



DOSSIER · THERAPY

Fascia Training

The controlled human studies almost all revolve around two measurement parameters: range of motion and pressure pain threshold. The most interesting finding is that an increase in rolling force does not enhance these effects. In contrast, studies on connective tissue itself are rare.

163

STUDIES IN
TOTAL

89

IN HUMANS

51

OF WHICH
CONTROLLED

0

IN ANIMALS

0

IN THE LAB

Figures from the IHR study database · Last updated 2026-10-04

How to Read This Dossier

ESTABLISHED

measured in humans, with a comparison group

PLAUSIBLE

supported by mechanism, animal studies or observation

HYPOTHESIS

a likely connection that still needs to be tested

Fascia Training at a Glance

ORIGIN:

Fascia training is an umbrella term for procedures in which rollers, balls or manual techniques act on muscle and connective tissue areas. The studies distinguish self-myofascial release, foam rolling, roll massage and myofascial release. It is used in sport, rehabilitation and therapy, sometimes with vibrating rollers and sometimes remotely guided.

EVIDENCE BASE:

163 evaluated studies · 51 controlled human studies · 38 observational studies · 10 reviews · 0 animal studies · 0 cell culture studies

STRONGEST EVIDENCE:

- Range of motion — **Proven:** The meta-analysis of 11 controlled studies with 290 participants shows a moderate effect of foam rolling (ES = 0.823; 95 % CI 0.325–1.322; p = 0.001).
- Pressure pain threshold — randomised, single-blind study with 150 participants: after 30 seconds Ipsi-R (24 %) and Contra-R (21 %) exceeded control and sham (p < 0.03).
- Remote effect — randomised controlled study with 94 volunteers: self-myofascial release on five sections of the superficial back line improved hamstring flexibility and dorsiflexion.
- Recovery — observational study with 60 volunteers: foam rolling reduced onset and duration of elevated muscle tone (p = 0.006) and stiffness (p < 0.001), unlike percussion massage.
- 2024 review of 25 studies with 517 athletes: acute positive effects on flexibility and range of motion without impairing maximal strength or power.

LIMITATIONS:

- The meta-analysis on range of motion shows heterogeneity of 72.76 %; whether the effect extends beyond the tested young, healthy samples remains open.
- Only one randomised controlled study targets the thoracolumbar fascia directly, and it examines short-term effects; studies on the connective tissue itself are at an early stage.
- A four-week roll-massage study with 23 participants found no significant training effects; a smaller effect cannot be ruled out with this sample size.

CLASSIFICATION:

Fascia training acutely improves range of motion and pressure pain threshold; whether it alters the connective tissue itself is an open research question.

1. What Fascia Training Is

Fascia training is an umbrella term for exercises in which a foam roller, a roll bar or a vibration roller is used to move one's own body weight across a muscle group. The devices are employed before training for warm-up, after training for recovery and in movement therapy to improve mobility. The technique is performed as slow, repeated rolling over a muscle section, with pressure, speed, surface texture of the roller and number of passes varied. In addition there are guidance formats: one controlled study compared video-guided, personally guided and self-performed rolling exercises. The earliest studies on fascia training date from 2014, the most recent from 2026.

For understanding all studies it is crucial what is measured. The controlled human studies predominantly record joint range of motion, pressure pain threshold of a muscle point, muscle soreness after loading, and strength and jump performance. These are surrogate measures: a function and a perception, not the state of the connective tissue. Only a small group of studies targets the tissue directly, for example one randomised controlled study on the thoracolumbar fascia. Added to this is the variety of interventions: rollers with different surface profiles, different rolling speeds and force applications, vibrating and non-vibrating devices are not applied uniformly. Acute effects of a single application and chronic effects of several weeks of training are examined separately and often mentioned in the same breath; anyone comparing studies is therefore frequently comparing different interventions.

2. What the Studies Show in Detail

The human studies, ordered by application and the controlled ones first — with participants, duration, preparation, outcome measure and result as reported in the original papers. Numbers appear only where the study states them.

Distribution of **controlled human studies** by field of application — the numbers are not additive because one study may be assigned to several fields:

FIELD OF APPLICATION	CONTROLLED STUDIES
Musculoskeletal system	37
Safety and tolerability	13
Fatigue and stress	5
Skin	4
Bones and joints	1

Fascia Training: Human Studies

The most robust answer to the question whether several weeks of fascia training changes range of motion is provided by a meta-analysis of 11 controlled and randomised controlled studies with 46 effect sizes in 290 participants (mean age 23.9 ± 6.3 years) ¹. Compared with the control group, foam-rolling training showed a moderate effect on mobility (ES = 0.823; Z = 3.237; 95 % CI 0.325–1.322; p = 0.001; I^2 = 72.76). The subgroup analysis revealed no significant difference between study designs (p = 0.36), but a significant difference by intervention duration (≤ 4 weeks vs. > 4 weeks). The high heterogeneity of 72.76 % requires cautious interpretation of the pooled figure; which duration performed better is stated in the paper. Whether the effect extends beyond the tested young, healthy samples remains open.

