

# Vibration therapy and osteoporosis

## What is osteoporosis?

Osteoporosis occurs when bone mineral density and bone mass decrease. This results in bones becoming increasingly fragile and therefore at a higher risk of fracture, even after minor falls. Osteoporosis can affect anyone, even those who are active and eat a healthy diet.

Broken bones are often referred to as 'fragility fractures.' The terms 'fracture' and 'broken bone' mean the same thing. Fractures can occur in various parts of the body, the most common being the wrists, hips, and spine. It is the broken bones that lead to the pain associated with osteoporosis. Additionally, spinal fractures (often undiagnosed) may cause a loss of height, pain, and increased curvature of the spine (e.g., Scoliosis and Kyphosis).

Not everyone with osteoporosis goes on to break a bone. There are ways you can reduce your fracture risk and live well with osteoporosis.

## What is vibration therapy?

Vibration therapy is a mechanical vibration delivered to the body whilst on a platform. The direction of the vibration can be vertical or oscillatory. As the machine vibrates it transmits energy to your body stimulating your muscles to contract and relax dozens of times each second, with the aim of increasing circulation, muscle strength and flexibility.<sup>1</sup> Research has proven Low-intensity Vibration therapy activates the cells in your bones to regenerate.<sup>2</sup>

There has been significant research into the benefits of vibration therapy. Its use is becoming more common in the UK.

Low-intensity Vibration therapy devices are different from the high-intensity vibration devices often found in gyms used to enhance muscle growth. There are no known contraindications or side effects associated with Low-intensity Vibration (LiV) therapy.<sup>3</sup> It is well documented that high-intensity vibration devices can pose a risk to users, especially those with underlying health conditions, such as osteoporosis.<sup>4</sup>

LiV must be differentiated from vibration slimming devices that involve thick rubber bands or belts placed around your middle which shake you up, sometimes quite violently. These are designed specifically for the purpose of weight loss and muscle toning and do carry a health risk.

## The history of vibration therapy and bone health

Low-intensity Vibration therapy was initially developed by scientists looking to reduce bone density loss experienced by astronauts whilst in zero gravity. Through continued research, Professor Clinton Rubin (Musculoskeletal Research Laboratory, Stony Brook University) identified that 10 minutes a day of gentle, precise, targeted vibration therapy increases bone mineral density.<sup>5</sup>

This same technology has been refined to help people improve their bone density on Earth. It has long been known that weight-bearing exercise has a positive influence on bone. Vibration therapy works in a similar way by stimulating the stem cells in bone to reproduce.

## What types of whole-body vibration therapy are there?

Low-intensity Vibration therapy and high-intensity vibration therapy are both whole-body vibration therapy, however, it is important not to confuse the two.

There are a variety of different vibration devices available in the UK; they vary based on the direction and size of the vibrations produced and are not all suitable for use by those with osteoporosis or other underlying health conditions.<sup>6</sup> If you have osteoporosis, it is advisable to choose a device certified by the British Standards Institute (BSI) as a Class IIa medical device. The Marodyne LiV is the only Low-intensity Vibration device currently available in the UK with this certification.

Low-intensity Vibration devices, such as the Marodyne LiV, resemble a set of large bathroom scales and emit tiny up and down (vertical) vibrations 30 times per second at 0.4g. These gentle vibrations travel through the feet, up the spine to the jaw.

High-intensity whole-body vibration devices emit a high acceleration, high level vibration, typically over 1.0g. High-intensity whole-body vibration devices can be seriously damaging to those with bone conditions, such as osteoporosis, due to the magnitude of the force exerted on the body. Several high-intensity whole-body vibration devices far exceed what is considered safe for even brief exposure.<sup>7</sup>

## Who can use whole-body vibration therapy?

It is important to check the medical certification of the device you wish to use, and the contraindications associated with its use.

