Principles of a fascia oriented training apporach

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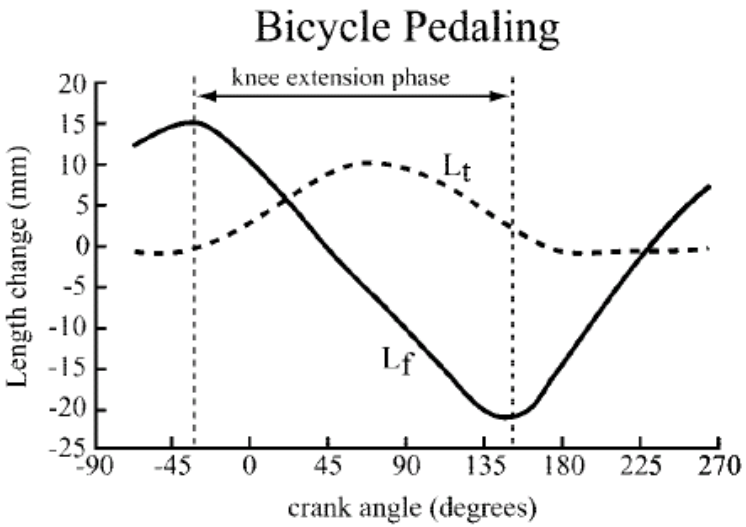
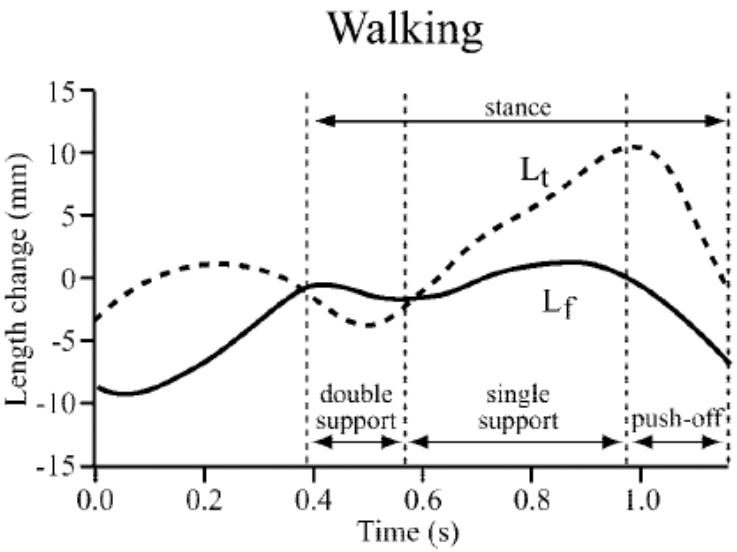
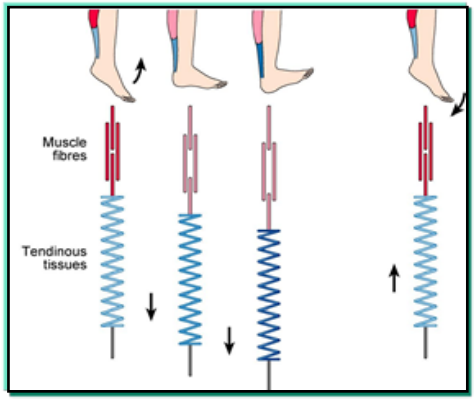
Fasziale Rückfederung

Fukunaga 2002

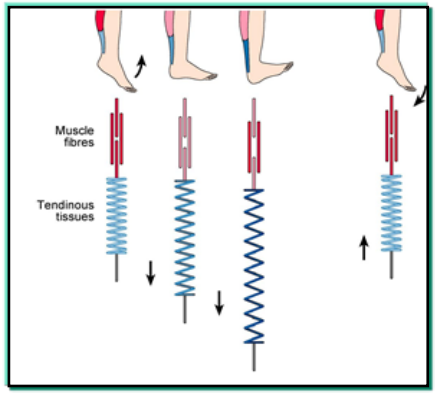






Muscle emphasis:

muscle fibers shorten



Fascial recoil emphasis:

use of elastic recoil

Eur J Appl Physiol (2011) 111:539–548
DOI 10.1007/s00421-010-1667-4

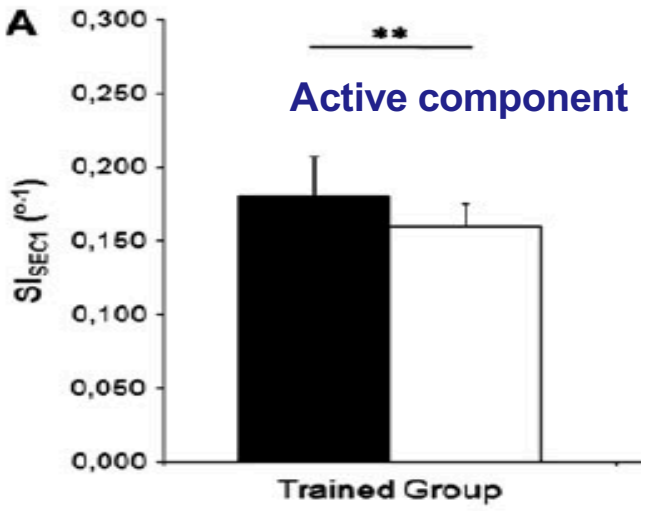
ORIGINAL ARTICLE

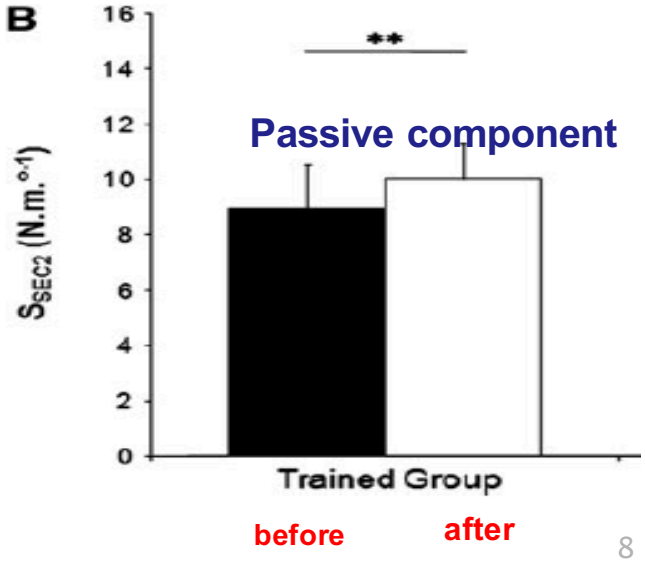
Effects of plyometric training on both active and passive parts of the plantarflexors series elastic component stiffness of muscle–tendon complex

Alexandre Fouré · Antoine Nordez · Peter McNair · Christophe Cornu

34 plyometric training sessions (1 hr each for 14 wks.)

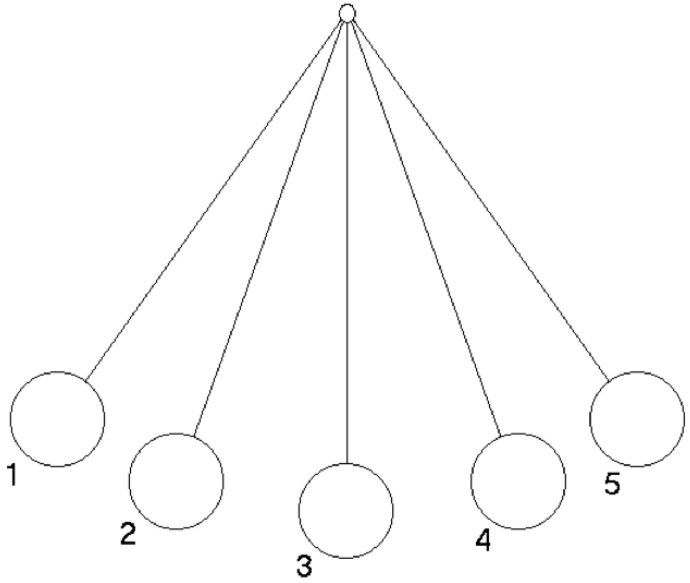
„ A significant increase in the passive component of the SEC stiffness was found. In contrast, a significant decrease in the active part of the SEC stiffness was observed





Two methods of storing and releasing kinetic energy

Swing Storage

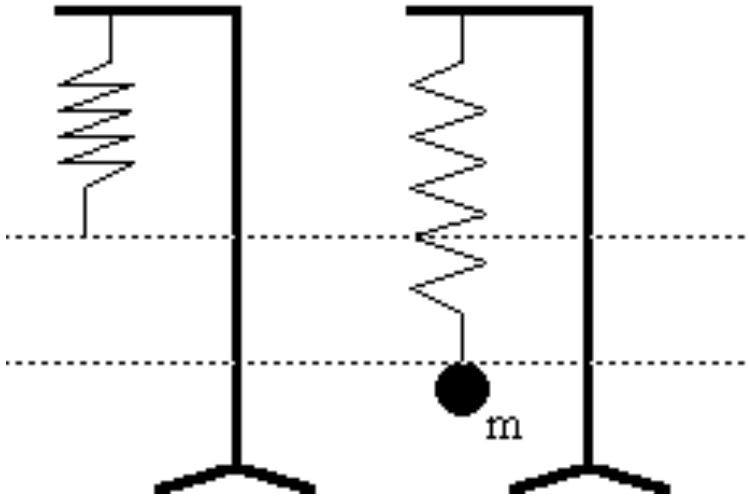


Kinetic energy stored in spatial relationship to gravity

- **Fluidity, sense of ease**
- **Fascial tissues not loaded**
- **Low chance of strain injury**