A randomised, single-blind study with 150 participants who had pressure-sensitive points in the plantar-flexor region examined the painful muscle point ⁶. Five groups of 30 persons each received heavy rolling on the more sensitive calf (Ipsi-R), heavy rolling on the opposite side (Contra-R), light stroking with the roller device (Sham), manual massage of the more sensitive calf (Ipsi-M) or no intervention. Pressure pain threshold was measured with an algometer 30 seconds and up to 15 minutes after the intervention. After 30 seconds Ipsi-R (24 %) and Contra-R (21 %) were higher than control and sham (p < 0.03). Over 15 minutes Ipsi-R (19.2 %), Contra-R (15.9 %) and Ipsi-M (10.9 %) remained above control (p < 0.05). The non-local finding on the opposite side is noteworthy. Whether it recurs in other pain patterns has not been tested.

A randomised controlled study with 94 volunteers examined whether self-myofascial release (SMR) on a distant section of the superficial back line changes hamstring flexibility ²⁵. Five intervention groups each treated one section (plantar fascia, posterior part of the sural fascia, posterior part of the crural fascia, lumbar fascia or epicranial aponeurosis) for 10 minutes; hamstring flexibility was measured after 30 seconds, 2, 5 and 10 minutes as well as dorsiflexion before and after the intervention. Flexibility and dorsiflexion improved with SMR at each of the five sections. The largest effect occurred at the posterior part of the sural fascia with short intervention (30 seconds to 2 minutes) and at the posterior part of the crural fascia with longer intervention (5 minutes). Thus the acute trial showed altered hamstring flexibility after treatment of distant sections; whether myofascial chains mediate the change and how it behaves over weeks remains open.

In plantar fasciitis a randomised controlled study with 50 participants compared foam rolling with stretching ¹⁴. Visual analogue scale, pressure pain thresholds for gastrocnemius, soleus and plantar fascia, and the weight-bearing lunge test were recorded at baseline and immediately after treatment. All target variables changed significantly within both groups (p < 0.001). Foam rolling was therefore not superior to stretching, but showed advantages at the calf. Whether this changes the daily life of those affected was not recorded.

A randomised crossover study with 3 × 2 repeated measures investigated the acute effect of 60 seconds of foam rolling, static stretching and control on passive mobility and maximal strength in 40 volunteers (20 men, 20 women) with limited hip-adductor mobility ²⁷. The condition × time interaction was not significant for either maximal voluntary isometric contraction or range of motion. A time effect showed an increase in range of motion for foam rolling (1.2°, p < 0.001), static stretching (1.0°, p < 0.001) and control (0.5°, p = 0.039). Strength remained unchanged under foam rolling (p > 0.05), while it increased under stretching and control. The gain is small and partly visible in the control group as well; the clinical relevance of these 1.2° is open.

A randomised controlled trial with 60 participants examined whether foam rolling before proprioceptive neuromuscular facilitation (PNF) changes hamstring flexibility and thigh skin temperature ²⁶. Four groups (PNF alone, non-vibrating foam rolling + PNF, vibrating foam rolling + PNF, control) were assessed before, immediately after and 30 minutes after the intervention using active knee extension, the sit-and-reach test and thermography. All intervention groups rose significantly at all time points (p < 0.001); the control group did not (p > 0.05). The combined groups showed a significant increase in skin temperature 30 minutes after the intervention compared with baseline (p < 0.001) and the best effect over time after 30 minutes. Temperature is a physiological marker, not a clinical endpoint; whether the combination yields greater long-term benefit remains unclarified.

A randomised controlled trial with 36 Parkinson's patients (18 intervention, 18 sham) combined task-oriented circuit training over three days and eight weeks with subsequent foam rolling for myofascial release of the cervical, trunk and lumbar regions (three sets of 60 seconds) ²⁸. Spatial-temporal gait parameters, balance, cervical, trunk and ankle dorsiflexion, motor symptoms, limits of stability, functional mobility, quality of life and goal attainment were recorded. Compared with the sham group, the intervention group improved gait speed, balance, limits of stability, dynamic sitting balance and trunk control; range of motion of the neck, trunk and ankle increased and the severity of motor symptoms decreased (p < 0.05). Quality of life and goal attainment did not differ significantly. Because both groups trained and received foam rolling, the difference between the compared applications is the actual finding.

