



KINEKRING NOORDWEST-VLAANDEREN STELT VOOR

Foam Rolling in de kinepraktijk

 Dhr Peter Pollet

 20/06/2024

 Sportzaal OLV Psychiatrisch ZH
Barrièrestraat, inrit parking Nr 2
8200 Sint-Michiels Brugge

 19u30: Start workshop
21u30: Einde
Parking sluit om 22u



1

Deze KNWV – workshop wordt gesteund door



2

Foam Rolling?

Dhr. Peter Pollet

1

1

Foam Rolling

Evidence?

Dhr. Peter Pollet

2

2

Foam rolling: evidence



- Personal trainers: experience/ expertise
- EBP in the **beginning**
 - EBP Pubmed !

Dhr. Peter Pollet

3

3

Massage/ (Foam Rolling): **general believes**

- Prevent dysfunctions
- Improve relaxation
- Decreases muscle tone
- Decrease soreness
- Improves performance
- Improves length/tension ratio
- Improves warming-up
- Decreases lactate
- Decreases fatigue post-workout
- Stimulates parasympathic system
- Decreases cortisol levels
- Improves mindset



Dhr. Peter Pollet

4

4

Michael Clark:(2000) National Academy of Sports Medecine

Foam rolling is based on a
accupressure concept:

**Use the pressure of the FR for
treating triggerpoints**

Foam rolling is injury prevention.



Dhr. Peter Pollet

5

5

Michael Clark (2000)

“Foam Rolling **before stretching and exercising is like taking the parking brake off *before* you start driving your car.”**

Dhr. Peter Pollet

6

6

Michael Clark (2000): *Foam Rolling stops the Cumulative Injury Cycle*

- Correct muscle-problems.
- Improve mobility.
- Decrease soreness and jointstress.
- Decrease neuromuscular tenderness.
- Stimulates the muscle tendon apparatus.
- Improves neuromuscular efficiency.
- Improves optimal functional muscle length.



Dhr. Peter Pollet

7

7

Michael Clark: Foam Rolling guidelines

- **Hold** 1-2(90 sec.) minutes and look for triggerpoints.
- **Pain= stop rolling and stay** on this spot for 30-45 seconden.
- **Red flag: do not go into constant pain! (inflammation) (Jill Cook; tendinopathy,2016)**

Dhr. Peter Pollet

8

8

Butler en Moseley (2003): healing: explain pain



9

Vern Gambetta (2007)

“Recovery is a **normal** proces after training, **preparing the next training.**”

”Recovery is absolute necessary for **tissue healing.**”

“Recovery sessions are always post-workout and contain cold plunges, cardio-work and self-massage (1997-1998).”

Dhr. Peter Pollet

10

10

“Rolling around on a foam roller is not warm-up.”

“Foam Rolling is
used in
cooldown”

**Vern Gambetta
2008**



Dhr. Peter Pollet

11

11

Michael Boyle (2010)

Also pre-workout!



Foam rolling is more a self-massage based on long rolling strokes and smaller triggerpoints. (2006).

MIKE BOYLE
MBSC
STRENGTH & CONDITIONING

Dhr. Peter Pollet

12

12

Michael Boyle (2010)

“A good training session has density.”

- **Density** is using **supersets en complexes**.
- **Density comes by** replacing rest by **foam rolling en Movement Prep**.

Foam Rolling is done preworkout (density) and postworkout (recovery).

Do it every day!

Dhr. Peter Pollet

13

13

Michael Boyle (2010)

Tissue changes: recovery

- length = stretching = flexibility ≠ elasticity
- density = foam rolling, optimal training!

Density foam rolling = 5 minuten

*“The Roller unknots the knot before stretching begins.
Start rolling and stretching or you are 5 steps behind.”*

Dhr. Peter Pollet

14

14

flexibility	elasticity
<ul style="list-style-type: none"> • Related to joints and cartilage = joint flexibility • The ability to move joints and muscles through their full ROM (MOBILITY) • Stretching exercises • Low force static loads for periods of time result in optimal gains in elastic deformations. • Mild stretch= 30-40% of maximum stretch 	<ul style="list-style-type: none"> • Related to muscles and tendons= muscle-tendon elasticity • A temporary lengthening of the tissues, returning to their original length • “train power it may save your life”: reach the elastic limits at a higher sarcomere length, develop the lowest tension”.
Dhr. Peter Pollet	15

15

<p>Mark Verstegen</p> <p>EXOS</p>	
Dhr. Peter Pollet	16

16

“The foam roll is a great barometer of **the quality of soft tissue.**”

Foam rolling is done pre, during and for sustain, post-workout.

Mark Verstegen (2004)

Dhr. Peter Pollet

17

17

Mark Verstegen (2014)

- Foam Rolling is done pre-workout, between workouts and post-workout , on recovery days and off-days.
- Foam rolling is **treating triggerpoints** and is a **recovery** tool.
- Start with **8-12 reps or 30-60 sec.**

Dhr. Peter Pollet

18

18

Mark Verstegen

- Improves recuperation.
- Decreases Triggerpoints.
- Decrease muscle tension through the nociceptive system
- Relax muscles.
- Improves circulation.
- Ensures health.

Dhr. Peter Pollet

19

19

Mark Verstegen (2009)

“Think of your body as clay. The foam roll softens up the clay, so you can remold it into something more pliable and functional.”

