Practitioner guide

We originally developed our massagers to benefit our patients and enable us to provide better quality more effective and affordable care. With patients enjoying these benefits we shared this with colleagues so they could provide these benefits to their patients. Please allow us to share these benefits.

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A message from Dr Graeme

Why we built our massagers
My name is Graeme. I received my Chiropractic degree from what is now RMIT University in Melbourne, and practised for 27 years in regional Victoria. We developed our massagers to allow patients to supplement our care with quality therapy at home. As you will read in our article “Trigger point treatment: deactivation or elimination” the successful elimination of chronic myofascial issues usually takes a lot more applications of therapy than we can give them. When we built or massagers we started to get far better results. Patients were able to use supplementary therapy at home to help get the soft tissue therapy they needed, and having less soft tissue therapy to do personally allowed more time during consultations to better manage the condition.

Opening up a host of new benefits
The initial goal was to help make dealing with chronic myofascial conditions easier and more practical to handle. However, having a way to enable patients to have practically unlimited quality soft tissue therapy we saw other potential uses and benefits such as for injury prevention, health and wellness and sports, then we started pouring through the research finding a host more potential benefits plus how to direct this therapy more efficiently and scientifically.

Part one: the basics
In this guide the first section is on the basics. The first and most important section is The scientifically proven effects of vibration massage- with clinical applications.” This will give you the confidence of knowing exactly what therapeutic effects you are providing, and the best frequencies to achieve these. The next section is on using our massagers to save your own body. Too many fellow professionals carry musculoskeletal injuries and are even forced to stop practice. The last part of the basics is the “how to” section where we cover basic usage techniques, safety and implementation in clinic.

Part two: specific conditions and research
The second part of this guide is our more detailed specific information. Here we will have guides covering specific areas of interest such as sports, health and wellness and chronic condition such as fibromyalgia. We also have guides covering specific research with clinical applications.

Part three: Looking after colleagues and future colleagues
The final part of our guide is where we cover the how we look after colleagues and student practitioners with referrals to practices, practitioner and wholesale pricing, samples, and massagers for students and colleges.
Dr Graeme's comments

In this summary we investigate the science behind the use of vibration massage. This helps us envisage uses and to develop protocols. Most refer to relevant vibration frequencies. To put these frequencies into perspective our DrGraeme General Purpose Massagers are build to deliver strong vibration from approximately 10-55 Hz (cycles per second).

The scientifically proven effects of vibration massage- with clinical applications

Effect on muscle contraction/relaxation
Various studies have shown that the application of vibration massage in the range of 20-60 Hz causes muscles to relax, while vibrations from 100-200 Hz have been shown to cause muscles to contract (1).

Clinical applications
Muscle relaxation is a major goal/benefit of massage and soft tissue therapy. The research shows that this is best achieved by applying massage between 20 and 60 Hz. This can be obtained by applying our General Purpose Massager between half and full speed. Clinical experience shows that about ¾ speed works very well and is very comfortable for patients. There are massagers designed to run faster, as this has a pain reducing effect (discussed later). However this causes contraction rather than relaxation. These faster speeds can be used in to stimulate muscles for specialist techniques used for certain neuromuscular conditions.

Effect on blood flow
In the extreme, excess vibration can have an adverse effect on blood flow. This is an issue with occupational hazards such as using a chainsaw. Research has shown that gripping a handle vibrating at 30-480 Hz for one hour will reduce blood flow to the hands and fingers. Further, such vibration at 120Hz will slow nerve conduction (2). However, normal therapeutic applications of vibration have been shown to significantly increase blood flow (3) (4) (5). In one trial vibrations both 30 and 50 Hz were shown to substantially increase peripheral blood flow, with 50 Hz giving the superior, with a more rapid and longer lasting effect. 30 Hz vibration slowly increased blood flow, which lasted for about 7 minutes. Following 50 Hz blood flow increased more rapidly and was still above baseline after 15 minutes (4).

Clinical applications
Like the relaxation of muscles, an increase in blood flow to the tissues is a major therapeutic goal of massage and soft tissue therapy. The application of vibration at 50 Hz was shown to be the best way to achieve this. This can be applied by using our General Purpose Massagers at about 90% of full power.

Pain reduction
As discussed throughout this manual vibration massage is useful to help address several causes of pain. However, the application of stimulation at 100 Hz has been shown to neurologically block pain. The most common way this is achieved is by the use of a TENS machine, although the application of mechanical vibration has been shown to work at least as well, if not better (8).
Clinical applications
Our DrGraeme massagers have been built to help address many of the causes of pain rather than to block pain signals. However, some other massagers though run at 100 Hz for this purpose. As an example, a trial showed that repeated applications of 100 Hz massage to the distal quadriceps muscles produced a considerable reduction of symptoms in those with osteoarthritis of the knees (9).

Stretch reflexes
Stretch reflexes are those elicited by receptors in the muscles to prevent excessive elongation. It is a protective mechanism that causes the muscle to contract when being overstretched. The application of vibration has been shown to suppress this reflex (1) (10).

Clinical application
There are two significant uses for this effect. First, in a trial gymnasts used the application of 30 Hz vibration inhibiting the stretch reflex to achieve superior results to stretching without vibration (15). Secondly, as discussed in a later section the suppression of this reflex helps allow the spasmed sections of muscles that form trigger points to relax. This is a key component of trigger point therapy.

Reduce post exercise soreness and speed recovery
Damage to muscles caused during exercise is known as “exercise induced muscle damage”. This results in pain known as delayed muscle soreness (DOMS) and a temporary reduction in muscle performance. It can be measured by the presence of blood chemicals that result from cell membrane damage, tissue necrosis and muscle cell damage. The application of 30-65 Hz vibration to muscles either prior to exercise or after exercise results in considerably less pain, faster recovery, and the presence of considerably less of the resultant blood born chemicals (16) (17) (18) (19) (20) (21) (22).

Clinical applications
The research clearly shows that those exercising will have less pain and recover faster if vibration massage is applied to muscles either before or after exercise. This is a simple convenient, economical therapy that should be recommended to all those who play sport or exercise, and have no contra-indications. The General Purpose Massager delivers 50-60 HZ at maximum or near maximum speed. A typical protocol may be applications of 60 seconds to the belly of each muscle as part of a warm up routine, then after exercise and each day during recovery.

Increase the performance of muscles
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. (23)

Clinical applications
This should be of interest to anyone who wishes to achieve greater performance, such as those who play sport of work out in a gym. A research summary (23) found 21 published trials covering this area. The protocols and vibration frequencies used varied widely. However, in general they found that the lower frequencies (5-50 Hz) used short duration applications compared with those for higher frequencies. They also found that better results were achieved by applying the vibration directly to the muscles rather than via indirect methods such as having the weight being lifted vibrate.

Increased healing
Vibration is shown to increase the flow of blood. The benefits of increasing blood flow for healing are well understood. As an example, in those with poor circulation vibration has been shown to increase the oxygenation of tissues, and is seen as a promising therapy (24). Trials involving animals though have been
able to investigate the effects of vibration much further. In one such trial uniform cuts were made in mice (25) while in the other the brachial plexus of rats were injured (26). Healing with and without the application of vibration was monitored in both. The results were quite amazing. They include the following:

- increased angiogenesis (formation of blood vessels)
- increased formation of skin cells, granulation tissue and collagen deposits resulting in faster wound healing.
- the production of higher levels of Growth Factor and other hormones
- it can promote contraction and extension of muscle fibres, strengthen muscular tension, elasticity and tolerance, so, it can prevent and cure muscular atrophy.
- can effectively promote the repair of myelin sheath and axes of injured brachial plexus
- It can improve peripheral nerve units and excite peripheral nerves, so as to accelerate their conduction

**Clinical applications**

If one uses vibration massage to help rehabilitate a musculo-skeletal injury it would be certain that the increased blood flow would have a positive effect on healing. There would probably be an increase the production of growth hormones, an increase in repair tissue and blood vessel formation, plus other benefits. This would be an incredible benefit. However, because they have only been demonstrated in animal experiments they cannot be promised.

**References**

extension in women with apparent reduced hamstring extensibility: A randomised trial. J Physiother. 2011;

12. 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.


Dr Graeme's comments

As we all know, manual therapy can be physically demanding, often requiring repetitive movements, awkward postures and the application of force. Unfortunately these can take a toll on a practitioner’s body leading to injury or even being forced to leave his or her profession. In this summary we show the seriousness of the problem and how the use of a DrGraeme massager can help prevent these issues.

The biggest benefit: saving your body

The seriousness of the problem

As an example, a study of New York chiropractors (Homack 2016) found pain or injury rates of 21.7% for the neck, 30.4% for the upper or middle back, 44% for the lower back, and 58% for the upper extremities. A survey of Physical Therapists found an incidence of 32% work related musculoskeletal injury, and a survey of 601 massage therapists and body workers found 77% had some sort of musculoskeletal symptoms, with thumbs (30%), wrists (27%) and shoulders (26%) being the most common. 43% had been forced to make changes to their practice and 23% were considering leaving their profession as a result (Green 2006).

Addressing this issue

Not surprisingly the major causes of these injuries appears to be applying pressure and the maintenance of awkward postures. Suggestions to minimise these include reducing your exposure to risk as much as possible and developing good body mechanics and work postures. As described below, the use of our massagers should help. The more tasks that are done this way rather than manually the greater the benefit.

Applying pressure

The incidence of thumb, wrist and shoulder injuries is very high, with the application of pressure being given as a major cause. Vibration massagers use vibration to penetrate rather than pressure, and often the weight of the machine is sufficient to make proper contact. Using these there is practically no pressure through a practitioner’s wrists, hands and shoulders.

Awkward postures

A practitioner’s body needs to be positioned suitably in order to apply manual pressure. Such positions often require awkward postures. On the other hand without needing to apply pressure, and being able to reach using the use the handle of the massager rather than positioning one's body, one can avoid most awkward postures.

Having the patient do the work

Stress on practitioner’s bodies is completely removed by the use of supplementary home massage where a patient uses our massagers at home under professional advice

References

Homack D and Hedge A Survey of Occupational Injuries to Practising Chiropractors Austin J Musculoskeletal Disord. 201; 3(2): 2016

Basic usage instructions

Controls
The General Purpose Massager has on/off button underneath, and a sliding variable speed control on top. The Deep Tissue Massager has a three position sliding control on top (off-slow-fast). The "button" underneath on a Deep Tissue Massager is not functional (provision for a control only)

Forget many of your manual techniques
Using a mechanical vibrating massager after using manual techniques is a bit like going from an axe to a chainsaw. You will need to forget a lot of manual practices.

- With a mechanical massager there is no need to press in or rub.
- There is no need to move the massager. You normally just sit the massager over the area to be massaged until it is finished, then move to the next spot. If you move the machine when massaging it is usually very slowly allowing the vibrations to "soak in".

Choice of heads
The heads are not for "digging in" like manual massage. When using manual massage one may use something like our smaller rounded head to help press in. With vibration it is actually the large flatter head that transmits the vibration best. The smaller rounded head can be used for some specialised uses, and to access parts that are harder to get to with the larger head. In the case of the multiple projection head the projections are not to penetrate or "dig in" with, but can be used to stop "pattering" over a larger area (discussed later).

Use over clothing or a cloth
Use over clothing or a cloth. This prevents skin irritation and minimises the risk of transmitting infection.

Relax the part to be massaged
Massage is more effective if the muscle is relaxed and not under tension

Try to position the part to be massaged to be horizontal.
When the part being massaged is horizontal 1) the weight of the machine helps apply pressures, and 2) the weight of the machine does not need to be supported by the user. This makes it easier and reduces fatigue.
The massager contact
To get the maximum penetration the head of the massager should sit flat on the part to be massaged. At moderate speeds the weight of the machine should be enough to maintain contact. However, as speed increases the massager head will have a tendency to patter (bounce up and down). When this happens either slow the machine down, apply a moderate amount of pressure until the head stops pattering, or try the flat head with projections.

Duration
Clinical judgement should develop with usage. As a starting point try:
• a moderate speed setting
• 30 seconds for a moderate trigger point (60 for chronic deep trigger points such as those in the glutes)
• there may be multiple trigger points in an area, each needing an application of massage

Also, our massagers are scaled units which keeps out moisture and dust but keeps in heat. Please allow to completely cool after 15 minutes use. For clinicians using our massagers extensively we recommend using two machines and alternate usage.

Pain or discomfort
Whereas manual (eg. by hand) massage sometimes requires painful pressure to get to a deep spot, vibration massagers use vibration to penetrate. There is no need to press in or cause pain. In fact pain can cause muscles to tense which can work against massage. If pain or discomfort are experienced we recommend you either slow the massager to a comfortable level or cease.

Cord care
Our massagers are designed to be held and moved around, which can cause the cord to bend or twist. If a cord is bent sharply (usually where it joins into the machine) it can create a weakness. The cord will tend to bend preferentially in that spot. Eventually metal fatigue can cause the copper to crack. Personally, a very expensive high quality Bosche drill did the same shortly before writing this.We have fitted our massagers with super high quality cords capable of being bent 10,000 times without fail. However, nothing is indistructable. To help them last a very long time please don't pull or bend the cords excessively. If they are damaged the massager will stop and start when the massager or cord is moved around. If they do this stop using it immediately and have it repaired or replaced.
Dr Graeme's comments
Most of this should be basic knowledge for any qualified professional who deals with manual therapies, though one needs to anticipate what a home user might do. In the usage guides that come with our massagers we say that usage such as when pregnant or with a pacemaker needs to be discussed. For situations such as these to our knowledge there is no research to say whether it's safe or not. Our advice is that people with pacemakers can have heart attacks and pregnancy can have issues totally coincidentally. We don't want to get the blame because a massager was used the day before. In these cases please err heavily on the side of caution.

Massager safety

Overview
According to the scientific literature the incidence of adverse reactions to any type of massage is extremely rare. However, there are probably a lot more unreported incidents that cause temporary pain or discomfort without any long term effects. Most of these would be avoided by a trained professional simply by using his or her common sense.

A literature review of adverse reactions
Ernst (2003) did a world wide literature search and found relatively few reported cases of adverse reactions to any type of massage, whether performed by a professional or other. Some were due to the dislodgement of a deep vein thrombosis in the calf. One would expect all professionals dealing with manual therapies to be aware of that risk and take appropriate precautions. A couple were as a result of nerve damage caused by deep pressure. That would have been extremely painful. One was pressure at the elbow, while the other was in the proximal hand. Apart from that the reports were things I could never imagine a professional doing. For example, in one case a wife walking on her husband’s back damaged his kidney. Believe it or not, in another incident a lady put a massager with a rolling action under her neck when she went to sleep. The sheets got caught up in the mechanism and strangled her.

Unreported reactions
This author is personally aware of many cases where massage has caused pain or aggravated tissue damage in an injury. However, the results are temporary with minimal or no lasting effects, so would not warrant reporting. Such an example would be a sports trainer massaging a corked thigh, or self performed ischaemic compression where a person thinks tissue damage is “good pain”.

Coincidental occurrences
Our vibration massager may or may not have an effect on things such as pacemakers and pregnancy. However, people with pacemakers can have heart attacks and pregnant women can have problems. We don’t want someone with co-incidentally having a something go wrong after being massaged and having the massager being blamed. Any time there was a potential for such a co-incidental occurrence our recommendation is to err heavily on the side of caution.

Conclusion
In summary, the possibility of dislodging a deep vein thrombosis is something all those involved with massage should be aware of. There are masseurs who equate the causation of pain with doing good, however a professional should be aware that this is not damaging nerves or injuring other tissues. Apart
from that, even with untrained people performing massage the incidence of serious consequences is extremely rare. Common sense for a trained professional should suffice for most situations.

Reference
E. Ernst; The safety of massage therapy. Rheumatology 2003; 42 (9): 1101-1106

Extra reading
A comprehensive guide to cautions and contraindications of massage

Information provided by the Australian government on Deep Vein Thrombosis
Dr Graeme's comments
Before we started building our massagers the massagers we found for home use were practically useless. No-one we knew prescribed home use of a massager, and there was no research on it. However, we did manage to find research on the self/home use of other forms of massage. These were all quite positive.

