Vibration Therapies, from Massage Guns to Jacuzzis

What are the medical benefits of vibrating massage and other kinds of tissue jiggling?

Paul Ingraham • Sep 19, 2022 • 20m read

I was fascinated by vibrating beds in hotel rooms when I was a kid in the 70s and 80s. They were "fun" but puzzling: why was it a *thing?* Vibration is paradoxically both relaxing and/or stimulatory, but generally pleasant — it is a kind of massage, after all. But maybe it's something a little more "magical" too. There are a few familiar types of common coarse vibrational therapies:

- Vibrating massage chairs and tools, especially the "**massage gun**" devices that have exploded in popularity in the last few years. (Massage guns used to mainly be called "thumpers," but that term seems passé now. The "gun" thing has just taken over, probably thanks mostly to the dominant brand, Theragun.)
- Jacuzzi jets that thoroughly jiggle your soft tissues while you soak.
- Vibrating exercise platforms that shake your whole body as a form of workout.

Whole lotta shakin' going on! These are all obviously flesh jiggling, *physical* vibration, and this article is mostly about those macro-scale vibrational therapies, especially massage guns. I will explain the possible biological and neurological effects, some which are intriguing, and especially why it feels so good; give some practical tips and product recommendations; and explore some painful conditions where vibration might be most useful, using frozen shoulder particularly as one of the best-case scenarios for vibration.

I was a Registered Massage Therapist with a busy practice in Vancouver, Canada, from 2000–2010, RIP. After that, science journalism and this website took over my career and they remain my sole focus today. See my bio. This is one of dozens of articles on PainSci in the massage category.

Do massage guns work?

Few people take *percussion therapy* seriously, but many are willing to buy and try because it feels good and it *might* be helpful. But helpful how? Feeling good obviously has some value, but most of the *medical* claims are either true but trivial … or overstated bullshit. *Performance* and especially *recovery* are the big themes: vibration supposedly helps muscles do what they do, and get back to normal after they've done it. Is there any truth to that?

Maybe a kernel, probably no more. The science is thin and inconclusive. The only available scientific review of vibration for DOMS is junk science, completely useless. [1] Despite that stain on the literature, there are still a handful of trials of interest. I'll use Broadbent *et al.* as an example. [2] It seems mostly fine, if a bit underpowered.

The science of vibration for muscle recovery is thin & inconclusive — of course.

It was a test of vibration therapy on sore muscles in runners: 29 recreational runners were asked to run downhill for 40-minutes, which is about as reliable a recipe for DOMS as can be devised for a bunch of typical recreational runners. Only the legs of elite runners are ready for a challenge like that, and not all of them. Half of the runners were given "once-daily sessions of vibration-therapy on the upper and lower legs," and the other received no treatment. Vibrated muscles were less sore and had fewer blood markers associated with soreness. Which gets my attention. The authors concluded:

> "Vibration therapy reduces muscle soreness and interleukin-6. It may stimulate lymphocyte and neutrophil responses and may be a useful modality in treating muscle inflammation."

Intriguing, but also far from conclusive. [3] There is one other like this — a study with positive results and no obvious problems [4] — but it's not enough. There might be something here, but we just won't know until some larger, better tests are done.

Vibration and flexibility: a consolation prize

The only actually persuasive good-news evidence I know of shows that vibration seems to have a clear effect on flexibility. It appears that if you just add some *vibration*, even already flexible gymnasts can get a surprising boost in flexibility, [5] [6] [7] at least temporarily. That seems like a plausible neurological effect on flexibility … and a neat one. It also seems consistent with the modern theory that flexibility is a function of *sensory tolerance* of stretch, rather than modified tissue [8] — an idea explored in detail in my stretching article.

There's just one little problem: the value of flexibility is actually quite low. It is highly overrated, along with stretching. [9] Vibration may deliver flexibility, and that's cool, but it's also not a big deal.

