

POWER  PLATE®

Discover the Difference

Medical Conditions Workshop

Power Plate and Special
Populations



Medical Device Directive (MDD)



Power Plate is officially classified as a class IIa Medical Device within the European Economic Area (EEA). This has been achieved under the Medical Devices Directive (MDD) 93/42/EEC as amended.

The following medical claims have been investigated and officially upheld:

- Can assist in falls prevention
- Enhancement of strength and power
- Reduction / alleviation of chronic pain
- Reduction in appearance of cellulite
- Body weight and body fat reduction
- Enhancement of bone density and prevention of bone mineral loss
- Enhancement of circulation and functioning of cardiovascular system
- Enhancement of flexibility and range of motion

Medical Device Directive (MDD)



WHAT IMPORTANCE DOES MDD PLAY FOR YOU ?

- You will be able to start referring to the beneficial medical aspects of the PPI Medical Device that have been validated through our Clinical Literature Review
- PPI is the only WBV company in the world to have it's full product range certified under the MDD umbrella
- New found creditability for WBV

REMEMBER: *PPI is now a medical device manufacturing company*

Power Plate Disclaimer



We advise all users to contact their physician or specialist before using the Power Plate® machine and recommend that they do not start training without first obtaining medical clearance to exercise.

In all cases, if an individual is currently active, cleared for exercise, and already does any weight-bearing exercise such as weight training or jogging they are likely to be a good candidate for training on the Power Plate machine.

However every person should be examined on an individual basis by someone qualified to advise them. As with any form of exercise, if your client feels faint, dizzy or ill while working out on the Power Plate machine, you should cease the session immediately. Consult your doctor or specialist before restarting your training.

We strongly recommend all trainers to be certified Power Plate Instructors.

Research is being conducted on the effects of Acceleration Training™ exercise on specific medical conditions. Scientific and practical evidence indicate that there are a number of conditions where it is proven to be beneficial to integrate Power Plate training into a personal treatment plan. This should always be done under the supervision of a physician/specialist or trained professional.



Key Research

1. Research – Muscle Recruitment



Title:

Whole-body-vibration-induced increase in leg muscle activity during different squat exercises

Authors:

Roelants M, Verschueren S, Delecluse C, Levin O, Stijnen V.

Published:

Journal of Strength and Conditioning Research, 2006

Location:

University of Leuven, Belgium

Duration:

1 day

Subjects:

15 male physical education students (mean age 21.2 years)

Machine:

Power Plate Next Generation



1. Research – Muscle recruitment



Protocol:

1 group - 2 conditions:

- A) Power Plate condition
- B) Control condition

Power Plate condition:

- EMG recordings of the rectus femoris, vastus lateralis, vastus medialis and gastrocnemius
- 20s, 35 Hz and 2.5mm amplitude setting
- 4 sets of 3 exercises (squat, deep squat and one legged squat)
- 1 min rest in between each set and exercise