Research and professional acceptance of home massage

*Historical perspective*
When we started building massagers to our knowledge such home usage of massage was not widely prescribed. Some of the reasons are summed up in a UK study (McDonagh 2005). They found that practitioners did not support the usage of home massage for the following reasons.

- The manufacturers of massagers for consumer use were more focused on looks than function
- The instructions provided with such machines were poor, and
- Practitioners preferred to do it themselves

*Sports usage*
On the other hand, as discussed elsewhere in this manual the sports and athletics community value massage, and the use of foam rollers to perform home massage has become widespread.

*Research acceptance*
We could only find a small number of trials were home massage has been addressed, but they have all been positive.

**Trial One (Field 2003)**
A daily regime of home massage reduced pain and increased grip strength in carpal tunnel pain syndrome sufferers.

**Trial two (Hanten 2000)**
A home program of stretching and self performed ischaemic pressure (Trigger Point Therapy) reduced the sensitivity of trigger points.

**Trial three (Atkins 2009)**
Self massage to the quadriceps was found to improve pain and function in those with Osteoarthritic knees

**Trial four (Field 2007)**
Self massager was shown to increase grip strength and reduce pain in those with osteoarthritis on the hands

**Trial five (Chan 2015)**
Found that self massage combined with physical modalities was more effective than modalities alone for myofascial pain dysfunction syndrome

**Trial six (Wamontree)**
Self massage provided better results than taking isobufen for patients with upper back pain and associated trigger points.
References


How to implement home massage

We recommend that you familiarise yourself with the usage of our massagers and our research information articles so you have a good scientific footing. As long as one follows a few simple precautions it should be incredibly safe, so simple clinical trials may be used. This can be a simple as performing an examination, using the massager, then re-examining. For trailing home use many practitioners first practice on themselves, then let family and friends use our machines.

Introducing to patients
The best way to start with home use is to have some patients perform some basic soft tissue therapy on themselves, with you supervising. This takes minimal extra time, as you would be holding the massager yourself anyway. You may even be able to do something else such as doing some notes while intermittently observing.

Demonstrate
To help the patient understand the benefits is often worthwhile perform an examination before and after being massaged. This can be as simple as palpating before and after, noticing any change in tenderness through to any other test clinical judgement dictates. Once you have demonstrated this you may recommend the patient get his or her own massager. Stress that it is supplementary to your care, just like exercises or other home advice. It just allows them to help with part of their problem.

Practical steps to help

Systematise
It is good to have a system in place to help make sure your recommendations are implemented. For example, once a once a massager is recommended there is a system in place to get that message to the front desk so they can organize the patient to get one.

Usage guides and research articles
Our Usage Guide explains the explain the rationale and benefits of home massage. If you need extra we’re got plenty. Just ask. We also now have plenty of research summaries and other articles available on our website. Feel free to use this for patient education purposes.

A massager in reception
This is a must. Have a massager plugged in next to a seat so patients can try one. They almost sell themselves, especially if the reception staff are enthusiastic about them, which leads to the last point. Make sure your reception staff have their own massager or at least access to one.

People seeking massagers
When people show our massagers to friends and relatives they often wish to purchase their own. If they live locally they will probably source one from the same clinic. Alternatively, our website gets a large amount of traffic from people looking for clinics to purchase our massagers from. If someone comes into your clinic looking for a massager that can be a real bonus. Our attitude is that he or she probably has a problem that we can help them with. At the minimum you can profit from the sale of the machine, and they are now familiar with the clinic. I recommend you have staff trained to be very helpful, maybe asking what they will be using it on and recommending a consultation.

Christmas and other gifts
Mothers day and fathers day are always good, but Christmas time can be a unique experience. The massagers make great Christmas presents for hard to buy for people. If people know you have the massagers available that is when you can get people walking in and buying an arm full.
**Dr Graeme's comments**

As stated earlier the main reason we built our massagers was to enable more complete treatment of chronic myofascial issues. As a general principle, we found that myofascial tissues deteriorate over time, and are substantially changed by the time one experiences pain. The general goal of treatment seemed to be the relief of pain, but with those tissues remaining in their deteriorated condition function would never return to normal and relapses were inevitable. The continued application of therapy and appropriate management once asymptomatic would continue to gradually improve those tissues, but the cost and inconvenience of the extra applications of therapy would become prohibitive. The following article illustrates this principle with one of the key components of myofascial deterioration: trigger points, and discusses a practical solution to this issue.

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**Trigger point treatment: deactivation or elimination**

**Introduction**

According to the scientific literature the goal of treating (myofascial) trigger points is to deactivate them. This is merely changing them from a state where they spontaneously cause pain to where they do so when palpated. This helps relieve symptoms, but they are still there, still causing considerable detriment, and are just one aggravation away from becoming spontaneously painful again.

Clinical trails measure success as relieving pain, but is deactivation leaving patients with their underlying condition still there causing ongoing detriment and subject to probable relapse a worthwhile clinical goal, or even being honest with patients? In this article we will briefly discuss how this occurs, why deactivated trigger points are still detrimental, then finish by discussing some options for complete elimination.

**Trigger point basics**

**What is a trigger point**

Trigger points are described as being palpable lumps within taut bands of muscle that have characteristic pain referral patterns. They are a key issue in most musculoskeletal pain syndromes (1–4). They are thought to start from microscopic damage to muscles caused by injury or overuse, especially if blood flow is reduced due to chronic tightness. The science behind them can get quite involved, but in summary:

- Part of the muscle goes into spasm forming a palpable lump.
- The spasm is locked on by a positive neurological feedback loop.
- Because the spasmed part of the muscle is shortened the remainder of the muscle becomes tight.
- With tightness restricting blood flow and the continued contraction of the spasmed section of muscle there is a build up of neurotransmitters and metabolic wastes, and a depletion of oxygen and nutrients.

**Active vs Latent**

Trigger points are called active if they spontaneously refer pain, or latent if they only produce pain when pressed upon. They are of course the same entity, free to revert from one state to another. Aggravation can change a latent trigger point to being active, while rest or treatment may revert it back to being latent.

**Prevalence**

Overuse and chronic tightness of muscles are common, and trigger points can exist in their latent state not noticed. Because of this trigger points are highly prevalent in asymptomatic people (5).
**Latent trigger points are still a problem**

Apart from being just one step from becoming symptomatic, having part in continuous spasm with reduce blood will of course be detrimental for the muscles, and the hypertonicity and reduced functionality will adversely effect posture and biomechanics. Even without referring pain, the consequences of latent trigger points have been summed up as follows. (5)

- restrict ranges of motion
- cause muscle weakness
- cause muscle fatigue
- alter muscle activations, and
- induce muscle cramps
- affect posture and joint function, creating further issues.

On top of that, scientists are now finding that latent trigger points still produce sub-threshold levels of pain that over time sensitisates the nervous system. This is a major cause of issues such as fibromyalgia and migraines (6).

**The goal of treatment according to the scientific literature**

To quote a review of trigger point therapies: (7)

"Most physical therapy treatments of MPS (myofascial pain syndromes) are targeted at deactivation of MtrPs (myofascial trigger points)."

There have been huge numbers of trials into the efficacy of trigger point treatments. All bar three we could find had stated goals such as deactivation or symptom relief. Success of therapy was determined by such measurement as pain levels, the amount of pressure upon a muscle needed to produce pain, ranges of motion, and various questionnaires relating to pain and disability. These are very worthwhile goals, but only three checked whether the trigger points were still present.

**The three exceptions**

We were able to find three trials that investigated the presence of trigger points after therapy.

**Trial one (8)**

52 active trigger points were treated with three weekly applications of dry needling. Symptoms were of course reduced. However, after treatment 11 were still active, 26 had deactivated, and only 15 (29%) were eliminated.

**Trial two: (9).**

Patients received 12 weekly therapy sessions, with each using multiple trigger point therapies. This is way in excess of what happens in most clinical practices, both in the number of sessions and what was done at each session. Patients did report symptomatic relief, but upon examination approximately 2/3 of the trigger points remained.

**Trial three (10)**

Patients were given three sessions of manual therapy plus a home exercise program. After treatment 32% of trigger points were eliminated.
Elimination instead
The bulk of scientific trials do not even consider remaining trigger points, so what would it take to actually eliminate the problem rather than (temporarily) deactivating them. As the clinical researchers haven’t done this we need to use the basic science and clinical tools we have. We present the following thoughts that may be helpful.

Clinical focus and goals
We can be happy that symptoms improve, but we need to clearly shift the goal to eliminate rather than deactivate. The researchers conducting trials don’t examine for trigger points post treatment, but clinicians certainly can. This would provide a more realistic view of patient’s improvement, and develop clinical experience

Causative and aggravating factors
Clinicians need to do the detective work to help reduce or eliminate any causative or aggravating factor.

Effective treatments
There have been a large number of trials evaluating and comparing various trigger point therapies. As mentioned they usually only consider symptom related affects. The results obtained are fairly similar, with no therapy showing consistently or remarkably superior results. To help determine an effective treatment we need to look at a trigger point’s pathophysiology.

- There is spasm of the section of muscle, perpetuated by a positive neurological feedback loop
- There is a reduction in blood flow with the associated build up of neurotransmitters and metabolites, and the depletion of oxygen and nutrients.
- The whole muscle becomes hypertonic.

Where journals have speculated how different therapies work they are usually said to address one or more of these issues. Scientific research has found that vibrations in the range of 30-50 Hz address all three (11).

- It disrupts neurological feedback loops.
- It increases blood flow.
- It relaxes muscles.

The number of therapy sessions
As previously discussed, we have trials showing that:

- three sessions of dry needles eliminated 25% of trigger points,
- 12 sessions of multiple therapies eliminated approximately 1/3 of trigger points, and
- three sessions of manual therapy combined with home exercising eliminated 32% of trigger points.

The logical assumption from this is that it is possible to eliminate trigger points, but it would take far in excess of 12 sessions. This is the big hurdle, as it starts to be come very unaffordable, and patients tend to lose motivation once their symptoms go. Our professional quality massagers for home use were developed to overcome this. Unlike needles, lasers or professional manual massage, with the appropriate equipment and advice patients can use this at home.

DrGraeme’s clinical experience
Dealing with chronic musculoskeletal conditions can be frustrating. Hypertonic muscles will resist attempts to restore normal biomechanics, and patients will always need more soft tissue therapy than we can provide. We wanted to have patients access vibration massage at home like our professional machines
provide, but all the home use massagers we could find ended up in our wheelie bin, and we built our own. We had patient’s whose paraspinal musculature was so chronically tight it was impossible to restore any articular movement, but with daily home use of our massagers the muscles relaxed enough to do so. We found that it takes a long time, but with regular home therapy to supplement our care muscles do gradually improve.

References


10. DrGraeme. The scientifically proven effects of vibration massage- with clinical applications [Internet]. Available from: https://www.drgraeme.com/articles/2019/08/scientific-effects
**Dr Graeme's comments**
The potential benefits of home use vibration massage for patients or clients who play sports or exercise are massive. It will help with warmups, injury prevention, performance enhancement and the rehabilitation of injury. Research shows that it will also reduce post exercise soreness and speed recovery. All your patients or clients who play sports or exercise should be using them.

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**The sports and exercise guide to the use of vibration massage**

**Introduction**
The DrGraeme massagers were originally developed to enable practitioners help patients with conditions such as back pain. They often needed many applications of massage but could not afford the use of professional masseurs. The the only real alternatives were massage machines for home use or the use of self massage such as with foam rollers. Neither were seen as effective enough to provide the therapy needed (1,2). The DrGraeme massagers were built to fill this need by providing economical professional standard home massage, and are now widely prescribed by practitioners such as Chiropractors and Physiotherapists. They are so effective many use them in practice themselves.

Back pain sufferers are not the only ones who can benefit. Professional sports clubs provide masseurs for their players to prevent injuries, improve performance, speed recovery and help rehabilitate injuries. The use of DrGraeme massagers helps make this type of care available to those who exercise or play sports, but cannot afford the copious amounts of massage provided by professional sports clubs. This guide covers the use of these massagers with scientifically demonstrated benefits and practical applications.

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Professional masseurs are excellent, but an affordable alternative was needed for backpain sufferers who needed many sessions.

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Professional sports extensively use professional masseurs and therapists. We now have an effective affordable alternative with scientifically proven benefits for:
- warm-ups
- assisting stretching
- assisting recovery
- reducing DOMS (post exercise soreness)
- increasing performance
- treating trigger points ("knots" in muscles)
Using a DrGraeme vibration massager
The usage guide available on the DrGraeme website describes usage in more detail, but basically all one needs to do is place the vibration head on covered skin over the part to be massaged and allow the vibrations to penetrate. Unlike manual massage techniques there is no pressing in and no need to cause pain. There is very little skill needed. As long as it is placed over the correct part it doesn’t matter whether a skilled practitioner or a non-professional is holding the machine. It will do a quality job regardless. That said, we recommend that users of our massagers or any sort of therapy seek professional advice to make sure it is safe and appropriate, plus get the proper management for any condition they may have.

The scientifically proven effects of vibration massage
When using a DrGraeme massager it is the vibration that penetrates deeply into the muscles rather than the pressure of the machine. Science has shown that the vibration will have the following effects.

1. Relax muscles (3)
2. Increase blood flow (4–6)
3. Reduce pain (7)
4. Cause lengthening of muscles similar to achieved by stretching (8–11)
5. Reduce Delayed Onset Muscle Soreness (DOMS), reduce residual blood chemicals, and speed recovery (12–19)
6. Assist healing (20–22)
7. Increase the performance of muscles (23)

Practical usage

trigger points
We discuss trigger points first in this guide because they are an almost universal problem that professional masseurs in sports clubs would continually deal with, and where amateur participants would get by far the most benefits.

What are trigger points
Those who have had a sports massage would understand that the very good masseurs are excellent at finding deep painful “knots”. These really hurt when pressed upon, but afterwards pain is often reduced and one is able to move more freely. These painful “knots” are known as trigger points. They are actually parts of the muscle that have gone into spasm and will not release. This causes the whole muscle to tighten and blood flow to be restricted. They are caused by things such as over-use and minor injuries, which is what most who play sport or exercise do so most will have developed a large number of trigger points.

Why are they so important?
As masseurs find, sports people and athletes can have many trigger points without pain. These are called Latent (pain free) Trigger Points. However, even without pain, with part of the muscle in constant spasm, being tightened and with restricted blood flow the trigger points will;

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• restrict movement,
• cause muscles to under perform and fatigue quickly,
• and of course be easily injured.

In this latent (pain free) state the trigger points themselves are only painful when a masseur presses on them. However, if they worsen or are aggravated they can start referring pain without provocation. When they do this they are known as Active (pain producing) Trigger Points. They are responsible for, or at least contribute to a wide range of pain syndromes.

_Treatment is a continuing job_

Overuse and minor injuries cause trigger points to develop and they can accumulate undetected in their latent (pain free) state. Also, even if treated occasionally they will still be there. Research has shown that while a small number of treatments may revert active (painful) trigger points back to being pain free it takes a very large number of treatments to actually eliminate them (24). Until they are eliminated completely they still restrict performance, pre-dispose to injury, and of course are ready to shoot pain again if aggravated. The practical implication is professional masseurs at sports clubs are continually finding and treating these “knots”, keeping them at bay.

_The treatment of trigger points_

There are many treatments for trigger points, including those painful pressure techniques masseurs use. The use of vibration massage is effective because it has been scientifically shown to disrupt muscle spasms, relax muscles and stimulate blood flow. The treatment is very simple. All one needs to do is place the massager head over the trigger point for 30-60 seconds, allowing the vibrations to penetrate and have their effects. As with any treatment for trigger points this will need to be repeated over a long period of time. Later in this guide we discuss the use of vibration for purposes such as warming up, reducing post exercise soreness and aiding recovery, assisting stretching and assisting healing. In practice the vibrations have a wide range of effects so the treatments are similar. What this means is that for example if you do a treatment for recovery you are also helping with flexibility and treating trigger points at the same time.