That bizarre 2021 study of "robotic mouse massage"

Massage science rarely makes a big splash, but a strange new study did in 2021 with *this* extraordinary claim: "robotic" massage of mice supposedly helped their little muscles heal. [10]

It was an elaborate, high-tech study of massaging injured mouse muscles with high doses of vibration purports to find evidence that massage is "antinflammatory" and "regenerative." (Importantly, no such clinical phenomenon is evident in humans.) Public statements by the researchers were strongly hyperbolic and cast doubt on their competence. While some of the findings are intriguing, it's extremely unlikely that they are replicable or clinically relevant in people. It is important to study and confirm the clinical effects of massage *before* doing complex animal research to try to explain how they work. This study is a classic example of a "fishing" expedition: a search for meaningful signals in a lot of complex data.

But the headlines were credulously shared by countless massage therapists on social media, while the massage gun industry rejoiced. I rolled my eyes and started warming up my debunking muscles. You can read my detailed analysis here: "Robotic Mouse Massage: Is It 'Regenerative' and 'Anti-Inflammatory'?"

Shooting yourself with a massage gun is mostly just a bit of *massage* – which is both good and bad

I use massage guns myself — somewhat sheepisly, because I'm not really sure *why*. I use them for the same (murky) reasons I still pay for massage therapy sometimes: it feels

good, it's a morale boost, and it seems to have a shot at relieving some stiffness and aching associated with "muscle knots." [11] I don't expect much else.

And massage guns are just self-serve massage. Whatever value massage therapy has, massage guns can deliver a little bit of that in the comfort of your own home. But what does massage therapy have? The **medical benefits of massage therapy** are weaker than most people assume — even the kind of massage that's delivered by hand, skilfully combining many different techniques. [12] The profession is riddled with myths, pseudoscience, and unjustified claims. [13] For instance, massage does not relieve workout soreness, [14] and does not "increase circulation."

Vibrating massage is a thin slice of the massage therapy pie, with the cherry-on-top idea that there's something about *vibration specifically* that is a potent "active ingredient" in massage. But almost nothing has ever been "clinically proven" *or disproven* about *any* kind of massage at all, let alone this narrow sub-type. This is mostly an evidence-free zone, ruled by marketing and not science.

But vibration is interesting, there's no question it can feel terrific, and on a case-by-case basis it might be worth trying. Just keep your expectations on a short leash, and see below for some more information about the potential for serious side effects.

"Vibrations" and "frequencies" and "resonance" – surprisingly huge themes in both medicine and quackery

Waves and oscillations are an extremely fundamental aspect of nature at all scales. This doesn't translate into many clear clinical implications, but that hasn't stopped people from trying. There are several types of subtler vibration therapies, all glowing with the promise of exotic biological benefits and "stimulating" tissue back to full vitality:

- many flavours of ultrasound
- infrared radiation (heat, which is molecular vibration)
- electrical and magnetic stimulation [15]
- even frickin' lasers!•*pew pew!*•

These are mainly *micro*scopic vibrations aimed at your cells and molecules, at a wide range of frequencies and tiny amplitudes, with the idea that cells like to "dance" to certain tunes. But most such methods are *not* promising, and to date there are almost no examples of any vibrational therapy that truly delivers the goods — just a handful of very specific applications. For instance, we know that you can blast kidney stones with sound waves, some deep brain stimulation techniques seem to have genuine clinical value.

And then there's the bullshit…

Quackery's love affair with vibration

There are many fanciful claims about vibration that overlap with "energy medicine," most of them cluelessly referencing "frequencies" and quantum physics. Crystal healing is a classic example. Another is homeopathy, which depends heavily on the bizarre belief that substances can make a *vibrational imprint* on water, which is then transmitted to us. "Bioresonance" is less famous, but a particularly pitch perfect example.

And on and on it goes: countless snake oils over the decades have hitched their wagon to the credibility of physics by referencing energies, frequencies, resonance, entrainment and so on.

