



# Vibration massage reduces post exercise muscle soreness

## Summary

Research findings clearly show the use of vibration massage reduces post exercise Delayed Onset Muscle Soreness (DOMS), reduces residual blood chemicals such as Lactic Acid, and speeds the recovery of muscles. This article discusses these research findings plus how to simply, economically and best take advantage of this.

## What causes DOMS

DOMS occurs as a result of exercise induced muscle damage. It is soreness that develops about 24 hours after exercise, peaks, then gradually resolves over 5-7 days. Along with soreness there is a reduction of muscle performance plus a measurable increase in various blood chemicals that occur as a result of muscle tissue breakdown and necrosis.

## The research

In each of the following trials strenuous exercise was used to cause exercise induced muscle damage. The researchers tested participants before exercise then several times over the next few days. They measured soreness, muscle performance and the levels of various blood chemicals. Some were treated with vibration massage while for comparison others who received no treatment and/or another treatment. The effects of vibration depends on the frequency, so research refers to the frequency of vibration used. To put these numbers into perspective a DrGraeme General Purpose Massager delivers vibration from approximately 10-55 Hz (cycles per second).

### *First trial (1)*

In this trial one third of participants had no treatment, one third were given conventional massage, while the third group had their muscle massaged before exercise using a vibrating massager set at 50Hz. The results showed that both conventional massage and the vibration massage resulted in significantly lower DOMS, with those receiving vibration massage recovering faster than those who received conventional massage. They also showed that the group receiving the vibration massage had significantly less residual Lactic Acid.

### ***Second trial (2)***

In this trial one group received vibration massage of 50Hz to the centre of the muscle, while the comparison group received no vibration. There was a significant decrease in the soreness of those who received vibration when compared to those who received none. Muscles showed a decrease in maximum contraction strength post exercise for both groups, but this decrease was less in those who received vibration.

### ***Third trial (3)***

In this trial one group received a vibration massage of 30-50Hz while the comparison group received no vibration. The group receiving vibration experienced a significantly lower level of pain.

### ***Fourth trial (4)***

In this trial one group received vibration massage at 40 Hz while the comparison group received no vibration. Those receiving the vibration experienced significantly less pain over 24-120 hours post exercise.

### ***Fifth trial (5)***

This trial one group was treated with a vibration pad giving 30-65Hz, for 30 minutes starting 30 minutes after exercising then on days 1,2 3 and 4. From days 2-5 soreness of those receiving the vibration was 18-30% less than those who did not, with soreness disappearing altogether earlier.

### ***Sixth Trial (6)***

It was shown that the application of 50-60 Hz vibration to muscles either prior to exercise or after exercise results in considerably less pain and the presence of considerably less of the resultant blood born chemicals

## **Literature review articles**

### ***Review One (7)***

“Vibration is an effective modality in the field of rehabilitation. Vibration therapy improves muscular strength, power development and kinesthetic awareness, increased flexibility, motor unit synchronisation. Various researches which shows effectiveness of vibration therapy in management of DOMS”

### ***Review Two (8)***

“Vibration therapy before eccentric exercise may prevent and control DOMS”

## **Other benefits of vibration massage for sports and exercise participants**

As well as reducing DOMS and speeding recovery the application of vibration massage has been shown by research to have many other potential benefits for those participating in sports or exercise.

### ***Relaxation of muscles***

The application of vibration massage at about 50 Hz has been shown to cause the relaxation of muscles (9). Apart from the general benefits of relaxation vibration massage has been shown to cause muscles to relax and lengthen having a similar effect to conventional stretching (10)(11)

### ***Increased blood flow***

Vibration at 50 Hz has been shown to cause a rapid increase in blood flow that persists for over 15 minutes (12) Along with the relaxation of muscles these are two main beneficial effects that make massage so widely used in professional sports for both warming up and recovery.

### ***Increased performance***

The application of vibration has been shown to enable the nervous system to stimulate more receptors in muscles, both in number and type. The result is higher maximum contraction force and increased muscular effort. Frequencies from 5-50 Hz seem to do this much faster. (13)

### ***Healing and rehabilitation***

The previously discussed increased blood flow is recognised as having a beneficial effect on healing. In addition research with animals (14)(15) has shown that the use of vibration has been found to increase the concentration of growth hormones and other beneficial chemicals, accelerate wound healing, plus speeding the growth and repair of blood vessels, nerves, muscles and other tissues. Because of these the use of vibration massage can potentially speed healing, recovery and rehabilitation.

### ***Trigger Points (16)***

Trigger points are those tender tight spots in muscles masseurs love to find. Technically they are parts of muscles that have gone into spasm and will not relax, causing the muscle to tighten and blood flow to be restricted. They can develop as a result of strenuous exercise so they are extremely common in sports people.

Trigger points can eventually go on to cause pain, but even without pain they cause a lot of problems. These are discussed elsewhere, but simply speaking they do as one would expect from a tightened muscle that is trying to contract all the time but not getting enough blood. They restrict movement, fatigue very quickly, and are prone to being injured. They are constantly tight and resist being stretched, and of course trigger points can eventually start shooting pain.

It is because of this that even when not causing pain they they adversely affect performance and increase the risk of injury. Massage is an effective treatment for trigger points. This is another reason professional sports clubs make heavy use of massage. Vibration massage is particularly effective as it relaxes the muscle and increases blood flow. plus has the advantage in that that it can easily be self applied.