_Warming up_

Warm ups are typically done to stretch muscles and other tissues to a more effective operational length plus increase blood flow to flush the muscles with oxygen and nutrients. This serves to help prevent injuries and allow peak performance. Typically a warm up will include moderate exercise, stretching, and many professional sports also include a massage or “rub down”. The use of vibration massage has several scientifically proven benefits that could be part of this routine.

• It has been shown to cause increases blood flow which lasts for over 15 minutes (4–6)
• The relaxing effect has been shown to produce a lengthening in muscles equal to that produced by conventional stretching (8–11)
• The use of vibration massage before or after exercise has been shown to reduce DOMS and speed recovery (12–19)
Clinical guidance
Place the massager on the belly of the muscle and allow the vibration to penetrate for 30-60 seconds using a frequency of approximately 50 Hz (90% on a DrGraeme General Purpose Massager). If there is a trigger point in the muscle belly one can place the massager over it to treat the trigger point at the same time.

Post exercise/ reducing post exercise pain
Professional sports often use massage or a “rub down” after exercise to reduce residual stiffness and speed recovery. Vibration massage has been shown to relax muscles and stimulate blood flow. It has also been shown scientifically to reduced DOMS, reduce residual blood born chemicals such as lactic acid, and enable more rapid return to full function (13–19).

Clinical guidance
The massager protocol is similar to that used for a warm up. As with any form of therapy used post exercise care must be taken so as not to further damage any damaged tissue. Any pain on application should alert one to the need for professional assessment.

Improve stretching
Vibration massage has been shown to help improve stretching by causing muscles to relax and help remove the trigger points that tighten muscles and prevent them from stretching. This is achieved by using similar applications to that used for warm ups, recovery or the treatment of trigger points. Vibration has also been shown to inhibit protective reflexes to allow further stretching. This has been used by elite gymnasts, but is not something we recommend.

Relaxation affect
Vibration at approximately 20-60 Hz causes the relaxation of muscles. This has been shown to produce similar lengthening of muscles of muscles to that achieved by conventional stretching(9–11,14) In some circumstances this may be a better option than conventional stretching. For example, in the case of an injured ankle stretching the calf muscles may damage healing ligaments, but vibration massage applied to the calf muscles would not.

Trigger points
The previously discussed trigger points involve spasm of part of the muscle. This prevents the muscle from stretching. Attempts to do so will not be very successful and may cause injury. It is often this reason that muscles are constantly tightening or being injured. Treatment of those trigger points will allow normal stretching.

Reflex inhibition
There is a stretch reflex that helps protect muscles from damage. What happens is that when a muscle is stretched to far it automatically contracts to prevent stretching further. In a scientific trial gymnasts used vibration at 30 Hz to inhibit this reflex allowing them to gain more flexibility than achieved with conventional stretching(25)
Increasing performance
Science tells us that the application of vibration will enable the nervous system to stimulate more muscle fibres, both in type and number, resulting in a higher maximum force being generated by the muscles and increased effort. There have been a large number of trials showing this, with vibrations from 5-50 Hz seeming to require shorter applications (23). We’re not sure how practical this would be for most sports people and gym users, but would be something an Olympic weight lifter would seriously look at. For a casual sports person the greatest gain to performance would be through the elimination of issues such as trigger points and tightened muscles that inhibit normal performance.

Increased healing
Vibration is shown to increase the flow of blood. The benefits of increasing blood flow for healing are well understood. As an example, in those with poor circulation vibration has been shown to increase the oxygenation of tissues, and is seen as a promising therapy (20). Further to that, trials involving cuts being made in mice (21), and rats having their brachial plexus injured (22) then their healing monitored have shown that vibration massage produces quite amazing results. These include the following.

- Increased angiogenesis (formation of blood vessels)
- Increased formation of skin cells, granulation tissue and collagen deposits resulting in faster wound healing.
- The production of higher levels of Growth Factor and other hormones
- It can promote contraction and extension of muscle fibers, strengthen muscular tension, elasticity and tolerance, so, it can prevent and cure muscular atrophy
- Can effectively promote the repair of myelin sheath and axes of injured nerves.
- It can improve peripheral nerve units and excite peripheral nerves, so as to accelerate their conduction

Corrective exercises
In their guide to corrective exercises (26) the USA’s National Academy of Sports Medicine (NASM) provide detailed discussion on how things such as issues with muscles alter biomechanical function. There is a large amount of information about this on our website, but the take home message is that in order for corrective exercises to be successful and function to return to normal these issues need to be dealt with first. The NASM provide a simplified strategy for doing this:

- first treat tissues that are excessively contracting (such as the spasmed trigger points),
- then lengthen shortened tissues.

NASM have not got our massagers in the USA so they recommend the use of foam rollers, but it is believed you can do a bit better. The NASM guide gives comprehensive information about the issues to be dealt with and the use of corrective exercises, but use our previously discussed strategies to deal with excessively contracting and shortened muscles.

Further information
DrGraeme massagers are available either from the website www.drgaeme.com or through professionals who supply them for their patients/clients. Qualified sports and exercise professionals please email directly for practitioner pricing.
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VIBRATION THERAPY ON LOWER LIMB’S SENSORMOTOR CONTROL IN WORKERS SUFFERING FROM DIABETIC FOOT – STATE OF ARTS AND STUDY ON A NEW PREVENTION AND THERAPEUTIC SYSTEM.


**Dr Graeme’s comments**

Massage has long been used for health and wellness. We have examples ranging from therapeutic massages at day spas through to corporate massages where employees are given regular basic massages such as a 15-20 minute chair massage. Because of cost and inconvenience most patients or clients do not get to benefit from these. However, with one of our massagers sitting next to their favourite lounge chair regular wellness massages are now possible. Let’s look at the potential benefits.

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**Massage for health and wellness**

**Introduction**
The home use of a DrGraeme massager allows practically unlimited quality massage therapy at home. In this article we look at the potential health and wellness benefits. We will first briefly discuss the scientifically proven effects of vibration massage: that is, what your massager actually does. We will then look at the two main areas of potential benefit. The first is to maintain the function of the musculoskeletal system while preventing pain and injury. The second is the potential health related benefits such as the reduction of stress and anxiety, improved sleep and the reduction of blood pressure.

*We just consider the effects of the massage*

As well as the physical massage, benefits from a relaxation massage at a day spa may also come from things such as the relaxation, soothing music, aroma therapy or conversation with the therapist. On the other hand, in the case of corporate chair massages and some of the harder therapy sessions these are limited. In this article we consider just the effects of massage, which is what home use with a massager delivers. In the research referred to scientists have generally tried to isolate the effects of massage. They did this in trials by things such as having the masseurs work in silence using non-fragrant oils such as olive oil, and having the controls having appropriate relaxation.

**What vibration massage actually does?**
The following is a summary of the scientifically proven effects of vibration massage. For more information please see The scientifically proven effects of vibration massage- with clinical applications elsewhere in this guide.

- Causes the relaxation of muscles
- Causes an increase in blood flow
- Reduces post exercise soreness and speeds recovery
- Increases the performance of muscles
- Increases healing

**Prevention and maintenance**
As with almost every chronic clinical condition, musculoskeletal pain and dysfunction goes through a phase of sub-clinical deterioration until either some threshold is passed or aggravation occurs and the condition becomes symptomatic. In the case of musculoskeletal conditions this deterioration can include biomechanical changes, articular dysfunction, muscle hypertonicity and the development of myofascial trigger points. As an example, myofascial trigger points have been shown to be highly prevalent and cause dysfunction in asymptomatic shoulders (2–4), and progress to be a major cause of shoulder pain (1). Regular vibration massage will certainly help eliminate hypertonicity and myofascial trigger points in the asymptomatic stage, improving function and helping prevent the development of symptoms. We have a detailed discussion on this elsewhere in our guide: Trigger points: deactivation or elimination.
Health benefits
The best example of using regular massage for health benefits is what is known as “corporate massage” These are generally regular basic massages provided to employees. A typical corporate massage would be where and employee would receive a weekly 15-20 minute neck and shoulder massage while sitting in a chair clothed. Companies providing these claim that they improve job satisfaction, reduce stress, and reduce work related pain and injuries. There have been a large number of clinical trials investigating these. They have shown very positive results. Let us look at what they have found.

Reduced stress and anxiety
There have been a large number of trials investigating the effect of regular massages on stress and anxiety. As stress and anxiety is a huge issue for medical workers many of these trials have been conducted on these groups. These trials have used various forms of massage, but have universally found them to reduce stress and anxiety (5–13). Where the researchers have measured the residual effects these have been favourable. For example, when intensive care nurses were given a Swedish massage twice a week for four weeks there was a significant reduction in stress levels. This was still apparent two weeks after the massages ceased (8).

Sleep quality
We found three trials that measured the effect of regular massages on sleep quality. They trailed massage on intensive care nurses, carers for cancer patients, and hypertensive women. They all showed very positive results (11,14,15).

Blood pressure
Many trials have shown that regular massages have a favourable effect on blood pressure (11,16–22). For example, in a trial where 25 women with slightly increased blood pressure received 10 sessions of Swedish massage at three times per week the average blood pressure was lowered from 128/81 to 116/76. The blood pressure of the 25 women in the control group who laid down relaxed was unchanged (16).

One study investigated the long term effects of massage. Subjects were given 10 sessions of Swedish massage. It was found that blood pressure was still reduced after 72 hours, but had reverted to the original levels after two weeks (23) . This suggests that if massage were used to help control blood pressure there would need to be applied every few days.

Musculoskeletal pain and function
One of the primary goals of corporate massages is to reduce pain and the potential for work related injuries. Several trials measures pain and disability using questionnaires. All gave very positive results (7,13,24,25). However, one went a step further measuring head and neck ranges of motion. Twice weekly chair massages for a month were shown to increase head and neck ranges of motion (24).

Summary
Research shows there to be considerable benefits from regular massage therapy. When performed by professionals this is cost and time prohibitive for most people. However, it has been shown that the self application of vibration massage gives similar physiological effects, and more. In the absence of any contraindications the overwhelming majority of patients or clients would benefit hugely from regular self application of vibration massage.

References


Dr Graeme’s comments

As practitioners we are continually dealing with dysfunctional musculoskeletal systems. Typically dysfunction develops and is perpetuated by changes to functional elements, such as a shortening of muscles and connective tissues, articular issues, and muscles unable to contract normally. It is important to note that the central nervous system (CNS) continually monitors all these functions, and will alter neurological control to compensate. The dysfunction that results causes abnormal stress on elements such as joints, muscles and connective tissues, which over time this leads to injury or pain syndromes.

When simple therapies or medication are used the abnormal functional elements remain. More importantly, when exercises alone are used the body the CNS will cause movements to be performed in the same dysfunctional manner, with all the associated abnormal stresses.

Clearly, if one is to properly rehabilitate any injury or pain syndrome one needs to correct the dysfunction, but how do you correct it? If you try and use some form of corrective exercise, as stated, the CNS controls movements to compensate for any abnormalities, so movements will not be normal. On the other hand, if the abnormal functional elements are removed the central nervous system will have no need to compensate. Simply, you correct the abnormal functional elements and let the central nervous system do what it is designed to do.

In the USA’s National Academy of Sports Medicine’s publication NASM’s Essentials of Corrective Exercise Training (I) they describe addressing the following issues as part of a correctional exercise plan.
1. Inhibitory techniques to relax hypertonic muscles
2. Lengthening techniques for contracted muscles
3. Activation and integration techniques

My colleagues will probably be able to think of a few more things that need to be addressed, but it does illustrate some of the considerations and the process needed. This is a complex area so the purpose of this article is just to illustrate some of the issues, then provide some advice on overcoming one key issue that usually proves to be a major stumbling block.

Functional rehabilitation

Basic neurological control

Normal function

In a large company a CEO will provide directions, then a team of middle managers work out the best way to do it. Your nervous system works like this. Your equivalent of the middle management is the Central Nervous System (CNS). It is like a massive super computer which takes your directions, monitors feedback from sensors throughout your body, then sends out instructions. If you consciously decide to walk forward your CNS will work out how to do this. You don’t need to think about things like when to tighten your quadriceps or what angle you ankle joint should be. Instead, subconsciously your CNS monitors everything from your balance through to the stress on your joints and tension in your muscles. It sends instruction to your muscles to control your movement so it is is the most efficient, while minimising stress and damage.
Why function becomes abnormal
If part of your body becomes abnormal your CNS will detect this, and make changes to the control in compensation. An obvious example would be if you injured your ankle. Your CNS would detect this and cause you to limp. Limping is a less efficient way to walk and would abnormally stress other parts of your body, but your CNS will be monitoring all of these and making the best overall solution it can. What happens when your ankle heals? Your CNS detects this and automatically adjusts your walking back to normal.

The consequences of abnormal functional
If you walk with a limp for a long period of time you may develop back develop back problems or issues with the other leg. This will be fairly obvious. However, there are a host of other issues that cause abnormal function that are a lot less obvious, but very harmful just the same. This is known as dysfunction (abnormal or impaired function). It creates extra stress on tissues and results in the uncoordinated movement of joints. This predisposes to injury and can result in rapid degeneration. Dysfunction is a key issue in most musculoskeletal injuries and pain syndromes.

Some causes of dysfunction
There are many causes of dysfunction. We must stress here that it can be a complex issue, and their detection requires an examination by a properly qualified professional. In this article we will discuss two very common causes: articular dysfunction and myofascial trigger points.

Articular dysfunction
Articular dysfunction is extremely common. Simply speaking, it is where joints (in particular articular surfaces) cannot move freely through their normal ranges of movement. This restricts movement, causes abnormal stress upon the joint, and of course the CNS will make compensations which may be detrimental to other parts of the body. Their detection and correction requires specialised knowledge and training.

When functional correction is attempted without addressing articular dysfunction it cannot be successful. The CNS will continue to perform movements in the compensatory manner. Abnormal stress upon tissues and articular surfaces will continue, which can only be detrimental. This is illustrated by a two trials that compared the treatment of shoulder impingement syndrome with exercises alone vs combining exercise with using techniques such as joint manipulations to correct articular dysfunction. Exercises alone only produced moderate symptomatic relief, whereas when articular dysfunction was addressed and the joints able to move more normally the need for compensation was removed the results were much better (2,3)

(Myofascial) Trigger Points
The second major cause of dysfunction is trigger points. There are several reasons for this.

Alteration of muscle function
Trigger points are sections of muscle in continual contraction. Because of this the whole muscle becomes hypertonic, while blood flow is reduced resulting in a depletion of oxygen and a build up of waste products. Clearly, the muscle will be tight and not able to work normally so, the CNS will need to compensate. As an example, in an investigation of shoulder abduction researchers found that when trigger points were present in shoulder muscles the CNS altered the timing and “firing order” of the various muscles that control shoulder movement (4). When the researchers treated the trigger points and re-tested the neurological control had gone back to normal. Several other researchers have found similar alterations of muscle recruitment patterns due to the presence of trigger points, stressing that this causes poor control of movement and an increased possibility of damage (5–7)
Trigger points can be asymptomatic, and are highly prevalent
Because trigger points are caused by the things we do every day and are initially asymptomatic they are highly prevalent, even in asymptomatic people (8–15). Further, even in their asymptomatic state trigger points can badly affect function (11,16).

Treatment of trigger points commonly just (temporarily) reverts them back to their asymptomatic state
As discussed in our article Trigger Point Treatment: deactivation or elimination most treatments for trigger points do not eliminate them, rather just revert them back to their asymptomatic state where they are (temporarily) not causing pain, but still cause all the functional issues.

Practical advice
We need to recognise that dysfunction is an issue with all musculoskeletal conditions, and that correction is impossible unless the elements causing dysfunction are addressed. The correction of function using exercises alone usually cannot work. We need to follow the principle of correcting these elements, as discussed in National Academy of Sports Medicine’s publication NASM’s Essentials of Corrective Exercise Training, but also deal with the causes of dysfunction they have not mentioned.

Trigger points are the biggest challenge
Of these causes, trigger points and other chronic myofascial changes create the biggest challenge. This is because, as discussed in our article Trigger Point Treatment: deactivation or elimination although treatment often relieves pain the trigger point will remain in it’s asymptomatic state. Pain (temporarily) goes, but dysfunction remains. The use of supplementary self massage using our massagers was recommended as a practical, economical way for patients or clients to totally eliminate trigger points, allowing normal function.