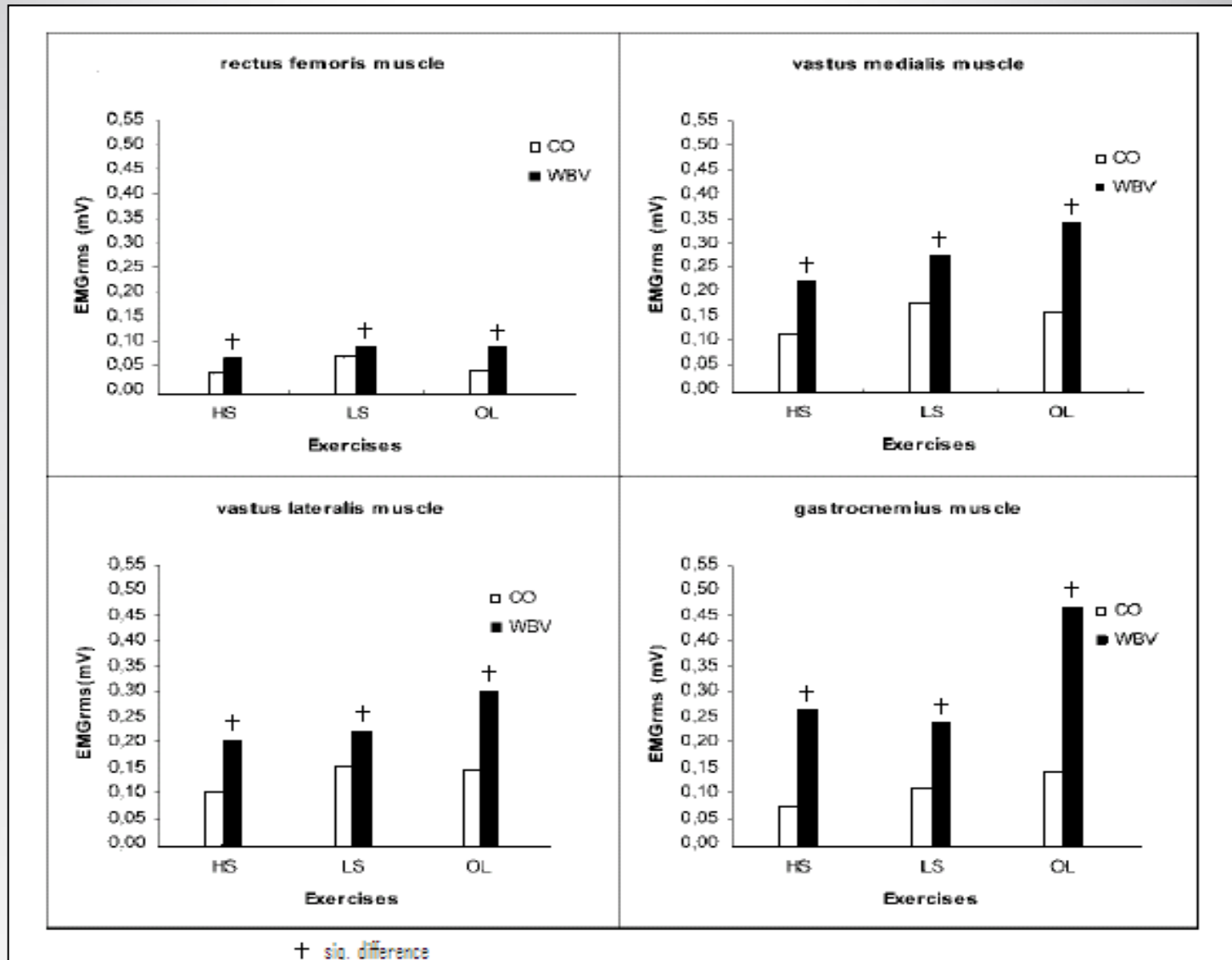
Control condition:

- Same as Power Plate condition but without the vibration

1. Research – Muscle recruitment



Results:





1. Research – Muscle recruitment

Conclusions:

- “In all 3 exercises WBV elicits a significant increase in leg muscle activity compared with the same exercises without WBV.”

Discussion:

- “The EMG signal was higher in the muscles closer to the platform. So the vibration effect was clearly dependent on the distance between the muscle and the vibration platform.”

2. Research – Strength & Power



Title:

EFFECTS OF VIBRATION TRAINING ON MUSCLE STRENGTH: A META-ANALYSIS

Authors: Marin, P. & Rhea M.

Published: J. of Strength and Conditioning Research 2009.

Meta-analyzed: 31 studies

Findings: *“Acute changes in strength are negligible; however, chronic improvements in strength compare favorably with conventional resistance training for vertical vibration platforms.”*

“The average treatment effect for chronic vertical vibration exerciser (over an average of 13.5 weeks of training) was 1.24 with mean effects for untrained and athletic populations being 1.78 and 0.54, respectively. For comparison, the average treatment effect in meta-analyses of conventional strength training (34,39) was found to be 1.55 (untrained) and 0.47 (athletic). Although such comparisons across meta-analyses should be done with caution.

