

Advances in Exercise Methods for Cerebral Palsy

How whole-body vibration technology is shaking up current thinking on exercise prescriptions for CP and post-stroke patients

by Keith DeOrio, M.D.

Exercise is good for everyone!

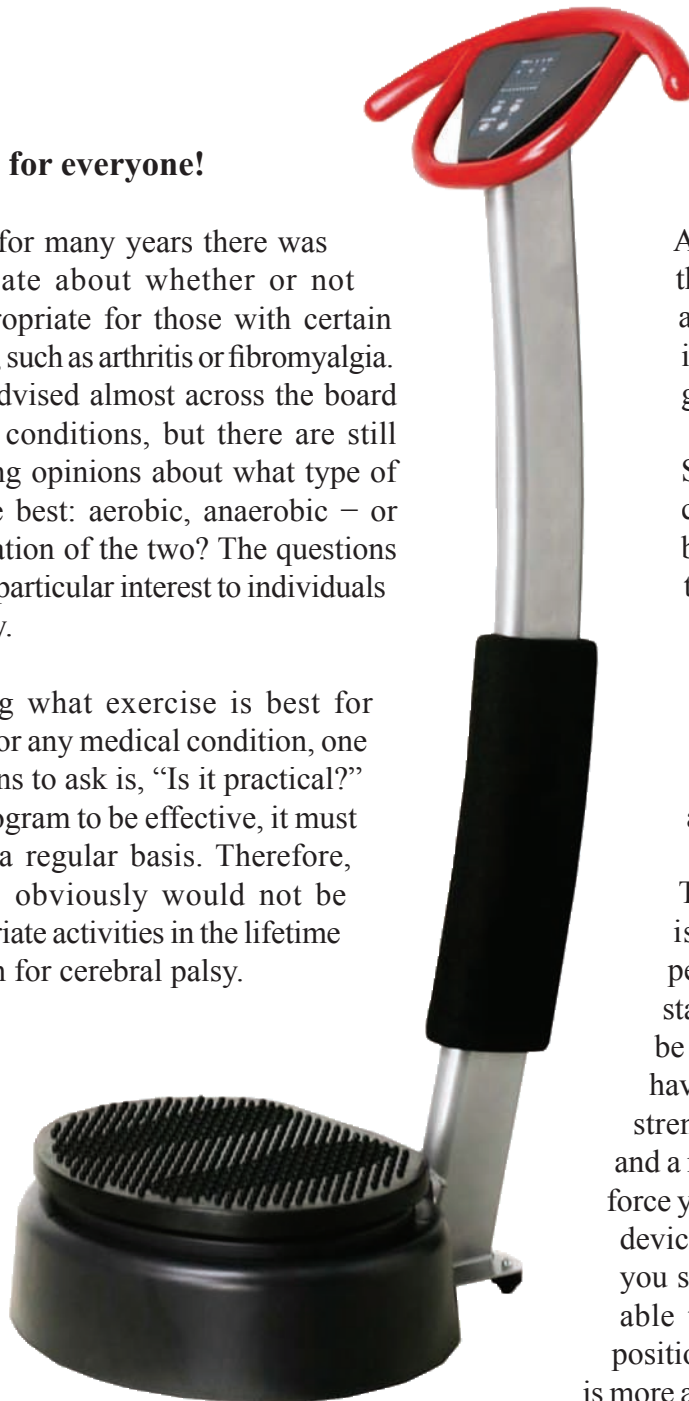
True enough, but for many years there was considerable debate about whether or not exercise was appropriate for those with certain medical conditions, such as arthritis or fibromyalgia. Now exercise is advised almost across the board for most medical conditions, but there are still strong and differing opinions about what type of exercise would be best: aerobic, anaerobic – or perhaps a combination of the two? The questions being raised are of particular interest to individuals with cerebral palsy.