A good condition to shake up: frozen shoulder

Frozen shoulder gives us one of the single best examples of how vibration might be therapeutically useful, but it also greatly depends on the details. Vibration might be more useful for folks with **frozen shoulder (AKA adhesive capsulitis)** than many other conditions, if the freezing is "functional." In some cases (or even many), the joint may be immobilized because it's partially or even entirely *neurologically inhibited* (think "spasm") rather than physically limited by contracture/adhesion — see The Role of "Spasm" in Frozen Shoulder.

Vibration might be quite a good way to disrupt that inhibition.

Even if a case of frozen shoulder is completely dominated by contracture, it's still a condition that relies heavily on the use-it-or-lose-it principle, and there's probably usually some inhibition piled on top of the contracture. Vibration could help eliminate that, creating a window of opportunity for as much movement as the contracture can possibly allow — and every little bit counts.

How does it do this? Probably the same way that vibration improves flexibility (discussed above). Flexibility is mainly a function of our "tolerance" of stretch rather than the actual physical looseness of our tissues. In other words, our brains detect excessive stretch and actively block us from going further than it thinks we should, by *inhibiting* our attempt to reach further — a kind of brain-imposed paralysis. "You shall not pass!" Vibration probably interferes with that inhibition, essentially "confusing" the brain about what an acceptable level of stretch is. If vibration can interfere with *that* inhibition, it might well also be able to free up a badly inhibited shoulder. A frozen shoulder is basically just a shoulder you cannot "stretch."

Even if it's just a temporary, minor effect, it would still be an extremely useful way to facilitate range of motion exercises. My advice is to integrate vibration into your rehab plan, using it as a way to improve the odds that you'll be able to move further.

To be clear, there is no evidence that this is the case. *This is just a hypothesis.* But it's a really promising one, I think.

Please experiment: try range of motion exercises before vibrating, and then try again after vibrating. Is there an obvious difference?

Why does vibration feel so good?

Vibration is inherently relaxing for most people, assuming it isn't applied too suddenly or intensely or in an uncomfortable location. I think there are a couple reasons for this:

1. **Proprioceptive confusion.** Proprioception is the sense of position or movement, our under-appreciated "sixth" sense. If you move or shake the body at random, the cerebellum gets a deluge of nonsensical proprioceptive data, sensory information about movements that the brain did not plan. Assuming a safe and healthy emotional context, the nervous system, overwhelmed by the flood of stimuli, willingly "gives up" and stops resisting the movement — an unusual state.

2. **Sensory novelty.** Fresh and unusual sensations are the bedrock of massage therapy: when we get a good massage, we experience many sensations that are unique to that context, and that is half the appeal. But vibration delivers especially strong and distinctive sensory novelty: it feels like nothing else, and it feels like the *opposite* of feeling stuck. Like splashing cool water on your face when you're hot, vibration feels like a natural antidote to stillness, stiffness, and stagnation.

To a minor extent, these effects might explain why people like the subtler, finer vibration therapies like TENS — but the "confusion" and "novelty" are also subtler, and the relaxation effects are definitely less profound.

Other conditions to vibrate, or not, and why

Other conditions where movement dysfunction might be a significant factor, and a bit of why, and therefore might be helped by vibration:

- Both low back pain and neck pain, because they involve substantial fear factors. Gentle vibration can be surprisingly comforting and pleasant at the same time that it's stimulating.
- Muscle strain, because it's a way to physical stimulate injured tissue without physically stressing it. I would vibrate a strain gently long before I would massage it directly.
- Tennis elbow, because, like frozen shoulder, it's got a split personality: there are cases that are dominated by tendinitis, and there are cases dominated by muscle pain.

- Bruxism, jaw clenching, and temporomandibular joint syndrome, because "tension" seems to be central to these problems and vibration is a an accessible method of targeted relaxation.
- Unwanted contractions, like cramping or twitching, might respond well to vibration (highly speculative, but plausible).