It is apparent that vibration exercise can result in similar or greater strength improvements compared with conventional resistance training.

“The meta-analysis shows that for chronic strength improvements, vertical vibration platforms are much more effective compared with oscillating platforms.”

3. Research – Flexibility

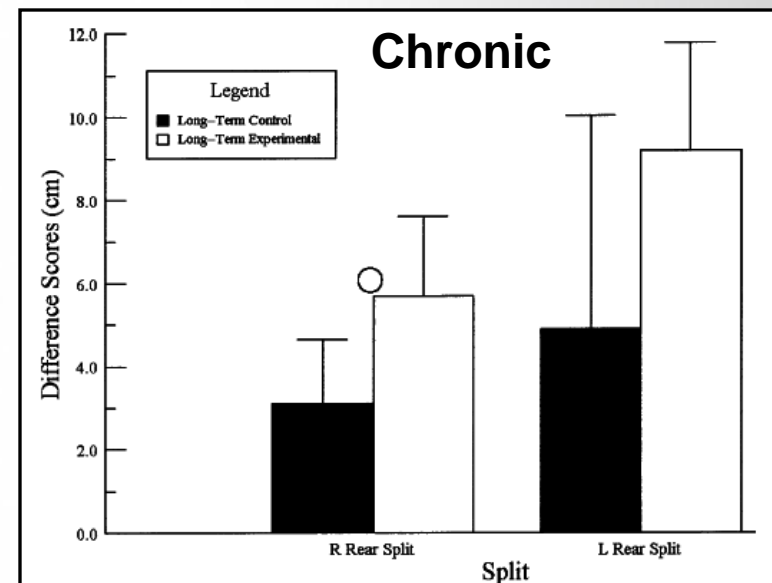
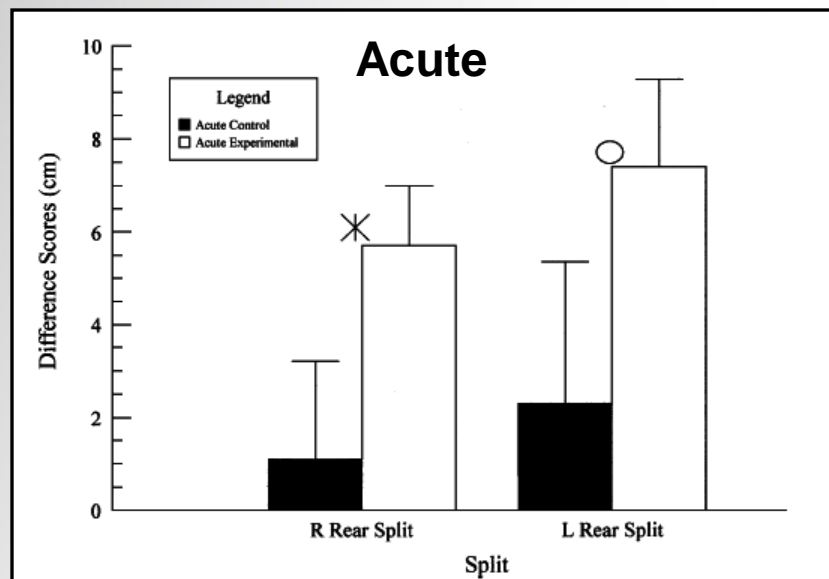


Title: Flexibility Enhancement with Vibration: Acute and Long Term

Published: Medicine and Science in Sport and Exercise, 2006 (Sands et. al.)

Protocol: 10 adolescent males (5 control vs 5 WBV)

- Stretched to the point of discomfort for 10 s followed by 5 s of rest, repeated four times on each leg and (4 min total)
- Pre-test followed by an acute phase post-test, then second post-test measurement was performed following 4 wk of treatment



4a. Research – Circulation



Title: Whole-body vibration exercise leads to alterations in muscle blood volume

Published: Clinical Physiology, 2001 (Kerschán-Schindl et al.)