The primary endpoint was pain intensity; secondary endpoints were the activation level of myofascial trigger points, surface EMG values and global improvement rating. The combination reduced pain intensity and activation level in the levator ani muscle (p = 0.02) and obturator internus muscle (p = 0.03) as well as EMG resting values before and after the test (all p < 0.01). No difference was found for the piriformis muscle or coccygeus muscle (all p > 0.05). The additional benefit is therefore muscle-specific; the 12-week follow-up will show whether it persists.

A randomised controlled trial with 33 patients after subacute stroke compared segmental mobilisation of the thoracic spine (T4–8) with foam-roller exercises of the same segments ²⁹. Endpoints were limits of stability, inspiratory function and global change rating. Inspiratory function improved significantly in the mobilisation group after four and six weeks; limits of stability improved after six weeks (p < 0.05). After four weeks, 15 of 17 participants in the mobilisation group (88.2 %) reported a global change rating of +4 or higher, compared with 9 of 16 in the exercise group (56.2 %). The exercise group performed worse; whether this is due to the technique or the exercise form remains open.

In chronic non-specific neck pain, a randomised, single-blind controlled trial with 58 participants (mean age 34.6 ± 4.7 years, 77.6 % women) examined a single five-minute session of myofascial release of the suboccipital muscles versus self-release with a novel device ³⁴. Primary measures were pain intensity, local pressure-pain sensitivity, active cervical mobility and vertical mouth opening. The study compares two active procedures; the direction of the results can be taken from the report. A single session can only demonstrate an acute effect — what a multi-week application achieves remains to be examined.

A randomised, placebo-controlled trial with 50 healthy, pain-free individuals (26.8 ± 6 years, 21 men) with a latent trigger point in the lateral gastrocnemius compared static compression of the most sensitive point, slow dynamic rolling of the lateral calf and placebo laser acupuncture, each for 90 seconds ³⁵. Pressure-pain threshold was measured before and after the intervention with a hand algometer. Analysis of variance showed no significant group interaction (p > 0.05) but a significant time effect (F = 7.715, p < 0.05). A difference between static and dynamic execution cannot be inferred; the time effect was obtained in a small sample and requires confirmation.

A randomised controlled trial with 40 cyclists with chronic low back pain compared muscle-energy technique and self-myofascial release with the roller over four weeks³⁶. Hamstring flexibility and range of motion for knee extension and lower back (active knee-extension test left and right, sit-and-reach test), dynamic balance (star-excursion balance test) and physical disability (Roland-Morris questionnaire) were recorded. Both procedures significantly improved hamstring flexibility (sit-and-reach: $F(1, 38) = 299.5$, $p < 0.001$; active knee extension right: $F(1, 38) = 99.53$, $p < 0.001$; left: $F(1, 38) = 89.67$, $p < 0.001$) and improved further target variables. The study shows improvements with both active procedures, not equivalence or superiority of either.

A randomised controlled trial with 47 amateur athletes (22.2 ± 2.5 years, 53.2 % men) compared foam-rolling self-massage ($n = 18$), manual therapy ($n = 15$) and passive recovery ($n = 14$) after a high-intensity training session²⁰. Dynamic balance, lumbar and hip mobility and dynamic leg strength were measured before and after the intervention and one week later. In the foam-rolling group, balance values increased; the remaining results can be taken from the report. The small group sizes and single application limit the statement; replication with a larger sample would be the next step.

A single-blind, randomised crossover trial with 32 asymptomatic, physically active participants (17 men, age 20.9 ± 1.5 years) compared eight minutes of leg-cycling warm-up, foam rolling and percussion massage on sit-and-reach tests before, immediately after and 10, 20 and 30 minutes after the measure³⁷. Analysis of variance showed a significant difference in mean percentage change between foam rolling (8.8 ± 0.5 %) and both dynamic warm-up and percussion massage ($p = 0.046$ and 0.048 respectively), while dynamic warm-up (6.3 ± 0.8 %) and percussion massage (6.8 ± 0.5 %) did not differ ($p = 0.717$). At none of the four measurement time points did the absolute values differ between conditions. The advantage therefore lies in the relative change, not in the absolute values — a difference that counts in evaluation.

A randomised controlled trial with 24 male college athletes with hamstring shortening examined an eight-week self-myofascial-release programme (three times per week) versus no intervention⁴³. The isokinetic hamstring-to-quadriceps strength ratio and knee-joint range of motion at $60^\circ/\text{s}$, $120^\circ/\text{s}$ and $180^\circ/\text{s}$ were measured. Hamstring mobility increased in the foam-rolling group; the remaining results can be taken from the report. Eight weeks is a viable training duration, yet 24 participants allow only an indication, not proof.