Dhr. Peter Pollet

20

20

When Foam Rolling?
Personal coaches = it is an essential part of training!



Dhr. Peter Pollet

21

21

Foam Rolling: Evidence Based?
2000-2015

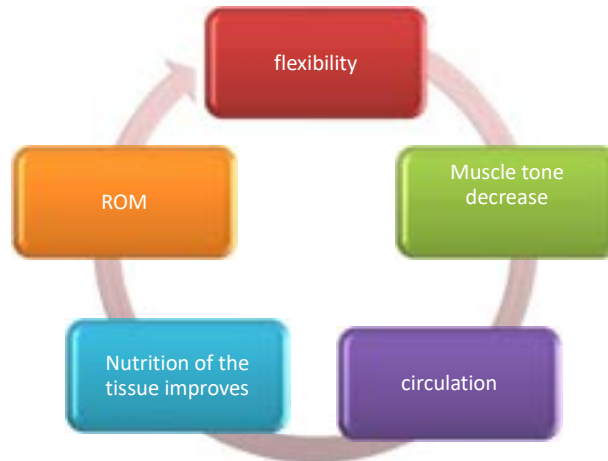
Dhr. Peter Pollet

22

22

Arteriel rigidity decreases?

Hanten et al.2000, Hou et al.2002

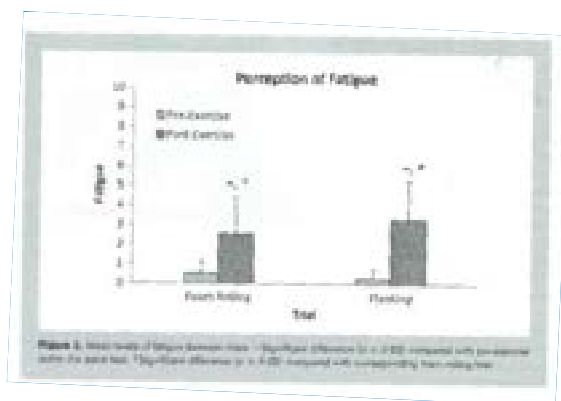


Dhr. Peter Pollet

23

23

Effect from Foam Rolling on performance



Healey et al. 2013

- No effect on performance.
- Significant effect on postworkout fatigue.
- More volume and longer training session

Dhr. Peter Pollet

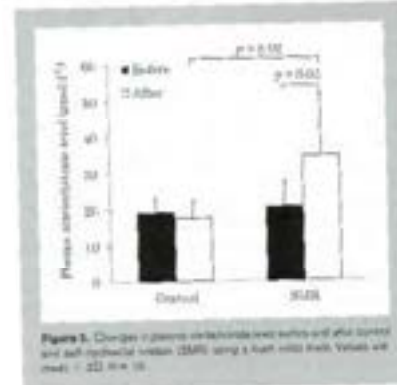
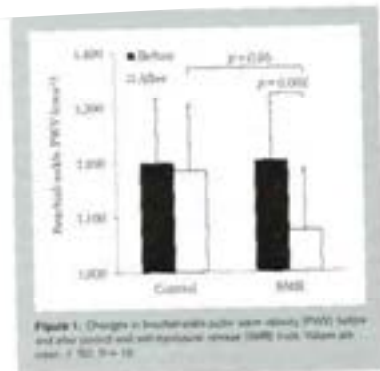
24

24

Foam Rolling improves arteriel rigidity and improves vascular function.

baPWV (pulse wave capacity= measures rigidity of arteries)

Plasma NO concentration improves (de activity of autonomic muscle)



Dhr. Peter Pollet

25

25

Park,Hwang 2015

“Stroke patients show a better balance in standing and standing up of a chair using 8 weeks a tennisball on the paralysed leg.”

Dhr. Peter Pollet

26

26

Junker et al. 2015

“Foam Rolling improves the flexibility of the hamstrings.”

3 sessions a week for 1 month foam rollen and test stand-and-reach test pre- and post work-out

Dhr. Peter Pollet

27

27

Markovic, 2015

“Passive knee flexion and SLR become significant better in ROM after 2 minutes foam rollen on m. quadriceps and hamstrings in soccer.”

Dhr. Peter Pollet

28

28

Foam rolling and Pubmed?

Dhr. Peter Pollet

29

29

Foam rolling and Pubmed

- **recover quickly** from demanding bouts of exercise.
- (increase sprint performance) **does not alter performance**
- **Increase flexibility**
- **reduce muscle pain sensation.**
- use of foam rolling as a **warm-up activity** rather than a recovery tool.
- positive effect on **range of motion and soreness/fatigue** following exercise
- effectively **reduced DOMS (delayed-onset muscle soreness)**
- **90 to 120 seconds per muscle group** may be the minimal duration to achieve a short-term reduction in pain/soreness.
- improved **pain tolerance**
- **used in combination with dynamic stretching and active warm-up before a training session.**
- improved **arterial function, improved vascular endothelial function, and increased parasympathetic nervous system activity** acutely, which could be useful in recovery.
- There is conflicting evidence whether SMFR can improve **flexibility long-term.**
- **active recovery (AR), neuromuscular electrical stimulation (NMES), and foam rolling (FR)** in terms of **blood lactate (Bla) removal, reduction in delayed-onset muscle soreness (DOMS), and restoration of muscle strength, endurance, and flexibility** have similar effects.
- Foam rolling postexercise diminished delayed-onset muscle soreness and improved recovery of muscle strength and **joint proprioception**
- **higher blood lactate concentration at exhaustion and a larger blood lactate clearance after 10 min to post exercise.**
- Foam rolling postexercise diminished delayed-onset muscle soreness and improved recovery of muscle strength and joint proprioception.
- FR enhanced recovery from exercise-induced damage. A short session of foam rolling with active joint motion appears to have a greater **effect on passive joint ROM** and PPT than rolling without motion. Pressure pain thresholds (PPT)
- reducing pain perception after DOMS
- Increasing ROM in the stand and reach test improve chest wall mobility, posterior chain muscle flexibility, and some movements of the lumbar spine in sedentary women
- **10 to 20 repetitions per set**
- **activation of cutaneous and fascial mechanoreceptors** and interstitial type III and IV afferents that modulate **sympathetic/parasympathetic activation**
- **blood flow, and fascial hydration affecting tissue stiffness**
- **Vibration FR: improve greater short-term benefits in pain perception and passive extension hip joint ROM.**