Location: Department of Physical Medicine and Rehabilitation, University of Vienna

Subjects: Healthy volunteers

Duration: 1 session of 9 minutes in total, 26Hz, 3 sets of squats (diff. depths)

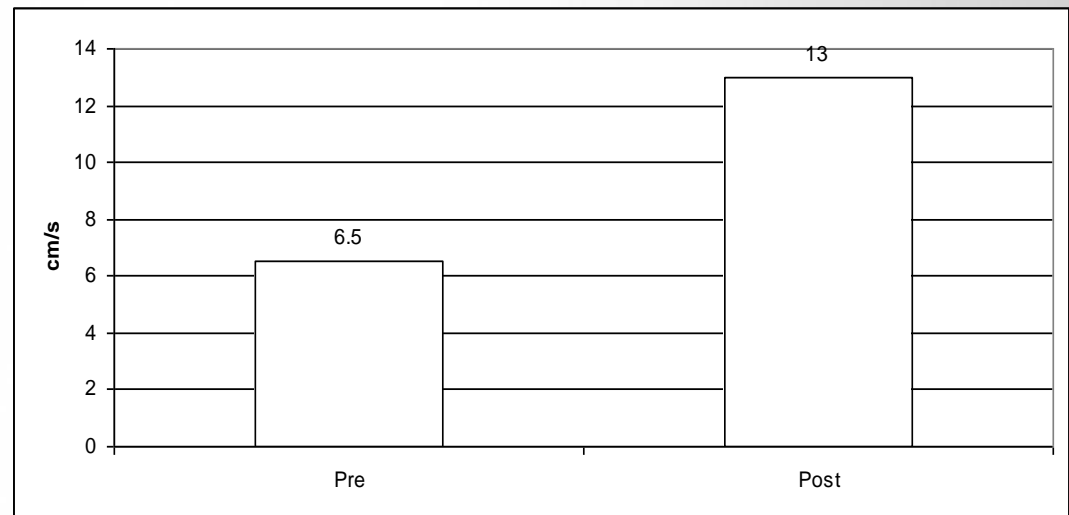
N.B - Discussion:

“The results of the study indicate that a short-term exposure to whole-body vibration of 26 Hz does not have the negative effects known from long-term exposure to high frequency.”

“Heart rate values, systolic and diastolic blood pressures after exercise did not show a statistically significant change compared with baseline.”

Results

Muscular blood circulation in calf and thigh **significantly** increased after exercise



4b. Research – Circulation



Title: The effect of 30 Hz vs. 50 Hz passive vibration and duration of vibration on skin blood flow in the arm.

Authors: Maloney-Hinds C, Petrofsky JS and Zimmerman G.