When considering what exercise is best for cerebral palsy, or for any medical condition, one of the first questions to ask is, “Is it practical?” For an exercise program to be effective, it must be performed on a regular basis. Therefore, most team sports obviously would not be considered appropriate activities in the lifetime fitness prescription for cerebral palsy.

Also impractical are those activities that would require considerable speed and skill, such as tennis, or that would involve a high risk of injury, such as gymnastics or figure skating.

Some of the most popular exercises for cerebral palsy are performed on Swiss balls, as the instability of the surface is thought to enhance motor skills. Because the surface is unstable, these should be performed with a spotter at all times. However, it is pertinent to ask just how much value a person can carry over from training on an unstable ball to such activities as walking.

The fact is, whenever possible it is preferable from a motor learning perspective to perform exercises from a standing position. The truth of this can be demonstrated simply: Many therapists have hand-held devices that measure grip strength. You simply squeeze the handle, and a needle on a dial will indicate how much force you are exerting. If you can obtain such a device, you will find that regardless of where you squeeze the handle, you will always be able to exert more force from a standing position. This is because the nervous system is more active from a standing position. Strength



coaches have known this for decades and prefer to train their athletes with standing exercises, such as barbell squats, rather than seated exercises, such as leg presses.

Another factor to consider for cerebral palsy is that weight-bearing activities are superior for increasing bone density and are thereby important for preventing degenerative problems such as osteoporosis. In fact, studies conducted on young Russian weightlifters found that they had greater bone density levels than their peers who did not lift weights.

Although there are many excellent exercise protocols that can improve the quality of life for those with cerebral palsy or strokes, including walking and weight training, one exercise option that can prove particularly valuable is *vibration training*.

The Vibration Option

As a holistic medical doctor with a wellness medical practice, I am always looking for new and better ways to improve fitness and health for my patients. Last year I found such an option when I was introduced to a vibrating exercise platform called the **VibroGym**.

Designed and developed by the Dutch Olympic trainer Guus van der Meer and Marcel Tamminga, the **VibroGym** is a type of exercise machine that has been used for years by many professional athletes, but it also has many unique therapeutic and medical applications. Among its unique qualities that I found, supported by a significant body of research, was that it not only stimulates the neuromuscular and endocrine systems but also improves strength, circulation, bone density and even fat metabolism.

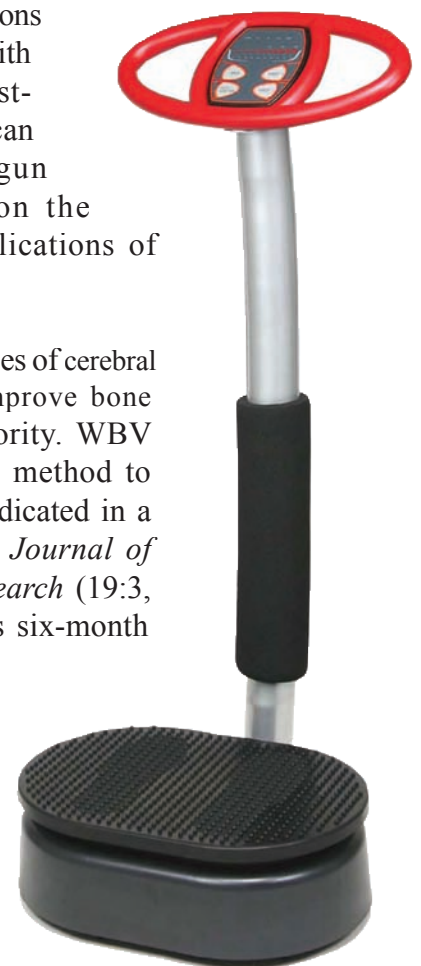
The vibrating platform uses technology based on decades of initial research conducted by the Russian space program with the cosmonauts. The Russian scientists found that one problem with spending extended periods of time in space is that the lack of gravity causes degenerative conditions such as rapid bone and muscle tissue loss. In an effort to stop or reverse these degenerative conditions, researchers were led to the whole-body vibration (WBV) technology.