-> Very nice movement. But not FF

Spring Storage



Kinetic energy stored in tissue strain

- **Fascial tissues stretch loaded**
- **Impact needs to be very rapid**
- **Strain injuries more common**

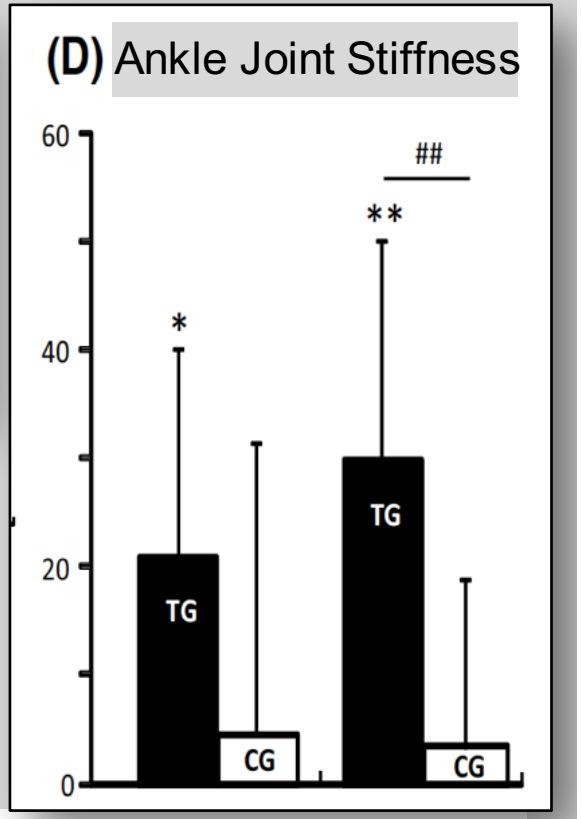
-> FF. Good for re-modeling crimp into fascial tissues

Eur J Appl Physiol (2015) 115:863–877
DOI 10.1007/s00421-014-3065-9

ORIGINAL ARTICLE

Neuromuscular mechanics and hopping training in elderly

Merja Hoffrén-Mikkola · Masaki Ishikawa ·
Timo Rantalainen · Janne Avela · Paavo V. Komi



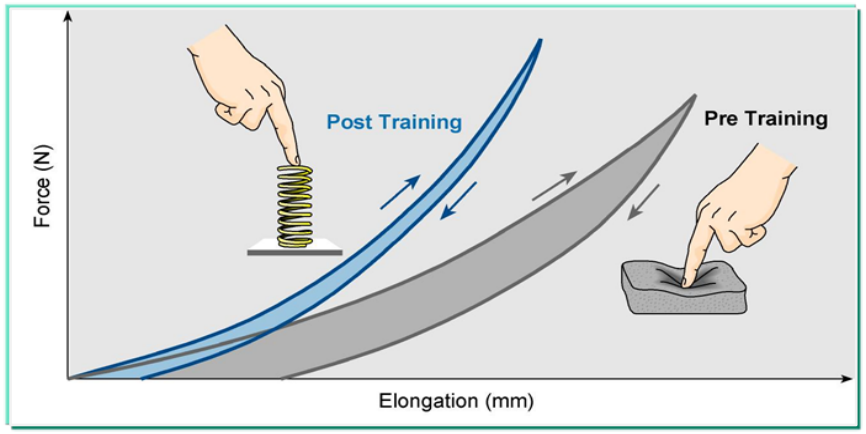
11 wks of hopping training for 11 wks in elderly men improves performance and tendon utilization

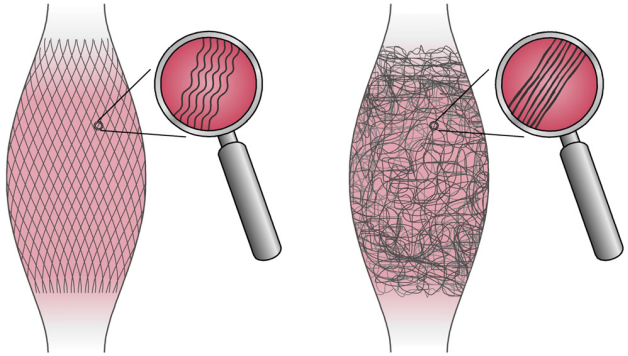
Table 2 Progression of the exercise intervention (adopted from Rantalainen et al. 2011)