Published: Med Sci Monit, 2008

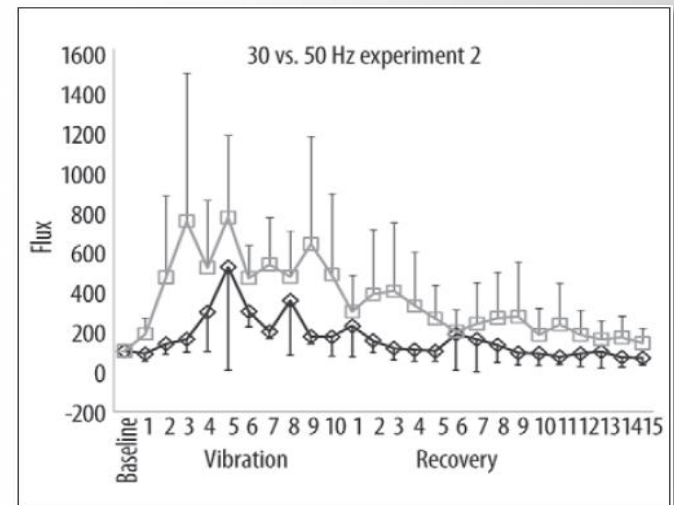
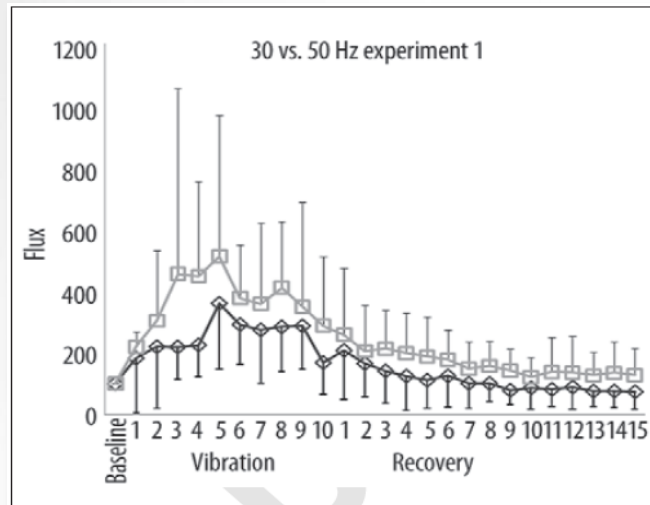
Subjects: 25 healthy adults (age 18-43)

Protocol:

- 2 studies to determine:
 - difference in skin blood flow (SBF) due to passive vibration of the forearm at 30 vs. 50 Hz
 - if there is an optimal duration
- In both studies the subject's were passively vibrated for 10 minutes.

Results:

“Vibration massage on 30 and 50 Hz significant increases blood flow in the forearm”





Multiple Sclerosis

Multiple Sclerosis (MS)



Multiple Sclerosis is a **chronic, inflammatory disease** that affects the **central nervous system** (CNS). It affects the neurons, the cells of the brain and spinal cord that carry information and allow the brain to control the body.

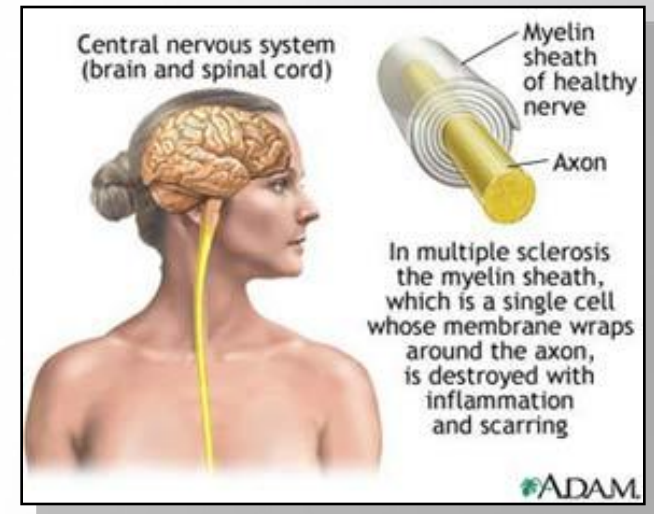
Surrounding and protecting some of these neurons is a fatty layer known as the myelin sheath, which helps neurons carry electrical signals. MS causes gradual **destruction of this myelin** (demyelination) in patches throughout the brain and spinal cord.

The name multiple sclerosis refers to the **multiple scars (or scleroses) on the myelin sheaths**. This scarring causes symptoms which vary widely, depending upon which parts of the nervous system are affected

Common Symptoms

- Muscle weakness
- Coordination problems
- Numbness
- Slurred speech
- Changes in sensation
- Blurred vision
- Tremors
- Fatigue
- Pain
- Some patients will also experience depression, problems with concentration and memory, problems with balance and overheating.
- It will often cause impaired mobility and even disability due to paralysis in more severe cases.

