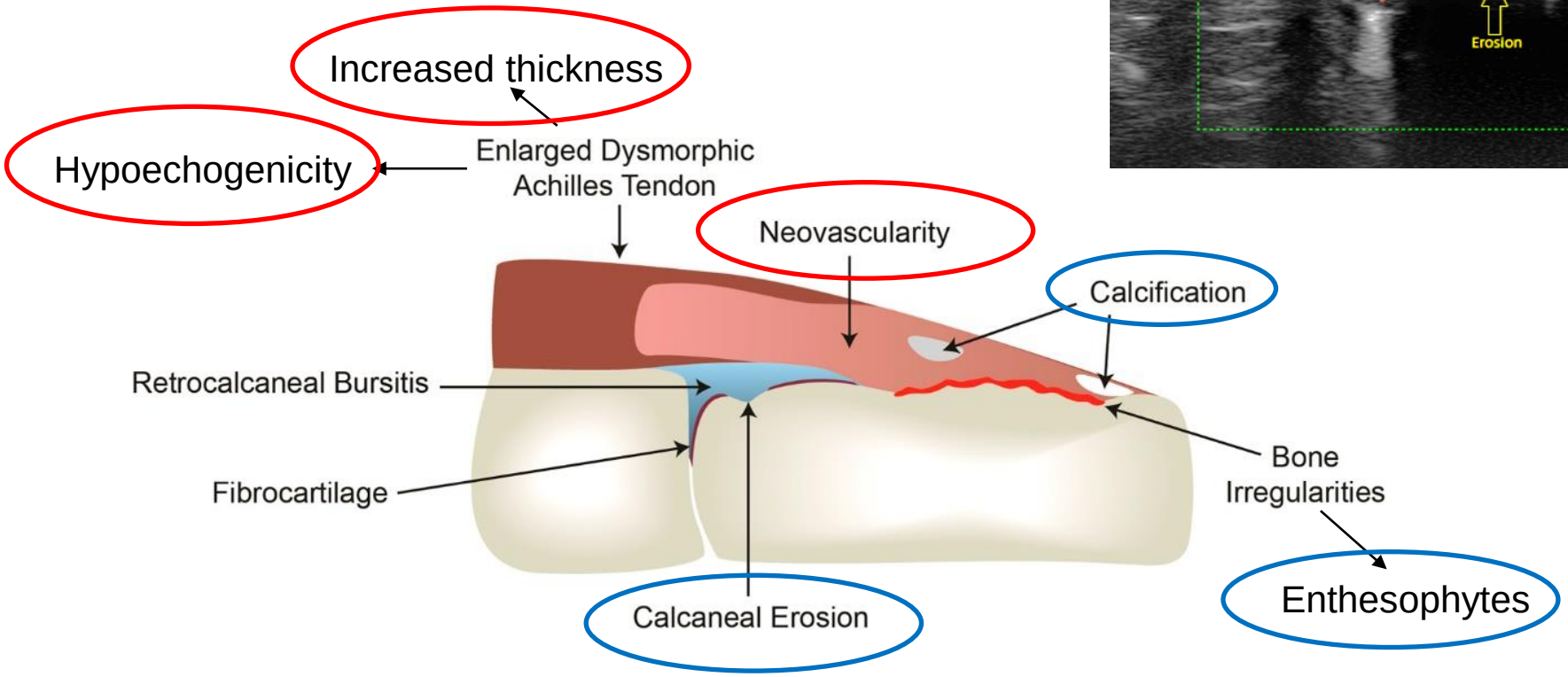


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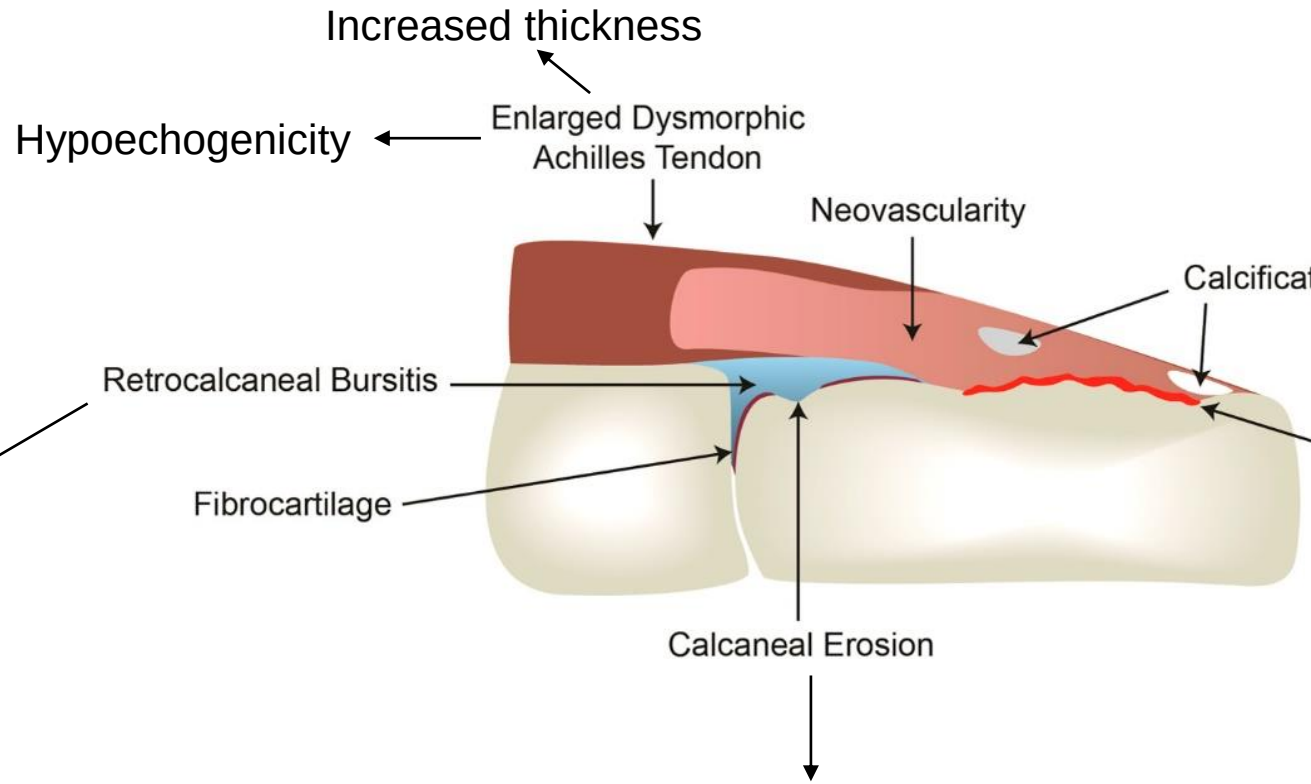
Image from Kaeley et al, 2018.

Ultrasound enthesitis features



PsA +AT: 10 (45.5%)
PsA –AT: 9 (40.9%)
Controls: 2 (9.1%)
***p*=0.019**

PsA +AT: 2 (9.1%)
PsA –AT: 4 (18.2%)
Controls: 0

Enthesophytes

PsA +AT: 15 (68.2%)
PsA –AT: 11 (50%)
Controls: 4 (18.2%)
***p*=0.003**

PsA +AT: 8 (36.4%)
PsA –AT: 7 (31.8%)
Controls: 2 (9.1%)

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Ultrasound enthesitis features