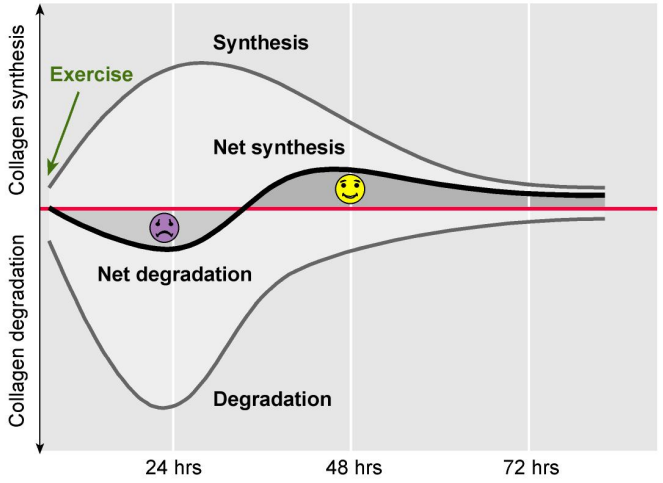
Week	1	2	3	4	5	6	7	8	9	10	11
Sets × intensity (% of maximal GRF)	4 × 75	2 × 75 3 × 90	1 × 75 4 × 90	1 × 75 4 × 90	1 × 75 4 × 90	2 × 75 5 × 90	2 × 75 5 × 90	2 × 75 5 × 90	2 × 75 5 × 90	2 × 75 5 × 90	2 × 75 5 × 90

Maximal hopping was measured every 2 weeks and submaximal intensity levels were readjusted accordingly

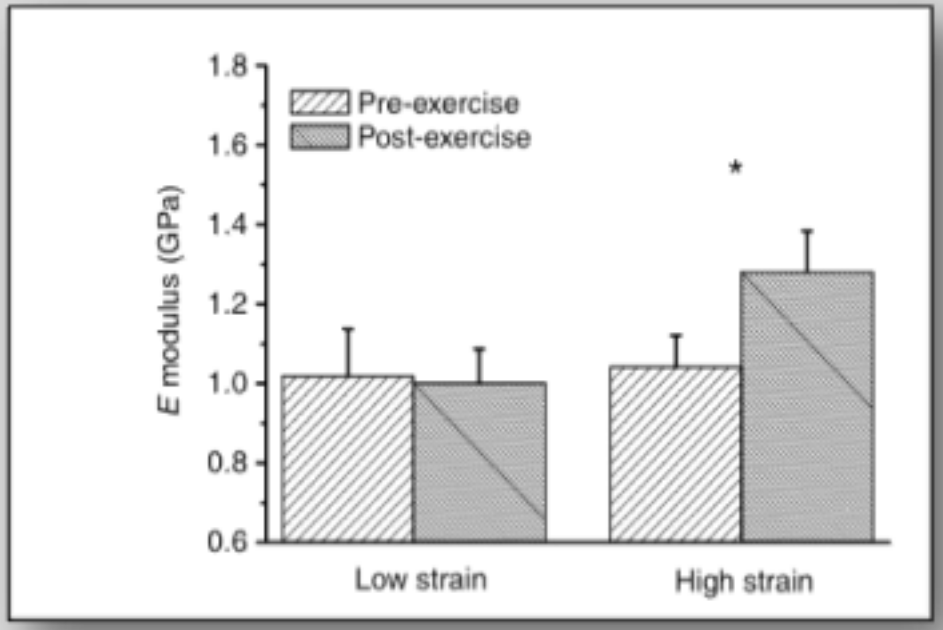
Healthy loading induces remodeling of fascial architecture







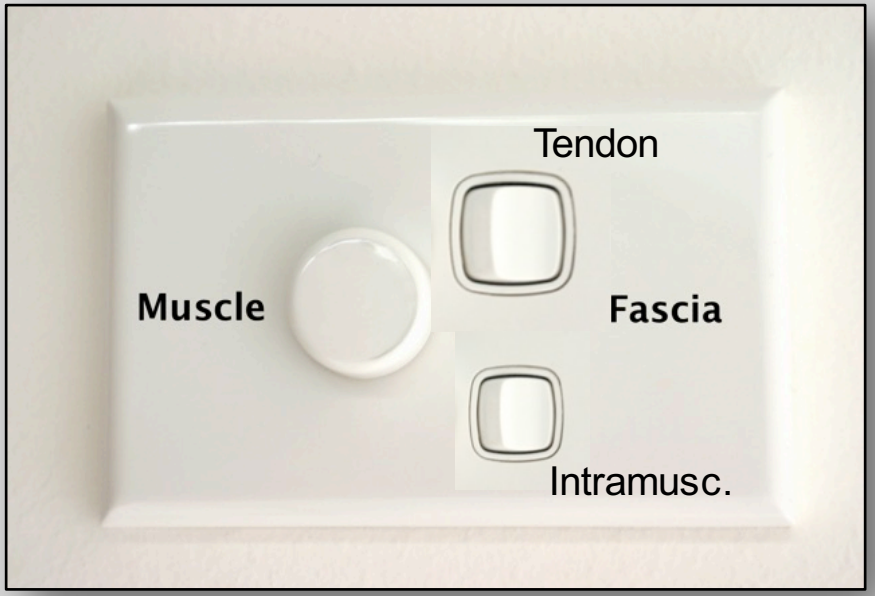
- Staubesand 1996 found a 2-directional **lattice** orientation in fasciae of young women compared with older women
- Jarvinen 2002: i**mmobilization** induces multidirectional collagen arrangement and crimp-reduction.
- Wood 1998 reported an increased collagen **crimp** formation in daily running rats.