*Ill. from
http://adam.about.com/reports/Multiple-sclerosis_1.htm*



Multiple Sclerosis (MS)



Concerns for Exercise

- If a patient presents cardiovascular **dysautonomia** (irregular function of the autonomic nervous system that leads to a blunted heart rate and decreased blood pressure in response to exercise), **heart rate and blood pressure must be monitored** throughout the exercise program, and intensity may need to be decreased
- **Heat sensitivity, Incontinence** (loss of control of bowel/bladder)
- **Spasticity/tremor** - focus on areas of muscle imbalance, engage in **gentle rhythmical/active flexibility exercises before exercise** and in **static flexibility movements after exercise** that focus on increasing mobility and lengthening of tight areas
- **Lack of balance and coordination** – this may lead to dangerous falls
- **Medication** may affect energy level, muscle coordination and muscle strength
- People with MS usually suffer from **off days**. Symptoms are fatigue, soreness, sleepiness, decreased functionality etc. If they do decide to train on such a day, we advise against trying to motivate them to give their best. Make sure to **prepare a 'bad day' training**, consisting of only recovery and regeneration exercises, as physical exertion on these days increases the chance of overtraining.

Multiple Sclerosis (MS)



Recommendations

- Choose exercises providing **maximum support**. Incorporate **balance and coordination training**.
- Prepare a '**bad day**' **training**, consisting of only **recovery and regeneration exercises**, as physical exertion on these days increases the chance of overtraining.
- **Prevent overtraining**. Start with just a **few minutes** on a very **low level**.
- For patients with MS, **rest may be even more important than exercise**. They recover at a much slower pace and will therefore require more time to recuperate, and after **overtraining** there is a major **risk of relapse and severe consequences**. This may take weeks to overcome, and some patients may never regain the same level of fitness.
- As MS patients **may lose control of major muscles at any time**, be prepared for sudden falls and spasms, and make sure you can **catch them** when this happens. Also keep in mind that due to the “top down” approach of muscles, some patients may be able to control their muscles during vibration, but cannot maintain this control once the stimulation ends.

Multiple Sclerosis (MS)



MS and Power Plate Exercise

Acceleration Training on the Power Plate may help patients suffering from MS in the following ways:

- **Decreasing spasticity and muscle imbalance** through **flexibility** training and **massage** of tight muscles
- **Fighting atrophy** by performing strength exercises on the Power Plate
- **Improving coordination and control of movement** by performing stability exercises on the Power Plate (single leg or unsupported exercises)
- Improving **stability and strength in all planes** of motion (because of the **multi-dimensional** displacement of the platform)
- **Decreasing pain** sensations due to the high stimulation of the mechanoreceptors (muscle spindles and Golgi tendon organs) and the desensitization of the pain receptors
- Improving intra-muscular and inter-muscular **coordination** (and therefore improving motor learning and motor control) because the fast rate of muscle contraction induces the motor units to switch on at the right time, at the right speed and in a synchronized way
- **Relieving depression** as a result of an increase in the production/release of serotonin (serotonin is considered the “feel good” hormone)
- **Improving bladder control** by enhancing the neuro-response and improving the strength of the **pelvic floor** muscles