Only 2/7 identified by clinical examination

PsA +AT: 9 (40.9%)
PsA –AT: 5 (22.7%)
Controls: 1 (4.5%)
***p*=0.016**

Increased thickness

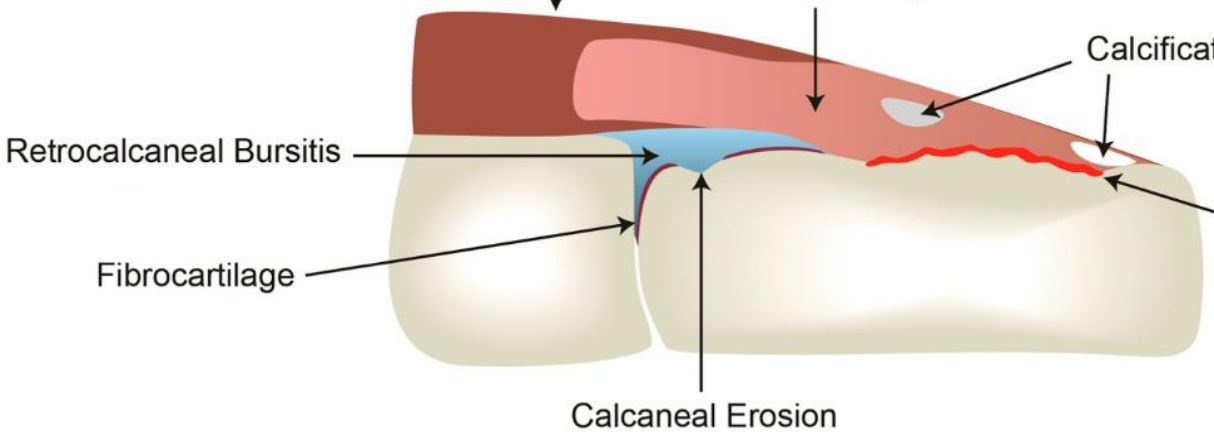
PsA +AT: 13 (59.1%)
PsA –AT: 3 (13.6%)
Controls: 3 (13.6%)
***p*=0.001**

Hypoechogenicity

Enlarged Dysmorphic Achilles Tendon

PsA +AT: 7 (31.8%)
PsA –AT: 0
Controls: 0
***p*<0.001**

Neovascularity



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Strain elastography

	PsA +AT	PsA -AT	Healthy controls	*p* value
Insertion				
Hard	10 (45.5)	9 (40.9)	8 (36.4)	*0.684*
Intermediate	1 (4.5)	2 (9.1)	4 (18.2)	
Soft (abnormal)	11 (50)	11 (50)	10 (45.5)	
Mid-portion				
Hard	5 (22.7)	7 (31.8)	6 (27.3)	*0.880*
Intermediate	4 (18.2)	2 (9.1)	4 (18.2)	
Soft (abnormal)	13 (59.1)	13 (59.1)	12 (54.5)	
Myotendinous				
Hard	9 (40.9)	16 (72.7)	15 (68.2)	*0.223*
Intermediate	3 (13.6)	2 (9.1)	2 (9.1)	
Soft (abnormal)	10 (45.5)	4 (18.2)	5 (22.7)	
p value **bold** = ≥0.05 for significance				

AT pathology

Tendinopathy assessments	PsA +AT	PsA -AT	Controls	*p* values
Thickening (palpation)	5 (45.5%)	0	3 (27.3%)	***0.043***
Morning stiffness	10 (90.9%)	1 (9.1%)	1 (9.1%)	***<0.001***
Pain on passive dorsiflexion	4 (36.4%)	0	0	***0.011***
Pain on resisted plantarflexion	5 (45.5%)	0	0	***0.003***

Median (IQR). *p* values based on Pearson's chi squared statistical test, **bold** indicates p<0.05 for significance.