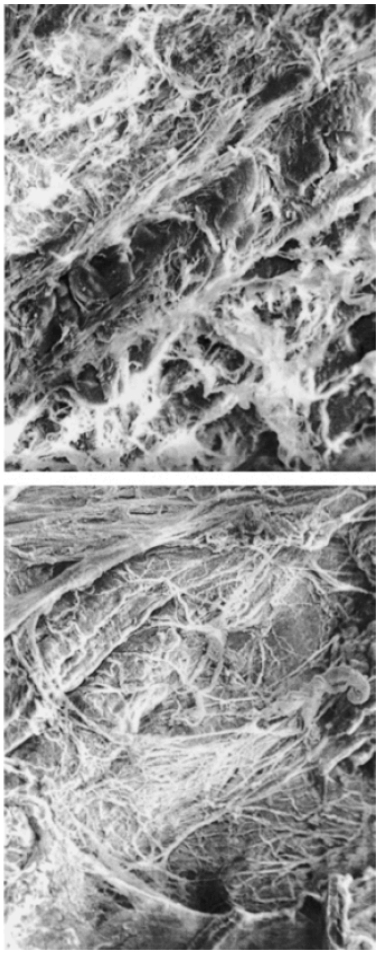
Arampatzis et al. 2007 J Experim Biol 210

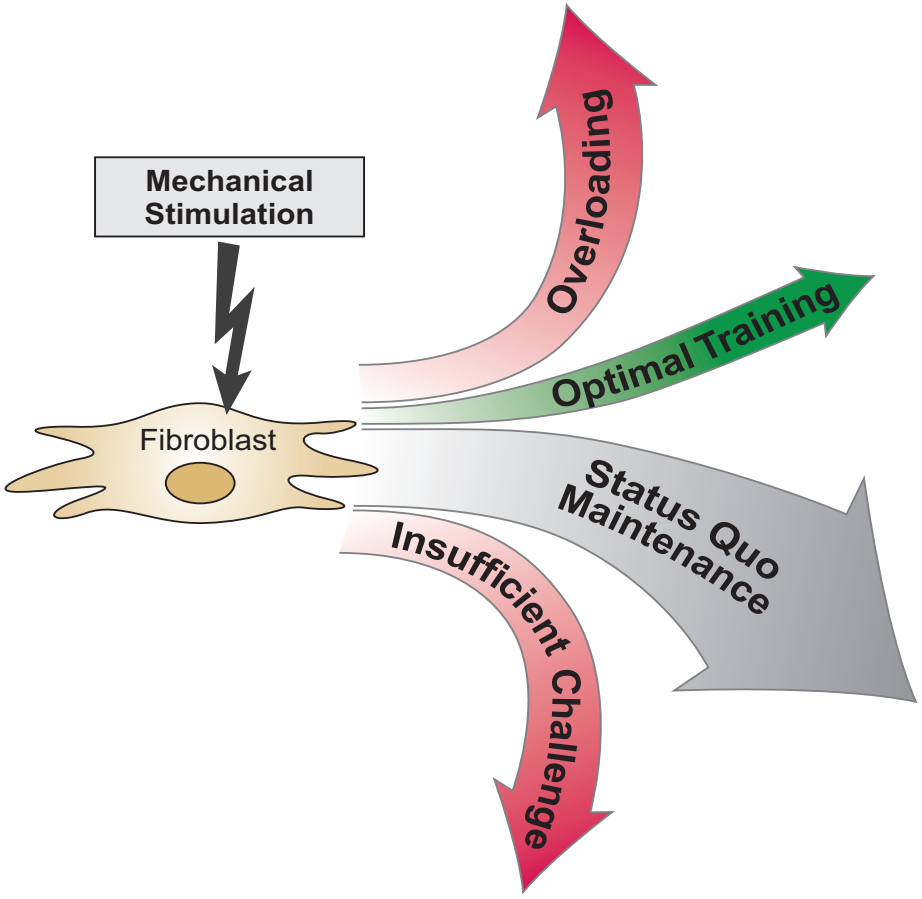
Higher stimulation threshold for tendinous tissues than for myofibers