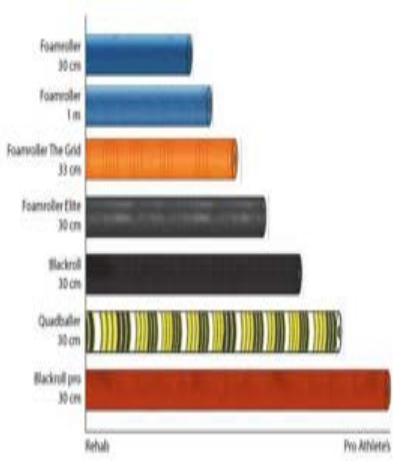
30

Dhr. Peter Pollet

30

Foam Rollers

- Divers, rigid, small, big,...
 - (Curran et al.2008): **Multilevel rigid roller (MRR)** compared with **Bio-foam roller (BFR)**
 - **Vibration FR: Pain, ROM** (2019)
- MRR produce more pressure on Soft T.**
BFR treat bigger surfaces
VFR: Pain, ROM



Dhr. Peter Pollet

Nociceptie: druk en pijn, proprioceptie/ body awareness

De receptoren worden "wakker" van:

- Belaste bewegingen (weightbearing)
- Houdingsbesef (posture)
- Huidstimulatie (tape, FR, massage,....)
- Actieve spiercontractie van stabilisatoren! (breathing, isometrics)



Sherrington's Law of Reciprocal Innervation

Whenever an agonist muscle is capable of contract, an equivalent voluntary antagonist is set to its antagonism, which relaxes and actually lengthens

CHARLES SCOTT SHERRINGTON



English physiologist Sir Charles Sherrington (1857-1952) was a pioneer in the study of the nervous system. He was awarded the Nobel Prize in 1905 for his work on the reflexes of the spinal cord. He is best known for his discovery of the stretch reflex and the concept of reciprocal innervation. He also discovered the inhibitory postsynaptic potential (IPSP) and the excitatory postsynaptic potential (EPSP). His work laid the foundation for modern neurophysiology.

PARTNER SQUAT HOLDS

method you can do at home

- Inademen is automatisch, **ademhaling** is bewust! = autonoom zenuwstelsel! (n.vagus, diafragma,...)
- Behandel "the new system": "**keep tall** during sitting,standing,walking,.." EXTENSION
- Behandel " the length tension relationship ": "**dysfunctions!**" (**mobility-stability**)
 - Posture/ houding
 - **Diepe stabiliserende systemen**
 - Triggerpoints onder controle krijgen (stabiliteit, motor control)
 - **Kinetic linking**
 - Compensatie!
- Behandel "**triggerpoints**" : vertegenwoordigen de grootste bron van pijn in een dysfunctie!"

"Above all, learn to breathe" (Joseph Pilates)
" Isolated movement doesn't truly exist."

33

Richtlijnen in behandeling:

- Zorg voor volledige **mobiliteit** = normalize joint mobility! ROM
 - **Manipulaties**, mobilisaties, **ST-Releases**
 - Stijf en verkort
- Zorg voor een normale "**tissue length**"
- Zorg voor een normale "**houding**"!
- Zorg voor normale "**body awareness en balans**"
- Zorg voor **efficiënte bewegingspatronen**.
- **Werk Functioneel!**

" Fix the movement compensations, lengthen the short muscles and do not work threwh pain!"

- INHIBITION
- MOBILIZE
- ACTIVATE
- INTEGRATE

34

34

Foam Rolling in de kinepraktijk



- **Inhibition:**
 - Soft tissue work (recovery technique), manipulation
- **Mobilize: ROM**
 - End range
 - End range feel
 - **Mobility-stability: 10° or more**
- **Activate: prime-synergic movers and stabilizers**
- **Integrate: "whole body movement"**
- **Functional training**



35

Work!

Dhr. Peter Pollet

36

36

m. Latissimus Dorsi

Foam Rolling



Anatomy



Dhr. Peter Pollet

37

37

m.Latissimus dorsi

assess



Soft tissue

- Stick
- FAT
- Active cupping
- DDF
- Exercise!!!