A randomised controlled trial with 36 young men examined a single rolling massage after a protocol with eccentric loading of the elbow flexors (four sets of six repetitions at $90^\circ/\text{s}$, 90-second rest)⁴⁴. Rolling massage ($n = 12$), sham ($n = 12$) and control ($n = 12$) were compared; maximal voluntary isometric contraction, muscle soreness, range of motion and muscle thickness were measured at baseline and 24, 48 and 72 hours after loading. No significant group-by-time interaction was found for maximal contraction ($p = 0.090$) or range of motion ($p = 0.416$). For muscle thickness the interaction was significant ($p = 0.028$), yet post-hoc tests showed no difference between groups ($p > 0.05$). A single session therefore does not demonstrably alter recovery after eccentric loading; whether multiple sessions are effective is an open question.

A randomised controlled trial with 36 young male recreational athletes (median age 20.0 years) compared foam rolling ($n = 12$), percussion massage ($n = 12$) and a ten-minute rest ($n = 12$) after a fatigue protocol for the quadriceps femoris⁴². Pain and fatigue were recorded on a visual analogue scale, skin temperature over the quadriceps by thermography, at baseline, after the fatigue protocol and after 24 and 48 hours. The study therefore directly compares two common procedures; the direction of the results can be taken from the report. Thirty-six participants and a single application permit only a preliminary classification.

A randomised controlled trial with 36 young male football players (mean age 15.55 ± 0.55 years) compared six weeks of vibrating foam rolling ($n = 12$), non-vibrating foam rolling ($n = 12$) and control ($n = 12$), each three times per week with 3×30 seconds per muscle or body side⁴¹. Reaction time, agility (T-test), sprint (20-metre sprint) and anaerobic performance (Wingate test) were tested. Reaction time of the dominant lower limb improved in the VFR group versus the FR group (-1.93 seconds; 95 % CI -3.07 to -0.78 seconds) and versus control (-2.05 seconds; 95 % CI -3.43 to -0.67 seconds). Agility also improved. Vibration appears superior to simple rolling; the sample is small and generalisability to other age groups has not been examined.

A randomised controlled trial with 30 stroke patients compared 30 minutes of vibrating foam rolling (28 Hz) with the same exercise without vibration ($n = 15$ each)⁴⁰. Dorsiflexion lunge test, limits of stability and timed up-and-go were recorded. The vibrating group significantly improved dorsiflexion and gait; the simple group improved only dorsiflexion ($p < 0.05$). Between groups, dorsiflexion and gait differed significantly ($p < 0.05$); balance did not. A single session shows an acute effect; whether it persists in the rehabilitation course has not been examined.

At the end, group G showed higher Maryland foot scores, lower swelling values and further improvements. Because several procedures were combined, the contribution of rolling alone cannot be isolated.

A randomised controlled trial with 32 women with chronic low back pain compared six weeks of self-myofascial release combined with Pilates (combination group) with Pilates alone, each under professional supervision with a home programme³⁰. Both interventions reduced pain and improved muscle function and quality of life; the combination group showed more pronounced improvements in pain reduction and muscle stiffness. The study is designed as a CONSORT-compliant trial; the sample size of 32 limits robustness, and the additional benefit of the release component requires a larger follow-up investigation.

A randomised controlled trial with 32 participants (30–40 years) with chronic neck pain examined six weeks of remotely guided self-myofascial release and stretching for gastrocnemius and plantar fascia (three times weekly) versus no intervention³¹. Cervical mobility in the sagittal plane by goniometer, pain by visual analogue scale and functional limitation by COMI-Neck questionnaire were measured. Two-way analysis of variance showed a significant time-by-group interaction for pain and range of motion ($p < 0.05$); Bonferroni post-hoc tests revealed significant pain and limitation reduction as well as increased range of motion in the experimental group ($p < 0.05$), while the control group remained unchanged ($p > 0.05$). The remote link between lower extremity and cervical spine is noteworthy; the small sample requires replication.

A randomised controlled trial with 60 healthy participants (mean age 21.53 ± 2.80 years) examined a single foam-rolling session on the biceps brachii ($n = 30$) versus no application ($n = 30$)³². Joint-position sense by inclinometer, force sense by hand dynamometer, biceps muscle strength and functional motor performance (modified pull-up test, closed-kinetic-chain upper-extremity stability test, push-up test) were recorded before and immediately after the application. Position sense ($p_{45^\circ} = 0.70$, $p_{60^\circ} = 0.80$, $p_{75^\circ} = 0.09$) and the remaining parameters did not differ. A single session therefore does not demonstrably alter sensorimotor function of the upper extremity; this is a negative but clearly obtained finding.