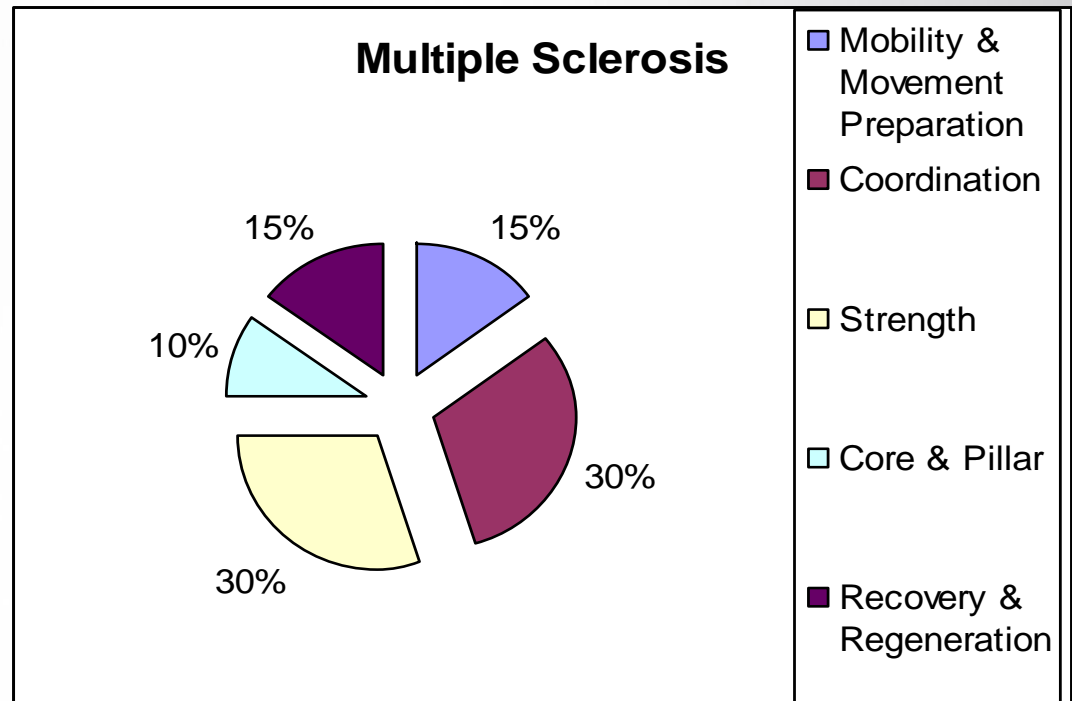
Multiple Sclerosis (MS)



Guidelines for Exercises and Execution

Pay special attention to the **strength exercises** (to improve muscle weakness and increase energy level through hormonal release) and **stability and coordination exercises** (to improve intra- and inter-muscular coordination, motor control and balance). Focus on **functional movement patterns** and muscle function. Certain exercises will be extremely beneficial to the overall quality of life.

Other important modalities that need to be included in the training routine are **flexibility exercises** (through movement preparation) and **regeneration exercises** (to decrease tension and pain sensations in tight or spastic muscles).



Multiple Sclerosis (MS)



Possible exercises for those limited due to MS



Pectoralis Strength



Lateral rotation for Strength



Medial rotation for Strength



Back Extension for Strength



Hamstring Strength



Abductor Strength



Adductor Strength



Calves Strength

Multiple Sclerosis (MS)



Possible exercises for those limited due to MS



Squat with standing limitation



One legged squat with standing limitation



Quadriceps Strength



Upper body Strength



Lower Back Strength

Multiple Sclerosis (MS)



Possible stretches



Pectoralis Stretch



Adductor Stretch



Hamstring/Calf stretch

Possible stimulation exercise



Lower leg stimulation

N.B

The use of these exercises is not just limited to Multiple Sclerosis sufferers. These exercises will likely also be applicable to those with other medical conditions.

Research Multiple Sclerosis (MS)



Title:

Vibration therapy in multiple sclerosis: a pilot study exploring its effects on tone, muscle force, sensation and functional performance.

Published:

Journal of Clinical Rehabilitation. (Schyns et. al.)

Subjects:

Sixteen people with multiple sclerosis were randomly allocated to one of two groups.

Intervention:

Group 1 received four weeks of whole body vibration plus exercise three times per week, two weeks of no intervention and then four weeks of exercise alone three times per week. Group 2 were given the two treatment interventions in the reverse order to group 1.

Results & Conclusions:

“The results of this study suggest that exercise performed three times a week for four weeks improved muscle force output, functional ability and general well-being in people with multiple sclerosis.”

“The addition of whole body vibration to the exercise program provided some added benefit to exercise alone in terms of reducing muscle spasm. In addition there was a trend towards a greater increase in muscle force generation with the addition of whole body vibration.”