References
Dr Graeme’s comments

Large numbers of our patients or clients have been diagnosed with fibromyalgia. However, translated from medical language a diagnosis of fibromyalgia actually means they can’t find anything wrong with you. All their tests have come up negative. They don’t know what it is, haven’t got a clue how to fix it. They have no expectation of a cure, only a huge shopping list of drugs and therapies to try and relieve the symptoms. Worse than that usually diagnoses are made by finding something on tests or scans. When the diagnosis is made because they cannot find anything that creates all sorts of problems. If they miss something, which happens a lot, it gets thrown into the fibromyalgia waste basket.

Although medical journals and so forth are telling doctors this, the cause and successful treatment have been in scientific journals for over a decade. It takes a while for this sort of information to filter through, and even longer when the drug companies and medics are making massive fortunes providing unnecessary tests and symptomatic care for people who will never get better. This article discusses these findings, and gives some practical advice on how to deal with “fibromyalgia” patients.

How scientists have successfully treated fibromyalgia

The medical diagnosis

Being given a diagnosis of fibromyalgia gives the impressions that doctors have worked out what’s wrong. This could not be further from the truth. Most medical conditions are diagnosed when doctors find something wrong. However, there are no tests or findings for fibromyalgia. Doctors diagnose it when a patient has wide spread pain and other symptoms, but they cannot find anything wrong, ie all their tests come up negative. There are several problems with a diagnosis such as this.

1. Patients get diagnosed with fibromyalgia when real problems are missed. This is very common. One trial found that 57% had un-diagnosed rheumatic conditions (1).
2. When doctors cannot find anything wrong all they can do us prescribe symptom relieving drugs and therapies. There is not even a thought of cure (2).

The scientist’s understanding of fibromyalgia

Sensitisation of the nervous system

Scientists have found that fibromyalgia is actually caused by a sensitisation of the nervous system. When the nervous system is sensitised normal stimuli becomes painful, painful stimuli are amplified, and because the nervous system controls most of your body’s functions you get may seemingly unrelated symptoms (3,4)

What causes the sensitisation?

The main cause of sensitisation of the nervous system is prolonged bombardment from other sources of pain. If one has a recognised problem causing pain, such as an arthritic condition, doctors usually understand that chronic (long term) pain will cause secondary issues. However, it becomes a huge issue when the cause of prolonged pain is unrecognised or un-diagnosed. It is very confusing when a host of secondary effects are observed, but no primary cause is evident
So what is this unrecognised or un-diagnosed cause of long term pain? Scientists have identified the main cause as (myofascial) trigger points. These are those tender lumps in muscles that shoot pain when masseurs press upon them. They do not show up in any standard medical test, nor be treated by drugs or surgery, so they barely rate a mention in medical journals and are too often not diagnosed. The pain from these trigger points has been shown to:

1. cause the nervous system to be sensitised
2. add to the total amount of pain in a process known as “summation”

**Treating the cause**

Scientists have done a lot of work showing cause and effect, but the key is what happens when pain from these trigger points is removed. When this was done in a clinical trial it has not only relieved the local pain from the trigger points, but relieved fibromyalgia symptoms across the whole body. This clearly shows trigger points to be the cause. The scientists who did this research over a decade ago clearly state that the way to treat fibromyalgia is it eliminate these underlying sources of pain (5).

*The issue with treating trigger points*

The scientists eliminated the pain from trigger points by injecting them with anaesthetic. That is a very good thing to do in scientific research to prove a theory, but not a suitable way to eliminate the problem long term. Medicine does not offer a worthwhile solution. As previously stated trigger points do not show up in medical tests, cannot be eliminated with drugs or surgery, and are barely mentioned in medical journals. On the other hand there are a host of alternate therapies that treat trigger points, ranging from massage techniques through to the use of needles and lasers. However, as discussed in our research summary on eliminating trigger points the goal of these treatments is to (temporarily) inactivate them only. As a consequence they continue to be re-aggravated, sending the pain that eventually causes sensitisation. Because too often medicine overlooks trigger points, and alternate treatments usually only temporarily inactive them, trigger points are allowed to persist for the long periods of time needed to cause sensitisation. Of course, the longer a problem is there the more difficult it is to eliminate.

**The practical solution**

The scientists eliminated the pain from trigger points by injecting them with anaesthetic. This is ideal for research to prove a concept, but not a practical long term solution for fibromyalgia sufferers. The ideal way to eliminate pain from trigger points is to eliminate the trigger points. Our article *Trigger points: deactivation or elimination* gives general guidance in how to do this. However, fibromyalgia does create some extra challenges. By the time one develops fibromyalgia the underlying condition will have become very chronic and very entrenched, requiring a large amount of therapy over a long period of time. On the other hand the sensitisation will make the patient or client less tolerant of treatment. This is probably why although being an excellent treatment for trigger points and other chronic musculoskeletal conditions, the results of trials testing massage have only shown moderate but inconsistent results (6–8).

*Helpful hints*

Due to the issues of chronicity and sensitisation the following hints may be of use.

1. smaller, more frequent applications of therapy may be used
2. there may be the option of using some sort of pain relief to temporarily allow more effective treatment. Using anaesthetic injections like the scientists did would probably work, but there may be other solutions
3. It would be better to use trigger point therapies that cause less pain. For example, a laser would cause less pain than using ischaemic compression.
Our solution
This author is not experienced with the use of modalities such as dry needles or laser. Understanding the basic principles though these would probably successfully treat the underlying cause of a lot of fibromyalgia. However, it would take a huge number of applications, which most patients or clients would find un-affordable and highly inconvenient. Our solution is to supplement care with the home use of our vibration massagers. That way, even if it takes hundreds of applications of therapy over time it is still affordable and convenient.

References
Dr Graeme’s comments

There is now a huge amount of research showing that intermittent applications of vibration in the range of 35-50 Hz dramatically increases the rate of healing. You will find many of the pictures in this report absolutely amazing. I’ve read the promotional material about the effect on healing of things like laser, but the effects of vibration are huge by comparison and your patients or clients can easily apply the therapy at home several times a day.

The clinically proven effects of vibration on healing

Introduction
There has been a huge amount of research done on the effect of vibration on healing. The amount of information is staggering, with researchers investigating everything from how bone fractures heal on xray and how fast wounds heal, through to the number of repair cells, level of growth hormones and levels of other blood chemicals. To present this all in a readable manner there will brief summaries of each area and pictures that literally speak 1000 words, and further details in an appendix.

The protocol for most of these trials has been the application of vibration in the range of 35-50Hz (60-95% of full power in a General Purpose Massager), with applications from 15-30 minutes a day. Clinicians would need to advise usage in a manner that was not to soon after an injury or done in a manner that could cause further injury, but with that in mind this is something most patients or clients could take advantage of.

Please also note that most of this research was done on animals such as sheep, mice and rats. Research ethics committees tend to frown on doing the things the researchers did on humans.

Summary of effects

Healing bone fractures
There have been a large number of trials investigating the effect of vibration on the healing of bone fractures. Therapeutic applications have generally been in the range of 35-45Hz, with applications of 20-30 minutes per day. Researchers have viewed healing on xrays, measured various blood chemical levels and noted the number of osteoblasts (bone producing cells). All trials showed that the application of vibrations sped up healing remarkably (1–9)

Wound healing
We found two trials that measured the effect of vibrations on wound healing. The results are illustrated in the following pictures. As healing is an issue for diabetes sufferers due to impaired circulation the researcher were interested about whether vibration’s effect of increasing blood flow would help (10,11)

Muscle injury
A study into the effect of vibration on the healing of muscles used applications of 45 Hz for 30 minutes a day. As shown in the following pictures this resulted in a remarkable increase in the size of muscle fibres and reduction in the amount of fibrosis (12)
Nervous tissue

Scientist investigating the effect of vibration on the healing of nervous tissue by deliberately injuring the brachial plexus on a large number of mice (13). What they found was truly remarkable. We’ve reproduced their summary of findings in an appendix, but in summary the vibration was found to:

- accelerate the formation of new skin and tissues, speeding the closure of wounds
- accelerate the formation of new blood vessels
- increase blood flow and increase the permeability of capillaries allowing more blood to the tissues
- increase the production of Growth Factor and various other growth related hormones.
- promotes the repair and regeneration of nerves
- increase the activity of various other chemicals needed for growth and repair

The pictures

The healing of sores (10)

This photo and graph shows the effect of applying 45 Hz vibration for 10 minutes per day, as compared with using an alternative method of stimulating growth: electrostimulation.
Wound closure (11)

These are from another trial using 45 Hz for 30 minutes per day. LIV stands for low intensity vibration, while the controls were allowed to heal naturally.

Formation of blood vessels (11)

In the same trial the formation of blood vessels was investigated. In these pictures the darker lines are the blood vessels. It shows that vibration (LIV) cause the growth of a lot more blood vessels.
**Level of growth hormones (11)**

These graphs show the effect of vibration on the levels of various growth hormones. Vibration of 45 Hz for 30 minutes a day caused a remarkable increase. Where the graph shows a lower level it's actually a good thing for that chemical.

**Muscle fibres (12)**

This photo shows the effect on healing muscle of 45 Hz vibration for 30 minutes per day. It shows muscle fibres in cross section. Those receiving vibration have clearly grown much larger.
Fibrosis (12)

From the same trial. In these photos the lighter staining represents fibrous scar like tissue, while the red is the muscle fibres. This clearly shows that the application of 45 Hz vibration for 30 minutes per day resulted in healing and muscle growth with far less scar tissue.

Appendix One: results in the scientist's own words

The following is a direct summary from the trial testing the effects of vibration on the healing of injured nerves. There are a few technical terms, but overall it's pretty easy to understand (13).

"Effect of Mechanical Massage Treatment on Muscles of Limbs
Mechanical vibration massage treatment has obvious effect on muscular atrophy induced by nerve root injury. It can dilate capillary, increase volume of blood flow, so as to greatly improve blood supply and nutrition in local tissue; It can make the wall of micrangiun rhythmically flatten and restore, accelerating flow of blood; And it can promote contraction and extension of muscle fibers, strengthen muscular tension, elasticity and tolerance, so, it can prevent and cure muscular atrophy.

Effect of Mechanical Massage on Secretion of NGF (Nerve Growth Factor- a growth hormone)
Benign stimulation of mechanical vibration massage can activate the response of nerve immune and neuroendocrine systems, and transmit the signals to the submandibular gland through complicated ways, promoting secretion and storage of NGF in the submandibular gland. Finally, NGF is transported to brachial plexus root injury area through digestive, circulative and nerve systems.

Effect of Mechanical Massage on Repair of Injured Nerves
Mechanical vibration massage can effectively promote the repair of myelin sheath and axes of injured brachial plexus in the rat. It can effectively improve blood circulation of the injured myelin sheath, promote proliferation of SC and survival of the cell body of injured neurons, so as to form a necessary regenerative micro-environment early for repair of nerve, and it induces stress responses of immune and neuroendocrine systems in the rat, promotes secretion of NGF in this gland, and it can improve peripheral nerve units and excite peripheral nerves, so as to accelerate their conduction reflection.
Effect of Mechanical Massage on Na+, K+-ATPase Activities

Na+, K+-ATPase activity on the surface of muscular cell membrane is an important limited factor for excitability and contractile strength of muscular cells. After skeletal muscles lose nervous innervation, generation of ATP is hindered, so Na+, K+-ATPase activity decreases. Under the mechanical massage stimulation, the muscular cells cultured in vitro show increases in stress-related gene expression and protein synthesis, leading to adaptability reconstruction of structures and contractile characters of the muscular cells, which are closely related with activation of Na+, K+-ATPase, and influences the distribution and functional activity of Na+, K+-ATPase on the surface of muscular cell membrane. In brief, mechanical vibration massage can promote the regeneration and recovery of the brachial plexus, and effectively slow down the decrease of Na+, K+-ATPase activities induced by the nerve injury, preventing muscular atrophy, and it promotes the generation of submandibular gland NGF, providing a favorable environment for regeneration of nerve

References

An easy safe way to improve sleep quality while reducing anxiety, heart rate and blood pressure

Summary
A recent study published in the journal *Asian Pacific Journal of Cancer Prevention* showed that a simple 15 minute back massage each day for a week reduced anxiety, lowered heart rates and blood pressure, and improved sleep quality. This is non-pharmaceutical, extremely safe and practically side effect free. The only thing stopping most people from enjoying these benefits is that having a professional massage each day would be prohibitively time consuming and expensive. Patients and clients can now do this by using our DrGraeme serious massagers for home use.

The study overview
The authors of the study were seeking a way to benefit those who care for cancer patients, a task that can be very demanding and stressful. They chose as research subjects 44 carers aged 18 years and older with no significant medical or musculoskeletal problems. 22 received the massages while 22 were used as controls (to compare). Those massaged were given a fairly standard 15 minute manual back massage each day for a week. For scientific purposes the researchers needed to make sure any improvements were due to the massage alone. To do this physiological effects were minimised by having the therapists keep communications to a minimum, and non-aromatic baby oil was used to eliminate any aroma therapy effects. So they knew that any improvements were not due to the rest and relaxation while being massaged comparison group rested quietly in a silence room, and were not allowed anything that might affect the outcome such as music, television or exercising. The researchers used scientific questionnaires and measurements to measure anxiety levels, heart rate, blood pressure and sleep quality.

The study results

*Anxiety state*
Anxiety levels were measured by two methods. The first was by using a scientific questionnaire where scores range from 0 to 80. Over the week the massage group improved from 49.68 to 45.68 while the control group actually worsened.

The second measurement was the level of a chemical called cortisol in the blood. This is significantly increased by psychological stressors, especially chronic stressful events. The authors noted that six previous reviews of the effect of massage on cortisol levels showed either small or non-significant improvements. However, this study achieved a very significant reduction. The researchers attributed this to providing multiple applications of therapy.

To quote the authors:

*In this study, a decrease in cortisol levels after massage was not surprising because massage was applied in multiple doses as 15 minutes a day for one week, thus sustaining the effect of massage might be effective.*
Blood pressure and heart rate

To quote the authors:

Our findings showed that both BP and HR, which are psychological indicators, significantly decrease by massage.

Sleep Quality

As measured by a questionnaire called the “Pittsburgh Sleep Quality Index” 77.3% of the subjects initially suffered from poor quality sleep. After the week this had reduced to only 63.6%, with average index scores also significantly reduced. Interestingly, as occurred with the anxiety state measurement the control group worsened. Maybe being involved in the trial created extra stress?

Conclusion

This simple intervention repeated over time was shown to produce excellent and worthwhile results. There were no pharmaceuticals involved, and no side effects. The trial only went for one week, so it can be speculated that continuing the intervention may have produced further improvements. Anxiety, high blood pressure and poor sleep can be a complex problem so it should be assessed professionally so a safe, comprehensive management plan can be determined. Regular massages may help. Such regular massages if done professionally would be prohibitively expensive, but practically unlimited quality massages can be received at home using our DrGraeme massagers with professional advice. Massages can usually be combined with other forms of therapy such as exercise, relaxation and psychological counselling.

Reference

Pinar RI, Afsar F. Back Massage to Decrease State Anxiety, Cortisol Level, Blood Prsssue, Heart Rate and Increase Sleep Quality in Family Caregivers of Patients with Cancer: A Randomised Controlled Trial. Asian Pac J Cancer Prev. 2015;16(18):8127-33

Further related studies

Study one (Katz 1999)

Staff at a large teaching hospital were given eight 15 minute sessions of Swedish massage. Compared with the controls the experimental group showed significant reductions in pain and tension, and an improved mood.

Study two (Narazi 2015)

Intensive care nurses were given a 25 minute session of Swedish massage twice a week for 4 weeks. Compared with the controls the experimental group showed a significant reduction in stress levels. This was still apparent two weeks after the intervention ceased.

Study three (Engen 2012)

Nurses were given a 15 minute chair massage each week for 10 weeks. Their stress related symptoms reduced significantly, and interestingly 60% were willing to pay $10-25 for a 15 minute massage at work if available.