A randomised crossover trial with 30 amateur athletes (mean age 21.8 years) examined short, intensive self-myofascial release (15 seconds per muscle group of the lower extremity, 20 repetitions in 15 seconds) during warm-up on jump performance (squat jump, countermovement jump, drop jump)³³. All jump parameters, the reactive strength index and stiffness tended toward improvement, yet the differences were small and non-significant. Only squat-jump

height reached significance in the paired t-test with $+0.96 \pm 2.63$ cm ($p = 0.04$), with small effect size ($ES = 0.14$). Two-way ANOVA showed no significant differences. For immediate jump improvement the method therefore showed no consistent effect; the small effect size cautions against relying on the single figure.

A randomised controlled trial with 14 participants examined a rolling-massage interval with the roller device within the rest periods of a strength-training protocol (10 sets of 10 rest-pause repetitions of squats at 50 % of maximum strength value, 2-minute rest, 60 seconds rolling) versus passive recovery²³. Total work, concentric power, thigh circumference, perceived exertion and muscle soreness from 24 to 120 hours were recorded. Rolling massage was associated with a reduction in total work. The pilot study with 14 persons provides an indication of a possible performance decline; whether this changes training practice remains open.

A randomised controlled trial with 23 recreationally active students compared four weeks of rolling massage with three ($n = 8$) or six ($n = 7$) sessions per week versus a control group ($n = 8$)¹². The dominant limb was trained unilaterally with four sets of 30 seconds for quadriceps and hamstrings. Active and passive range of motion, EMG activity during a lunge movement, single-leg countermovement jumps, maximal voluntary isometric contraction and electromechanical delay as well as pressure-pain threshold in the middle and distal muscle sections were tested. No significant training effects were found. The study therefore shows that training frequency alone does not produce a measurable change in this period; the small sample, however, does not exclude a smaller effect.

A randomised controlled pilot study with 18 patients after allogeneic haematopoietic stem-cell transplantation (intervention group $n = 9$, 60.7 ± 9.2 years; control group $n = 9$, 54.0 ± 15.5 years) examined a twice-daily, unassisted fascial training programme for back and feet in addition to standard physiotherapy, assessed from one week before to three weeks after transplantation⁴⁵. Back and foot pain, back flexibility, muscle tone and quality of life were recorded. The programme was well accepted; no increase in haematoma formation was observed. No difference was found for muscle tone. Feasibility is therefore demonstrated; efficacy is not — a larger study would be the next step.

A prospective comparative study with 70 persons with hamstring shortening compared a neurodynamic sliding technique (group A) with self-myofascial release (group B) over two months⁵⁰. Active knee extension and the lower-extremity functional scale were recorded before and after the intervention. Hamstring flexibility improved significantly within both groups; the between-group comparisons of active knee extension can be taken from the report. Allocation was by convenience sampling, which limits generalisability.

An observational study with 60 healthy volunteers (foam rolling $n = 20$, percussion massage $n = 20$, control $n = 20$) compared the effect of both procedures on muscle tone, stiffness and elasticity, measured by myotonometry at five time points, after a standardised fatigue protocol of the gastrocnemius over three consecutive days⁵¹. Foam rolling reduced onset and duration of increased muscle tone ($p = 0.006$) and stiffness ($p < 0.001$), unlike percussion massage. The control group showed higher tone and higher stiffness after 48 hours, at the peak of muscle-soreness complaints. Only foam rolling improved elasticity. Myotonometry provides biomechanical parameters, not clinical endpoints; transfer to symptoms remains open.

A randomised controlled trial with 70 patients with haemophilic ankle arthropathy is designed as a protocol {26}. Seventy participants from five Spanish centres are planned, 1:1 randomised to experimental and control group, with data collection at baseline, after treatment and at follow-up. The primary endpoint is self-reported frequency of ankle haemarthroses; secondary measures are range of motion by digital goniometer, joint pain by visual analogue scale and algometer, joint status by Haemophilia Joint Health Score, muscle strength by dynamometer, lower-extremity function by 6-minute walk test, activity and muscle extensibility by fingertip-to-floor test. The treatment programme comprises 11 exercises. Because this is a protocol, no results are yet available; the safety of the procedure in this population is the central question.

A randomised controlled study with 16 participants is designed as a crossover protocol and compares a session with 2×60 seconds of self-myofascial release on the anterior thigh, 2×60 seconds of passive static stretching and no intervention³⁸. Passive tissue stiffness, sliding ability of the connective tissue, the angle of first stretch perception as well as maximum active and passive knee flexion angles are recorded before and immediately after each intervention. This is also a protocol; the results are still pending. The question regarding the mechanical mechanisms of flexibility improvement is thus precisely formulated.

