



CLINICAL BENEFITS OF JUVENT'S MICRO-IMPACT PLATFORM®

CLINICALLY PROVEN

100% NATURAL

NON-INVASIVE

NO ADVERSE EFFECTS



BIOMECHANICAL SIGNALS AND BONE MORPHOGENESIS:

Beyond physical support, the skeletal system serves many physiological functions such as endocrine, stem cell production, hematopoietic and mesenchymal (osteo-, chondro-, adipo-, angio-, neuro-, and myogenic). Proper skeletal health is vital for physical strength and proper maintenance of the endocrine and circulatory systems. Developing optimal bone mineral density (BMD) during childhood and adolescence is vital to establishing sufficient bone mass to support and maintain skeletal health throughout life.

To date, prevention of bone loss has been approached principally through nutrition, vitamin supplements and pharmacologic intervention. Additionally, the developing skeleton is able to modify its structure and strength in response to biomechanical loading induced by functional activity¹⁻². As a supplement to traditional exercise, brief daily exposure to low-magnitude mechanical stimuli (LMMS) has demonstrated a potential as an adjunct bone

therapy with anabolic and anti-resorptive properties³. LMMS involves standing on a pure linear displacement platform that transmits vertical accelerations well below 1g to weight-bearing bones⁴. These mechanical signals are anabolic to the skeletal system by stimulating mesenchymal stem cell populations toward osteoblastogenesis and improved bone mineralization⁵. Animal studies and several human clinical studies and trials have demonstrated LMMS efficacy in growing bones, resulting in gains in trabecular bone volume fraction and cortical area⁶⁻¹⁴.

JUVENT'S MICRO-IMPACT PLATFORM: THE LEADING LMMS TECHNOLOGY FOR HEALTHCARE AND SPORTS APPLICATIONS

This clinically proven fitness device is the result of \$45-million of R&D and 20+ worldwide patents. Its unique LMMS is a patented combination of intelligent software, sensors, and a precision mechanism that optimizes a signal personalized for each user's resonant frequency. Its' signal stays within a safe range of frequencies (32Hz-37Hz) and force (0.2-0.4g's). Unlike whole body vibration (WBV) 'shakers', Juvent provides safe, sub-millimeter micro-impacts. These generate the desired physiological response without risk of injury at energy levels far below OSHA and ISOs safety guidelines allowing use with even children and frail adults.

JUVENT'S MICRO-IMPACT THERAPY: A UNIQUE DEVICE

Juvent's Micro-Impact therapy is unlike any other vibration platform technology. It's a clinically proven device differentiated by research. **Table 1** We have provided specific differences in **Table 2**

Table 1 Completed clinical studies using Juvent's Micro-Impact Platform®

CLINICAL STUDY, YEAR (LIT. CITED)	CLINICAL RESULTS
POSTURAL INSTABILITY CAUSED BY EXTENDED BED REST IS ALLEVIATED BY BRIEF DAILY EXPOSURE TO LOW MAGNITUDE MECHANICAL SIGNALS, 2011 (1) - 29 healthy adults - 10 min daily for 90 days - Clinical Trial	- Ankle, knee and back strength - Knee endurance decreased between 10.2% and 20.0% in the control group - Knee endurance decreased between 2.4% and 14.2% in the LMMS group
PLANTAR VIBRATION IMPROVES LEG FLUID FLOW IN PERIMENOPAUSAL WOMEN, 2005 (2) - 18 Women aged 46-63yr. free of acute illness - 12 months - Clinical Trial	- Plantar vibration serves to significantly enhance peripheral and systemic blood flow, peripheral lymphatic flow, and venous drainage, which may account for the apparent ability of such stimuli to influence bone mass.
PREVENTION OF POST-MENOPAUSAL BONE LOSS (3) - 31 patients - Randomized double placebo controlled - 20 min/daily for 6 months	- Treatment group with high compliance had significant relative BMD increase in femoral and spine outcomes
MUSCULO-SKELETAL HEALTH IN YOUNG WOMEN WITH LOW BMD, 2006 (4) - 48 patients - 10 min/daily for 12 months	- Cancellous and cortical bone density increased by 2.1% and 3.4% respectively in the treatment group - No adverse effects
BMD* IN PEDIATRIC CANCER SURVIVORS, 2016 (5) - Randomized double placebo controlled - 10 min/twice daily for 12 months - Clinical Trial	- Effective in improving whole body and tibial BMD - Tibial BMD increased by a mean of 11.2% in highly compliant group - No adverse effects with twice daily 10 min use
BMD IN PEDIATRIC CROHN'S PATIENTS, 2016 (6) - Randomized double placebo controlled - 10 min/daily for 6 months - Clinical Trial	- Trabecular BMD and cortical area outcome measures improved significantly - No adverse effects
BMD IN THALASSEMIA PATIENTS, 2012 (7) - 18 patients - 20 min/daily for 6 months - Pilot Study	- Whole body BMD and serum markers of bone formation increased significantly - No reported adverse effects
BMD IN PEDIATRIC CEREBRAL PALSY PATIENTS, 2010 (8) - 31 patients - 10 min/daily for 6 months	- Greater increase in the cortical bone outcome measurements during the vibrational treatment period - No adverse effects
LOW MAGNITUDE MECHANICAL LOADING OSTEOGENIC IN CHILDREN WITH DISABLING CONDITIONS, 2004 (9)	- 11% increase in trabecular bone density in the tibia following six months of treatment, in contrast to the 6% loss of bone mineral density in children standing on placebo devices

*Bone Mineral Density

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 These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease. Juvent's Platform is a Powered Exercise Device.