Conditions less likely to be helped:

- Carpal tunnel syndrome, because it's caused by a physical entrapment of a nerve, which probably just cannot be altered by vibration
- Most overuse injuries, like plantar fasciitis or runner's knee or Achilles tendinitis, because the issue with the tissue is usually just *overload*, and neurological inhibition isn't a factor
- Stress fracture, because it will probably just make it hurt more, without helping.
- Fibromyalgia, because it's an extremely complex systemic condition, very unlikely to be meaningfully affected. Vibration might be a source of pleasure, but not treatment.
- Gout, bursitis, arthritis, or any acutely inflamed musculoskeletal conditions are all no-go zones for vibration. Wherever inflammation is surging, vibration is unlikely to be helpful … or welcome.

This is all quite speculative, of course.

Whole body vibration as exercise and therapy

If you believe that a massage gun can enhance performance and recovery, then why not MOAR?! The claims and the hype overlap strongly with massage guns, but they also go further: WBV is touted as a form of *exercise*. "Vibration plates" or platforms are now widely available, and there are even vibration gyms with industrial strength versions.

Almost any kind of empty promise you can imagine has been made about these things: They'll help you lose weight! Improve your sleep! Clean your gutters! There is no research that clearly supports any of the fitness claims. Vibration is *extremely unlikely* to enhance your fitness more than, say, a bit of extra walking each day.

Vibration is extremely unlikely to enhance your fitness more than, say, a bit of extra walking each day.

There is a little bit of research about the effect of WBV as a therapy for various kinds of common problems. For instance, if you suffer from patellofemoral syndrome, a kind of runner's knee, maybe WBV can blunt your pain and boost your vertical jump height?

No. *Exercise* can achieve those things. Adding WBV doesn't make it any more effective. [16] With one caveat: once again, vibration did improve *flexibility*. (Too bad flexibility has

basically nothing to do with PFPS.)

Quite a few experiments like this have been done, for a variety of conditions with predictably mixed results, either inconclusive, [17] negative [18] or "positive" (damning WBV with faint praise). [19] There's a bunch of sizzle here, but little steak.

The Thumper: My preferred percussive therapy tool

The Thumper is a sturdy example of a vibrating massage tool, a class of massage tools that deserves a little more attention. There are many gadgets like the Thumper, and most notably the massage "gun" form factor has exploded in the last few years. But I kick it old school with the Thumper brand: a well-designed device built here in Canada.

I've had my Thumper for about 15 years now, and it works as well today as it did the day I brought it home. I used it routinely in my massage therapy clinic for many years (a favourite part of the treatment for many clients), and mainly as a self-massage tool ever since, but it's also a nice easy way for my wife to give me quite a bit of massage for minimal effort. [20]

A Thumper is not cheap, so there ought to be a good reason to get one. Fortunately, it offers a lot of value regardless of therapeutic effect, just as massage does generally, but probably even more so: for those who enjoy them, vibrating massagers can deliver a lot of pleasant stimulation super conveniently for a long time. It may cost up front, but over the long haul it's quite economical.

Massage gun side effects: shooting yourself in the foot (or anywhere) with a massage gun

All massage can be followed by feeling a little sore and exhausted, sometimes even flu-like grossness. This phenomenon is known as post-massage soreness and malaise (PMSM). This may actually be caused by muscle injury, which spills proteins into the blood and clogs the kidneys, a condition known as *rhabdomyolysis* known mostly for its dangerous extremes, but can also be much milder and less obvious. This is a hypothesis, but there's a strong scientific case for it, which I explore in another article, Poisoned by Massage. It's also quite relevant to delayed-onset muscle soreness

In 2020, the journal *Physical Therapy* published a case study of a woman hospitalized with severe rhabdomyolysis in a fairly open-and-shut case of overusing a massage gun intensely on her legs. [22] She had severe bruising, she could barely

Vibration and back pain — *Sitting is not in itself a cause of back pain. But sitting plus vibration? That's another matter. Whole body vibration correlates with back pain: the more*

urinate, and so much protein in her blood it couldn't even be measured. It was a life-threatening emergency. It's plausible and even likely that she had some biological vulnerability, and her muscles were more "fragile" than others, but that doesn't make it any less serious a concern (most kinds of side effects only hit a few vulnerable people hard enough to cause real trouble).

