


Increased muscle
activation with i.Tonic™
vibration exercise



*The use of the FreeMotion Fitness™
i.Tonic™ increases muscle activity up to
217%*



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The use of the FreeMotion Fitness™ iTonic™ Platform increases muscle activity up to 217%

This research examining the influence of the iTonic on muscle activity during exercise, demonstrates:

- *WBV can increase the amount of muscle activity by 113% over exercise without vibration.*
- *The use of light weight external resistance during the exercise shows great effectiveness by increasing the vibration effect to 217% greater muscle activation*
- *Low amplitude and 50Hz demonstrated the greatest muscle activity with high amplitude, 30 Hz showing the next highest activation.*

Muscle Activation

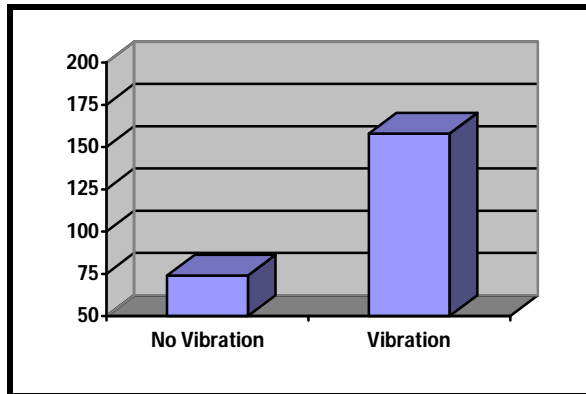
In order to cause motion, stabilize the body, or move an external resistance, the neuromuscular system generates force through contracting muscles. The amount of muscle that is activated depends on the task or conditions. Complex movements require greater muscle activation as do movements resisted by heavy resistance. Simple movements or those requiring very precise control rely on small amounts of muscle tissue.

When using exercise as a means of improving muscular fitness, the goal is to overload (place an unaccustomed stress) on as much muscle tissue as possible in the least amount of time. Especially in the beginning stages of training, the nervous system does not recruit large amounts of muscle tissue to perform resistance training exercises. Thus, strength is limited but increases very quickly as the brain becomes more accustomed to the stress of such exercise. Even in heavy resistance training it is difficult to recruit large amounts of muscle tissue among the general population. It takes years of training and preparation before the brain will allow the recruitment of large portions of muscle tissue and generate high levels of force. The result is exercise that focuses on small portions of the body's muscle tissue and a failure to train muscle fibers that are not recruited. What is needed is a form of exercise that promotes increased muscle tissue activation, enabling more rapid and impressive strength adaptations.

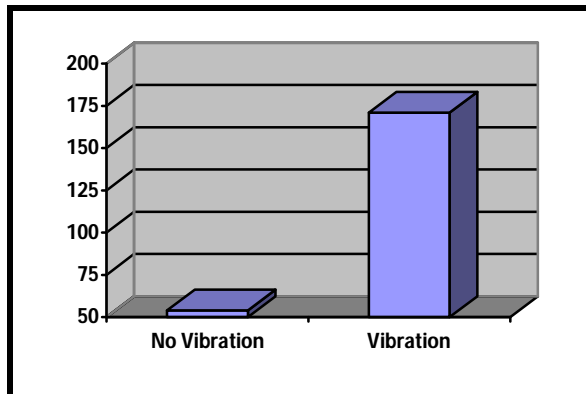
Whole-Body Vibration and Muscle Activation

Vibration exercise has been shown to increase strength and power to a degree similar to light-to moderate-resistance training. One theory as to why such training mimics the effectiveness of conventional exercise is an increased activation of muscle tissue during training. Recent research conducted under the direction of Dr. Matthew Rhea, Director of Human Movement at A.T. Still University, demonstrates that whole-body vibration exercise on the i.Tonic increases muscle tissue activation during exercise by as much as 217%.