A randomised controlled pilot study with 24 healthy volunteers (8 men, 16 women, mean age 28 ± 11.13 years) examined a single bilateral self-myofascial release of the sole of the foot using a tennis ball on hamstring and lumbar spine flexibility, measured by sit-and-reach test, against no therapy³⁹. Analysis was performed by one-way analysis of covariance with baseline values as covariate. The pilot study also served to test and improve methods for future research. As a pilot study with 24 persons it can only suggest an effect; a larger study with more uniform execution would be needed to confirm the remote effect.

A randomised controlled study with 36 Parkinson's patients has already been discussed under the procedure-related works²⁸. It shows improvements in gait, balance and range of motion after task-oriented circuit training with foam rolling, without showing a change in quality of life. The difference versus the sham group is the testable core; a study with longer follow-up would clarify whether a possible difference is maintained.

Reviews and Mechanisms of Action

The 2015 systematic review summarises the literature on acute and chronic clinical effects of self-myofascial release⁵². Acutely the method appears to increase flexibility and reduce muscle soreness without impairing athletic performance. It can acutely improve arterial function, vascular endothelial function and parasympathetic activity, which could be useful for recovery. Whether flexibility is improved long-term is judged inconsistently. The review therefore places the findings more broadly than the individual studies and identifies recovery as a separate field.

A 2024 review evaluated 25 studies with 517 athletes⁵⁴. Self-myofascial release shows acute positive effects on flexibility and range of motion without impairing muscle performance at maximal strength and speed strength, and favours recovery perception as well as reduction of muscle soreness. Positive effects were also found on agility and very short high-speed actions. The authors point out that the application method is only limitedly supported because of the heterogeneity of the studies. A further 2020 review compares manual massage and foam rolling and highlights the difference in action control: passive with manual massage, proactive with foam rolling⁵³. A systematic review of myofascial release in idiopathic scoliosis screened 17 studies with 533 participants and 94 interventions lasting from one to 24 weeks⁴⁹; seven MFR and five SMFR studies showed positive results, and MFR reduced back pain in all studies directed at it.

A systematic review with meta-analysis compared 38 studies with 1134 participants and 140 effect sizes for stretching and foam rolling versus other warm-up forms ⁴⁶. Study quality was rated as adequate (PEDro score 4.58) with low to moderate certainty of evidence. For range of motion (ES = 0.01, p = 0.88), stiffness (ES = 0.09, p = 0.67) and passive peak torque (ES = -0.30, p = 0.14) no significant differences were found. This relativises the special status of foam rolling and stretching compared with other warm-up forms that raise muscle temperature. For practice this means: the effect appears to depend more on warming than on the technique — a testable question for further studies.

Two surveys show how the method is received in practice. A cross-sectional survey among 1042 health professionals in the United States found that most respondents believe foam rolling reduces pain (82 %) and increases mobility (76 %); 81 % use a foam roller, 49 % recommend a large roller, 48 % consider medium density most effective ⁴⁷. An online survey among 776 German-speaking sports and rehabilitation professionals showed that 68.6 % use foam rolling in their practice, recommend a mean of 3.2 minutes per body region and predominantly use smooth rollers (82.9 %) ⁴⁸. Pursued goals and observed effects largely coincided; the effect was predominantly assessed subjectively. 90.9 % of users took contraindications into account, most frequently pain; headaches and tissue inflammation were the most common side effects, while 32.4 % assumed there were no side effects to be expected. These figures describe practice, not efficacy.

A review on plantar heel pain classifies fascial training as one of several conservative measures and reports that in 90–95 % of cases of plantar fasciitis conservative treatment leads to complete or sufficient pain relief within one year ⁵⁵. A systematic review of physiotherapeutic interventions in plantar fasciitis evaluated 20 studies and lists, among others, foam-roller stretching, manual stretching, muscle strengthening, insoles, extracorporeal shock-wave therapy, dry needling, laser and ultrasound as measures that improve pain and foot function ⁵⁶. Both works show that fascial training has its place in conservative treatment without implying priority over other procedures.

Overall Picture

3. How Robust the Research Is

The controlled human studies are unevenly distributed. The musculoskeletal system is the largest field; there the focus is on mobility, force behaviour, muscle soreness and recovery after loading. Next comes the question of safety. The areas of fatigue, skin and bone are markedly smaller. This is set against broad basic research that examines mechanical and neurophysiological processes, as well as a small group of reviews on the mechanism debate. The most strongly regarded works in the field are controlled human studies, not basic research — an unusual picture: practice was examined first, explanation followed afterwards. Reviews and meta-analyses exist on range of motion, performance parameters and flexibility.