Study four (Bost 2006)

Nurses received a 15 minute Swedish back massage once a week for 5 weeks. Anxiety levels were significantly reduced as compared to controls.

Study five (Shulman 1996)

Employees of a large company experiencing downsizing were given a 15 minute chair massage each week for six weeks. A significant reduction in anxiety was achieved.
References


Dr Graeme’s comments
This important piece of research shows that trigger points are the major cause of shoulder pain but even after 12 very thorough treatment sessions where symptoms had gone most of the trigger points were still there. Despite being a major cause of shoulder pain medical journals barely mention trigger points.

The presence and treatment of myofascial trigger points in chronic shoulder pain

Summary

Trigger points are the major cause of shoulder pain
The authors of two pieces of research state that although myofascial trigger points (MTPs) are well accepted as a source of pain they are barely considered when diagnosing or treating shoulder pain. To investigate their involvement the researchers first examined the shoulder muscles of 72 subjects with chronic non-specific shoulder pain and found a high prevalence of MTPs. They then conducted a randomised control trial where the treatment group received 12 weekly sessions, each consisting of multiple forms of trigger point therapy. After the 12 weeks the number of trigger points had reduced, and there was a corresponding decrease in the pain and disability scores. From this we can conclude that MTPs are heavily involved in non-specific shoulder pain, and their treatment is a must.

Pain went, but the trigger points were still there
However, after the 12 extended weekly therapy some pain and disability was still present. More importantly, examination showed that about 2/3 of the trigger points remained, although many had reverted to their latent (pain free) form. Simply, only about one third of trigger points had actually been eliminated. Further, the authors state that due to microscopic damage an the presence of causative and aggravating factors the trigger points may redevelop. The complete elimination of trigger points therefore would take a much larger number of applications of therapy, plus some sort of ongoing maintenance. This would be economically prohibitive if relying on professional therapy alone.

Challenging the conventional diagnosis of shoulder pain

Contradicting the conventional diagnosis
The authors state that according to medical literature the most common cause of shoulder pain is subacromial impingement, which causes inflammation and degeneration of the subacromial bursae and tendons. They point out that the following facts contradict this.

• Calcifications, acromion spurs, subacromial fluid and signs of tendon degeneration are equally prevalent in healthy subjects as in patients with shoulder pain.
• Scientific evidence from randomised controlled trials (RCTs) and systemic reviews of the effectiveness of multimodal rehabilitation, injection therapy, physical therapy, or the application of other therapies in patients with shoulder pain are either conflicting or lacking.

Evidence suggestion trigger points
On the other hand the authors state that the involvement of MTPs in musculoskeletal pain is becoming increasingly accepted. They are said to contribute to shoulder pain the following ways.

• The referral of pain by active MTPs is well understood.
• Although latent (pain free) trigger points are not an immediate source of pain they may elicit pain when stimulated, such as with sustained or repeated contractions.
• Latent MTRs may disturb normal motor recruitment patterns and movement efficiency resulting in joint dysfunction, which places abnormal stress on the joint tissues and increases the risk of injury.

Despite this evidence the authors state that the treatment of MTPs is rarely included in systematic reviews of the effectiveness of conservative interventions in patients with shoulder pain.

The trials

Subjects
For the investigation of the prevalence of MTPs, 72 subjects were chosen from patients with non-specific shoulder pain aged between 18 and 65 referred to a primary care practice that specialises in neck and shoulder pain.

Trial one: prevalence
For each subject, all 17 muscles known to produce shoulder pain or shoulder dysfunction were examined for MTPs. Muscles containing active MTRs were found in all 72 subjects, while muscles containing latent MTPs were found in 67 subjects. The median number of active MTPs per subject was 6. The most common muscles where active trigger points were found were infraspinatus (56 subjects) and upper trapezius (42 subjects).

Trial two: treatment
In the investigation of treatment of MTPs the same 72 subjects were randomly divided into control and treatment groups. The treatment group had their MTPs treated by a therapist. The outcome was measured by counting the number of MTPs remaining, and by the use of a detailed questionnaire that focused on physical function, pain and other symptoms (DASH).

Treatment
patients were treated on a weekly basis for 12 weeks. Each treatment included:
• multiple applications of ischaemic compression for each trigger point
• massage
• cryotherapy
• specialised stretching, plus hold and relax techniques.

Results
At the end of the trial those in the treatment group had significantly less MTPs and showed significant reduction in pain and disability as measured by the DASH questionnaire. Moreover, the number of trigger points and the DASH questionnaire were correlated: ie, as the trigger points disappeared the pain and disability reduced. A summary of the results follows.

• Average MTPs at start:  7.4 active and 4.2 latent
• Average MTPs after 12 weeks:  4.8 active and 4.7 latent
• There was no measure of the residual effects after treatment was discontinued. We do not know whether the MTPs and symptoms gradually returned

Clinical implications

Correct diagnosis and treatment of shoulder pain
The results of these trials contradict the common diagnosis and treatment of shoulder pain. Instead, it strongly implicates MTPs a major cause, and points to their treatment as a major priority.

The requirements of care
There is a discussion of the treatment of MTPs elsewhere in this guide. However, 12 extensive sessions
of therapy over 12 weeks produced results that of might well be described as “half fixed”, and the authors suggest that factors may cause it to continually redevelop. Taking this to it’s logical conclusion it would take considerably more than the 12 visits then further ongoing care to “fix” the problem. If done by professionals alone this would be prohibitively expensive for most people. A solution would be supplementary home massage using a DrGraeme massager under professional advice. We happily supply sample massagers to degree qualified practitioners who deal with musculoskeletal complaints, on a one per clinic basis. Please email us directly on graeme@drgraeme.com for samples or practitioner/wholesale supply.

References

Bron et. al High prevalence of shoulder girdle muscles with myofascial trigger points in patients with shoulder pain
BMC Musculoskeletal Disorders 201112:139

Dr Graeme's comments

The research clearly shows that if your patient or clients use a vibration massager before or after (or both) exercise they will get far less sore and recover faster. It is easy, convenient, with practically no ongoing cost. They should all be doing it.

Summary of research on the effect of vibration massage on post exercise muscle soreness and recovery

In this article we will briefly review some research findings in relation to the affects of vibration massage on Delayed Onset Muscle Soreness (DOMS), residual Lactic Acid, and the recovery of muscles post exercise.

The research

In each of these trials participants underwent strenuous exercise to induce post exercise soreness and fatigue. Some subjects received vibration massage while others received either no treatment or a different treatment (controls). The recovery and levels of post exercise soreness was compared.

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 (cycles per second). The results showed that both conventional massage and the vibration massage resulted in significantly lower DOMS, with the vibration group recovering faster than the conventional massage group. They also showed that the group receiving the vibration massage had significantly less residual Lactic Acid.

Second trial (2)

In this trial the one group received a vibration massage of 50Hz to the centre of the muscle while the control group received no treatment. There was a significant decrease in the soreness of the vibration massage group compared with the control. Both groups showed a decrease in maximum contraction strength post exercise, but this decrease was less in the vibration massage group.

Third trial (3)

In this trial the treatment group received a vibration massage of 30-50Hz, with the vibration massage group showing a significantly lower level of pain.

Fourth trial (4)

This trial used the combined intervention of having the exercise performed on a vibrating platform, and applying vibration massage to the muscles. They found significantly reduced pain 24-120 hours after exercise for the treatment group.

Fifth trial (5)

This trial used a vibration pad giving 30-65Hz, with 30 minute massages being given 30 minutes post exercise plus on days 1, 2, 3 and 4. Compared with the control, from days 2-5 soreness was 18-30% less, with soreness disappearing altogether earlier.
Literature review articles

**Review One (6)**

“Vibration is an effective modality in the field of rehabilitation. Vibration therapy improves muscular strength, power development and kinesthetic awareness [27], increased flexibility, motor unit synchronisation. Various researches which shows effectiveness of vibration therapy in management of DOMS”

**Review Two (7)**

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

Discussion

Vibration massage has been clearly shown to reduce post exercise pain and speed recovery. When using our DrGraeme General Purpose Massager under proper advice it is also relatively inexpensive and easy to apply. The frequencies used in the trials ranged from 35-50 Hz, which equates to using our massager between 60-90% of full speed. Applications are direct to the muscle, and are affective when used both before exercise and during recovery. The use of a vibration massage in moderation on normal muscles (no injury or pain syndromes) is relatively safe. One should consider recommending most sports people and exercise participants to take advantage of this therapy.

References

(1) Imtiyaz S1, Veqar Z2, Shareef MY3 To Compare the Effect of Vibration Therapy and Massage in Prevention of Delayed Onset Muscle Soreness (DOMS). J Clin Diagn Res. 2014 Jan;8(1):133-6
(3) Kamandani et.al. The Effect of Acute Vibration Training on Delayed Onset Muscle Soreness in Young Non-Athlete Women Health Scope. 2013 November; 2(3): 119-24
Summary of research on the effect of vibration massage on muscle length and joint range of motion, with practical applications

Introduction
In this article we will briefly review some research findings in relation to the affects of vibration massage on allowing muscles to relax and lengthen, thus allowing joint range of motion (ROM) to increase. Following that we will discuss how we make a practical use of this. It is provided as general information only. While we hope you put it to great use, such use should be consistent with your training and your patient’s needs. Any feedback will be most appreciated.

Research on the effect of vibration massage on joint range of motion (ROM)
In all the trials below vibration massage was applied to muscles. Joint ranges of motion were measured, with increase being due to a lengthening of muscles allowing the joint to move further.

**Trial One (1)**
Knee extension was measured with the hip flexed to 90 degrees. Multiple applications of 50 Hz (cycles per second) massage were applied to the hamstring muscles over a eight week period. Compared with the control group the massage group had an average increase of 13-14 degrees.

**Trial Two (2)**
Hip flexion was measured by attempting to touch ones toes. For the massage group a 44 Hz massage was applied each day to the hamstrings for three days. A stretching group used conventional stretches each day, while a third group acted as a control. Both the stretching and massage groups showed a similar significant improvement in hip joint ROM

**Trial Three (3)**
This trial used the toe touching measurement and hamstring massage. Vibration massage was used with unspecified protocol on the hamstrings and erector spinae muscles. The massage group showed a 5cm improvement as compared to the controls.

**Trial Four (4)**
In this trial a straight leg raise (SLR) was measured. A proprietary device called “Deep Oscillation” was used. This is a device that has a pad that is applied to the skin. The makers claim that it’s therapeutic affect is from mechanical vibrations that penetrate. From what is understood the pad creates an electrostatic attraction to the skin that switches on and off. It works like having a vacuum cleaner on your skin switching on and off very fast creating a vibration. In other words, it’s an impressive looking, patentable and very expensive way to create a simple mechanical vibration. Anyway, the Deep Oscillation group had an increase in SLR over the controls.

Practical use of this information
Like stretching exercises, localised vibration massage has been shown to be an effective method of producing lengthening of muscles, and therefore increasing joint ROM. In some situations stretching exercises would be the best choice, while in others the use of vibration massage would be the best. This
section will cover two situations where the use of vibration massage is by far the best choice, if not the only choice.

1. Situations involving damage or injury
2. Where it is difficult or impossible to isolate a stretch to a specific muscle or joint.

Additional benefits
As discussed elsewhere in our practitioner manual the use of vibration massage will have other beneficial affects. For example, if used as "stretching" during a warm up it will increase localised blood flow, help reduce post exercise blood flow and speed recovery. If used post exercise it will decrease soreness and speed recovery. As discussed in our section on assisting healing, if used as part of rehabilitation it will speed healing by increasing blood flow plus possibly a host of other affects.

Situations involving damage or injury

Injured ankle example
The first situation where vibration massage by far the best choice is where stretching can cause damage to an injury. Let us use an ankle sprain as an example. The typical treatment is to first immobilise the joint while the damage to the ligaments and other localised structures heal. While the joint is immobilised the calf muscles will shorten, but stretching at this stage would involve ankle joint movement which would damage the healing ligaments. On the other hand, as long as there were no contraindications localised vibration massage could be used on the calf muscles while the ligaments were healing. Once the ligaments heal far less rehabilitation would be needed.

Other examples
There are many other examples of where this principle could apply. It is very common for a person with an injured lower back to have muscles deep in around their pelvis and hips that are shortened and need stretching. However, stretches for these muscles also tend to put stress through the lower back, causing the risk of further injury. Vibration massage could be used on these muscles with the person lying in a neutral position. This should not place stress on the injured lower back.

Difficult or impossible to isolate a specific muscle or joint

Spine example
The second situation where the use of vibration massage is an excellent choice are functional problems where it is difficult or impossible to isolate a specific joint or muscle. Let's use the spine as an example. In your spine you have many joints, each doing basically the same thing. This spreads the work so each individual joint does not have to work too much. When a spine bends each joint should move a little bit, adding up to a complete movement. The issue here is that it is impossible to isolate movement or a stretch to one specific joint. It is a common situation for one joint to be injured then subsequently stiffen while healing. As this happens the adjacent joints often become hypermobile to compensate. In this situation how does one isolate movement to the stiffened joint in order to stretch that joint's intrinsic muscles? A spinal stretch will only isolate movement to a region of the spine, not to an individual joint. Within that region most movement would occur in the hypermobile joints. On the other hand vibration massage can be applied directly to the intrinsic muscles of the stiffened spinal joint.
An illustration of changes due to spinal injury
The following diagrams how spinal function can change over time due to injury. These situations require very specific elongation "stretching" of muscles and mobilisation of joints. Specific elongation can be achieved by a direct application of vibration massage. The specific mobilisation of the joints requires a specific adjustment/mobilisation. This is something that requires a high degree of specialised training.

Normal spine

*Balanced (Left)*
This shows a normal spine in a balanced neutral position. There are joints between the vertebrae. The muscles (red) balance and move the spine.

*Normal bending (right)*
To bend normally the muscles on one side pull tight while the muscles on the other side relax to allow movement. Each vertebrae moves about the same amount.

An injured spine

*Initial injury (right)*
This diagram shows an injury to the lower joint. While this is healing the body tends to splint or restrict movement at the injured joint while, letting the adjoining joints move extra to compensate. This diagram shows the spine bending to the left. The injured lower joint has not moved while the joint above is moving extra.

*Long term functional change (right)*
If healing takes a considerable time, or where there is repeated injury (eg. an occupational task) the injured joint may stiffen while the compensating joint may start moving too much. In this case the muscles associated with the stiff joint will shorten while the ones associated with the joint moving too much will lengthen. This is a very common issue with serious long term consequences including increased wear and potential injury for the compensating joint, and of course pain.
References


Dr Graeme’s comments
We really like what people are trying to achieve with foam rollers. However, the results of clinical trials of their use are not remarkable, and their unsupervised usage does carry some risks. We believe patients or clients would be safer and get more reliable benefits by using one of our vibration massagers with appropriate professional advice.

The use of foam rollers for self massage in sports

Introduction
Professional massage therapy is used extensively by professional sports clubs and athletes. Seeing these benefits but not able to afford these professional services, others playing sports or exercising attempted to emulate this therapy by the use of foam rollers. This is done by using one’s body weight to press on the roller, emulating the pressure of a professional masseur. It’s proponents claim that it is not as effective as massage therapy performed by a professional, but has the advantage of being inexpensive and practically unlimited.

Do they work?
The use of foam rollers tries to emulate a highly valuable professional therapy. How does the use of foam rollers compare?

Clinical trials
One would imagine that the results obtained in clinical trials would be as good as it gets. Subjects would be professionally examined to determine suitability, given appropriate instructions, then well supervised. The results in those clinical trials we found were a mixed bag. They are summarised in the appendix to this article.

Real world usage
In real world usage users would not be appropriately selected, instructed or supervised. Let’s look at what is likely to happen.

Use on inappropriate conditions
In the trials subjects would be excluded where usage was inappropriate, such as usage on damaged tissue. In the real world users may apply heavy pressure to things like torn muscles and haematomas.

Appropriate pressure and effleurage
Professional masseurs are able to examine tissues then determine the appropriate pressure. Home users may not have this judgement.

