

## New technologies reduce falls

Among fall-prevention technologies, whole body vibration is gaining momentum  
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The statistics are familiar: each year, one in three people aged 65 or older will fall, and falls are the second leading cause of death among older adults. The National Institutes of Health, state, and local agencies have published volumes of information about the perils of elders' falls, but no comprehensive, feasible program to prevent falls has emerged. There is little excitement or consistency in the programs, and many produce lackluster results.

Of course, we understand the risks. But often, despite the statistics and our best efforts at motivation, many older adults make little or no effort to exercise or adopt physical activity. So, where do we go from here?

The answer lies in education. In addition to identifying elders at risk of falling, it's important to emphasise the proactive solutions that can be effective. There are scientifically researched tools available that can help significantly reduce the incidence of falls.



Among the major causes of falls are: environmental, such as home trip hazards or electrical wires, footstools, elevated thresholds, and uneven outdoor terrain, including sidewalks and curbs; vestibular problems' neuropathy and other diseases; diet; physiological problems affecting ankles, feet, knees, and hips; muscle deterioration; and obesity.

Most agree that exercise, particularly weight resistance, presents the best option for older adults. However, many older adults who would benefit from such training are strangers to lifting weights or running on treadmills. For individuals in the 80s, this form of training was not widespread years ago and health clubs offering such exercises simply weren't in existence. But there are alternatives.

### **Whole body vibration**

As early as the 1970s, the East Germans and Russians were experimenting with technology that came to be known as whole body vibration (WBV). Basically, it involved a metal platform to adjust involuntarily in order to achieve balance, WBV also caused the muscles to fire at different frequencies, thereby taxing muscle strength.

At first, the technology was used to train athletes, improving coordination, muscle growth, and calorie burn. During that era, the Soviets found that this new technology could be used during orbital space flight for their cosmonauts to combat the ravages of weightlessness, which caused muscle and bone density platforms and held on with straps. Concurrently, American astronauts had to abort long-term space flights because of the deleterious effects of extended weightlessness and often had to be carried on stretchers after disembarking from the capsules.

## **Evolving technology**

Throughout the 1990s, WBV technology took flight in Europe; many universities and medical establishments began to quantify its results. Numerous studies were commissioned and most of the early studies emanated from Europe.

Around 2000, the technology was introduced to the United States via trade shows specific to the fitness industry and directed to, for example, health clubs. There was a barrier to market entry through that means of distribution, as fitness devotees refused to believe that a few minutes on a WBV platform could deliver benefits similar to those achieved in an hour on traditional fitness equipment.

However, the concept ultimately took hold in universities and physical therapy clinics, and hundreds of additional studies were conducted to understand the benefits of WBV and how it could benefit various segments of the population. The conclusions on its benefits included the following:

- With respect to health, WBV reduced pain caused by arthritis, neuropathies, and other maladies; halted the effects of osteoporosis and built bone density; boosted circulation and the cardiovascular system; increased metabolism; improved balance and coordination; and accelerated wound healing and tissue regeneration.
- In the area of fitness, it built stronger muscles; increased flexibility and range of motion; and decreased recovery time from exercising.
- With regard to wellness, WBV improved the feeling of well-being and increased serotonin production; improved the quality of life; reduced lower back pain; and decreased stress levels.

These results were achieved through WBV's causation of the following responses:

- muscular contractions;
- involuntary neuromuscular stretch reflex;
- tendon, ligament, and cartilage stimulation;
- hormonal response promotion; and
- small twitch muscle fibre exercise as body sought to balance.



About 10 years ago, competitors attempted to enter the market. Fast-forward to 2015 when researchers identified a new demographic that could benefit from WBV. It appeared ideally suited for the older adult population for the following reasons:

- They don't want to spend the time or are incapable of doing formal exercise;
- They respond to the benefits and feel of WBV almost immediately, and are then motivated to continue the exercise routine;
- WBV is relatively easy and safe with stable vibe platforms, particularly with falls as a concern;

- Benefits can be achieved in as little as three times per week and 10 to 15 minutes per session, even by simply standing on the platform; and
- Recent research demonstrates that WBV can help alleviate the pain and suffering caused by fibromyalgia, Parkinson's disease, osteoporosis, neuropathy, back pain, chronic fatigue, and many chronic diseases and conditions.

### **Measuring program success**

How is this success measured in terms of fall prevention? There are several means of testing individuals' likelihood of falling, and a variety of balance-testing assessments.

The fear of falling plays a role in fall risk as well. By utilizing specific measurement tools, a practitioner can advise older adults regarding the following:

- In what direction is he or she most likely to fall?
- Is he or she in a high risk of falling category?
- What are the limits of sway in each direction before a fall is likely?
- How is weight distributed from right to left leg?
- How does vision, particularly in low light conditions affect his or her balance?
- How does he or she fare on uneven or perturbed surfaces?

A new device features insole sensors that relay to the practitioner real-time information regarding walking patterns, balance, and sway with dynamic rather than static measurements. A Bluetooth relay switch attached to the shoestrings sends the information to an iPad for recording the results.

Early diagnosis provides older adults and their physicians or practitioners detailed information about individuals' fall and likelihood so recommendations on training, medication, diet, physical therapy, and other corrective measures can be made. This new science has augmented, if not surpassed, the merits of casual observation such as sit-to-stand, get-up and go, and other subjective observational tests.

### **Other helpful devices**

Once older adults experience a fall or a near miss, they frequently stop moving in favour of sitting, for fear that their next move might lead to a catastrophic break of limb, hip, or skull. This results in weight gain, muscle loss, and balance deterioration, the expected physiological results of inactivity.

Ankle-foot orthotics (AFO), which can enhance stability when standing and walking and sometimes correct physiological problems, can be prescribed. Confidence associated with AFO use can directly influence an older adult's psyche regarding walking ability, helping to avoid falls.



Falls are so deleterious, and physically and financially costly, that additional proactive solutions must be devised and, more importantly, implemented.

Author: Brian Lewallan, Aged Care Issue 02, 2021