

Power Enhancement through Whole-Body Vibration Training on the i.Tonic

*Specific Applications for the use of the
FreeMotion Fitness™ i.Tonic Platform*



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Demonstrated Benefits of Whole-Body Vibration Training for Power Output

This research, along with other published research examining whole-body vibration training, demonstrates valuable benefits for enhancing power output:

- *Increased power output in the vertical jump test immediately after a short bout of WBV.*
- *Increased power output in the back squat exercise immediately after a short bout of WBV*

Neuromuscular Control of Force

The creation of force by muscular contraction is influenced by numerous factors. The size of individual muscle fibers, the number of motor units recruited for a contraction, the synchronization of motor unit firing, and the employment of reflexive mechanisms can affect the amount of force generated (strength) and the speed at which force is created (power). Athletes train long hours to develop one or more of these components in an attempt to increase performance.

In the early stages of training, muscle activation and synchronization increase rapidly, resulting in a dramatic improvement in strength and power. As training time goes on, muscle fibers hypertrophy or increase in size, contributing even more to increased force production. Once muscle tissue reaches genetically limited size, further increases in activation and synchronization, along with appropriate triggering of the stretch reflex, can further contribute to enhanced strength and power expression.

Plyometrics and resistance training at high loads and/or fast speeds have traditionally been employed as a means for enhancing strength and power among athletes. Research has

consistently shown that these methods are effective in this regard. However, researchers and exercise professionals are constantly looking for an added edge in training.

Whole-body vibration exercise (WBV) has been studied as a potential method of increasing strength and power. While conflicting results have been found, WBV does appear to have some influence on the neuromuscular system and may serve as a valuable supplement to sports conditioning programs. Theoretical speculation, backed by some physiological measurements, alludes to an effect on the nervous system when vibration is applied to the human body in appropriate forms/levels. One mechanism that can serve to enhance force output is the stretch reflex. This reflex is a tie between muscle spindle fibers which monitor the length and rate of lengthening by the muscle tissue. The spindles will trigger a rapid, powerful muscle contraction if a risk of over-stretching is presented. Whole-body vibration presents a rapid, although short, lengthening influence on the muscle tissue. This rapid lengthening triggers the stretch reflex and enacts a very powerful muscle contraction. If used appropriately, this reflexive action could enhance both training and performance among power athletes.

Examining Changes in Power Output Following WBV Exercise

Recent research conducted under the direction of Dr. Matthew Rhea, Director of Human Movement at A.T. Still University, demonstrates the changes that occur in power output when an individual performs short bouts of whole-body vibration exercise on the iTonic®. Dr. Rhea and his colleagues at Arizona State University, the European University of Madrid, and Mesa Community College undertook a series of tests with college athletes to examine the possible benefits of WBV during power training.

Two separate experiments were conducted, the first measuring changes in power during the vertical jump test and the second measuring power changes during sets of power squats. In both studies, athletes were tested before and after short bouts of WBV exercise on the iTonic®. Different applications for WBV were tested in an attempt to identify the optimal dose. An immediate increase in power following WBV would signal an improved function of the neuromuscular system and, in the case of the squat exercise, an increased performance during the exercise.

Both studies found that WBV did result in a significant improvement in power. An average improvement of 5-10% was demonstrated in both the vertical jump test and power expressed during the squat exercise. In fact, athletes were able to jump high and lift faster, performance characteristics that will enhance performance and training. The optimal dose of WBV appears to be 30 seconds, 50 Hz, high amplitude with 60-90 seconds rest before performing the power activity.

The possible applications of this among athletic populations includes the use of the iTonic® as a pre-exercise for conventional exercises such as the squat and bench press. The increased power during the squat/bench press is expected to enhance the overall effectiveness of a long-term training program. The iTonic® can also provide significant benefits for power athletes such as sprinters, jumpers, and throwers who can incorporate WBV into their warm-up routines prior to competition and/or practice.