HEALTH SCIENCES
UNIVERSITY OF COPENHAGEN

Institute of Sports Medicine Copenhagen
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How to address Achilles tendinopathy when usual first line treatment fails?

Heavy slow resistance versus eccentric training

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HSR versus ECC training as treatment of Achilles tendinopathy

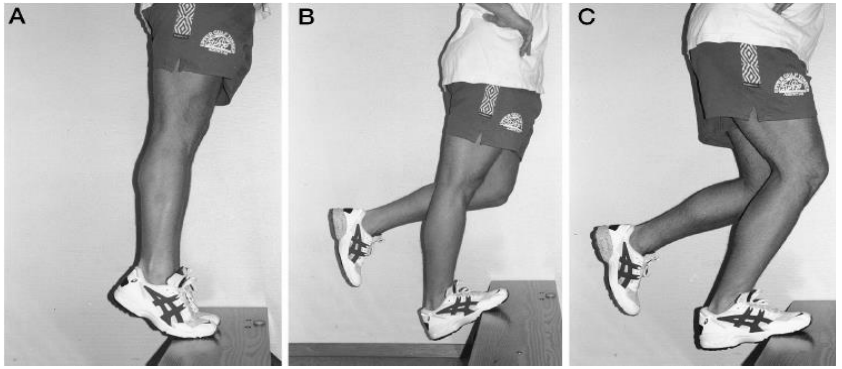
Eccentric training has become the dominant conservative choice of treatment for Achilles tendinopathy

(Mafi et al. 2001, Ohberg et al. 2004, Maillaras et al. 2013,Habets et al. 2014)

Achilles tendinopathy remains a clinical challenge to manage successfully,

as many as 45 % may not respond to the ECC training regime.

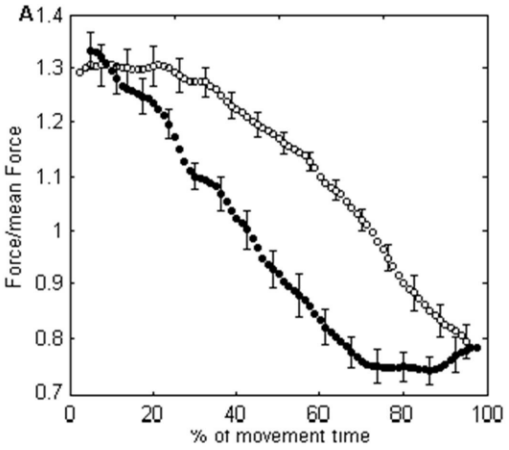
(Sayana et al. 2007)



Exercise	Two types of excersis 3 set of 15 repetitons
Load	15 – 20 RM
How often?	Twice a day 7 days a week for 12 weeks

Key components:
load magnitude, time under tension and restitution

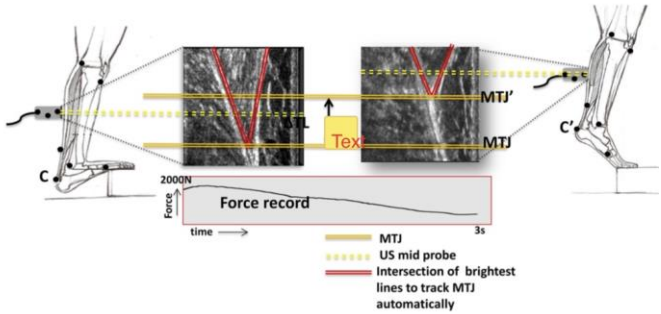
- Tendon tissue can not discriminate between eccentric or concentric muscle contraction



