



# The Chinese University of Hong Kong

## Non-confidential Abstract of Technology Disclosure

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**Title:**

### **INTERACTIVE WEIGHT BEARING EXERCISE PLATFORM IMPROVES MUSCLE FUNCTION AND REDUCES BONE WEAKNESS**

**CUHK Ref. No.** : 05/MED/255

**Inventor(s)** : Professor Kwok Sui LEUNG, Department of Orthopaedics and Traumatology

**Patent Status** : US patents pending                      **Licensing Status** : Available for licensing

**Non-confidential abstract:**

**Affordable Exercise Platform**

Interactive Weight Bearing Exercise is a kind of mechanical stimulation to induce musculoskeletal system to respond actively and has been proven as a treatment and prevention of some age-related problems of bone and muscle weakness. Breakthrough technology developed at The Chinese University of Hong Kong (CUHK) places this valuable resource within the reach of community consumers.

**Elderly at Risk**

Osteoporosis is a thinning and weakening of the bone that leads to an increased risk of fracture. It is very common among the elderly, esp. postmenopausal women. The fractures often occur in the hips and wrists, as a result of fall. Spine fracture may result in some cases. These fractures may affect mobility or even cause mortality.

Weakening of the bones is not the only factor that increases the risk of fracture in the elderly. Muscle weakness and slow response time also contribute to balance difficulties and increasing the risk of falls. Widespread inactivity and lack of weight-bearing exercise among the elderly is a major cause of such muscle-related degeneration.

**Proven Benefit**

A wealth of scientific data has demonstrated the effectiveness of Interactive Weight Bearing Exercise in reducing these risks of fracture. A few groups of researchers, including experts at the CUHK, have found improvement in bone mineral density after a period of daily treatment with the exercise platform. Even more significant is the beneficial effect on muscle tone and effect. These multi-factorial effects on both bone and muscle have proven positive functional outcomes for elderly users. Clinical trials have also shown a potential advantage for patients' recovery from fractures, as well as the improvement in balancing ability and bone quality of postmenopausal women.

In terms of mechanism, Interactive Weight Bearing Exercise is proven to induce micro-blood vessels formation and enhances blood flow, thus accelerating tissue repair. Also, the active exercise may provide a resonance frequency to compensate the lost firing rate due to reduced muscle fibers in aging. This exercise program requires the subject to stand upright on the platform for 20 minutes a day only, which most people including elderly comply with the exercise very well.

**A Platform with Innovation**

This novel designed magnetic levitation system and actuator are used to support the platform and to generate the specific vibrations. The vibration setting is monitored in real-time by a built-in microprocessor and sensor. The platform is equipped with Liquid Crystal Display (LCD) readout. This innovative design results in high energy efficiency, low noise, low friction and easy maintenance.

**Unique in the Market**

The new CUHK's cost effective exercise platform allows access to the wider market, and offers the chance to provide widespread benefits to the elderly community as a whole. The CUHK Interactive Weight Bearing Exercise Platform will be available for end users by the end of 2010.

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