Dhr. Peter Pollet

38

38

m.Pectoralis minor

Foam Rolling



Anatomy



Dhr. Peter Pollet

39

39

m.Pectoralis

Major: sternaal- claviculair

minor



Dhr. Peter Pollet

40

40

Thorax

Foam Rolling



Anatomy

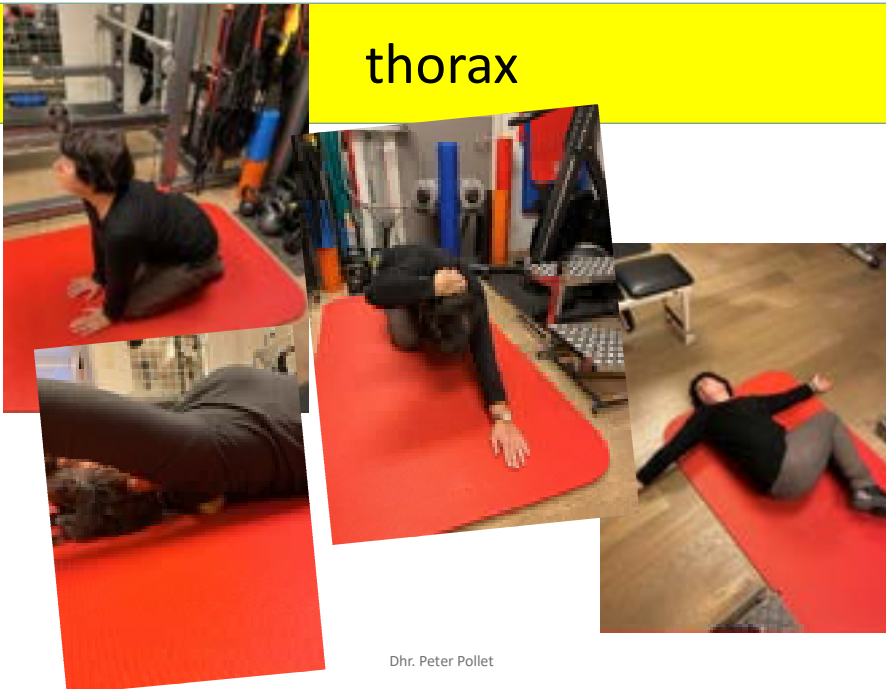


Dhr. Peter Pollet

41

41

thorax



Dhr. Peter Pollet

42

42

M. Triceps Surae

Foam Rolling: bi/unilateraal

Anatomy



Dhr. Peter Pollet

m.Triceps surae



Dhr. Peter Pollet

Anterior extensors

Foam Rolling



Anatomy



Dhr. Peter Pollet

45

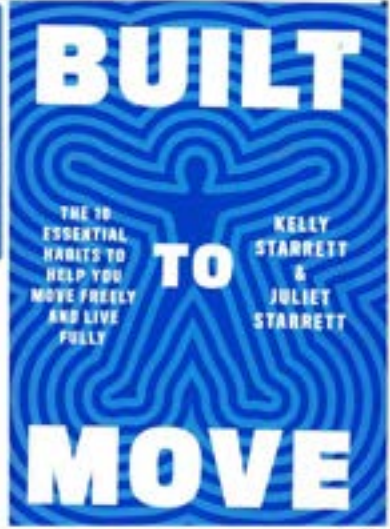
45

Hamstrings (Kelly Starrett 2023)



Place a ball or roller underneath your front-facing leg just below your foot, then extend the leg. Contract and straighten your leg, then alternately relax and bend your knee as you shift side to side on the ball or roller, using a scissoring motion. Keep repeating the motion, working the ball or roller down your leg from your hip toward your knee as you go, about two minutes or as long as five minutes on each side.

Mobilizing while seated is one of our favorite ways to sneak in some soft tissue mobilization.



Dhr. Peter Pollet

51

46

46

Hamstrings: distal, proximal and rotations

Distal: flexion to extension



Proximal: extension!!!



Dhr. Peter Pollet

47

47

m. Piriformis

Foam Rolling



Anatomy



Dhr. Peter Pollet

48

48

m.Piriformis stretch

stretch



Soft tissue: triggerball



Dhr. Peter Pollet

49

49

Deep six: rotators

Quadratus femoris



Gemelli-obturatorii,..



Dhr. Peter Pollet

50

50

M. Tensor Fascia Latae

Foam Rolling



Anatomy



Dhr. Peter Pollet

51

51

m.Tensor fascia latae

Soft tissue:

Thera-gun

Stick

Triggerbal

FAT

Active cupping



Dhr. Peter Pollet

52

52

m.Tensor fascia latae



Dhr. Peter Pollet

53

53

Double Leg FR M. Tensor Fascia Latae



Dhr. Peter Pollet

54

54

M. Quadriceps Femoris

Foam Rolling



Anatomy



Dhr. Peter Pollet

55

55

m. quadriceps



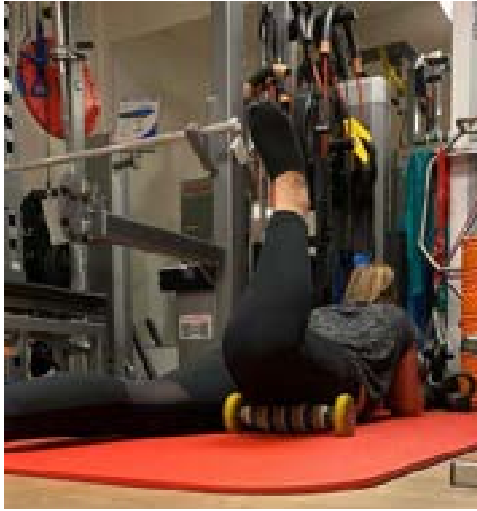
- Stick
- Triggerpointsystem
- Triggerbal m. vastus lateralis-medialis
- FAT
- Active cupping