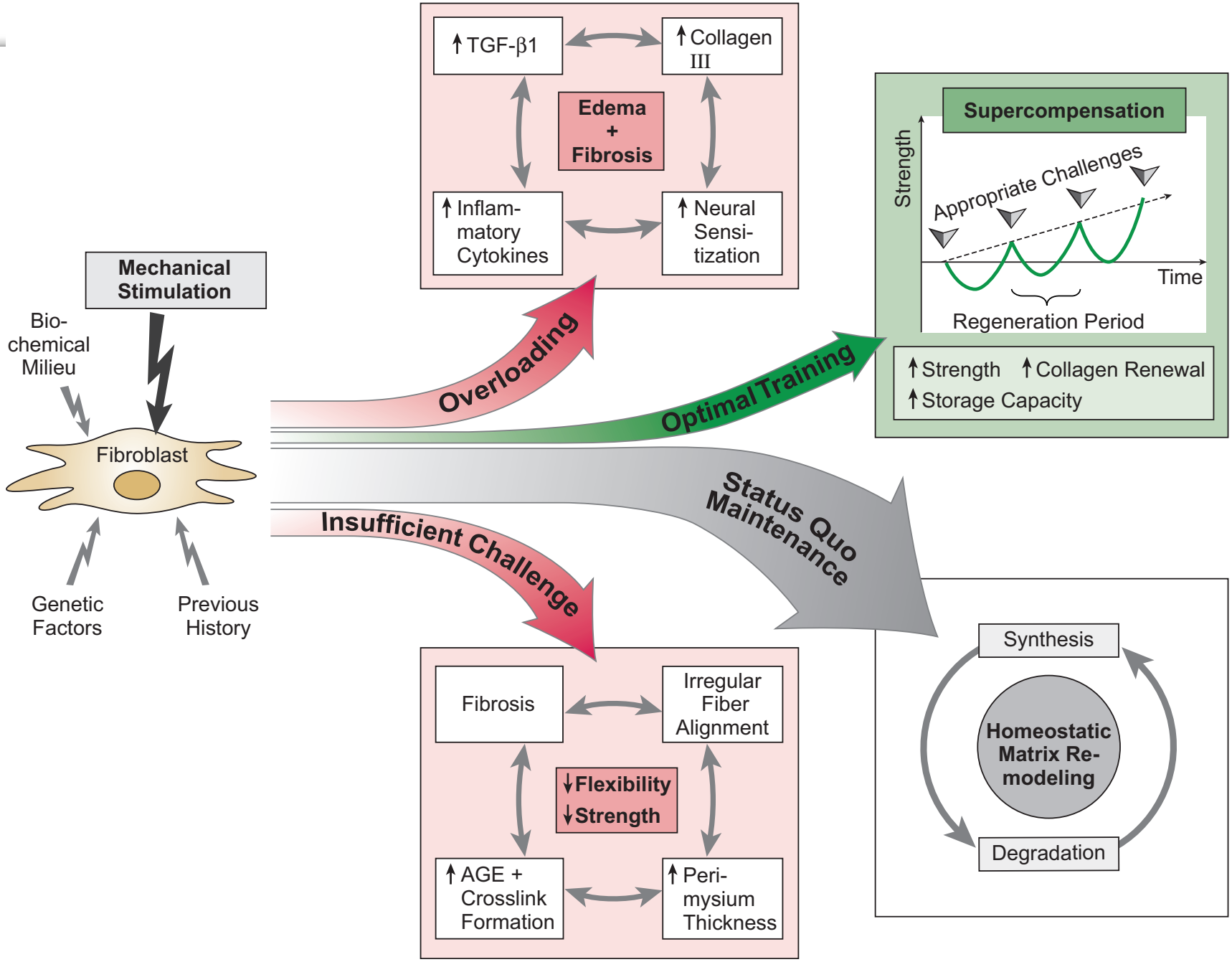
Moderate loading seems sufficient for training effect in intramuscular fasciae