Open circles = ECC
Filled circles = CON

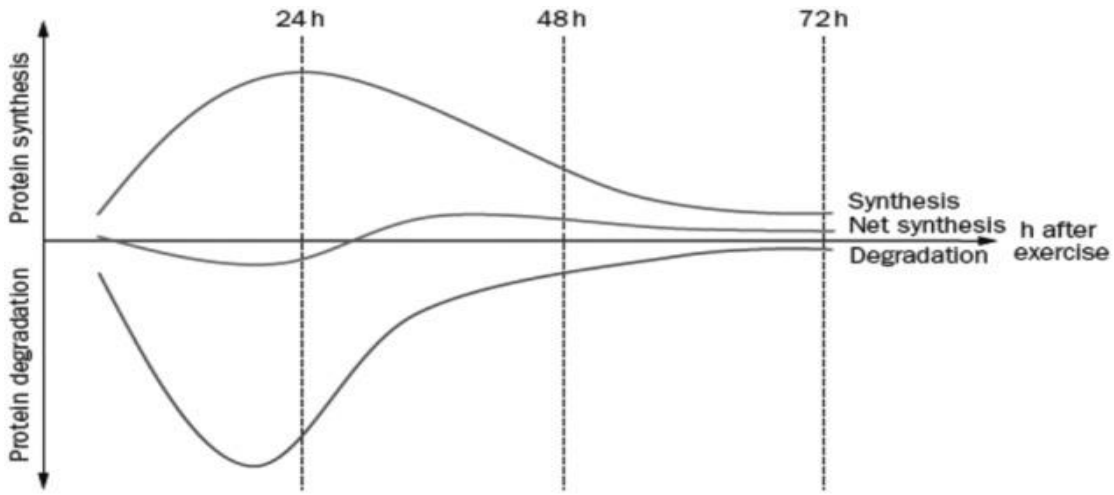
Chaudhry, S. et al. *J.applied Biomech* 2015

- Tendon tissue is affected by load magnitude and '*time under tension*'



Key components: time under tension and restitution

Tendon protein turnover after exercise



Magnusson, S. P. *et al. Nat. Rev. Rheumatol.* 6, 262–268 (2010)

HSR versus ECC training as treatment of Achilles tendinopathy

Exercise program	3 types of exercises Soleus and Gastrocnemius
Load	15 RM to 6 RM 3-4 sets
Time under tension	6 sec (3 sec + 3 sec)
Restitution	72 hours restitution between sessions (2.5 times/week)
How long?	12 weeks

Week	Sets and repetitions.
1	3x15
2-3	3x12
4-5	3x10
6-8	4x8
9-12	4x6

Heavy Slow Resistance Versus Eccentric Training as Treatment for Achilles Tendinopathy

A Randomized Controlled Trial

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Investigation performed at Bispebjerg Hospital, Copenhagen, Denmark, and Faculty of Health and Medical Sciences, University of Copenhagen, Copenhagen, Denmark

Central instructions for patients with Achilles tendinopathy

- All patients must document every training session in a standardised training diary
- Supervised session 1 week after intervention start

- Pain are allowed to reach 40 to 50 mm VAS during the exercises
- Pain should have subsided the following training session
- If pain had not subsided, adjust:
  - -training load
  - -daily living activities
  - -sporting activities was adjusted

- No sporting activities in the initial 3 weeks of the intervention
- No sporting activities throughout the intervention period with pain exceeding 30 mm VAS
- No NSAID's throughout the intervention

Training diary for ECC

Træningsdag #1 Dato_____

Øvelse	Set & Reps	Morgen (√)	Aften (√)	Ekstra belastning (kg)	Kommentarer
Hæl-sænkning på strakt ben.	3 x 15				
Hæl-sænkning med bøjet knæl)	3 x 15				

Træningsdag #2 Dato_____

Øvelse	Set & Reps	Morgen (√)	Aften (√)	Ekstra belastning (kg)	Kommentarer
Hæl-sænkning på strakt ben.	3 x 15				
Hæl-sænkning med bøjet knæl)	3 x 15				

Træningsdag #3 Dato_____

Øvelse	Set & Reps	Morgen (√)	Aften (√)	Ekstra belastning (kg)	Kommentarer
Hæl-sænkning på strakt ben.	3 x 15				
Hæl-sænkning med bøjet knæl)	3 x 15				