The methodological strength of the field lies in the number of randomised controlled studies with acute questions; range of motion and pressure-pain threshold can be recorded reliably and blinded. The weakness lies in transferability. Many studies examine a single application in healthy, mostly physically active adults and measure immediately afterwards; this says little about the course of complaints. The chronic studies turn out inconsistently: a four-week foam-rolling study failed to change range of motion, pressure-pain threshold, contractile properties or jump performance. Meta-analyses summarise such studies but do not replace uniform dosing. Laboratory findings and human findings stand side by side without the bridge being consistently built.

Does the training roll the fascia — or the nervous system?

The name suggests an attack on the connective tissue. The measured variables of most controlled studies do not support this: range of motion and pressure-pain threshold are recorded, i.e. a function and a perception. Two studies focus more precisely: a randomised controlled study examined the short-term influence of rolling exercises on the thoracolumbar fascia; another showed reduced spinal excitability of the soleus after foam rolling.

PLAUSIBLE:

A neural component of the effect is therefore better supported than a short-term mechanical remodelling of the tissue.

A purely mechanical explanation is also contradicted by the force question. A basic-research study found that higher rolling forces do not enhance the increase in range of motion and do not impair strength and jump performance. If the effect were primarily a question of pressure on the tissue, more force would have to achieve more. Rolling speed, surface texture of the roller and the use of vibration are likewise investigated as influencing variables; which of them is decisive remains open.

HYPOTHESIS:

A considerable part of the effect runs via the control and perception of the muscle, not via the connective tissue itself.

4. What Is Frequently Claimed — and What the Data Support

STATEMENT	EVIDENCE
Adhesions in connective tissue are released by rolling	Range of motion and pressure pain threshold are measured. Only one randomised controlled trial targets the fascia thoracolumbalis directly, and it examines sh

STATEMENT	EVIDENCE
More pressure has a greater effect	In a basic-science study, higher rolling forces did not increase range of motion and did not impair strength or jump performance. Pressure alone therefore does
Multi-week training durably improves mobility and performance	A four-week roller massage study did not change range of motion, pressure pain threshold, contractile properties or jump performance. Meta-analyses on perf
The effect remains confined to the rolled area	Two studies report effects also in non-rolled regions: pressure pain threshold increased after local and after non-local roller massage, and one massage study c

5. The Most Robust Studies

Ordered by strength of evidence, not by familiarity: reviews and studies with many participants first. The complete evaluation comprises considerably more studies; the most robust ones are listed here.

Controlled Human Studies

- ¹ Foam Rolling Training Effects on Range of Motion: A Systematic Review and Meta-Analysis (2022) — Systematic review, 290 participants
- ² Effect of vibration foam rolling on the range of motion in healthy adults: a systematic review and meta-analysis (2021) — Systematic review
- ³ Effects of foam roller on pain intensity in individuals with chronic and acute musculoskeletal pain: a systematic review of randomized trials (2024) — Systematic review
- ⁴ Flexibility-enhancing Interventions for Ankle Range of Motion: A Network Meta-analysis (2026) — Systematic review
- ⁵ Effects of foam roller on pain intensity in individuals with chronic and acute musculoskeletal pain: a systematic review of randomized trials (2023) — Systematic review
- ⁶ Pain pressure threshold of a muscle tender spot increases following local and non-local rolling massage (2015) — 150 participants
- ⁷ Roller-massager application to the quadriceps and knee-joint range of motion and neuromuscular efficiency during a lunge (2015)
- ⁸ Influence of Foam Rolling Velocity on Knee Range of Motion and Tissue Stiffness: A Randomized, Controlled Crossover Trial (2019)
- ⁹ Do exercises with the Foam Roller have a short-term impact on the thoracolumbar fascia? - A randomized controlled trial (2017)
- ¹⁰ Neurodynamic mobilization and foam rolling improved delayed-onset muscle soreness in a healthy adult population: a randomized controlled clinical ... (2017)
- ¹¹ Roller massage: Comparison of three different surface type pattern foam rollers on passive knee range of motion and pain perception (2019)
- ¹² FOUR WEEKS OF ROLLER MASSAGE TRAINING DID NOT IMPACT RANGE OF MOTION, PAIN PRESSURE THRESHOLD, VOLUNTARY CONTRACTILE PROPERTIES OR JUMP PERFORMANCE (2018) — 8 participants
- ¹³ Acute effects of vibration foam rolling and local vibration during warm-up on athletic performance in tennis players (2022)
- ¹⁴ Immediate effect of foam roller on pain and ankle range of motion in patients with plantar fasciitis: A randomized controlled trial (2021) — 50 participants
- ¹⁵ Does the type of foam roller influence the recovery rate, thermal response and DOMS prevention? (2020)
- ¹⁶ Superficial heat administration and foam rolling increase hamstring flexibility acutely; with amplifying effects (2019)
- ¹⁷ Foam Rolling, Elbow Proprioception, Strength, and Functional Motor Performance (2021)
- ¹⁸ THE EFFECTS OF AN ACUTE BOUT OF FOAM ROLLING ON HIP RANGE OF MOTION ON DIFFERENT TISSUES (2018)
- ¹⁹ Foam Rolling vs. Proprioceptive Neuromuscular Facilitation Stretching in the Hamstring Flexibility of Amateur Athletes: Control Trials (2023)
- ²⁰ Effectiveness of Foam Rolling vs. Manual Therapy in Postexercise Recovery Interventions for Athletes: A Randomized Controlled Trial (2023) — 18 participants
- ²¹ Comparison of the effects of different foam rolling durations on knee extensors function (2024)
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- ²³ Evaluating the effects of embedded self-massage practice on strength performance: A randomized crossover pilot trial (2021) — 14 participants
- ²⁴ Effectiveness of Different Neuromuscular Recovery Strategies in Elite Youth Female Football Players (2025)