intense the vibration, and the longer it lasts, the more likely you are to get back pain. [21] *An occupational hazard for, say, helicopter pilots. And vibrating-bed testers?*

Obviously you can overdo any physical treatment, but this isn't just a matter of overdoing it, for three reasons:

1. Relatively *normal use* of the product could be downright dangerous for at least some people.
2. It probably causes lesser side effects in almost anyone, and although that's not medically serious, it is also literally the opposite of the intended effect of the treatment in principle. That is, it may not be just a "side" effect, but the *main* effect, the only significant biological consequence of the treatment — a treatment that not only doesn't work, but backfires.
3. This is speculative, but *vibration specifically* could be more likely to provoke rhabdo than ordinary deep massage.

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A big chunk of this article is an excerpt from my **frozen shoulder book**. If you want to know more, there's a substantial free introduction, and a couple of other excerpts available:

- **"Windows of Opportunity" in Rehab** — The importance of WOO in recovery from injury and chronic pain (using frozen shoulder as an major example)
- **The Role of "Spasm" in Frozen Shoulder** — How to identify cases of functional frozen shoulder, dominated by muscular inhibition

About Paul Ingraham


Headshot of Paul Ingraham

I am a science writer in Vancouver, Canada. I was a Registered Massage Therapist for a decade and the assistant editor of ScienceBasedMedicine.org for several years. I've had many injuries as a runner and ultimate player, and I've been a chronic pain patient myself since 2015. Full bio. See you on Facebook or Twitter, or subscribe:

Related Reading

Here are a few other articles tangentially related to vibration therapy, but there are dozens more therapy and rehab options and concepts reviewed on PainScience.com.

- **A Deep Dive into Delayed-Onset Muscle Soreness** — The biology & treatment of "muscle fever," the deep muscle soreness that surges 24-48 hours after an unfamiliar workout intensity
- **Does Ultrasound Therapy Work?** — Many concerns about the widespread usage of therapeutic ultrasound, especially extracorporeal shockwave therapy (ESWT)
- **Quite a Stretch** — Stretching science has shown that this extremely popular form of exercise has almost no measurable benefits
- **Get in the Pool for Pain** — Aquatic therapy, aquajogging, water yoga, floating and other water-based treatment and injury rehab options
- **Mobilize!** — Dynamic joint mobility drills are an alternative to stretching, a way to "massage with movement"
- **Zapped! Does TENS work for pain?** — The peculiar popularity of being gently zapped with electrical stimulation therapy

What's new in this article?

Five updates have been logged for this article since publication (2020). *All* PainScience.com updates are logged to show a long term commitment to quality, accuracy, and currency. more

2022 — Added new section, "That bizarre 2021 study of 'robotic mouse massage.'"

2021 — A stronger focus on massage guns, and much more detailed analysis of the science of vibration preventing muscle soreness. There's a new section about whole body vibration. I also elaborated on exactly how vibration might be useful for frozen shoulder. Plus several other minor improvements.

2020 — New section, "Massage gun side effects: shooting yourself in the foot (or anywhere) with a massage gun."

2020 — "Massage guns" were strangely missing from this article, as well as any discussion of their efficacy, so I corrected that. I also substantially revised everything to make this a more general article about the theme of vibration in both medicine and quackery.

2020 — Added a couple citations; some editing and clarifications.

2020 — Publication.

Notes

1. Veqar Z, Imtiyaz S. Vibration Therapy in Management of Delayed Onset Muscle Soreness (DOMS). J Clin Diagn Res. 2014 Jun;8(6):LE01–4. PubMed 25121012 ❐ PainSci Bibliography 52478 ❐

   This extremely poorly written review is published in suspected predatory journal and is glaringly simplistic and overconfident about vibration for DOMS, based on "very few researches." It cannot be trusted at all, and only serves to highlight the poor state of the research.