## How to use vibration massage

Vibration massage is simple and relatively painless. Using an appropriate hand held massager one can easily use it on oneself for practically no ongoing cost. The trials show that vibration of approximately 50 Hz applied to muscles either before or after exercise will have benefits. Applications of only a minute to a few minutes seem effective, so these can practically be done each day if needed.

Research shows that historically massagers made for consumer use have not been very effective (17), with many of the same sort of machines still being sold. However, as a practicing chiropractor at DrGraeme we've produced a very serious piece of equipment called the General Purpose Massager. Set at 80-90% of full speed delivers strong massage at the frequency found to be of benefit. One of the main drawbacks of conventional massage is that it requires a masseur to be available and can be expensive. On the other hand DrGraeme massagers are very economical, and once set up with a massager and the appropriate advice the ongoing massage is readily available and practically free.

Although the risks associated with vibration massage are extremely small, if using it just for general maintenance and reducing soreness we ask that that you consult a professional to make sure it is appropriate and advise you how to get the best results. If using it on an injury or any sort of pain syndrome you should seek professional advice on how to manage that condition.

### *Sports clubs, heal professionals and sports professionals*

Please contact us directly for further information, professional rates and possibly a sample machine.  
graeme@drgraeme.com

### *Sharing*

If you know anyone who plays sport or exercises please share.

## References

1. Shaqufla I, et.al. To compare the effect of vibration therapy and massage in prevention of delayed onset muscle soreness (DOMS) [Internet]. Vol. 8, *Journal of Clinical and Diagnostic Research*. 2014. p. 133–6. Available from: <http://www.embase.com/search/results?subaction=viewrecord&from=export&id=L372172894%0Ahttp://dx.doi.org/10.7860/JCDR/2014/7924.3971>
2. 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;41(3):145–8.
3. Kamandani R, Ghazalian F, Ebrahim K, Ghassemlou N, Shiri Piraghaj M, Khorram A. The Effect of Acute Vibration Training on Delayed Onset Muscle Soreness in Young Non-Athlete Women. *Heal Scope*. 2015;
4. Broadbent S, Rousseau JJ, Thorp RM, Choate SL, Jackson FS, Rowlands DS. Vibration therapy reduces plasma IL6 and muscle soreness after downhill running. *Br J Sports Med*. 2010;44(12):888–94.
5. Lau WY, Nosaka K. Effect of vibration treatment on symptoms associated with eccentric exercise-induced muscle damage. *Am J Phys Med Rehabil*. 2011;
6. Kim J-Y, Kang D-H, Lee J-H, O S-M, Jeon J-K. The effects of pre-exercise vibration stimulation on the exercise-induced muscle damage. *J Phys Ther Sci*. 2017;29(1):119–22.
7. Veqar Z, Imtiyaz S. Vibration therapy in management of delayed onset muscle soreness. *J Clin Diagnostic Res*. 2014;8(6):10–3.

8. Sethi V. Literature review of management of delayed onset muscle soreness (doms). *Int J Biol Med Res.* 2012;3(1):1469–75.
9. Poenaru D, Cinteza D, Petrusca I, Cioc L, Dumitrascu D. Local Application of Vibration in Motor Rehabilitation - Scientific and Practical Considerations. *Maedica (Buchar) [Internet].* 2016;11(3):227–31. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/28694858> <http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=PMC5486165>
10. Bakhtiary AH, Fatemi E, Khalili MA, Ghorbani R. Localised application of vibration improves passive knee extension in women with apparent reduced hamstring extensibility: A randomised trial. *J Physiother.* 2011;
11. Atha J, Ph D, Wheatley DW, Sc B. JOINT MOBILITY CHANGES DUE TO LOW FREQUENCY VIBRATION AND STRETCHING EXERCISE \* ( b ) Astride standing : head pressing to alternate knees ( d ) Rear lunge , with toe rest : calf and leg stretching. October. 1974;26–35.
12. Maloney-Hinds C, Petrofsky JS, Zimmerman G. The effect of 30 Hz vs. 50 Hz passive vibration and duration of vibration on skin blood flow in the arm. *Med Sci Monit [Internet].* 2008;14(3):CR112-6. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/18301353>
13. Germann D, El Bouse A, Shnier J, Abdelkader N, Kazemi M, Germann D, et al. Effects of local vibration therapy on various performance parameters: a narrative literature review. *J Can Chiropr Assoc.* 2018;62(3).
14. Gregoletto D, Martínez CMC. Effects of spinal manipulation in patients with mechanical neck pain. *Coluna/ Columna.* 2014;13(4):269–74.
15. MEI R, XU Y, LI Q. Experimental Study on Mechanical Vibration Massage for Treatment of Brachial Plexus Injury in Rats. *J Tradit Chinese Med.* 2010;
16. DrGraeme. The presence and treatment of myofascial trigger points in chronic shoulder pain [Internet]. *DrGraeme.com.* 2018. Available from: <https://www.drgraeme.com/articles/2018-articles/Practitioner/Shoulder-trigger-points.php>
17. McDonagh D, Wilson L, Haslam C, Weightman D. Good vibrations: Do electrical therapeutic massagers work? *Ergonomics.* 2005;

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