Dhr. Peter Pollet

56

56

m.quadriceps



Dhr. Peter Pollet

57

57

m.quadriceps



Dhr. Peter Pollet

58

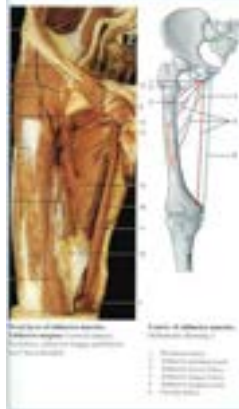
58

Adductor group

Foam Rolling



Anatomy



Dhr. Peter Pollet

59

59

Adductor

- M.adductor brevis,
- M.adductor longus
- M.adductor magnus
- M.gracilis



Dhr. Peter Pollet

60

60

Soft tissue therapy: adductors!

- FAT



- Cupping



Dhr. Peter Pollet

61

61

adductors

m.Adductor magnus



m.gracilis



Dhr. Peter Pollet

62

62

Lumbaal



Dhr. Peter Pollet

63

63

Gut smashing: ANS

breathing



trigger



Dhr. Peter Pollet

64

64

Overhead Wall Squat/ FR



Dhr. Peter Pollet

65

65

Plank to Moonwalker



Dhr. Peter Pollet

66

66

T4-T8 mobilisatie



Dhr. Peter Pollet

67

67

m.iliopsoas

Stick, triggerbal



Psoas-stretch



Dhr. Peter Pollet

68

68

m.iliopsoas

stretch

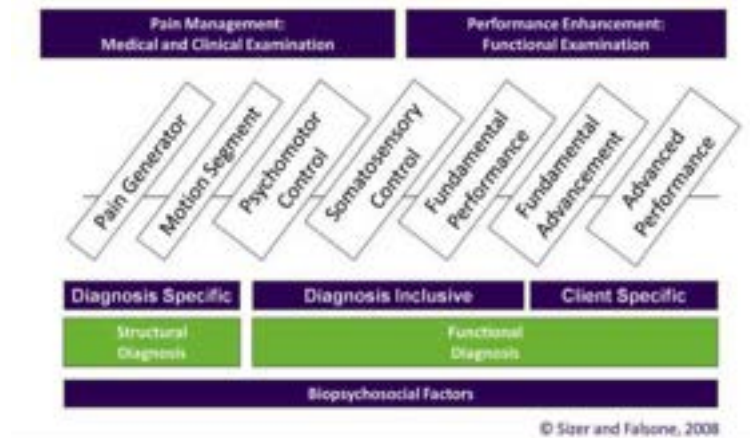


Soft tissue



Dhr. Peter Pollet

Bridging the gap:



Dhr. Peter Pollet

literature



The image displays a collection of sports literature. On the left, the cover of 'NEW FUNCTIONAL TRAINING FOR SPORTS' (second edition) features a man performing a squat with a kettlebell. Below it is 'WHAT WE NEED IS SPEED: Scientific Practice of Getting Fast' by Boris H. Jacobs, showing a stylized human figure with speed lines. In the center, 'CORE PERFORMANCE' by Mark Verstegen is shown with a man's portrait. To the right, 'Athletic Development: The Art & Science of Functional Sports Conditioning' features an action shot of athletes. Below these is 'BLISSFUL IGNORANCE: THE ART OF BEING AN ENTREPRENEUR' by Cassidy Phillips. On the right side of the collage is a photograph of two men standing in front of a presentation screen.

Dhr. Peter Pollet

71

Jill miller: the roll model

- Sustained compression
- Skin-rolling/ shear
- Stripping
- Crossfiber
- Pin & Stretch
- Contract/ Relax
- Pin/Spin& Mobilize
- Ball Plow
- Ball Stack

1

Sustained compression: fascial length/stretch

- Look for the epicenter, direction of pressure and angle of approach
- Breath!
- 90-120 sec.

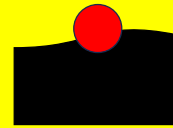
- Muscle spindles are stretched (stretch sensors)
- Fascial length
- Ex. foot



2

Skin-rolling/ shear: hydration, Ruffini

- Pull-wring-twist
- Mobilize the superficial layer from the deep layer
- Hyaluronic acid create tissue hydration: slide and glide
- Stimulate the Ruffini endings in the fascia: proprioception, ANS
- Ex. M.pec.minor, quad



3

Stripping: re-establish muscle length, MFRelease

- Slide the ball from one end of the muscle to the other end.
- From origin to insertion, along the “grain” of the muscle.
- Re-establish muscle length
- Myofascial release of the muscle
- Ex.cervical spine, quad,foam rolling

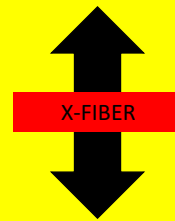


4

Cross fiber: re-establish fascia

- Move the ball across the muscle fibers
- Fascia stiffness, collagen production
- Ex. M. tibialis ant

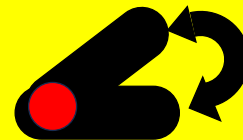
“Strip muscles that are locked short, crossfiber muscles that are locked long.”