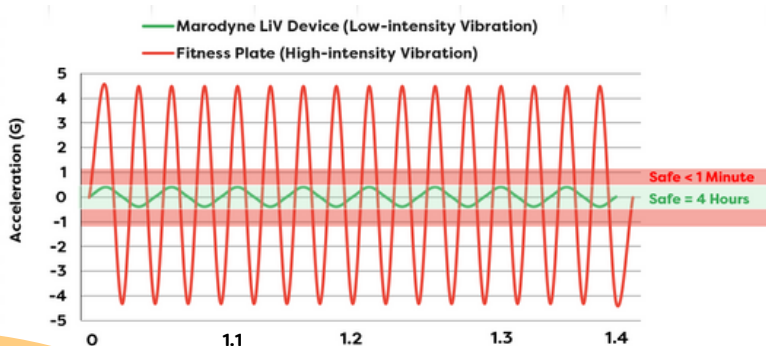
### Low-intensity whole-body vibration therapy:

Low-intensity whole-body vibration devices certified as Class IIa medical devices are designed to mimic the natural way muscles trigger regeneration in our bones, and therefore have no contraindications or side effects. These devices can be used with confidence by both adults and children. The Marodyne LiV is the only Low-intensity Vibration device certified by the British Standards Institute (BSI) as a class IIa medical device.

### High-intensity whole body vibration therapy:

High-intensity whole-body vibration devices are contraindicated and therefore unsuitable if you have any of the following conditions<sup>8 9 10 11</sup>:

- Any current or recent blood clots
- A pacemaker
- Are pregnant
- Dizziness or inner ear problems
- Osteoporosis
- Spinal fractures, injuries, or undiagnosed back pain
- Significant cardiovascular disease (such as heart attacks, angina, arrhythmia, or strokes)
- A recent orthopaedic injury or surgery
- Any recent implants in your body
- Epilepsy or prone to seizures
- Neuropathy
- Acute joint disease, arthritis, or rheumatoid arthritis
- Severe diabetes
- Cancers of tumours
- Retinal conditions
- Kidney or bladders stones
- Migraines
- Acute thrombosis or hernia
- Discopathy and spondylitis
- Recent infections
- Recently placed intrauterine devices



## How does Low-intensity whole-body vibration therapy improve bone health?

Mesenchymal stem cells produce either bone, cartilage, or fat cells. Ageing and other underlying health conditions cause our cells to produce less bone and more fat. This gradually reduces bone density and increases our risk of developing osteoporosis.

Low-intensity Vibration therapy counteracts this process by using precisely targeted, low-intensity vibrations to gently stimulate the body's bone building (osteoblast) cells to work.<sup>12</sup> It is a safe, natural, and gentle way to increase bone density.

## I am fit, very active and don't have osteoporosis. Will Low-intensity Vibration (LiV) therapy strengthen my bones?

There are studies that show Low-intensity Vibration therapy has been successful in preventing osteoporosis by increasing bone mineral density.

Vibration therapy has additional benefits when used alongside other exercise; the vibrations help activate cells and make them more responsive to exercise, improving bone growth.<sup>13</sup> Low-intensity Vibration therapy is being used more frequently for its benefits to circulation and muscle.<sup>14</sup>

## I have osteoporosis. Will Low-intensity Vibration (LiV) therapy help my bones?

Extensive research supports the use of Low-intensity vibration plates by people with osteoporosis. Devices emit gentle vibrations to increase bone mineral density and encourage bone growth, reducing fracture risk. Evidence shows Low-intensity Vibration therapy reduces your risk of falls as it improves muscle strength.<sup>15</sup> Any reduction in falls will reduce the risk of broken bones.

As with any treatment, we are all unique and results may vary. Some people may benefit more from vibration therapy than others.

Before using a device, make sure you know the intensity of its vibrations. Devices that vibrate rapidly at high levels have contraindications and cannot be deemed to be safe, especially if you have osteoporosis. Care must be taken when stepping on and off the machines. If you have any concerns about using a vibration plate, discuss it with your doctor or physiotherapist.

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