

The Potential *Negative* Effects of Whole-Body Vibration on the Human Body:

The effect of vibration on the body is dependent on several factors. As stated in the **WBV Good Practice Guide**, "...*The effects of vibration are therefore complex. Exposure to whole-body vibration causes motions and forces within the human body that may:*

- *cause discomfort,*
- *adversely affect performance.*
- *aggravate pre-existing back injuries, and*
- *present a health and safety risk.*

"Low-frequency vibration of the body can cause motion sickness.

"Epidemiological studies of long-term exposure to whole-body vibration have shown evidence for an elevated risk to health, mainly in the lumbar spine but also in the neck and shoulder. Some studies have reported evidence of effects on the digestive system, the female reproductive organs and the peripheral veins."

While this revelation may surprise most people who have only heard about the numerous [benefits of vibration therapy](#), healthcare professionals such as chiropractors & orthopedists have for years generally considered WBV to be harmful to the structure & integrity of the body. Exposure to WBV in the workplace has been commonly reported to be a leading cause of injury & long-term disability. There are established guidelines to regulate [how much exposure to WBV therapy is safe](#).

Lately, however, the media has brought attention to the achievements of leading scientific researchers who, using specific parameters under controlled circumstances, were able to demonstrate [amazing results](#) in correcting bone & muscle loss, improving strength &

flexibility, and reducing fat. Many companies began to capitalize upon this information by building WBV platforms that could be sold direct to the consumer for use at home. Unfortunately, many of these commercial platforms are claiming to achieve the same benefits achieved in research trials, but they are not using the same parameters used in the research that demonstrated those benefits.

As an example, many platforms have controls which allow you to adjust the frequency and/or amplitude of the unit. The vast majority of scientific articles are published on a specific frequency and/or amplitude. Research has consistently shown that different tissues in the body respond differently to different frequencies. If you are trying to stimulate bone cell production, for example, there is one frequency to which those cells are “tuned-in.” As an example, FM radios are frequency-modulated; if you want to listen to your favorite station with the best possible sound quality, you need to tune in as closely as possible to that specific frequency. AM radios are amplitude-modulated, and also have specific numbers which give you the best possible signal. These two factors – frequency & amplitude – are very important in determining whether or not WBV therapy will be beneficial, ineffective, or harmful.

According to the ISO 2631-1 guidelines on *Mechanical vibration and shock – Evaluation of human exposure to whole-body vibration*:

“The relevant literature on the effects of long-term high-intensity whole-body vibration indicates an increased health risk to the lumbar spine and the connected nervous system of the segments affected. This may be due to the biodynamic behaviour of the spine: horizontal displacement and torsion of the segments of the vertebral column. Excessive mechanical stress and/or disturbances of nutrition of and diffusion to the disc tissue may contribute to degenerative processes in the lumbar segments (spondylosis deformans, osteochondrosis intervertebralis, arthrosis deformans). Whole-body vibration exposure may also worsen certain endogenous pathologic disturbances of the spine. Although a dose-effect relationship is generally assumed, there is at present no quantitative relationship available.

“With a lower probability, the digestive system, the genital/urinary system, and the female reproductive organs are also assumed to be affected.

“It generally takes several years for health changes caused by whole-body vibration to occur.”

WBV therapy, like many other healthcare products, has the potential to cause harm if it is applied incorrectly.

Research has documented that certain frequencies have negative effects upon different parts of the body: working with frequencies around 8 Hz, researchers in Japan found that, “Short-term exposure to WBV led to a suppression of the activity of gastric smooth muscles and affect contraction wave,” essentially reducing the effectiveness of the digestive system³³.

Other research articles have found that vibration *at certain frequencies, amplitudes, & waveforms* is completely ineffective at achieving the results produced by WBV using other parameters:

- One study reports, “...vibration did not induce a significant change in EMGrms, mean and peak angular velocities, moment and power, time to peak power, and initial power at 100 milliseconds after the start of the concentric phase for either resistance load. Therefore, in aiming to train neuromuscular output using maximal-effort dynamic contractions (40 and 70% 1RM), *there is no benefit in employing direct vibration*, at least with a 1.2-mm amplitude and 65-Hz frequency.”³⁴
- From another studying testing whether WBV therapy might help to reduce ankle sprains, “After four weeks of WBV training no significant changes were found in latencies and reflex activity in both muscles in response to ankle sprain simulation. Similar results were observed for the time of ankle inversion motion. Based on the present results, *it is unlikely that 4-weeks WBV training has beneficial effects on ankle joint stability in the case of an ankle inversion motion.*”³⁵
- Another study looking to see if WBV therapy could help athletes recover after a work-out concluded, “*These results show no benefit of WBV on running performance recovery following a High Intensity Interval Training session.*”³⁶
- Researchers seeking to evaluate if WBV could enhance jump performance in young adult males found “*No significant group differences were seen for 30-cm depth jump height between weeks 1 and 7,*” and concluded that, “...*amplitude, frequency, and duration of application of WBV seem to be important factors that need to be controlled for.*”³⁷