In addition to providing a practical solution to the adverse health effects experienced by the cosmonauts, the vibration concept was soon applied to the fields of athletics and fitness. The technology won the innovation award for fitness equipment at the 2002 FIBO fitness and health conference in Europe (the world's largest such conference) and eventually found its way to the U.S.

Athletic superstars including the Miami Heat's Shaquille O'Neal, 2002 Canadian goalie and Olympic hockey gold medal winner Ed Belfour, as well as the Oakland Raiders and the Tennessee Titans, are among the first users in the U.S. to recognize the advantages of WBV training. Many of the Olympic Training Centers also use these devices.

The positive effects shown in cosmonauts and athletes suggest obvious applications in treating individuals with cerebral palsy and post-stroke patients. American researchers have begun conducting studies on the potential medical applications of WBV.

In the more disabling cases of cerebral palsy, exercises that improve bone density must be a priority. WBV appears to be an ideal method to achieve this goal, as indicated in a study published in the *Journal of Bone and Mineral Research* (19:3, 2004, 360-369). In this six-month study on 20 children with disabling conditions, the authors concluded that WBV training "... may produce a non-pharmacological treatment for bone fragility in children."



The Science Behind the Benefit

In simple terms, the platform produces a vibration through which energy is transferred to the human body. This mechanical stimulus produces a subconscious “stretch reflex” that causes the muscles to repetitively and vigorously contract and relax. The body rapidly adjusts to this stimulation, resulting in an increase in overall physical conditioning and total body neuromuscular balance.

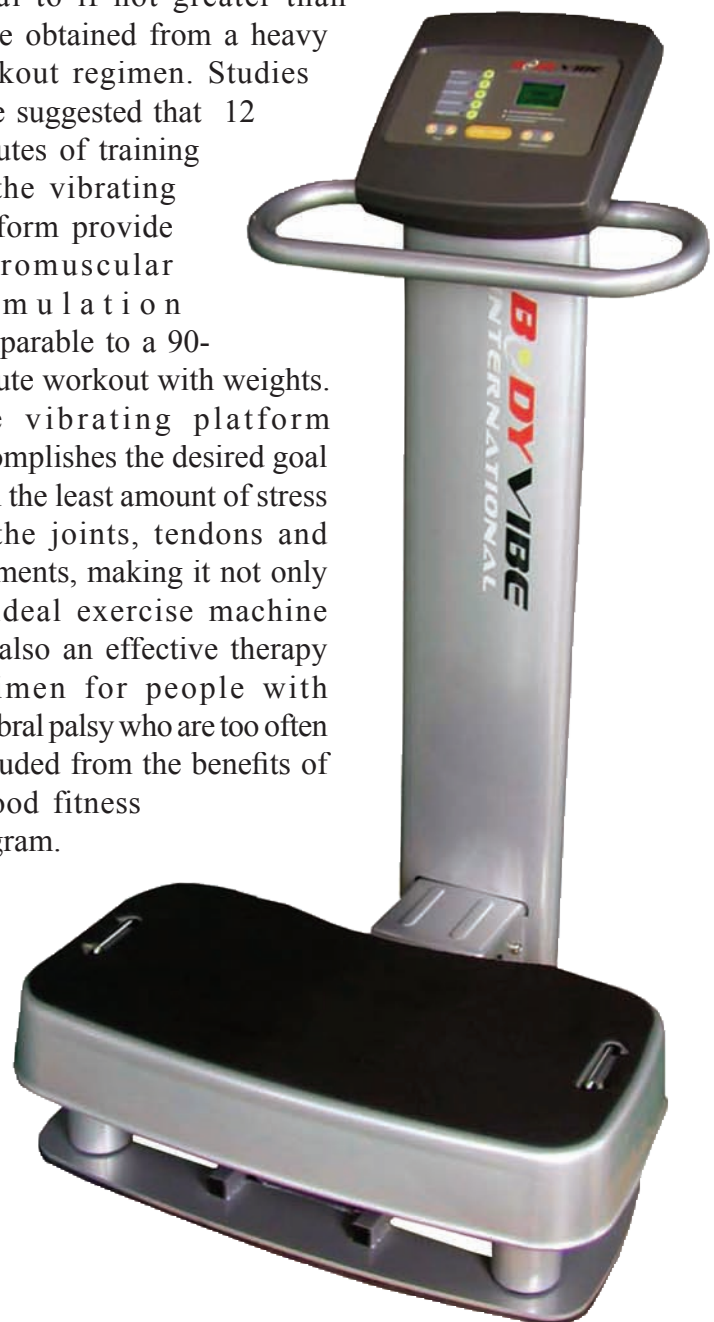
The **VibroGym** has a 20-inch x 32-inch vibrating base plate that the user can either stand on in various static or dynamic positions or can use for massage and other therapeutic applications. The plate vibrates at various levels ranging from 30 to 50 Hertz (times per second). The plate utilizes a three-dimensional vibration pattern moving from front to back, left and right, and up and down. It has handlebars affixed to the top front of the main shaft approximately four feet up from the plate. The handlebars stabilize the user as well as provide vibration stimulation from the handles into the user’s upper body through the hands. There are many professional level WBV distributors in the USA, but only one manufacturer that produces high quality and reasonably priced home units. The company is **Body Vibe International** and they can be contacted at www.bodyvibeusa.com or by calling 877-776-7262. Children models are available that can hold up to 220 pounds in weight with a smaller platform and height to fit their younger bodies.