"Good pain" vs "Bad pain"
The use of foam rollers is trying to emulate ischaemic compression (trigger point therapy) and some other forms of massage. These forms of massage are often painful. Masseurs often describe this as "good pain". Properly qualified masseurs are trained to understand the difference between "good pain" and pain produced by pressing on structures such as injured tissue or neurovascular bundles. On the other hand members of the general public usually are not. The dangers of having untrained people applying heavy pressure to these structures thinking they are producing "good pain" are obvious.
Conclusion
As professional sports find, there are huge benefits to be had from the plentiful availability of massage and soft tissue therapy. The idea behind foam rollers being able to provide inexpensive practically unlimited such therapy is an excellent one. However, the optimum usage in clinical trials only produces moderate and inconsistent results, and there are real issues with real world usage. The following is what we suggest is a better solution.

Professional advice
To be safe and get the best possible results professional advice is needed. Routine usage should be discussed with a profession, then further advice should be sought where conditions change, such as a new injury.

Use a vibration massager
We believe that the use of a vibration massage would give safer and more consistent results. They are easy to use with proven benefits. More importantly:

• They are far less reliant on the need for the correct skills and pressure. All one does set the machine at the desired speed, then place the head over the appropriate area for the recommended time. Because of this they should give far more consistent results.
• There is no issue apply pressure or cause pain. This removes any danger of applying too much pressure and mistaking "bad pain" for "good pain".

Appendix One: The research on the use of foam rollers

Trial 1
The treatment group performed self massages using a foam roller over an eight week period. The length of the hamstrings was measures by measuring knee extension with the hip at 90 degrees flexion. Compared with the control group no significant difference was found.

Trial 2
The effect of using foam roller on various aspects of athletics performance were measured. No improvement was found.

Trial 3
Hip extension was measured using a lunge. After one week there was some improvement. The use of five sessions a week produced no further improvement. However, participants felt satisfied with their intervention and were happy with the feeling of self control.

Trial 4
Both hip extension and knee extension were measured. There was a small increase in hip extension, but none for knee flexion.

Trial 5
Hamstring length was assess using hip flexion with the knee extended. The use of foam rollers caused an increase in length.

Trial 6
Hamstring flexibility was assessed using a sit and reach test. The use of foam rollers was shown to increase hamstring flexibility.

Trial 7
A four week trial measured hamstring length using a reach test. Both PNF stretching and the use of foam rollers were assessed. Both showed a similar increase in length.

Trial 8
Hamstring length was assessed by measuring knee extension with the hip at 90 degrees. Foam rollers produced no improvement.
References


**Dr Graeme’s comments**

Latent (pain free) trigger points may be the most common cause of fatigue. They are easy for any qualified professional who deals with musculoskeletal conditions to find, yet remain undiagnosed because they don't show up in medical tests or scanned, and are barely mentioned in medical journals.

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**Latent (pain free) trigger points shown to cause rapid fatigue**

**Summary**

A trial published in the journal *Pain Medicine* (1) found that muscles containing latent (pain free) trigger points fatigued quickly and became painful. Given the high prevalence of trigger points this may be a very common and overlooked cause of fatigue (2–8).

**Why latent (pain free) trigger points cause fatigue**

A trigger point is part of a muscle constantly in a hyper-contracted state, already suffering from local hypoxia and a build up of metabolites (9,10). In that state the hyper-contracted part of the muscle will already be fatigued, while other parts of the muscle will be affected but hypoxia and a build up of waste products.

**Consequences**

*Lack of diagnosis*

Despite their high prevalence trigger points barely rate a mention in medical journals as a cause of pain, let alone as a cause of fatigue. A patient could easily undergo a prolonged battery of medical consultations and tests, with the cause still remaining not found.

*Issues caused by trigger points*

**Pain**

The obvious consequence of latent trigger points is that they worsen or become aggravated, becoming actively pain producing. Active trigger points are a huge source of musculoskeletal and related pain syndromes. For example:

- Pelvis and urological conditions (11)
- Fibromyalgia (10,12–15)
- Head/neck/ headaches & migraines (16–25)
- Heel and foot (26,27)
- Elbow (28)
- Shoulder (29,30)

**Other issues**

Alternatively, even when latent (pain free) trigger points still cause huge issues. This is discussed elsewhere in our article *Trigger point therapy: deactivate or eliminate.* In summary though, along with the fatigue and characteristic tightness of muscles, latent trigger points can have a far-reaching role in postural changes and biomechanical dysfunction, which in turn can underlie a lot of pain syndromes, injuries and joint degeneration.
Clinical advice
Latent (pain free) trigger points are highly prevalent, and can lead to the problems discussed. It is well worth the time to examine for them. When planning treatment please read our article Trigger point therapy: deactivate or eliminate.

References
Dr Graeme’s comments
A while ago we had a call from a very grateful colleague. Her brother suffered from depression. She gave him this article. He had his trigger points addressed and is now much happier. I’m not an expert on depression, but then again the experts on depression are usually not experts on trigger points. This research does not show which is the chicken and which is the egg. It's just to make clinicians aware that where you get one you usually get the other. This is especially important as trigger points do not show up in medical testing and barely rate a mention in medical journals.

The relationship between latent trigger points and depression

Summary
A study published in the journal Clinical Rheumatology investigated the prevalence of latent (pain free) myofascial trigger points (MTPs) in the scapular muscles of apparently healthy pain free adults, and whether they were associated with depression. The trigger point examination found that 60% of the apparently normal people had one or more trigger points in these muscles. When assessing for symptoms of depression they found that in general the more latent trigger points the more depression symptoms. Those with no latent trigger points showed very few symptoms of depression, while those with five or more latent trigger points questionnaire results placed them well within the clinical depression range.

Trial details

Subjects
The subjects were 76 students and health care workers who had no neck, shoulder or thoracic pain, had no surgery or physical therapy in that region, and were not undergoing psychiatric treatment.

Muscles examined
The muscles assessed were the upper and middle trapezius, serratus anterior, and rhomboideus major and minor.

Measurement of depression
The level of depression symptoms was assessed using a questionnaire called the Beck Depression Inventory. When assessing the general population a score of 21 or over represents depression.

Results

Prevalence of trigger points
60% of subjects had one or more latent MTPs in the muscles examined.

Relationship with depression
Based on the number of latent MTPs found each subject was allocated into one of three groups:

Group one
- (30 subjects) having no latent MTPs
- Average depression score= 8
**Group two**
- (28 subjects) having 1-5 latent MTPs
- Average depression score= 10.3

**Group three**
- (18 subjects) having more than 5 MTPs
- Average depression score 28.5 (clinical depression is 21 and above)

It is very clear that in these pain free subjects those having a large number of trigger points also had very high depression scores.

**Clinical implications**

**The association with depression**
The research showed that in the asymptomatic people tested the higher the number of trigger points the higher the depression score tests, and visa versa. This indicates that they go together, but not causes which. The authors confirm this unknown by stating that the relationship between latent trigger points, anxiety, stress and depression is not fully understood. The authors speculated that depression may be a cause of latent trigger points, and hence stress and depression management may be considered as a treatment for latent trigger points. This may be correct. However, there are two other possibilities to consider.

- Firstly, latent trigger points may somehow cause depression. If that was the case trigger point therapy should be considered as a treatment for depression rather than visa versa.

- The second possibility is that there could be another issue that is a common cause of both trigger points and depression. A hypothetical example may be that a boring job that involves repeated mundane tasks with poor ergonomics. This could cause both trigger points and depression.

**Facts we can use**
The only thing that we can be certain of from this research is that latent trigger points are relatively prevalent in asymptomatic people, and that trigger points and depression tend to go together. The practical implications from this are as follows.

- When someone has depression (or depression symptoms) screening for trigger points should be considered.
- If someone has a high number of trigger points an assessment for depression should be considered.
- Regular screenings for trigger points seems wise due to their high prevalence, the possibility of them causing depression, and their proven potential to cause dysfunction and chronic pain syndromes.

**Reference**
Dr Graeme’s comments
The take home message from this research is you need to normalise articular function as part of any musculoskeletal correction program. Articular dysfuction causes abnormal stress upon joints and other tissues, and will not allow normal function.

Adding manual therapies directed at improving function produces far superior results

Summary
A trial published in the Journal of Orthopaedic & Sports Physical Therapy compared the results of the treatment of shoulder impingement syndrome with exercises alone, versus treatment with exercises plus the addition of joint manipulation and other manual therapies. They found that when these were added the results were far superior.

What joint manipulation and manual therapies add
The basic principle of joint manipulation is to help restore normal articular function. This is a complex issue. However, for simplification normal joint function needs the articular surfaces to be able to slide or spin freely upon one another through their normal ranges of movement. When this sliding and spinning is restricted joint movement becomes restricted or abnormal. The analysis of this function requires specialised training and an excellent knowledge of biomechanics. Correction is often achieved using specialised correctional techniques that help normalise restricted sliding or spinning. An excellent summary was found at https://www.physio-pedia.com/images/c/c0/Principles_of_Joint_Mobilization.pdf However, it is something that should definitely be left to those with the appropriate qualifications and training. In addition to joint manipulation soft tissue therapies were used. These would have the effect of relaxing hypertonic muscles and enabling them to function more optimally.

The trial

Subjects
33 men and 22 women diagnosed with shoulder impingement syndrome were chosen.

Interventions
Subjects were randomly assigned either exercise alone or exercise and manual therapy. Each group received six sessions over three weeks.

Exercises
Exercises were conducted under the supervision of a physical therapist and were described as a standardised strength and flexibility program. There were two passive stretches, plus six strengthening exercises described in the literature as being essential “core exercises” for shoulders.

Manual therapy
In trial of medication and simple therapies the intervention is easy to describe and quantify. However, for this trial experienced physiotherapists were basically told to assess the articular function and associated soft tissue issues of not only the glenohumeral joint but other related joints such as those of the cervical and thoracic spine. They were instructed to use their skills in manipulation and soft tissue therapies to correct what they found. This approach is not easy to quantify, but exactly what would happen if one consulted a quality clinician.
**What was measured**

Levels of pain were measured using visual analogue scales. Functional assessment was done using questionnaires covering a variety of general and specific activities.

**The results**

The results as measured by pain and function were clearly much superior for the group that received the manual therapy in addition to the exercises. It is best described by the following conclusion given by the authors.

*Manual therapy combined with supervised shoulder exercise is superior to supervised shoulder exercise alone for enhancing strength and function and reducing pain in patients with shoulder impingement syndrome. Our study also provides evidence that effective outcomes are obtainable after a relatively few physical therapy visits. It is important to recognise the functional interdependence of joints and soft tissues in the upper quarter when treating dysfunction of the shoulder.*

**Clinical comments**

As discussed in our articles on trigger points, pain syndromes such as impingement syndromes usually occur as a result of abnormal function (dysfunction). Normal function maintains the optimal relationship between joint surfaces and minimises the stress on tissues. However, when part of the system such as a muscle containing a trigger point or a joint not being able to move freely is not able to function normally the central nervous system is forced to make adjustments to compensate. The result is extra stress being placed on tissues and the contact between joint surfaces no longer being optimal. It is important to note that this happens subconsciously and cannot consciously controlled. Also, as shown by research summarised elsewhere in this guide it cannot be corrected by exercises.

Given these facts the results of the trial can be clearly explained and the implications become obvious. Those suffering from shoulder impingement syndrome will usually have dysfunctional neuromuscular control and biomechanics creating extra stress on tissues and joints. Exercises alone were performed using the same dysfunctional biomechanics. When joint manipulation and soft tissue therapies were added this removed the impediment, allowing the central nervous system to perform the exercises with more normal movement.

If one google’s “exercises for (any musculoskeletal pain syndrome)” one will find a huge number of listings of professionals, clinics and even professional bodies advising generic exercises alone. Clearly this approach is flawed. The correction of trigger points, articular dysfunction and any other sources of dysfunction needs to be done first.

**Reference**

**Dr Graeme’s comments**

As discussed in our section on functional correction, when a functional element has an abnormality, such as articular dysfunction, or a trigger point impeding the function of a muscle, the Central Nervous System (CNS) will make adaptations in compensation. Well meaning professionals note abnormal function then try and correct it with so called corrective exercises. This cannot work!! The CNS is going to control the function as is sees fit. As long as the abnormal functioning element remain function will be abnormal. With this abnormal function corrective exercises will continue to cause extra stress on joints and tissues.

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**Exercises shown to not correct abnormal muscle activation patterns**

**Summary**

Most movements require the co-ordinated contraction and relaxation of numerous muscles. The neurological control of this is known as a muscular activation pattern (MAP). Research summarised elsewhere in this guide describes how highly prevalent latent (pain free) myofascial trigger points (MTPs) alter MAPs producing dysfunctional movement and joint control. This increases stress on tissues, increasing wear and increasing the risk of injury and impingement syndromes. Treatment of MTPs was shown to normalise the MAPs.

Research published in the Journal Manual Therapy describes an abnormal MAP found in patients with neck pain. The authors believe that this would cause dysfunction which may increase adverse loading on sensitive cervical structures. Subjects with this abnormal pattern were each given one of two different six-week supervised exercise programs. Both exercise programs produced a reduction in pain, but neither changed or corrected the abnormal MAP.

**The trial**

**Subjects**

The subjects were 58 females with moderate neck pain of greater than 3 months duration. Exclusions were those with previous neck surgery or participation in a neck exercise program in the previous 12 months.

**The exercise programs**

Exercise programs were conducted over a six-week period. Participants received weekly supervision and instructions from an experienced physiotherapist. One regime was described as “endurance-strength training” while the other was described as “low load training of the cranio-cervical muscles”. Exercises were performed so as not to provoke neck pain.

**What was measured**

According to the authors, previous work had identified that patients with neck pain demonstrated a bilateral increase of sternocleidomastoid (SCM) muscle electromyography (EMG) amplitude, and a decreased ability to relax their neck muscles after the completion of a task. EMG readings were taken of the SCM muscles bilaterally. Pain and disability were also determined using a tool called the Neck Disability Index.
The results

• Both regimes resulted in a reduction of pain.
• Neither changed or normalised the abnormal SCM activation.

The pain hypothesis

It was suspected that the abnormal SCM activity was due to pain. The results showed a reduction of pain but the abnormal activity remained, negating that theory.

Did the exercises actually cause more problems?

The need for exercises as part of rehabilitation is well understood. However, let's look at what actually happened in this trial.

The initial situation

The subjects had chronic neck pain. The researchers identified abnormal neurological control of neck muscles which they suggested placed abnormal loads on sensitive cervical structures.

What they did

They had the subjects perform exercises for six weeks then found that the abnormal neurological control which placed abnormal loads on sensitive nerve structured remained. The exercises that were supposed to correct the problem did not do so. Further, the exercises were performed using the same abnormal function that causes abnormal loading on sensitive cervical structures. The exercises did not fix anything, and would have caused further damage.

A sensible approach

It needs to be recognised that most neurological control of these functions happens at a subconscious level, and that abnormal patterns are usually a result of something not working normally. In this practitioner guide we present two important such causes: trigger points and articular issues. It was shown that the treatment of trigger points actually corrected abnormal neurological control, while the combining articular manipulations aimed at correcting articular function greatly improved the results obtained by exercise. The clear message here is that one needs to address causes of dysfunction prior to implementing rehabilitation exercises.

Reference

Relief From Chronic Tension Type Headaches

Summary
The most common headache is said to be the chronic tension type. In a study of this type of headache 31 subjects were examined for myofascial trigger points (MTPs) in their cervical, upper trapezius, temporalis and frontalis muscles. The MTPs were then treated using ischaemic compression and stretching. This provided complete relief for 52% of subjects.

Trial overview
According to the background research presented by this study Chronic Tension Type Headaches (CTTHs) are the most common headaches, and scientific studies strongly implicate MTPs as a cause. To test this the researchers used 31 subjects. All had experienced at least three days with headaches per week for the past four weeks. They were treated using ischaemic compression and stretching as a trigger point therapy.

The results
Short term following treatment the average intensity of headaches improved from 7.28 to 1.65 as measured on a visual analogue scale. 52% obtained complete (short term) relief.