5

Pin & stretch: functional fascia/ de-activate triggerpoint

- Pin the ball against you and move the neighbouring limb away or toward the pinned ball to improve ROM.
- Combine stretch with pressure on the muscle
- Fascia becomes elastic and functional
- Relationship knotty point and the surrounding tissue.
- Ex. quad



6

Contract-relax: PNF/ post-isometric relaxation

- Stiffen the tissue where the ball is for 7-30 sec. Then relaxe the tissue
- Golgi tendon organ relax (proprioceptive stretch receptors in tendon, fascia, aponeurosis,....)
- Post-isometric relaxation
- Ex. Thumb, hamstring



7

Pin/spin and mobilize: frees up motion, W.U.

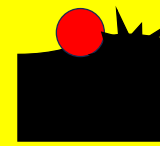
- Place a ball on the target area, lean your body weight into the ball, use the hand to spin, wring the ball deeper, mobilize a neighbouring joint in multiple directions.
- 90-120 sec.
- Wind the tissue in the other direction
- Warming-up, mobilize the tissue, improve circulation
- Ex.: m. piriformis



8

Ball plow: squeeze the tissue, go deeper!

- Use 2 balls and squeeze the soft tissue
- The balls stay on place.
- Mobilize soft tissue, W.U., circulation, relaxation
- Ex.: TFL

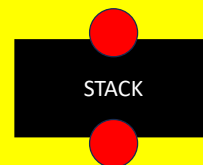


PLOW

9

Ball stack: clear tension down to the bone!

- Place one ball underneath the tissue and the other ball on the opposite side. Apply pressure to both sides to compress the tissue.
- Ex.: calf



STACK

10

Auteurslijst foam rolling

J Strength Cond Res 2019 **Influence of Foam Rolling on Recovery From Exercise-Induced Muscle Damage**, [Anthony P D'Amico](#)¹, [Jason Gillis](#),

FR appears to expedite recovery of agility after EIMD instigated by a repeated sprint protocol. Foam rolling may be useful for athletes requiring adequate agility who need **to recover quickly from demanding bouts of exercise**.

Front Physiol 2019 **A Meta-Analysis of the Effects of Foam Rolling on Performance and Recovery**, [Thimo Wiewelhove](#)¹, [Alexander Döweling](#)¹, [Christoph Schneider](#)¹, [Laura Hottenrott](#)¹, [Tim Meyer](#)², [Michael Kellmann](#)^{1,3}, [Mark Pfeiffer](#)⁴, [Alexander Ferrauti](#)¹.

The effects of foam rolling on performance and recovery are rather minor and partly negligible, but can be relevant in some cases (e.g., **to increase sprint performance and flexibility or to reduce muscle pain sensation**). Evidence seems to justify the widespread use of **foam rolling as a warm-up activity rather than a recovery tool**.

J Athl Train 2015 Jan, **Foam rolling for delayed-onset muscle soreness and recovery of dynamic performance measures**, [Gregory E P Pearcey](#)¹, [David J Bradbury-Squires](#), [Jon-Erik Kawamoto](#), [Eric J Drinkwater](#), [David G Behm](#), [Duane C Button](#),

Foam rolling **effectively reduced DOMS** and associated decrements in most dynamic performance measures. **delayed-onset muscle soreness [DOMS]**

Curr Sports Med Rep 2015, **Is self myofascial release an effective preexercise and recovery strategy? A literature review**, [Allison N Schroeder](#)¹, [Thomas M Best](#),

FR appears to **have a positive effect on range of motion and soreness/fatigue following exercise**, but further study is needed to define optimal parameters (timing and duration of use) to aid performance and recovery.

Int J Sports Phys Ther 2019 , **DURATION OF MYOFASCIAL ROLLING FOR OPTIMAL RECOVERY, RANGE OF MOTION, AND PERFORMANCE: A SYSTEMATIC REVIEW OF THE LITERATURE**

[Garrett A Hughes](#), [Leanne M Ramer](#)¹

MR for **90 seconds per muscle group** may be the minimal duration to achieve a short-term reduction in pain/soreness, with no upper limit found. Results do not support increases in chronic ROM or performance, and data are insufficient to provide a conclusive recommendation for impacting acute ROM.

Front Physiol 2019, **Foam Rolling as a Recovery Tool Following Eccentric Exercise: Potential Mechanisms Underpinning Changes in Jump Performance**

[Eric J Drinkwater](#)^{1,2}, [Christopher Latella](#)², [Christopher Wilshire](#)³, [Stephen P Bird](#)⁴, [Melissa Skein](#)

FR appears to improve jump performance in the later stages of recovery following ECC exercise. This may be in part due to **improved pain tolerance**; however, mechanical and neurophysiological are not modulated with FR.

J Bodyw Mov Ther 2015, **Effects of self-myofascial release: A systematic review**

[Chris Beardsley](#)¹, [Jakob Škarabot](#)²

Acutely, SMFR seems to **increase flexibility and reduce muscle soreness** but does not impede athletic performance. It may lead to **improved arterial function, improved vascular endothelial function, and increased parasympathetic nervous system activity acutely**, which could be useful in recovery. There is conflicting evidence whether SMFR can improve flexibility long-term. SMFR appears to have a range of potentially valuable effects for both athletes and the general population, including increasing flexibility and enhancing recovery.