More than 150 different exercise and stretching positions have been developed specifically for use with vibrating platforms. For example, to work the legs you can perform squats and lunges while standing on the plate. To increase the difficulty of the exercises, you can hold dumbbells when performing the exercises, decrease the rest interval between sets, increase the number of sets and reps performed, or increase the vibration rate of the machine.

The entire body musculature as well as internal organs and glands are affected by whole-body vibration

stimulation. The vibration also causes an adaptive neuromuscular response leading to physiological changes in the brain and the entire body. Physical therapists have found WBV therapy to be more efficient in resolving injuries than many traditional methods of therapy.

I believe that for many medical conditions, the positive effects of vibration training are equal to if not greater than those obtained from a heavy workout regimen. Studies have suggested that 12 minutes of training on the vibrating platform provide neuromuscular stimulation comparable to a 90-minute workout with weights. The vibrating platform accomplishes the desired goal with the least amount of stress on the joints, tendons and ligaments, making it not only an ideal exercise machine but also an effective therapy regimen for people with cerebral palsy who are too often excluded from the benefits of a good fitness program.



Benefits from Using a Vibrating Platform

1. Increased flexibility and mobility
2. Increased hormone secretion: IGF - 1, testosterone, and HGH (human growth hormone)
3. Enhanced bone and muscle building
4. Increased lymphatic drainage
5. Increased muscle strength
6. Increased circulation
7. Decreased cortisol levels
8. Pain reduction
9. Increased secretion of serotonin and norepinephrine
10. Increased T-cell count
11. Improved vitality and wellbeing

Editorial Note

Dr. DeOrio is an internationally known expert in integrative medicine. A graduate of the University of California, Irvine, College of Medicine, Dr. DeOrio is a specialist in nutritional and preventative medicine and recently published a new book outlining the revolutionary impact of Whole Body Vibration therapy in fitness, wellness and health called “**VIBRANETICS**”. His clinic, the DeOrio Wellness Medical Center, was featured in the Ideal Clinic section of *Alternative Medicine* magazine. He is the Alternative Medicine Advisory Board Member for *Men’s Health Magazine* and is the co-host of the new TV series on the Newleaf “Alternative Health” Network called “*Bedside Manor*”

Keith DeOrio M.D.
 DeOrio Wellness Center
 1821 Wilshire Blvd., Ste. 100
 Santa Monica, CA 90403
 Office: 310-828-4480

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