2. Broadbent S, Rousseau JJ, Thorp RM, *et al*. Vibration therapy reduces plasma IL6 and muscle soreness after downhill running. Br J Sports Med. 2010 Apr. PubMed 18812416 ❐

3. You might be thinking, "Why the hell not? Sounds cromulent to me!" There are two reason why it's not conclusive. First, modern science is an embarrassing mess, severely polluted with huge numbers of seriously flawed and underpowered studies, such that we can't believe any results without extensive replication. Second, we wouldn't trust one or two studies even if the science was as well organized as a neat freak's sock drawer — because even skilled, honest researchers screw up (usually in favour of what they want to believe).

4. Bakhtiary AH, Safavi-Farokhi Z, Aminian-Far A. Influence of vibration on delayed onset of muscle soreness following eccentric exercise. Br J Sports Med. 2007 Mar;41(3):145–8. PubMed 17138635 ❐ PainSci Bibliography 51829 ❐

5. Issurin VB, Liebermann DG, Tenenbaum G. Effect of vibratory stimulation training on maximal force and flexibility. J Sports Sci. 1994 Dec;12(6):561–6. PubMed 7853452 ❐

   In this 1994 experiment, as described by Sands *et al.*, gymnasts "used a vibrating ring suspended by a cable, in which the foot of the subject was placed while they stretched forward over the raised leg, targeting the hamstrings. The resulting increase in ROM was astonishing. These researchers demonstrated that vibration could enhance flexibility." The results were replicated by Sands *et al.* in 2006, and Kinser *et al.* in 2008.

6. Sands WA, McNeal JR, Stone MH, Russell EM, Jemni M. Flexibility enhancement with vibration: Acute and long-term. Med Sci Sports Exerc. 2006 Apr;38(4):720–5. PubMed 16679989 ❐

   This experiment replicated the results of an intriguing 1994 experiment by Issurin *et al*. Ten highly trained gymnasts did forward splits with or without vibration. They stretched to the point of discomfort for 4 minutes, alternating between each leg, 10 seconds of stretching at a time. Flexibility immediately after stretching with vibration was dramatically greater; the long-term results were less striking.

7. Kinser AM, Ramsey MW, O'Bryant HS, *et al*. Vibration and stretching effects on flexibility and explosive strength in young gymnasts. Med Sci Sports Exerc. 2008 Jan;40(1):133–40. PubMed 18091012 ❐

   Replicates the findings of both Issurin and Sands — "simultaneous vibration and stretching may greatly increase flexibility, while not altering explosive strength."

8. Ch W, Holzman C, Magnusson SP. Increasing muscle extensibility: a matter of increasing length or modifying sensation? Phys Ther. 2010 Mar;90(3):438–49. PubMed 20075147 ❐ PainSci Bibliography 55283 ❐

   People seem to be more flexible when they stretch regularly for a while, but why? A number of explanations have been proposed, and none have panned out. This article reviews them all in great detail, and the full text is free. It's not light reading, but there are some fascinating highlights.

   For instance, the popular theory that muscles actually change length ("plastic deformation") is dismissed: "In 10 studies that suggested plastic, permanent, or lasting deformation of connective tissue as a factor for increased muscle extensibility, none of the cited evidence was found to support this classic model of plastic deformation." After reviewing several more disproven popular theories, the authors conclude:

   > Increases in muscle extensibility observed immediately after stretching and after short-term (3 to 8-week) stretching programs are due to an alteration of sensation only and not to an increase in muscle length. This

theory is referred to as the sensory theory throughout this article because the change in subjects' perception of sensation is the only current explanation for these results.

In short, elongation is normally limited by strict neurological edict, in much the way that we have much greater muscle power available than we can normally, safely use. But to some extent we *get used to* stretching — we can learn to tolerate greater elongation.