Clinical comments

Inappropriate medications
Following treatment for trigger points the reduction in average headache intensity was dramatic, with 52% gaining complete relief. This is strong evidence that trigger points are a major cause of these headaches. However, every subject the researchers could find had been prescribed and were still taking anti-depressant medication. This is seriously wrong.

Other causes
Half of the subjects gained complete relief. What other causative factors are there for the other half? The author suggested without giving a reason that the major other cause may be psychological. This is very strange considering they were all on anti-depressant drugs and were still suffering headaches. Most chiropractors would include examine for cervical joint dysfunction as well and the presence of MTPs in their examinations. However, this can be the subject of another research summary.

The treatment of trigger points
The relief of the headaches was measured shortly after the application of therapy. The treatment of trigger points is covered in more detail elsewhere in this guide. However, they have been shown to require a great many applications of therapy over time, then probably require on-going maintenance. The tremendous time and cost involved by having this done exclusively by therapists makes this impractical for most patients. The DrGraeme serious hand held massagers for home use are able to be used by patients under professional advice to provide practically unlimited quality massage, making the treatment of MTPs more practical.

References
Dr Graeme’s comments
This study illustrates the very important concept that lower back pain sufferers have poor sensorimotor control because the Central Nervous System is receiving inaccurate feedback from joints an muscles. We have previously discussed how such inaccurate feedback causes poorly coordinated movement that creates abnormal stress to joints and other tissues. The authors worked out that they could temporarily block this inaccurate feedback using vibration and made the stupid suggestion that this could be used for rehabilitation. The correct way to address this inaccurate feedback is to address the cause, such as articular, muscular and connective tissue issues.

Lower back pain suffers found to have poor sensorimotor control, remedied by local muscle vibration

Summary
Studies have shown that those suffering lower back pain have have inhibited sensory feedback and control. This lack of control is thought to be a contributing factor to the back pain. The premise is that this inhibits coordination, creating abnormal stress upon the joints and other tissues. A recent study investigated one aspect of this sensorimotor control, the ability to accurately judge force applied by muscles. It was shown to be much poorer in those with lower back pain, and to become more normal following the application of localised vibration. The authors recommended that this could be incorporated as part of rehabilitation. As a provider of vibration massage devices this would normally be very exciting. It does give us some guidance, but there are serious issues with what the authors suggest.

The research

Outline
To coordinate the muscle activity required for both dynamic and static spinal stability the central nervous system requires accurate feedback from the sensors that provide information on things such as joint position, the tension on connective tissues and the force applied by muscles. It has been speculated that inaccurate such information affects the central nervous system’s ability to coordinate this stability and is a causative and perpetuating factor in many pain syndromes. This study investigated one such parameter—the ability to accurately judge and control muscular force. They compared those with lower back pain to normal controls, plus investigated the effect of fatigue and the application of localised vibration to the muscles.

The testing
Subjects were tested using a high tech exercise machine designed to exercise the lumbar extensor muscles. The subjects were able to practice developing a force equal to 60% of maximum while monitoring their effort on the gauge. Once this was done subjects were asked to reproduce this force using their judgement alone, with several tests done to assess variation. This was repeated again testing the effects of fatigue and of the application of vibration to the lumbar erector spinae muscles.

The results
Those with no back pain were able to reproduce this force quite accurately, with minimal variation between measurements. On the other hand, those with lower back pain were far less accurate and had greater variation between attempts. When vibration was applied to those with back pain they became far more accurate and less varied. Fatigue was shown to reduce accuracy in both controls and those with low back pain. As occurred with non-fatigue testing, vibration was show to improve accuracy.
Implications
The study shows that those with pain syndromes have abnormal sensory feedback impairing the ability of the central nervous system to provide the accurate control of muscles needed for the coordination of movement and stability. This is likely an important cause and perpetuating factor in pain syndromes. This is a serious consideration with regard to the prescription of rehabilitation exercises. Do we really want clients/patients performing rehabilitation exercises with the same abnormal coordination that causes problems in the first place???. However, there are serious issues with the solution suggested by the author.

Short term only
The post vibration testing was done immediately after the application of 30 seconds of vibration. Indeed, when further testing was done after 30 seconds of no vibration the results were back to where they were previously. If the vibration protocol used was implemented as suggested by the authors it would mean those undergoing rehabilitation would need to have the vibration applied immediately before each set of exercises, which is highly impractical.

It was only a "neurological trick"
In a previous study the authors tested the same vibration protocol on normal subjects. Rather than help them it made their sensory motor function less accurate. Why would such vibration make those with inaccurate control more normal, while making those who are normal become less accurate? This is what this author believes happened. The vibration frequency used was 80hz. 100 Hz is used by TENS machines and mechanical vibration to interfere with nerve transmission to create a pain block.

- In those with lower back pain feedback from sensors proving inaccurate information was interfered with. With inaccurate information removed control improved.
- When accurate information from the sensors in normal subjects was interfered with control worsened.

Some clinical guidance
There is no real clinical benefit from playing a neurological trick that lasts for 30 seconds. However, the trial results did confirm the reduction in sensorimotor control in those suffering lower back pain, implicating abnormal sensory information. To restore sensorimotor control we really need to look at correcting whatever is causing this sensory information to be abnormal. As discussed elsewhere in this manual two likely issues would be:

- trigger points
- articular dysfunction correctable by adjustments/manipulation

Reference
A practical approach to help demonstrate the cause and manage “tennis elbow” and similar conditions

Summary
In this research summary we will be sharing a simple practical test that helps show the cause, or at least a major contributing factor, for lateral epicondylitis (tennis elbow). We also share a simple procedure that can be a huge help to resolve these problems. The basic principles of this test and treatment can be used for many other similar syndromes.

Background
This was written in response to reading a sports practitioners forum. For tennis elbow one practitioner used dry needling and various therapies while another stated that these would just make the inflamed epicondyle angry. A third recommended a journal article (see below) that contained further contradictory advice. Too often we see this in the treatment of musculoskeletal conditions, illustrating two major issues.

1 The treatment/management of such conditions fails when basic principles are ignored.
2 Management too often focuses on symptoms and effects rather than underlying causes.

In this article we attempt to give a rationale that is consistent with basic principles, and focuses on causes rather than symptoms. Comments are most welcome.

Epicondylitis in a nut shell

What is tennis elbow
One of the basic principles of exercise is that repeated or over usage causes microscopic damage to muscles and connective tissues. Body builders use this principle by exercising to deliberately cause this damage, then follow this by recovery where the body is stimulated to repair and rebuild stronger. In the case of tennis elbow this injury occurs at the area of high stress at the lateral epicondyle of the elbow where most of the forearm extensor muscles attach. However, unlike what occurs with body builders it is repeated without allowing recovery. The body's ability to repair is overwhelmed. Over time this continual injury and attempted repair causes the pathophysiology known as epicondylitis.

The condition becomes chronic
As with most musculoskeletal conditions, if allowed to continue it becomes chronic and more complex. For example, the condition of the tissues at the epicondyle will deteriorate. The continual bombardment of the central nervous system by pain impulses can cause sensitization similar to that which occurs in fibromyalgia. Furthermore, the continuous pain, disability, and possibly failed attempts at therapy can cause psycho-social problems.

The involvement of muscular issues
In addition to the affect at the epicondyle, repeated/over usage usage of muscles usually causes the development of myofascial trigger points. (trigger points.) As discussed elsewhere these are focal sections of muscle that chronically spasm causing the whole muscle to become constantly tightened. In the case of
the forearm extensor muscles a tightening puts a constant stress on the attachment at the condyle. This tension will serve to exacerbate the injury and prevent healing. Because if this the management of tennis elbow should always consider the elimination of these trigger points to remove the abnormal tension on the epicondyle. A further consideration is that trigger points cause referred pain which may add to the symptom pattern.

**The simple test that helps make tennis elbow easy**

The following simple test will demonstrate this principle, showing the patient you have identified the cause of his or her problem and providing a clear rationale and direction for treatment.

1. Deeply palpate the epicondyle, noting it’s tenderness. It is usually worth having the patient do this his or herself to help understand the problem first hand without any thought of the practitioner using differing pressure in subsequent tests.

2. Palpate the extensor muscles for trigger points.

3. Thoroughly treat all the trigger points in the forearm extensors, allowing these muscles to relax to normal tension. This author does this by demonstrating to the patient how to apply the DrGraeme massager for approximately 30 seconds to each trigger point, then observing while they complete the treatment themselves. A post check is needed to ensure all have been treated. It must be stressed that they are not to put the massager on the condyle (sore spot), just the trigger points in the muscles.

4. After the trigger points are treated re-palpate (and have the patient re-palpate) the condyle. All things going well the condyle will be far less tender to palpate, demonstrating that the tension in the muscles was aggravating the condition.

**Explanation to the patients**

Tennis elbow is caused by repeated or over usage straining where the muscles attach. The trigger points cause the muscles to become tight, putting strain on the attachment, and not allowing it to heal. Treatment of the trigger points allowed the muscle to relax, taking the tension off. That is why the attachment became less tender. The management strategy is to remove the continuing stress and allow the injury to heal. Consistent with this as a goal, management could also include

- modification or restriction of aggravating activities
- stretching of the forearm muscles
- the possible temporary use of some sort of brace.

As the forum respondent said, if one pokes, prods or stick needles into the injured part it will just make it angry, so we leave the body to heal it.

**Chronicity issues**

**Trigger points**

As discussed in another research summary, a trial of 12 weekly extensive treatment sessions on shoulder trigger points produced considerable symptomatic relief, but examination showed that over half the trigger points still remained. From this it can be concluded that the complete elimination of the forearm trigger points may require well in excess of 12 applications of therapy, plus probably ongoing “maintenance”. The cost and time taken to have this done by a professional alone would likely be prohibitive. This is why we recommend supplementary home massage, and is why we have the patient apply the initial treatment themselves with a DrGraeme massager.
Tissue changes, sensitisation of the nervous system and psycho-social aspects
If the condition has not progressed to far the body should be perfectly capable of recovering. However, when any of these are present some assistance may be needed. Many of the possibilities discussed in the forum and journal article may need to be considered.

Concluding remarks

• These basic principles can applied to evaluating and treating many other musculoskeletal pain syndromes.

• Myofascial trigger points have been at least a complicating factor in every case of tennis elbow seen by this author in over 25 years of practice. In spite of this the journal article does not even mention them as a cause, aggravating factor or as a differential diagnosis.

Reference
**Dr Graeme’s comments**

Elsewhere in this guide we’ve discussed how issues with muscles and joints can alter Central Nervous System control, creating potential pain and injury through poorly coordinated movement and abnormal stress on tissues. These researchers found that the presence of trigger points in muscles actually slightly slows down their response. For a sports person swinging a bat or a racquet this means it getting to it's target a split second late. Out of form sports people sometimes say that their timing is out. Maybe it is.

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**Why a sports person’s timing may be “out”, or be out of form**

**Summary**

Most sports rely on some sort of muscular coordination and timing. Typically the brain receives some sort of stimulus or information. This is interpreted and processed, then signals are sent to the muscles causing them to take some action. What would happen if the brain sent out signals but the muscles were slow to react? Researchers found that this is exactly what happens when muscles contain myofascial trigger points (trigger points).

**The trail**

*What the researchers did*

The researcher chose 15 healthy women with a trigger point in their upper trapezius muscle, and matched them 15 similar women without such trigger points. These women were asked to stand upright with their arm slightly forward (shoulder flexed) holding a cable attached to a weight. The women were instructed that when they heard the audio stimulus (a sound) they were to lift their arm holding the weight to shoulder height as fast as possible. The researchers were able to measure the timing of the nervous response using surface electromyography (EMG) and the response of the muscles using force pads. Details follow.

**Muscles monitored**

The lifting of the weight from a standing position requires the coordinated effort of many muscles. Because of this the researchers used surface electromyography (EMG) to detect signals to the following muscles:

- anterior deltoid
- upper trapezeus
- gastrocnemius
- lumbar paraspinal
- cervical paraspinal
- sternocleidomastoid

**The action of the muscles**

In order to detect the action of muscles various sensors were used such as one attached to the cable, force pads in the platform subjects stood on, and others monitoring muscle action in the body.

*What they found*

The reaction time of muscles is made up of two parts. The first part is the time taken to when the muscle receives it's nerve impulse. The second is the time from when the nerve impulse is received to when the
force is generated. The researchers found that the presence of trigger points the time taken for the nerve impulse to arrive was unchange, but the time taken for the generation of force was increased. In other words, the muscles received their instructions normally, but were slower to react.

**Discussion of the results**

In other research summarised in this guide we have seen how as a result of trigger points:
- muscles will be tight and fatigue easily,
- other muscles will be recruited in compensation, and
- the coordination of muscles can be completely changed.

This research shows us that they will also be slow to react to. The coordination involved to play any sport is highly complex, but looking it simply it means that trigger points will slow reaction times and timing. For example, in tennis it would result in the racquet arriving late, miss-hitting the ball or missing it all together.

**Screening and treating trigger points**

Thoughout this guide we have detailed several adverse affects of trigger points for those who play sport and exercise. The slowing of reaction times with the resultant affects on timing and coordination are yet another. Earlier in this guide we discussed how the use of vibration massage can help treat trigger points. We recommend the best way to get these benefits and keep trigger points at bay is for those playing spots and exercising to be examined and advised by a professional who deals with musculoskeletal conditions then implement regular self/home use. This is analogous combining regular dental checkups with daily brushing and flossing.

**Reference**

_Yassin, M., et.al. Arm Flexion Influence on Muscle Reaction Time in Females with Active Myofascial Trigger Point._

Traditional home massage found to be far superior to anti-inflammatory drugs for chronic upper back pain

Summary
Although anti-inflammatory drugs are heavily advertised and routinely prescribed for pain syndromes a recent clinical trial found them to be far less effective than simple home massage for the relief of upper back pain. It not only produced a far superior at reduction in pain, it also produced significant improvements in ranges of motion and a reduction in muscular tightness and tenderness.

The pain reduction and functional improvements gained from the self massage indicate that myofascial issues are a significant part of such syndromes, and shows that self massage at home can be a useful part of their management. Musculoskeletal pain syndromes can be quite complex issues though, so we see the best use of self massage not as a substitute for popping a pill, but as part of a professional management that properly takes care of the underlying causes of pain syndromes and reduced function.

The trial details

Subjects
The 60 subjects (two groups of 30) were aged from 18-60 and had suffered from upper back pain for at least 12 weeks. The only other significant inclusion criteria was the presence of at least one myofascial trigger point. Studies have shown an extremely high prevalence of trigger points in such pain syndromes. One study even found trigger points in the shoulder muscles nearly 90% of asymptomatic people. Simply, practically all chronic upper back pain sufferers would have trigger points so it is reasonable to say that the groups were fairly representative of all upper back pain sufferers.

The treatments

The self massage
The subjects used a hooked cane called a Wilai stick to apply massage along the paraspinal muscles of the upper thoracic area. Using the stick, pressure was applied until mild pain was experienced, then released after five seconds. This was repeated five times for each point. The self massage was followed by a two minute stretching routine. The treatment was repeated each day for 5 days.

The anti-inflammatory drugs
Subjects took 400mg of ibuprofen three times daily for five days

The measurements
The following measurements were used
- the level of pain using a visual analogue scale
- the amount of pressure on muscles needed to elicit tenderness
- cervical ranges of motion
The results
Over the five days the self massage group experienced a reduction in pain from 5.4 to 0.08 on the 1-10 scale, plus excellent clinical improvements in tissue hardness/tenderness and cervical ranges of motion. In contrast, the ibuprofen group experienced a smaller reduction in pain, and no improvement in any other aspects.

Clinical discussion
Apart from showing that pharmaceutical companies and the medical industry are making massive fortunes pushing drugs that kill people while safer, less expensive and more effective solutions are available, the trial results help guide us in what is needed to successfully treat these pain syndromes.

The involvement of myofascial issues
The self massage used emulates the professional massage technique ischemic compression or “pressure point therapy”. This targets myofascial issues, especially trigger points. The excellent results show that myofascial issues are a major cause of upper back/cervical pain and dysfunction.