- One study wanted to find out if vibration could help prevent muscle being lost from disuse, to benefit astronauts. Volunteers spent two weeks in bed rest (with the headrest tilted down to counter the effect of gravity), and at the end of the two weeks, the researchers found “*Vibration Therapy failed to counteract the decrease in leg muscle volume induced by Head Down Tilt bed rest.*”³⁸
- While WBV therapy has been shown to increase joint flexibility & improve balance, researchers tested ankle mobility using one specific platform and stated, “*No significant changes in the measures of ankle dorsiflexion were found within or between treatments.*”³⁹
- Another research study attempted to use direct vibration at 65 Hz to enhance the strength of muscles in the leg, but found instead that “*...direct vibration, at the selected amplitude and frequency, does not enhance these neuromuscular variables in ballistic knee extensions during or immediately after training.*”⁴⁰

You might be thinking that it's kind of loopy for a website selling WBV platforms to begin by educating you about the possible negative effects of WBV therapy. However, it is important to us the consumer understand that WBV therapy, like all healthcare products, can be ineffective or even dangerous if it is not utilized properly. It's also important to emphasize that WBV can be very beneficial and have absolutely no negative effects, provided it is done with a clear understanding of how the body will be affected by the specific waveform of the vibration.

Scientists working to unravel the mysteries behind WBV have begun testing a wide range of frequencies & amplitudes to determine how the body is affected differently by each. One study explored the effect of vertical sinusoidal vibration at a broad range of vibrational intensities, delivered in frequencies ranging from 10 to 90 Hz. They found that, “*Substantial amplification of peak acceleration could occur between 10 and 40 Hz for the ankle, 10 and 25 Hz for the knee, 10 and 20 Hz for the hip, and at 10 Hz for the spine.*”⁴¹ Translating this into more easily-understood terms, what the authors are saying is that the intensity of this form of vibration can resonate more strongly (become amplified) in the ankle, knee, hip, & spine at certain frequencies, meaning that these tissues will be more affected (positively or negatively) by the vibration.

Furthermore, according to the same study: “*Beyond these frequencies, the transmitted vibration power declined to 1/10th-1/1000th of the power delivered by the platform.*” Obviously, if the vibration power is reduced to ten percent, or one-tenth of one percent, of the power that is produced by the machine, the effects will be similarly diminished.

They continue to state, “*Transmission of vibration to the body is a complicated phenomenon because of nonlinearities in the human musculoskeletal system.*” This is a very important statement. The Vibe was invented & perfected by a chiropractor with 35 years of experience in spinal biomechanics; this advanced understanding of how the body reacts in accordance to gravity & other laws of physics played a key role in the development of the Vibe. While the Vibe was invented in 2001 and this research article published in 2008, the laws of physics have not changed in the meantime. The Vibe uses a different system of vibration transfer than is referenced in this study; to learn more about the specific design, form & function of the Vibe, please click [here](#).

The most comprehensive overview of the current research on WBV to date looks at dozens of different articles on the topic, and breaks them down into human & animal studies²⁰. From there, the authors compare:

- 1) the specific *frequency* that was used in the study
- 2) the exact *amplitude* (intensity) at which the frequency was delivered
- 3) the *method of transmission* used to deliver the vibrational waveform into the body
- 4) the *physiological effects* that were documented in that study

It is very interesting to note that, in the majority of research conducted on WBV, the wave type is not even mentioned in the study. This makes it very difficult to determine exactly which type of vibration transmission method is superior. The full-text of the article may be accessed [here](#).

The physiological effects of WBV vary widely depending upon the three variables outlined above. One highlight of the article is this statement by the authors: “*Currently, many companies advertise the use of WBV as an effective means by which muscle strength and bone mass (in addition to other physiological benefits) can be obtained. While some scientific evidence supports these claims (e.g., accretion of bone mass), the recommended advertisements should be viewed with caution since appropriate standards for use of vibrating platforms have not been established and validated for any segment of the population.*”

It is the intent of Vibe For Health to be very specific about the results that users of the Vibe may expect, and to only make statements about our product which can be supported by research. We are committed to helping to add to the current body of literature by providing additional insight into what exactly constitutes ‘appropriate standards’ in the application of WBV therapy. For more information about the specific benefits that can be expected with regular usage of the Vibe, please click [here](#).