Training diary for HSR

Træningsgang nr: 1 Dato_____

Øvelse	Set & Reps	Belastning kg	Kommentarer
Læg-pres i Benpresmaskine.	3 x 15		
Hæl-løft (siddende el stående)	3 x 15		
Hæl-løft m. stang	3 x 15		

Træningsgang nr: 2 Dato_____

Øvelse	Set & Reps	Belastning kg	Kommentarer
Læg-pres i Benpresmaskine.	3 x 15		
Hæl-løft (siddende el stående)	3 x 15		
Hæl-løft m. stang	3 x 15		

Træningsgang nr: 3 Dato_____

Øvelse	Set & Reps	Belastning kg	Kommentarer
Læg-pres i Benpresmaskine.	3 x 15		
Hæl-løft (siddende el stående)	3 x 15		
Hæl-løft m. stang	3 x 15		

Projektansvarlig: PhD stud. Rikke Beyer. Institut for Idrætsmedicin Tlf. +45-61666884

HSR versus ECC training as treatment of Achilles tendinopathy.
A randomized controlled trial.

Results

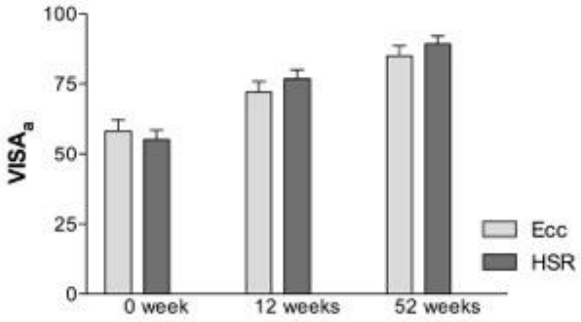

Figure 1

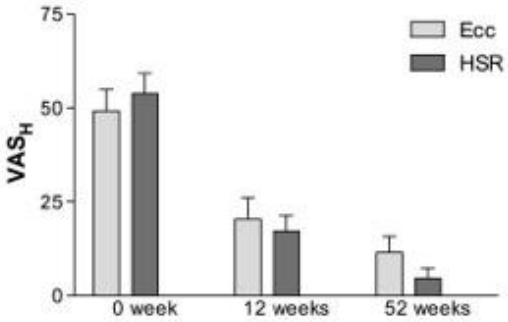

Figure 2

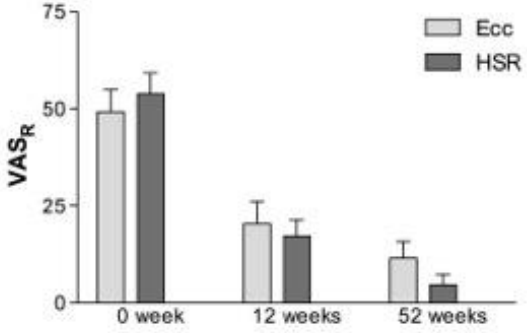

Figure 3

VISA-A, VAS_H and VAS_R score at baseline (0 weeks), after treatment intervention (12 weeks) and at one year follow-up (52 weeks) for the two intervention groups. Values are means ± SEM.

For VISA-A, VAS_H and VAS_R there was a significant effect of time ($P<0.0001$)

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Results

	ECC	HSR
Treatment satisfaction 12 wk	80 %	100 % *
Treatment satisfaction 52 wk	76 %	96 %
Training session compliance	78 %	92 % *
Time spend to complete the training	308 min/wk	107 min/wk

Values are presented as means.

* Significant difference between groups $P < .05$

Take home message

- Both the ECC and HSR are equally good
- Tendon tissue do not distinguish between ECC and CON muscle contractions
- '*Load'* is a key factor
- '*Time under tension*' is a key factor
- The optimal restitution length for Achilles tendinopathy is still unknown
- HSR is not that time consuming as ECC
  (107 min/week = 308 min/week)
- HSR has a higher compliance compared to ECC