The usefulness of self/home massage
The positive results support the use of home massage. However, as with home massage using our DrGraeme massagers we are not suggesting that it should be seen as an alternative to “popping pills”. Musculoskeletal pain and dysfunction can be a complex clinical entity, and should be addressed by a proper program determined by a professional after appropriate examination. Trigger points and other chronic myofascial issues can require extensive therapy repeated over a long period of time, so home massage is a very useful tool. However, a professional management plan may also include aspects such as joint function, the need for ergonomic and manual handling advice, the need for rehabilitation exercises, more complex myofascial issues that require professional intervention, and possibly many other aspects.

Reference
Altered muscle activation patterns shown to cause hamstring injuries- a guide to correction

The Study
A study of sports people used surface electromyography (EMG) to compare the neurological control of those who had suffered hamstring injuries with normal controls. They found that those injured had abnormal sensorimotor neurological control of their muscles, specifically the activation timing of their muscles was altered. The authors speculate that this places a higher cumulative load on the hamstrings, noting that previous research has shown such abnormal sensorimotor control has been shown to increase the risk of hamstring injuries, and has also been associated with lower back pain, sacroiliac injuries and knee injuries.

The implications
The study identified a genuine problem. An abnormal muscle activation pattern, such as was discussed in our section on functional rehabilitation, was found to cause the hamstrings to be overloaded, predisposing them to injury. The author states that this abnormality could be screened for as a preventative measure, and should be addressed as part of rehabilitation. This raises two serious issues.

How can this screening be done practically?
The researchers found the anomaly by analysing the results of surface EMG. This is an excellent research tool, but would it be practical in all but professional sporting clubs?

Once the issue has been found how can it be fixed?
Without providing any supporting evidence, the authors suggest that such sensorimotor abnormalities be remedied by focusing on controlled movement with exercises. However, as discussed elsewhere in this guide the timing of muscle activation is under the control of the Central Nervous System (CNS). Some issue will be causing the CNS to alter that timing, and corrective exercises will not change it.

A sensible solution
This study highlights a problem that needs to be addressed, but suggests a way to screen for this issue that is impractical and a method of correction that will not work. Let's look at a practical solution. We know that the CNS makes these compensations as a result of issues such as articular dysfunction and myofascial trigger points. These can be screened for and dealt with by any appropriately qualified professional who deals with musculoskeletal issues, using his or her normal clinical resources. Simply, find and eliminate causes of abnormal timing.

References
**Dr Graeme’s comments**

This is key research that shows that trigger points will cause the Central Nervous System (CNS) to alter the timing and firing order of muscles controlling movement, **AND that by eliminating their effect the CNS will re-adjust back to normal.**

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**Latent (Pain Free) Trigger Points Alter Neurological Control of Shoulder Movement Causing Damage, Impingement and Injury**

**Introduction**

This article summarises the very important clinical implications of the research done by Dr Karen Lucas in Melbourne for her PhD Thesis. She investigated the prevalence of latent (pain free) myofascial trigger points (MTPs) in the shoulder muscles of asymptomatic adults, and their affect on the control of muscles. She found that nearly 90% of the asymptomatic adults tested had at least one, and often many latent MTPs in these muscles. When investigating their affect on the neurological control of muscles, it was found that they alter the timing and activation of muscles producing dysfunctional movement. This creates abnormal stress on the joints and tissues, increases degeneration, and increases the risk of injury and impingement syndromes. It was further found that the treatment of latent MTPs normalises the neurological control. This has profound implications.

**What is a muscle activation pattern (MAP)**

Abduction of one’s shoulder through a full range of movement requires an incredible coordinated effort from a large number of muscles. There are the prime movers, the stabilisers, and the rotator cuff muscles whose job it is to maintain the smooth even contact of the glenohumeral joint surfaces. During the approximately 180 degrees of abduction each of these muscles must contract and relax at the appropriate time. This timing and activation is known as a muscular activation pattern (MAP)

**What was done**

**Subjects**

137 adult subjects were used for the trial. All had been pain free the previous week, had full shoulder movement and no obvious shoulder dysfunction or pathology. The subjects were examined for trigger points in seven of the muscles of their shoulder girdle.

**MTP examination**

14 were found to have no latent MTPs, while 123 (about 90%) had one or more. Nearly 80% of subjects had latent MTPs in their upper trapezius. Five out of the six remaining muscles scored at least 60% in the same respect.

**The effect on MAPs**

The subjects had the activity of the seven muscles measured by surface EMG during abduction. The latent MTP free subjects were used as a control. These controls all showed a consistent similar MAP for the seven muscles. On the other hand the MAP for those with latent MTPs showed differing orders and timing of activations.
**The consequences**

In the background research presented in this thesis it was discussed that this alteration of the MAP produces dysfunctional movement, therefore the joint loses its smooth movement placing extra stress on the joint and surrounding tissues, and creates the potential for impingement. This predisposes and leads to a host of conditions such as impingement syndromes, rotator cuff syndromes, joint degeneration, bursitis and tendinopathies.

**The effect of treatment of MTPs**

For the next part of the trial those with latent MTPs were divided randomly into treatment and sham treatment groups. The sham treatment group received “ultrasound” with a non-functional machine. The treatment group had their trigger points treated using dry needling and stretching. Immediately following stretching subjects were re-tested using the surface EMG. In summary, the MAPs for the treatment group became normal while those for the sham treatment group remained abnormal. Dr Lucas did stress though that the effect was only measured short term, and that the long term effects were uncertain.

**Clinical implications**

Some of the many clinical implications are discussed briefly below. Each will be dealt with more completely in future research summaries.

*Trigger point assessment and treatment should be considered for shoulder pain*

It has been shown the latent trigger points can cause shoulder pain directly by becoming active, or indirectly by changing the shoulder function resulting in impingements, uneven joint pressure and so forth. They should be considered in cases of shoulder pain.

*The prescription of exercises alone to correct pain syndromes should be seriously re-considered*

Patients are often given exercises alone to remedy shoulder and other pain syndromes. Research has shown that MTPs are highly likely to be involved. This study showed they caused the nervous system to produce movements that were abnormal and detrimental. The MAPs are not under conscious control so patients cannot be instructed to perform exercises correctly. During exercise movements will likely continue to be abnormal and detrimental. This research indicates that trigger point therapy should be done concurrently to normalise neurological control.

*Regular screening and treatment of trigger points Trigger point therapy should be considered.*

Regular soft tissue therapy or a regular massage would arguably find and diminish latent trigger points, thus preventing them from becoming active (painful) and causing abnormal function.

*Everyone using a gym or exercising should be regularly screened for trigger points*

Joint pains, injuries and impingement syndromes are too common among those who use a gym or exercise. This research suggests that latent MTPs causing abnormal joint function would make joints and tissues far more vulnerable to these. The risks would be magnified by the increased loads placed on these joints. As shown in the research the treatment of trigger points normalises muscular control.

*Implications for sports performance*

Whether one swings a golf club, a tennis racquet, or shoot basketballs you want the coordination of your muscles to be normal to produce the best results.
**Keeping it practical**

As shown in our previous research summary the treatment of trigger points can sometimes deactivate active MTPs making them pain free (latent). However, complete removal requires a course of therapy over a considerable length of time. The care these clinical implications suggest would involve a course of care to remove trigger points then regular maintenance screenings. If done by therapists alone this would be very expensive and time consuming, therefore be something only available to people such as elite sports persons. This is the reason the DrGraeme serious hand held massagers able to be used at home were developed. Under the guidance of a professional supplementary massage can be done at home, making this type of care affordable and practical.

**Reference**

*THE EFFECTS OF LATENT MYOFASCIAL TRIGGER POINTS ON MUSCLE ACTIVATION PATTERNS DURING SCAPULAR PLANE ELEVATION*, by K.R. Lucas PhD.
Comments from Dr Graeme

Your nervous system controls your movement in such a way that reduces stress on tissues and allows the joint surfaces to move across each other in a smooth controlled manner. It does this by continuously monitoring those tissues and joints, and activating your muscles in a precisely timed orchestrated manner. If something alters the timing and firing order of those muscles the mechanics completely changes. This creates a lot more stress upon tissues, and joint surfaces no longer move across each other smoothly. With this the risk of pain and injury increases, while wear and tear in joints increases leading to long term degeneration.

The research discussed here found that this is exactly what latent trigger points do. Most people who have been to a masseur will understand these. They are those lumps in your muscle you don’t know are there until the masseur presses upon them, then they are exquisitely tender and shoot pain. Further, the study found that nearly 90% of adults have these in their shoulders. The positive finding of this research is that if the trigger points are treated neurological control will revert back to normal. There are several consequences

The obvious one

The obvious consequence is that this research found that nearly 90% of adults experiencing no pain have an underlying condition altering their neurological control in such a way that predisposes to injury and accelerates degeneration

Treatment of pain and injuries

Given their prevalence in asymptomatic people and potential so cause pain or injury, it will be reasonable to assume that most musculoskeletal pain syndromes or injuries will have some trigger point induced neurological control abnormality as at least a partial cause. Treatment or remedial action needs to address this.

Prevention

Given the prevalence in asymptomatic people and their potential to cause harm screening and regular trigger point therapy appears wise.
Introduction
This research examines the neurological control of shoulder abduction. To perform this movement the control system must monitor sensors in the muscles, ligaments, joints and so forth, then orchestrate the precisely coordinated and timed contraction and relaxation of the various muscles involved. This is done in such a way to produce smooth efficient movement, minimising the stress upon the various muscles and ligaments. More importantly, it helps controls the position of the head of the humerus so it is positioned properly in the glenoid fossa, spreading the load evenly across the joint and avoiding any impingement. This trial used surface electromyography (S-EMG) to investigate the effects of latent trigger points on this control. Trigger points are those tender lumps within tight bands of muscle that shoot pain when pressed upon. They are known as latent when not causing pain (only causing pain when pressed upon). S-EMG is like the ECG used to monitor hearts, only it monitors nerve signals to muscles. Given that, the researchers investigated the following:

1. How common latent trigger points were in the shoulder muscles of adults with no shoulder pain
2. What was the effect of latent trigger points on the timing and coordination of muscle activity
3. What effect does treating the trigger points have.

Trial details

Subjects
137 adult subjects were used for the trial. All had been pain free the previous week, had full shoulder movement and no obvious shoulder dysfunction or pathology.

What was done

Trigger point examination
The researchers first examined seven main muscles that control shoulder movement for trigger points. As the subjects were all pain free, trigger points found were by definition latent (asymptomatic) trigger points Surface Electromyography (S-EMG)
During shoulder abduction the electrical signals sent to the muscles were monitored by surface electromyography (S-EMG). These are like the electrical sensors used with an ECG monitoring heart function, only the sensors are placed on muscles to detect nerve signals.

The results

Trigger point examination
Of the 137 subjects
• Only 14 were found to be trigger point free.
• 123 (about 90%) had one or more trigger points.
• Nearly 80% of subjects had them in their upper trapezius, while five out of the six remaining muscles scored at least 60% in the same respect.

The effect on control
Surface EMG was used to investigate the coordinated timing of the seven muscles under investigation during shoulder abduction.
1. The 14 subjects with no trigger points all showed a similar consistent pattern of muscle activation and timing.
2. On the other hand those with trigger points showed differing orders and timing of activation

Effects of treatment
Those with abnormal muscle timing and activation due to trigger points were divided randomly into treatment and sham treatment groups. The sham treatment group received “ultrasound” with a non-functional machine. The treatment group had their trigger points treated using dry needling and stretching.
• Immediately following stretching the treated subjects were re-tested using the surface EMG. The activation patterns had become normal.
• The activation pattern for those receiving the sham treatment remained abnormal.
**Lasting effects**

The fact that neurological control reverted back to normal once the trigger points were treated is very encouraging. Dr Lucas, the research scientist, did stress though that the effect was only measured very shortly after treatment, and that the long term effects were uncertain. As discussed in our research summary: *Trigger Points: deactivation or elimination* this is a serious concern. We raised the following points.

- According to a review of clinical trials investigating the treatment of trigger points the goal of trigger point treatment was to merely (temporarily) deactivate them.
- The three clinical trials that checked for the presence of trigger points after a series of therapy sessions found that the majority were still there.
- The way to totally eliminate trigger points would be to continue with treatments for a much longer period of time once asymptomatic. Due to cost and convenience, for most, self application with a vibration massager would be the only practical way to do this.

**Clinical implications**

*Prime consideration for musculoskeletal problems*

Given the nearly 90% prevalence in asymptomatic people, trigger points would almost certainly be involved in any musculoskeletal pain pain syndrome. As well as their well recognised ability to refer pain this research shows they may cause pain indirectly by the alteration of biomechanics, creating extra stress upon various tissues. Further, if treating them just to the asymptomatic stage this research shown that they will still cause serious issues.

*The prescription of exercises alone will not correct functional problems*

Patients are often given exercises alone to remedy shoulder and other pain syndromes. This research shows however that this abnormal function is likely due to altered neurological control. Correction exercises will not change this. As shown by this research the removal of the cause will correct this.

*Regular screening and treatment of trigger points Trigger point therapy should be considered.*

The subjects shown to have this problem were asymptomatic. Regular soft tissue therapy or a regular massage would arguably find and eliminate latent trigger points, thus preventing them from becoming active (painful) and causing abnormal function.

*Everyone using a gym or exercising should be regularly screened for trigger points*

Picture a person in a gym, asymptomatic but having trigger points in the muscles controlling shoulder joint movement. As he performs a bench press due to the alteration in control the head of the humerus does not sit normally in the glenoid fossa and several ligaments are under abnormal stress. On the 10th rep he feels sharp pain. This is what can happen when asymptomatic trigger points alter neurological control. Screening for trigger points would be even more important for those exercising.

**Reference**

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Practitioners and students

We've built or massagers and put all this information together to make it easier for colleagues to help their patients and clients. We enjoy doing this very much, but realise it would not be possible without your support. We appreciate this very much.

Practitioner and wholesale orders
Please contact us directly (graeme@drgraeme.com) for our special practitioner and wholesale prices. For Australian and New Zealand practitioners orders please contact us directly. European (including the UK) orders need to be entered through our practitioner only web page. Please email and request this page, as it is only given to practitioners.

Samples and referrals
We are happy to provide a sample massager (yours to keep, no charge) to any degree qualified practitioner who deals in musculoskeletal problems on a one per clinic basis. Please contact us to organise one. Those practitioners without a degree can still take advantage of our very attractive practitioner rates. We appreciate the referral of other practitioners. The easiest way to do this is by letting them know to contact us so we can organise any information they need and possibly a sample.

Colleges and students
We very much look after colleges that teach degrees in a musculoskeletal discipline and their students. Please contact us directly to organise any of the following.

Massagers for research, teaching and student clinics
We are happy to provide massagers for use in research, teaching and student clinics at no cost.

Personal massagers for students
We provide our massagers to students at a nominal cost and no postage charges. Often a class representative will organise a group order, but students are welcome to contact us individually.

Graduation presents
COVID has thrown a spanner in the works this year (2020), but we've had the pleasure of giving graduating future colleagues massagers as graduation presents. We hope to get that organised again next year. Interested students should have a class representative contact us directly.

Our website and other material
As a chiropractor for over 25 years whenever we do a guide or article we always consider two things:

Practitioners and students

Practitioner and wholesale orders
Please contact us directly (graeme@drgraeme.com) for our special practitioner and wholesale prices. For Australian and New Zealand practitioners orders please contact us directly. European (including the UK) orders need to be entered through our practitioner only web page. Please email and request this page, as it is only given to practitioners.
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Graduation presents
A while ago we started giving each member of graduation classes a massager as a graduation gift. More recently rather than waiting until graduation we've started to do give these graduation gifts earlier in the year to help students develop their clinical skills with them while at college. To organise this a member of the graduating class or the college usually contacts us.

Our articles and guides
As a chiropractor for over 25 years whenever we do an article or a guide we of course want to make it easier for colleagues to get better results, but we always have in the back of our minds how it will help patients or clients to understand the value of good quality professional musculoskeletal care. As an example, our guide Trigger points: deactivation or elimination explains why care needs to be continued into an asymptomatic phase. The need to consider function as well as symptoms is a strong theme. Please take a close look, and if you consider any worthwhile we'd love you to print them for patients, link them form your website, or post on social media.

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