9. Stretching is not a pillar of fitness: it isn't a good warm-up, and it doesn't enhance peformance, and it won't prevent or treat soreness or injury. But it can *cause* injuries, and it can *impair* performance (slightly). It will boost flexibility, for whatever that is worth — which is surprisingly little (even for most athletes). Many major muscles are just mechanically impossible to stretch in the first place. Stretch *might* help some kinds of pain, like muscle pain, but stretching is clearly not of much help to most chronic pain patients. There is no "advanced" stretching method that overcomes any of these limitations, but you can spend a lot of money on books and courses and certifications — stretching is surprisingly big, snake oil. But, yes, it does feel good. See Quite a Stretch: Stretching science has shown that this extremely popular form of exercise has almost no measurable benefits.

10. Seo BR, Payne CJ, McNamara SL, *et al*. Skeletal muscle regeneration with robotic actuation-mediated clearance of neutrophils. Sci Transl Med. 2021 Oct;13(614):eabe8868. PubMed 34613813 ❐

11. Most people have sore spots that are associated with sensations of stiffness and aching. The sore spots are known informally as "muscle knots" and more officially as "trigger points," but they are poorly understood. There is an extremely uncertain explanation for them, and the idea that massage can relieve them is an extremely uncertain solution for them — but trigger points are, nevertheless, the number one reason why massage therapy *might* be medically helpful. For much more information, start with my self-massage primer, or go straight to an advanced tutorial about trigger point therapy.

12. Therapeutic massage is expensive but popular and pleasant, with obvious subjective value, and proven benefit for anxiety and depression … but basically no other clearly confirmed biological or medical effects. Most notably, the evidence that massage can help back and neck pain is sketchy, and there is no reason to believe that massage can help much with any other common musculoskeletal pain problem.

    And yet some medical benefits are plausible despite the lack of evidence. For instance, many apparently successful treatments may be due to the effects of pressure on "muscle knots," which are a likely factor in many common pain problems, but poorly understood (and difficult to treat). And regardless, the effects on mood and mental health are so profound that patients can't really lose — it's a valuable service whether it "works" for pain or not.

13. The major myths about massage therapy are:

    - Massage increases circulation. Probably not… and *definitely* not as much as a little exercise.
    - "Tightness" matters. The three most common words in massage therapy — "you're really tight" — are pointless.
    - Massage detoxifies. It's actually the opposite, if anything.
    - Massage patients need to drink extra water to "flush" the toxins liberated by massage.
    - Massage treats soreness after exercise. Studies have shown only slight effects.
    - Massage reduces inflammation. An extremely popular belief based mainly on a single seriously flawed study.
    - Fascia matters. The biggest fad in the history of the industry.
    - The psoas muscle is a big deal. The most overhyped single muscle.
    - Massage stimulates endorphins (natural opioid) and reduces cortisol (stress hormone). They do not.
    - "Trigger points" are evidence-based. Actually, the science is seriously half-baked.
    - Massage therapists have spooky palpation skills. No, it's just ordinary expertise… and misleading.

    The complete list of dubious ideas in massage therapy is *much* larger. See my general massage science article. Or you can listen to me talk about it for an hour (interview).

    And massage is still awesome! It's important to understand the myths, but there's more to massage. Are you an ethical, progressive, science-loving massage therapist? Is all this debunking causing a crisis of faith in your

profession? This one's for you: Reassurance for Massage Therapists: How ethical, progressive, science-respecting massage therapists can thrive in a profession badly polluted with nonsense.

14. Guo J, Li L, Gong Y, *et al*. Massage Alleviates Delayed Onset Muscle Soreness after Strenuous Exercise: A Systematic Review and Meta-Analysis. Front Physiol. 2017;8:747. PubMed 29021762 ❐ PainSci Bibliography 52834 ❐

    This is a flawed meta-analysis with a technically "positive" conclusion that is clearly actually a damned-with-faint-praise result, consistent with the body of evidence on this topic. This analysis of pooled data from a dozen mostly poor quality trials — "garbage in, garbage out" — establishes nothing except that there probably isn't a strong benefit to detect.

    For a much more detailed analysis of this topic, see A Deep Dive into Delayed-Onset Muscle Soreness.

