

# Building Bone and Whole Body Vibration Training

The Effect of Power Plate® Training on Bone Mineral Density, Muscles Strength and Power, and Fat Loss in Postmenopausal Women.

This is a summary of a study published in the *Journal of Bone and Mineral Research* (Vol. 19 (3), 2004)

By Sabine Verschuere, Machteld Roelants, Christophe Delecluse, Stephan Swinnen, Dirk Vanderschuere and Steven Boonen  
Katholieke Universiteit Leuven, Belgium

## Study Conclusions:

Power Plate® training leads to a significant increase in hip area bone density (1.5%), as well as an increase in muscle strength and postural control in postmenopausal and postural control in postmenopausal women.

These research findings present an exciting solution for an ever-worsening problem in our aging population: osteoporosis, loss of postural control and balance, bone fractures from falls often resulting in difficult and incomplete recovery. As the average age of the Western world's population increases, we are faced with an increasing epidemic of osteoporosis. Each year, millions of people suffer from fractures due to early bone loss. One in three women and one in eight men will suffer from osteoporosis this year. In the U.S., 2.8 million people (80% of whom are women) suffer from bone loss; one million have been diagnosed, while 1.8 million aren't even aware that they are suffering from reduced bone mineral density (BMD).

Initial studies on Power Plate® training showed increases in strength in test subjects. Whole body vibration was shown to cause the body's muscles to contract subconsciously at 30 to 50 times per second, which can bring about a powerful training effect even while simply standing on the plate.

## Method:

The 90 participants—postmenopausal women ranging in age from 58 to 70—were divided into three research groups.

1. The whole body vibration group trained three times per week on Power Plate, for no more than 30 minutes per session. They performed static and dynamic exercises for the upper leg and hip area, such

as squats (one of the movements that allows you to sit down in a chair) and lunges.

2. The conventional weight training group trained three times per week, for about one hour per session, including a separate warm-up and cool-down.
3. The control group did no training at all.

Figure 1

Change in bone mineral density in the hip after 24 weeks of Power Plate® training compared to conventional strength training and an untrained control group.

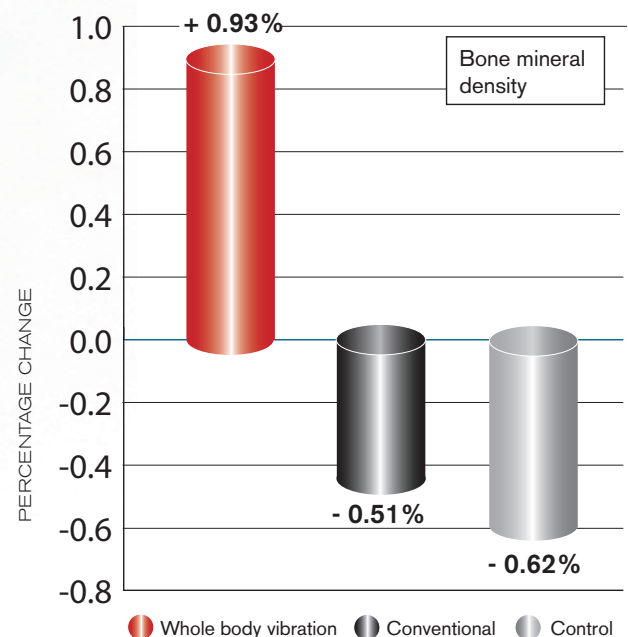


Figure 2

Change in dynamic (fig. 2A) and isometric (fig. 2B) strength in upper leg muscles for the whole body vibration group, the conventional training group and the control group.

Figure 2A

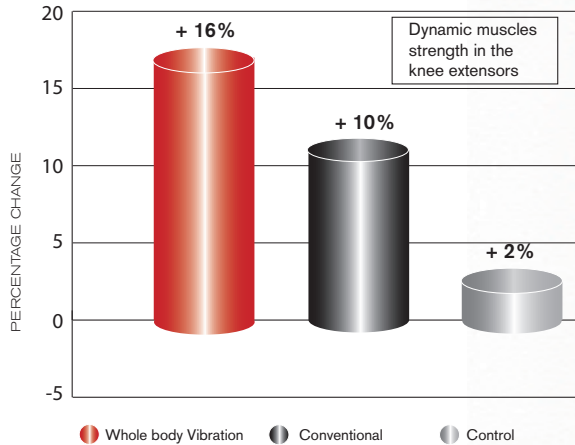
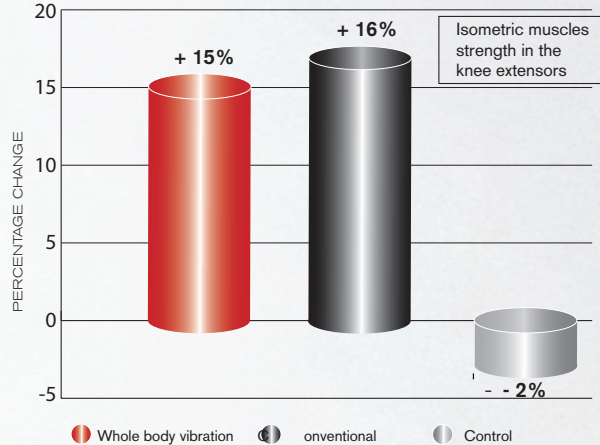


Figure 2B



The whole body vibration group performed workouts of 30 minutes or less, including static and dynamic exercises for the upper leg and hip area. The Power Plate® training variables started at a low level, which was gradually intensified by:

- increasing duration (exercise time)
- increasing the number of exercises performed
- shortening the rest periods between exercises
- increasing frequency from 35Hz to 40Hz
- increasing amplitude from low to high

The weight training group performed conventional weight training exercises for a total of one hour per session, including a separate warm-up and cool-down.

**Results:**

The whole body vibration group got positive results: strength increased as much as 16% in upper leg muscles, while bone density at the hip increased by 1.5%. In addition, the whole body vibration group showed an improvement in postural control and balance, increased muscle strength and lean mass, while losing body fat and fat mass. The conventionally trained subjects were able to slow the rate of bone loss, which is consistent with previous published studies on weight training and bone loss. The control group subjects continued to lose bone mineral density at the average rate.

**Conclusions:**

Power Plate® training :

- increases bone mineral density.
- is a viable solution to reverse bone loss and to eliminate osteoporosis.
- is an accessible training tool to help many populations prevent falls and fractures.
- increases strength.
- improves balance and equilibrium.
- improves posture.
- stimulates fat loss.
- improves health.

Power Plate® training minimizes the need for conscious exertion and stress on the musculoskeletal, respiratory, and cardiovascular systems. Most subjects enjoyed the whole body vibration sessions, did not consider the workouts to be difficult and reported only a moderate degree of muscle fatigue at the end of the session.