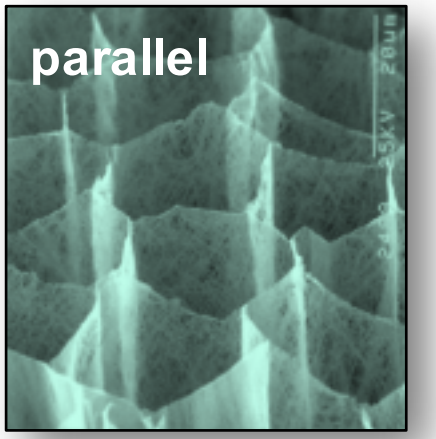
Davis‘ Law

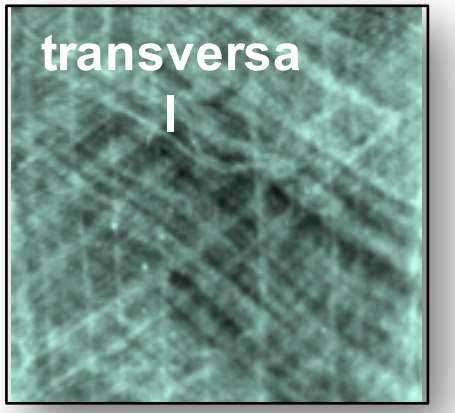


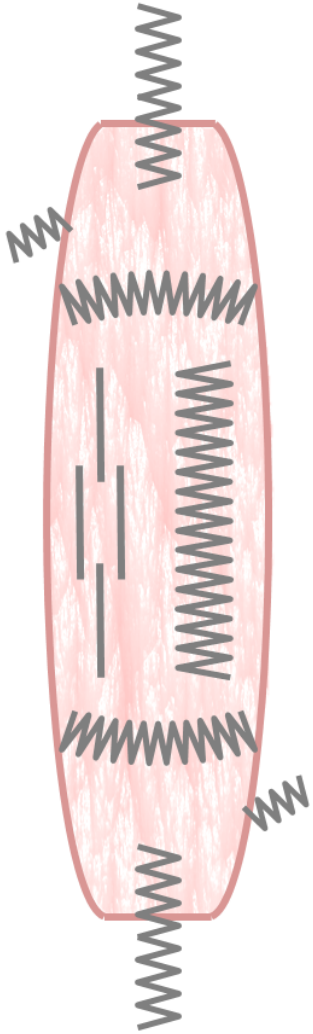

Mechanical Stimulation
Fibroblast
Overloading
Optimal Training
Status Quo Maintenance
Insufficient Challenge


↑TGF-β1
↑Collagen III
Edema + Fibrosis
↑Inflam-matory Cytokines
↑Neural Sensi-tization
Supercompensation
Strength
Appropriate Challenges
Time
Regeneration Period
↑Strength ↑Collagen Renewal
↑Storage Capacity
Mechanical Stimulation
Bio-chemical Milieu
Fibroblast
Genetic Factors
Previous History
Overloading
Optimal Training
Status Quo Maintenance
Insufficient Challenge
Fibrosis
Irregular Fiber Alignment
↓Flexibility
↓Strength
↑AGE + Crosslink Formation
↑Peri-mysium Thickness
Synthesis
Homeostatic Matrix Re-modeling
Degradation

Effect on different fascial elements





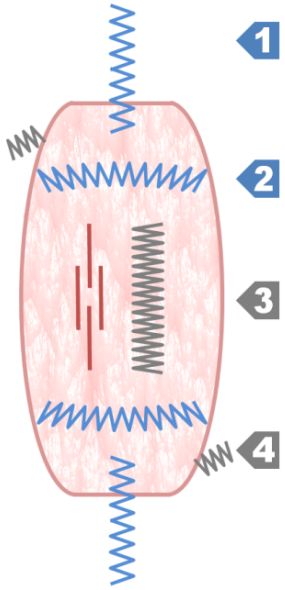


1. serial
2. transversal
3. parallel
4. extramuscular

Fascia Training:

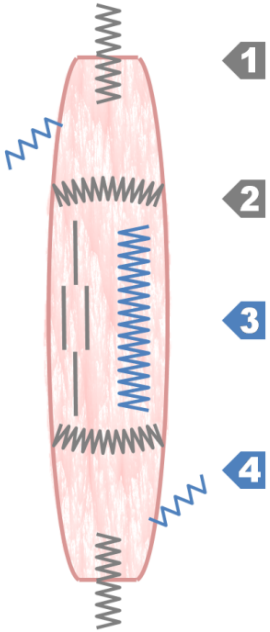
Stretch-Loading of the the most important fascial elements

Usual muscle work



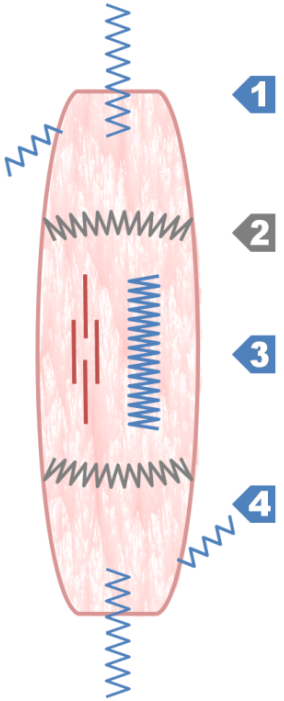
Muscle active
Normal range.

Melting stretch



Muscle relaxed
Long range.

Active resistance stretch



Muscle active
Long range.