J Bodyw Mov Ther 2020, **Effects of foam rolling on performance and recovery: A systematic review of the literature to guide practitioners on the use of foam rolling**, [Sharief Hendricks](#)¹, [Hayd'n Hill](#)², [Steve den Hollander](#)², [Wayne Lombard](#)², [Romy Parker](#)³

FR may reduce muscle stiffness and increase ROM and should be **used in combination with dynamic stretching and active warm-up before a training session**. Furthermore, the optimum

dosage to achieve these flexibility benefits seems to be a **total 90s-120s of FR**. FR reduced DOMS and increased PPT, and therefore may optimize recovery from training.

J Bodyw Mov Ther 2017, **Effect of self-myofascial release on myofascial pain, muscle flexibility, and strength: A narrative review**, [Leonid Kalichman](#)¹, [Chen Ben David](#)²

During the past decade, therapists and fitness professionals have implemented SMFR mainly via foam rolling as a recovery or maintenance tool. Researchers observed a significant **increase in the joint range of motion** after using the SMFR technique and no decrease in muscle force or changes in performance after treatment with SMFR. SMFR has been widely used by health-care professionals in treating myofascial pain. However, we found no clinical trials which evaluated the influence of SMFR on myofascial pain.

Int J Sports Phys Ther 2015, **THE EFFECTS OF SELF-MYOFASCIAL RELEASE USING A FOAM ROLL OR ROLLER MASSAGER ON JOINT RANGE OF MOTION, MUSCLE RECOVERY, AND PERFORMANCE: A SYSTEMATIC REVIEW**, [Scott W Cheatham](#)¹, [Morey J Kolber](#)², [Matt Cain](#)¹, [Matt Lee](#)³

The current literature measuring the effects of SMR is still emerging. The results of this analysis suggests that foam rolling and roller massage may be effective interventions for **enhancing joint ROM and pre and post exercise muscle** performance. However, due to the heterogeneity of methods among studies, there currently is no consensus on the optimal SMR program.

J Athl Train 2020, , **Foam Rolling and Muscle and Joint Proprioception After Exercise-Induced Muscle Damage**, [Aynollah Naderi](#)¹, [Mohammad Hossein Rezvani](#)¹, [Hans Degens](#)²

Foam rolling postexercise diminished delayed-onset muscle soreness and improved recovery of muscle strength and joint proprioception. These results suggested that FR enhanced recovery from exercise-induced damage.

J Sports Med Phys Fitness 2020 , **The effectiveness of three different recovery methods on blood lactate, acute muscle performance, and delayed-onset muscle soreness: a randomized comparative study**, [Buket Akinci](#)¹, [Yonca Zenginler Yazgan](#)², [Tulin Altinoluk](#)³.

This study aimed to compare active recovery (AR), neuromuscular electrical stimulation (NMES), and foam rolling (FR) in terms of blood lactate (Bla) removal, reduction in delayed-onset muscle soreness (DOMS), and restoration of muscle strength, endurance, and flexibility in healthy young individuals., This study showed **that AR, NMES, and FR have similar effects on Bla removal, performance recovery, and DOMS reduction** in healthy young individuals.

Sports (Basel) 2019 , **Acute Effect of Quadriceps Myofascial Tissue Rolling Using A Mechanical Self-Myofascial Release Roller-Massager on Performance and Recovery in Young Elite Speed Skaters**, [Shaher A I Shalfawi](#)¹, [Eystein Enoksen](#)², [Håvard Myklebust](#)¹,

Despite indications for potential benefits of the quadriceps myofascial tissue release using the mechanical self-induced multi-bar roller-massager on blood lactate concentration and Wingate peak-power, the myofascial tissue release gave no marked performance improvements nor indications of negative effects.

J Bodyw Mov Ther 2018 , **Comparison of a foam rolling session with active joint motion and without joint motion: A randomized controlled trial**, [Scott W Cheatham](#)¹, [Kyle R Stull](#)²

The purpose of this study was to compare the effects of a foam rolling session to the left quadriceps with active joint motion and without joint motion on passive knee flexion range of motion (ROM) and pressure pain thresholds (PPT).

.A short session of foam rolling with active joint motion appears to have a greater effect on passive joint ROM and PPT than rolling without motion. These observed changes may be influenced by the agonistic muscle activity during active motion. This activity may modulate activity of the antagonist muscle through reciprocal inhibition and other neural pathways.

J Sports Sci Med 2019 , **The Training Effects of Foam Rolling on Core Strength Endurance, Balance, Muscle Performance and Range of Motion: A Randomized Controlled Trial**, [Daniel Junker](#)^{1,2}, [Thomas Stöggl](#)¹.

No significant effects were found for balance and muscle performance. An 8-week training with the foam roll is effective in increasing ROM in the stand and reach test without concomitant decreases in

core "strength endurance", muscle performance and balance parameters. The core stabilization training was sufficient to improve performance

Trials 2017 , **Acute effects of foam rolling on passive tissue stiffness and fascial sliding: study protocol for a randomized controlled trial**, [Frieder Krause](#)¹, [Jan Wilke](#)², [Daniel Niederer](#)², [Lutz Vogt](#)², [Winfried Banzer](#)²

The results of the intended study will allow a better understanding of, and provide further evidence on, the local effects of SMR techniques and the underlying mechanisms for flexibility improvements.