Eight untrained men were prepared with EMG monitors over muscles in the legs. EMG measures the amount of muscle tissue activation and provided a means for comparing the amount of activity with and without vibration stimulus. Four conditions were performed for comparison: 1- Body weight squat, no vibration; 2- Body weight squat, low amplitude/50Hz vibration; 3- Body weight squat while holding dumbbells equal to 10% of bodyweight, no vibration; 4- Body weight squat with dumbbells, low amplitude/50Hz vibration. A second testing session was conducted to compare muscle activity at low and high amplitudes with frequencies of 25, 30, 35, and 50 Hz.

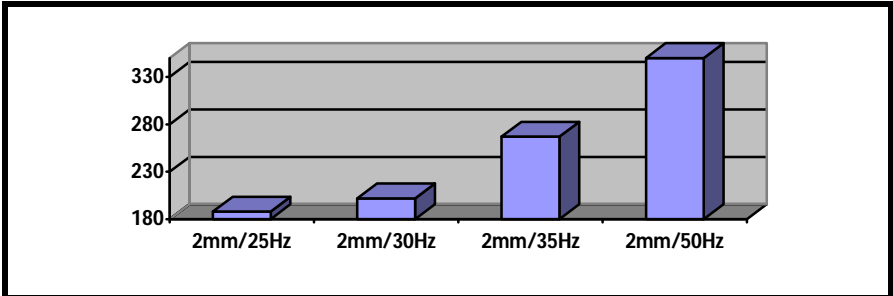


Muscle activity (μV) with and without vibration stimulus

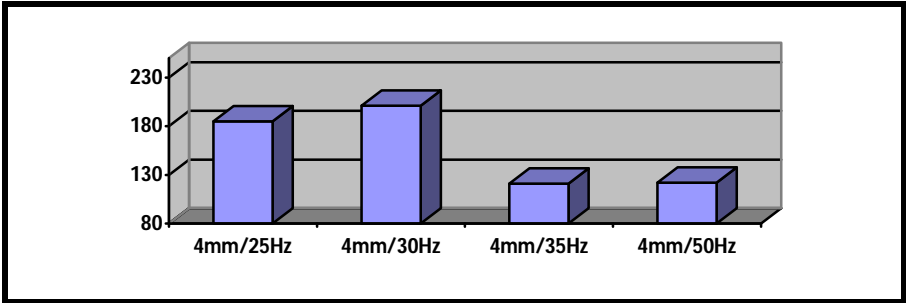


Muscle activity (μV) with and without vibration stimulus and added dumbbells

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Comparison among different vibration applications



Comparison among different vibration applications

These data demonstrate that vibration stimulus has a profound effect on muscle activity during exercise. The addition of dumbbells appears to enhance the effectiveness of the vibration stimulus by compounding increase in muscle activity. An increase in activity between 113% and 217% represents the recruitment of more than double the amount of tissue recruited for these exercises without the vibration stimulus. It is expected that by recruiting and stressing so much more muscle tissue, the vibration stimulus will dramatically increase the amount of strength/power gains observed following training on the i.Tonic platform.

The comparison between amplitudes and frequencies demonstrates that low amplitude at 50Hz produces the greatest amount of muscle tissue activation followed by 35Hz. High amplitude at 30 Hz appears to produce a similar result as low amplitude at 25-30Hz. Because the subjects in this study were untrained, it is unclear if higher trained subjects would respond in a similar fashion. However, these data provide a glimpse of optimal prescription of vibration exercise and can serve to guide the development of training programs.

Implications for Exercise Prescription

These data suggest that WBV will enable the exerciser to recruit and train more muscle tissue in less training time. The result is an increased effectiveness and efficiency of exercise programs. Trainers can include the i.Tonic into training programs to enhance the overall amount of muscle tissue trained. It appears that low amplitude, high frequency prescriptions are most effective for enhancing muscle activation; however, more research is underway to verify this effect and to evaluate the appropriate progression in vibration stimulus for optimal fitness gains.