Manual Therapy 15 (2010) 26–31

Contents lists available at ScienceDirect

Manual Therapy

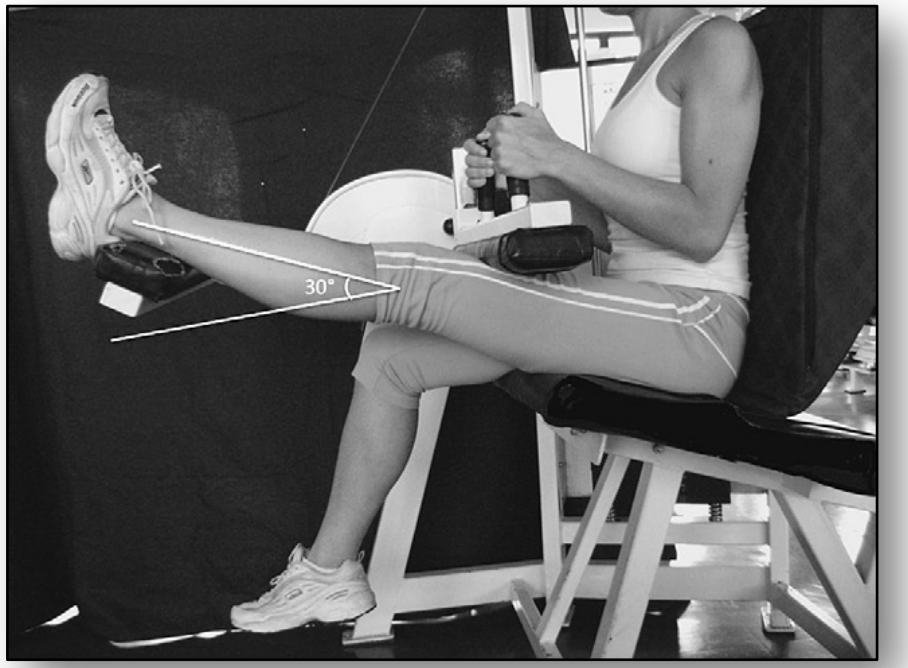
journal homepage: www.elsevier.com/math

Original Article

Stretching versus strength training in lengthened position in subjects with tight hamstring muscles: A randomized controlled trial

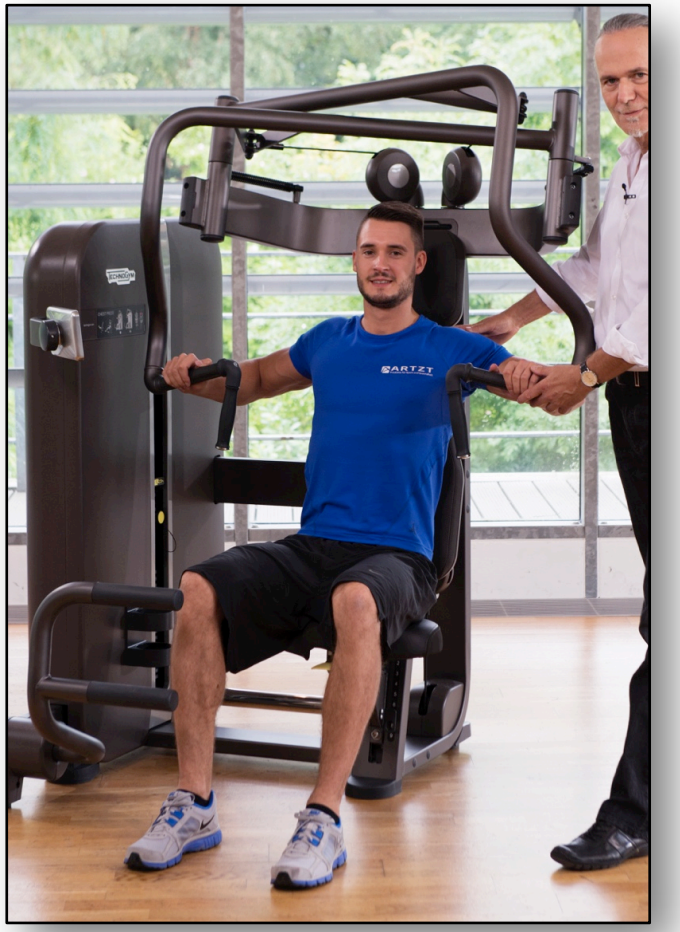
Cecília F. Aquino [a,*], Sérgio T. Fonseca [b], Gabriela G.P. Gonçalves [c], Paula L.P. Silva [d], Juliana M. Ocarino [e], Marisa C. Mancini [b]

[a] Fundação Educacional de Divinópolis, FUNEDI, Av. Sete de Setembro, 949. Centro, Divinópolis, Minas Gerais 35500-011, Brazil



45 subjects with tight hamstrings were assigned into 3 groups:
control, stretching and strength training in lengthened position;
performed 3x/wk for 8 wks.

- Stretching as well as Strengthening increased stretch tolerance.
- **Only Strengthening produced modification of flexibility**.



How to include specific fascia training in a standard muscle gym environment

- Working with 1/3rd of usual weight
- Mindful attention (3 seconds)
- Tensegral expansion
- Preparatory counter movement
- Proximal initiation of main movement
- Mini-bounces in both end-positions
- Embodiment (3 seconds)

For hypomobile persons:

- No mini-bounces in long-stretched postion only.
- final exhausting mini-repetitions in long-stretched position.

For hypermobile persons:

- Short percussive bounces in short-fibred position
- Proprioceptive refinement in long-stretched position
- Final exhausting mini-repetitions in short-fibred position

Chris Beardley
www.strengthandconditioningresearch.com

- *Acute effects*
  - Flexibility - **increases**
  - Athletic performance – **no changes**
  - DOMS – **decreases**
  - Parasympathetic tone -> possible increases?

- *Long-term effects*
  - Flexibility – **increases**
  - Balance – possible increases?

THANK YOU

Adjo Zorn PhD Anne Klein Stefanie Rankl
Robert Schleip PhD Werner Klingler MD Ralf Vogt (l. to r.)

www.fasciaresearch.com