Mid-portion US pathology in PsA +AT group

- 2 participants (PsA +AT) with mid-portion partial tears with Grade 2 neovascularity
  - 1 with enthesitis
  - 1 with no enthesitis features
- Significant mid-portion thickening (range 4.1mm – 16.1mm)

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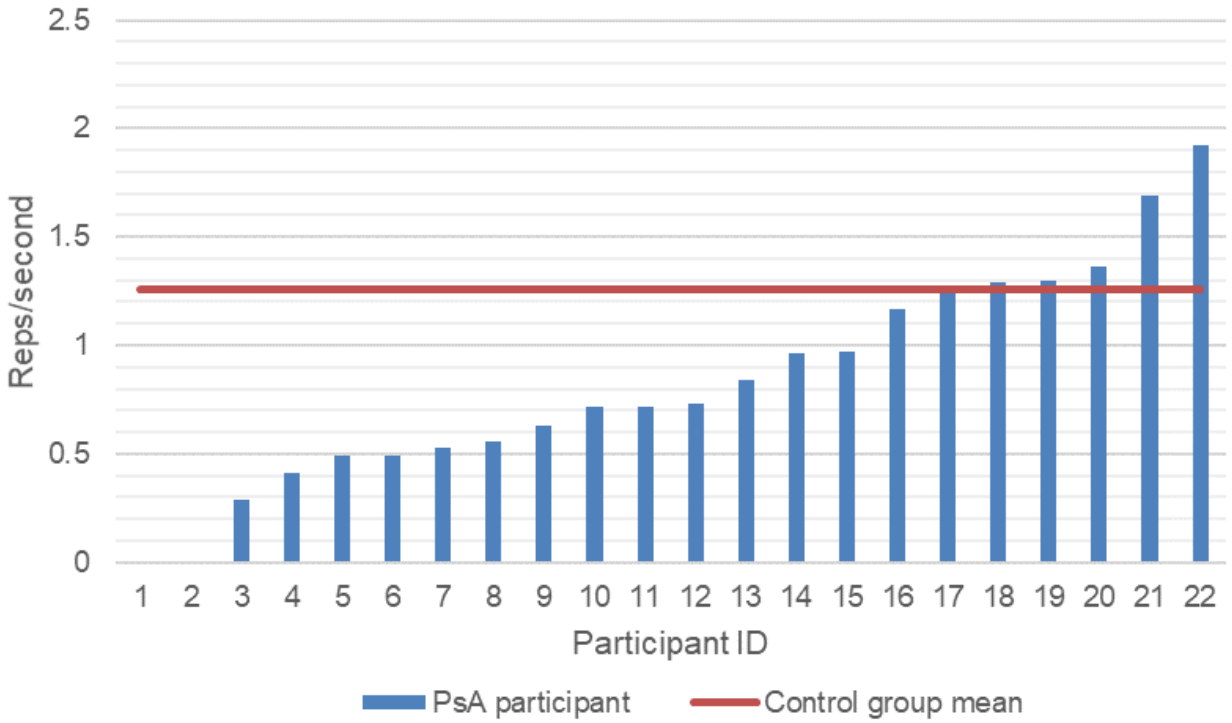
AT function – heel raise test

	Group	Mean (SD)	Range	*p* value
Heel raise rep rate	PsA +AT	0.61 (0.39)	0 – 1.17	***0.008***
	PsA -AT	1.05 (0.52)	0.41 – 1.92	
	Controls	1.26 (0.11)	0.76 – 2.1	