PeerJ 2017, **Neurodynamic mobilization and foam rolling improved delayed-onset muscle soreness in a healthy adult population: a randomized controlled clinical trial**, [Blanca Romero-Moraleda](#)^{#1,2}, [Roy La Touche](#)^{#3}, [Sergio Lerma-Lara](#)^{#3}, [Raúl Ferrer-Peña](#)^{#3}, [Víctor Paredes](#)^{#1}, [Ana Belén Peinado](#)^{#2}, [Daniel Muñoz-García](#)

Effective in reducing pain perception after DOMS whereas only FR application showed differences for the MVIC in the rectus femoris and strength. maximum voluntary isometric contraction (MVIC) and muscle peak activation (MPA)

J Sport Rehabil 2019, **Acute Effect of 2 Self-Myofascial Release Protocols on Hip and Ankle Range of Motion**, [Amandda de Souza](#), [Cristiano Gomes Sanchotene](#), [Cristiano Moreira da Silva Lopes](#), [Jader Alfredo Beck](#), [Affonso Celso Kulevicz da Silva](#), [Suzana Matheus Pereira](#), [Caroline Ruschel](#),

The results suggest that SMR of the posterior thigh and calf muscles acutely increases the ROM of both hip flexion and ankle dorsiflexion and that duplicating the SMR volume from 10 to 20 repetitions per set seems not to promote additional gains.

J Hum Kinet 2017 , **The Effect of Foam Rolling on Recovery Between two Eight Hundred Metre Runs**, [Anthony D'Amico](#)¹, [Vincent Paolone](#)²

The purpose of this study was to examine the impact of foam rolling on recovery between two 800 m runs., Foam rolling between two 800 m runs separated by 30 min performed by trained male runners does not alter performance.

J Bodyw Mov Ther 2015 , **Effects of self-myofascial release: A systematic review**, [Chris Beardsley](#)¹, [Jakob Škarabot](#)²

Acutely, SMFR seems to increase flexibility and reduce muscle soreness but does not impede athletic performance. It may lead to improved arterial function, improved vascular endothelial function, and increased parasympathetic nervous system activity acutely, which could be useful in recovery. There is conflicting evidence whether SMFR can improve flexibility long-term., Conclusion: SMFR appears to have a range of potentially valuable effects for both athletes and the general population, including increasing flexibility and enhancing recovery.

Sports Med 2019 , **Do Self-Myofascial Release Devices Release Myofascia? Rolling Mechanisms: A Narrative Review**, [David G Behm](#)¹, [Jan Wilke](#)²

The term "self-myofascial release" is ubiquitous in the rehabilitation and training literature and purports that the use of foam rollers and other similar devices release myofascial constrictions accumulated from scar tissue, ischaemia-induced muscle spasms and other pathologies. Myofascial tone can be modulated with rollers by changes in thixotropic properties, blood flow, and fascial hydration affecting tissue stiffness. While rollers are commonly used as a treatment for myofascial trigger points, the identification of trigger points is reported to not be highly reliable. Rolling mechanisms underlying their effect on pain suppression are not well elucidated. Other rolling-induced mechanisms to increase range of motion or reduce pain include the activation of cutaneous and fascial mechanoreceptors and interstitial type III and IV afferents that modulate sympathetic/parasympathetic activation as well as the activation of global pain modulatory systems and reflex-induced reductions in muscle and myofascial tone. This review submits that there is insufficient evidence to support that the primary mechanisms underlying rolling and other similar devices are the release of myofascial restrictions and thus the term "self-myofascial release" devices is misleading.

J Bodyw Mov Ther 2018 , **Immediate effects of diaphragmatic myofascial release on the physical**

and functional outcomes in sedentary women: A randomized placebo-controlled trial, [Débora Fortes Marizeiro](#)¹, [Ana Carolina Lins Florêncio](#)², [Ana Carla Lima Nunes](#)³, [Nataly Gurgel Campos](#)⁴, [Pedro Olavo de Paula Lima](#)⁵

The diaphragmatic myofascial release techniques improve chest wall mobility, posterior chain muscle flexibility, and some movements of the lumbar spine in sedentary women. These techniques could be considered in **the management of people with reduced chest wall and lumbar mobility.**

J Sports Sci Med. 2019, **Effects of Vibration and Non-Vibration Foam Rolling on Recovery after Exercise with Induced Muscle Damage,** [Blanca Romero-Moraleda](#) 1 2, [Jaime González-García](#) 1, [Ángel Cuéllar-Rayó](#) 1, [Carlos Balsalobre-Fernández](#) 3 2, [Daniel Muñoz-García](#) 4, [Esther Morencos](#) 5

The results suggest that the VFR group achieved greater short-term benefits in pain perception and passive extension hip joint ROM. Both protocols were effective in improving PPT, SmO₂, CMJ and knee joint ROM. The enhanced improvement in VAS and hip ROM measures could have significant implications for VFR treatment.

Int J Environ Res Public Health 2022, **Chronic Effects of Foam Rolling on Flexibility and Performance: A Systematic Review of Randomized Controlled Trials,** [Jeffrey Cayaban Pagaduan](#) 1, [Sheng-Yuan Chang](#) 2 3, [Nai-Jen Chang](#) 4 5 6,

Results revealed that chronic FR demonstrated conflicting results for improvement of flexibility. On the other hand, a majority of the articles in this review showed no beneficial effects of FR on performance. Lastly, the effect of FR on recovery is unclear. These findings suggest the need for further studies to establish the consensus about the long-term application of FR in flexibility, recovery, and performance.