15. There are two electrical stimulation therapies that produce vibration-like sensations:
    - transcutaneous electrical nerve stimulation (TENS) stimulates finer vibrations with electricity, basically "tingles" that feel somewhat vibratory
    - electrical muscle stimulation (EMS) is closely related to TENS, and uses slightly different settings to cause muscles to contract very rapidly

16. Rasti E, Rojhani-Shirazi Z, Ebrahimi N, Sobhan MR. Effects of whole body vibration with exercise therapy versus exercise therapy alone on flexibility, vertical jump height, agility and pain in athletes with patellofemoral pain: a randomized clinical trial. BMC Musculoskelet Disord. 2020 Oct;21(1):705. PubMed 33106162 ❐ PainSci Bibliography 51834 ❐ "The present findings showed that exercise therapy with and without WBV can significantly decrease pain and increase agility, vertical jump height and flexibility in athletes with PFP. Adding WBV to routine exercise therapy, however, can augment the effects of the latter on flexibility."

17. Bidonde J, Busch AJ, van der Spuy I, *et al*. Whole body vibration exercise training for fibromyalgia. Cochrane Database Syst Rev. 2017 Sep;9:CD011755. PubMed 28950401 ❐ PainSci Bibliography 51835 ❐

18. Anwer S, Alghadir A, Zafar H, Al-Eisa E. Effect of whole body vibration training on quadriceps muscle strength in individuals with knee osteoarthritis: a systematic review and meta-analysis. Physiotherapy. 2016 Jun;102(2):145–51. PubMed 26619822 ❐

19. Costantino C, Bertuletti S, Romiti D. Efficacy of Whole-Body Vibration Board Training on Strength in Athletes After Anterior Cruciate Ligament Reconstruction: A Randomized Controlled Study. Clin J Sport Med. 2018 07;28(4):339–349. PubMed 28657911 ❐

20. Speaking of my wife, bless her charming idiosyncrasies: she thinks that "Thumper" sounds displeasingly violent for a massage tool, whereas most people seem to think of the Thumper of cute animated-character fame. (Still others imagine summoning enormous sand worms.)

21. Lis AM, Black KM, Korn H, Nordin M. Association between sitting and occupational LBP. Eur Spine J. 2007 Feb;16(2):283–98. PubMed 16736200 ❐ PainSci Bibliography 53732 ❐

22. Chen J, Zhang F, Chen H, Pan H. {Rhabdomyolysis After the Use of Percussion Massage Gun: A Case Report}. Phys Ther. 2020 11. PainSci Bibliography 51936 ❐

    ABSTRACT

    Percussion massage guns are commonly used by professional athletes and nonathletes worldwide for warmup and physical recovery; however, there are no published clinical or evidence-based reports on percussion guns regarding their benefits, indications, contraindications, and even side effects. The purpose of this case report is to describe the first case of rhabdomyolysis as a severe and potentially life-threatening illness following use of a percussion gun. A young Chinese woman with untreated iron deficiency anemia presented with fatigue and pain in her thigh muscles for 3 days and tea-colored urine for 1 day, after cycling and subsequently receiving percussion gun treatment by her coach for the purpose of massage and relaxing tired muscles. Muscle tenderness and multiple hematomas were found on her thighs , and her urinalysis indicated hemoglobinuria. Her serum creatine kinase was reported as "undetectably high," a

hallmark of serious muscle damage leading to a diagnosis of severe rhabdomyolysis. Aggressive intravenous fluid resuscitation, urine alkalinization via intravenous alkaline solution, assessment of urine output, and maintenance of electrolyte balance were administered during hospitalization. The patient's clinical presentation gradually improved with the decline of creatine kinase, and she recovered well during follow-up. A case of severe rhabdomyolysis after percussion massage should alert caregivers, sports professionals, and the public to suspect and recognize the potentially serious adverse effects of percussion guns and to ensure that percussion massage guns be used appropriately and safely in rehabilitation therapy, especially in individuals with an underlying disease or condition. Research is needed to examine the benefits, indications, contraindications, and adverse reactions of percussion guns.

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