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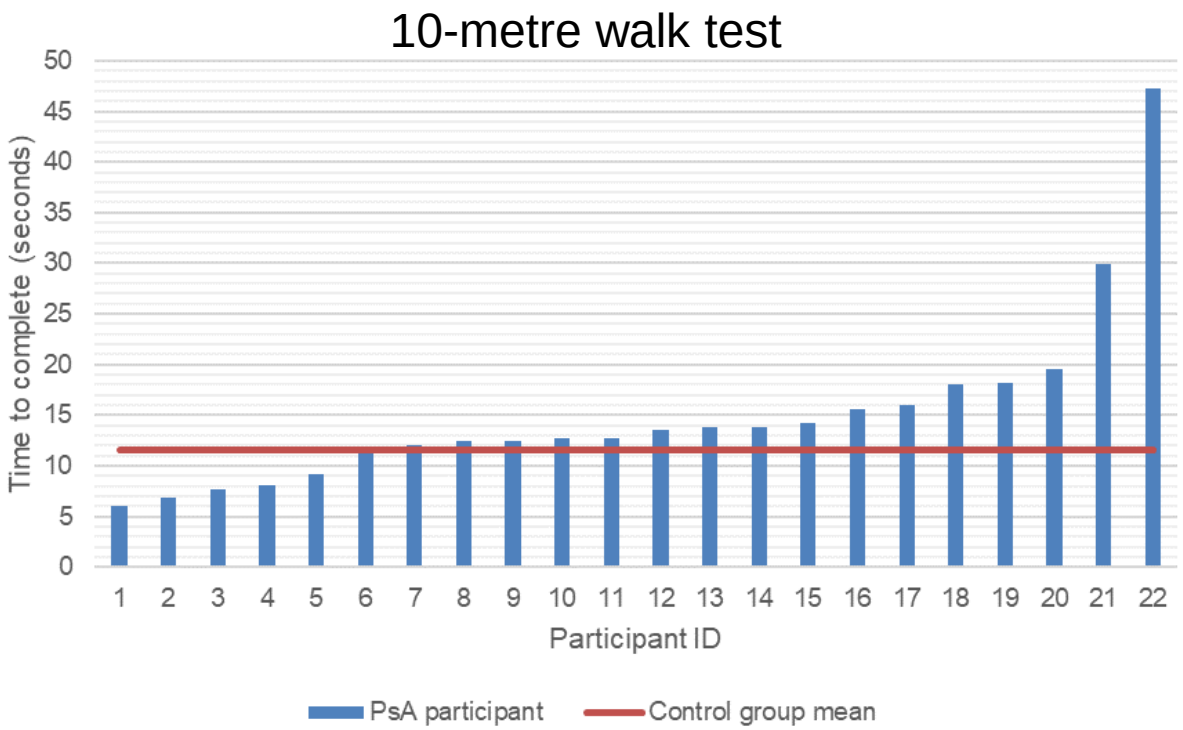
AT function

	PsA +AT	PsA -AT	Controls	*p* value
VISA-A	35.8 [25.7]	70.8 [18.9]	92.3 [7.2]	***<0.001***
10MWT (m/s)	0.72 [0.25]	0.80 [0.62]	0.86 [0.15]	*0.081*
VAS current	4.8 [5.7]	0	0	***<0.001***
VAS 7 days	6.6 [6.3]	0	0	***<0.001***

Median [IQR]. *p* value from Kruskal-Wallis statistical test. Bold $p<0.05$ for significance.



Global health

	PsA +AT	PsA -AT	Controls	*p* values
PsAID	5.52 (1.76)	3.38 (1.92)	-	***0.018***
HAQ-DI	1.21 (0.76)	0.76 (0.84)	0.57 (0.11)	***0.001***
ASES	4.88 (1.98)	7.53 (1.93)	-	***0.006***

Mean (SD). *p* values from *one-way ANOVA,* bold *p=0.05 for significance.*

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PsA +AT case summary

Participant	AT pain duration (years)	PsA duration (years)	Medication	AT treatment
1	10	4	Combo	Physio + pod
2	0.25	4	csDMARD	None
3	2	5	bDMARD	None
4	1	8	bDMARD	None
5	1	2	bDMARD	None
6	20	20	None	None
7	4	1	csDMARD	Awaiting
8	7	5	bDMARD	Pod
9	1	6	bDMARD	None
10	2	7	bDMARD	None
11	2	19	csDMARD	None

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Perspectives of patients and health professionals on the experience of living with psoriatic arthritis-related foot problems: a qualitative investigation

Kate Carter[1] · Steven Walmsley[1] · Diana Chessman[2] · Keith Rome[3] · Deborah E. Turner[1]

Take home messages

- Clinical examination missed cases of ‘active’ enthesitis
- Presence of pain = more disability & poorer function
- Functional deficits and disability present without pain – natural progression of disease?
- Subtypes of Achilles pathology in PsA
- Unmet need for non-pharmacological treatment

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Thank you!

 @aimie_patience

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