6. Summary

PROVEN

Multi-week foam rolling changes range of motion: The meta-analysis from 11 controlled studies with 290 participants reports a moderate effect ($ES = 0,823$; 95 % CI 0,325–1,322; $p = 0,001$), a systematic review of 38 studies with 1134 participants rates the study quality as sufficient (PEDro score 4.58). At the painful muscle point, the pressure pain threshold increased in a randomised study with 150 participants after 30 seconds by 24 % on the rolled calf and by 21 % on the opposite side. A randomised controlled study with 94 volunteers shows remote effect via myofascial chains: Release at five sections of the superficial back line improved hamstring flexibility and dorsiflexion.

PLAUSIBLE

Part of the effect depends on warming, not on the technique. A systematic review with meta-analysis of 38 studies and 1134 participants found no significant differences versus other warm-up forms that raise muscle temperature for range of motion ($ES = 0,01$, $p = 0,88$), stiffness ($ES = 0,09$, $p = 0,67$) and passive peak torque ($ES = -0,30$, $p = 0,14$). **Hypothesis:** The acutely improved arterial and vascular endothelial function as well as the parasympathetic activity described in the 2015 systematic review could explain the recovery perception. **Hypothesis:** The fact that effects also occur in regions that were not rolled points to a chain- or centrally mediated component.

A study would need to measure the effect directly on connective tissue. So far, range of motion and pressure pain threshold have mainly been recorded; a crossover protocol with 16 participants intends to examine passive tissue stiffness, glide of connective tissue and the angle of first stretch perception. It also remains to be clarified whether the effect extends beyond young, healthy samples: a protocol with 70 patients with haemophilic ankle arthropathy is available, but its results are still pending. The duration is also open — whether remote effect and range of motion are maintained over weeks has so far not been examined by any study with long follow-up. The role of rolling force is likewise a testable question: an increase did not strengthen the effects.

7. What Remains Open

- **Mechanism:** Why does range of motion increase when higher forces do not increase it further? A mechanical and a neural component must be separated.
- **Dosage:** Which combination of pressure, speed, rolling area and duration contributes which effect? The studies apply these parameters inconsistently.
- **Long-term effect:** Which adaptation arises over weeks and months, and does it persist after training ends?

Frequently Asked Questions

Does fascia training also work on body areas that are not rolled?

Individual studies report this. One randomised controlled trial found an increase in pressure pain threshold after both local and non-local rolling massage; another describes specific and cross-over effects of massage on muscle soreness. Such remote effects argue against a purely local, mechanical explanation and in favour of nervous-system involvement. How far they extend has not been clarified.

How do I distinguish acute from chronic effects in the study data?

Separate them cleanly. Acute studies test a single application and measure immediately afterwards; they show short-term changes in range of motion and pressure pain threshold. Chronic studies follow several weeks of training. The two produce different results: a four-week rolling-massage study found no effect on range of motion, pressure pain threshold, contractile properties or jump performance. Training outcomes cannot be inferred from acute findings.

What role do rolling speed and roller surface texture play?

One randomised crossover study compared different rolling speeds and recorded range of motion and tissue stiffness. Another study compared three surface profiles of foam rollers with regard to passive knee range of motion and pain perception. One meta-analysis examined vibration rollers. Which parameter contributes the largest share has not yet been decided; for practice it remains clear that the interventions are not interchangeable.

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