Tab.2 Specific differentiating features of Juvent's Micro-Impact technology

FEATURES	Whole-body vibrators	Juvent Technology
Delivered stimulation type	High to Low Magnitude High Frequency High Displacement	Low Magnitude High Frequency Micro Displacement
Amplitude type	Variable (1g-12g)	Micro-impacts (0.3 g)
Machine software-induced stable posture	✗	✓
User's body composition-calibrated amplitude/frequency adjusting	✗	✓
Induce uncontrolled & variable frequency	✓	✗
Induce key bone morphogenic and stem cell genes (e.g. BMP, osteocalcin)	✗	✓
Stable and uniform resonance with active feedback	✗	✓
Induces unnecessary pain signaling	✓	✗
Stable positive dose-response on bone-neuromuscular anabolic signaling	✗	✓

Lit. cited:

1. Ducher G, Bass SL, Saxon L, Daly RM. Effects of repetitive loading on the growth-induced changes in bone mass and cortical bone geometry: a 12-month study in pre/peri- and postmenarcheal tennis players. *J Bone Miner Res.* 2011; 26(6):1321–9.
2. Kontulainen S, Sievanen H, Kannus P, Pasanen M, Vuori I. Effect of long-term impact-loading on mass, size, and estimated strength of humerus and radius of female racquet-sports players: a peripheral quantitative computed tomography study between young and old starters and controls. *J Bone Miner Res.* 2002; 17(12):2281–9.
3. Chan ME, Uzer G, Rubin CT. The potential benefits and inherent risks of vibration as a non-drug therapy for the prevention and treatment of osteoporosis. *Curr Osteoporos Rep.* 2013; 11(1):36–44.
4. Xie L, Jacobson JM, Choi ES, et al. Low-level mechanical vibrations can influence bone resorption and bone formation in the growing skeleton. *Bone.* 2006; 39(5):1059–66.
5. Nagaraja M.P and Hanjoong Jo .The Role of Mechanical Stimulation in Recovery of Bone Loss—High versus Low Magnitude and Frequency of Force. *Life* 2014, 4, 117-130; doi:10.3390/life4020117

6. Xie L, Rubin C, Judex S. Enhancement of the adolescent murine musculoskeletal system using low-level mechanical vibrations. *J Appl Physiol* (1985). 2008; 104(4):1056–62.
7. Vanleene M, Shefelbine SJ. Therapeutic impact of low amplitude high frequency whole body vibrations on the osteogenesis imperfecta mouse bone. *Bone*. 2013; 53(2):507–14.
8. Mogil RJ. Effect of Low-Magnitude, High-Frequency Mechanical Stimulation on BMD Among Young Childhood Cancer Survivors: A Randomized Clinical Trial. *JAMA Oncol*. 2016 Jul 1;2(7):908-14. doi: 10.1001/jamaoncol.2015.6557.
9. Leonard MB, Shults J, Long J, Baldassano RN3, Brown JK, Hommel K, Zemel BS, Mahboubi S, Howard Whitehead K, Herskovitz R, Lee D, Rausch J, Rubin CT. Effect of Low Magnitude Mechanical Stimuli on Bone Density and Structure in Pediatric Crohn's Disease: A Randomized Placebo-Controlled Trial. *J Bone Miner Res*. 2016 Jun;31(6):1177-88.
10. Wren TAL, Lee DC, Hara R, et al. Effect of high-frequency, low magnitude vibration on bone and muscle in children with cerebral palsy. *J Ped Ortho*. 2010;30:732–738.
11. Fung EB, Gariepy CA, Sawyer AJ, Higa A, Vichinsky EP. The effect of whole body vibration therapy on bone density in patients with thalassemia: a pilot study. *Am J Hematol*. 2012 Oct;87(10):E76-9. doi: 10.1002/ajh.23305.
12. Gilsanz VI, Wren TA, Sanchez M, Dorey F, Judex S, Rubin C. Low-level, high-frequency mechanical signals enhance musculoskeletal development of young women with low BMD. *J Bone Miner Res*. 2006 Sep;21(9):1464-74.
13. Rubin CI, Recker R, Cullen D, Ryaby J, McCabe J, McLeod K. Prevention of postmenopausal bone loss by a low-magnitude, high-frequency mechanical stimuli: a clinical trial assessing compliance, efficacy, and safety. *J Bone Miner Res*. 2004 Mar;19(3):343-51.
14. Ward KI, Alsop C, Caulton J, Rubin C, Adams J, Mughal Z. Low magnitude mechanical loading is osteogenic in children with disabling conditions. *J Bone Miner Res*. 2004 Mar;19(3):360-9. Epub 2004 Jan 27.



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