

TITLE: Vibration Platform Equipment for Osteoporosis: Clinical Effectiveness

DATE: 08 September 2008

RESEARCH QUESTION:

What is the evidence for the clinical effectiveness of vibration platform equipment for the treatment or prevention of osteoporosis?

METHODS:

A limited literature search was conducted on key health technology assessment resources, including PubMed, OVID's CINAHL, the Cochrane Library (Issue 3, 2008), University of York Centre for Reviews and Dissemination (CRD) databases, ECRI, EuroScan, international HTA agencies, and a focused Internet search. Results include articles published between 2003 and September 2008, and are limited to English language publications only. No filters were applied to limit the retrieval by study type. Internet links are provided, where available.

RESULTS:

HTIS reports are organized so that the higher quality evidence is presented first. Therefore, health technology assessment reports, systematic reviews, and meta-analyses are presented first. These are followed by randomized controlled trials (RCTs) and observational studies.

Six RCTs and three observational studies were identified pertaining to the evidence for the clinical effectiveness of vibration platform equipment for the treatment or prevention of osteoporosis. No relevant health technology assessments or systematic reviews were identified. Additional information that may be of interest has been included in the Appendix.

Health technology assessments

No literature identified.

Systematic reviews and meta-analyses

No literature identified.

Disclaimer: The Health Technology Inquiry Service (HTIS) is an information service for those involved in planning and providing health care in Canada. HTIS responses are based on a limited literature search and are not comprehensive, systematic reviews. The intent is to provide a list of sources of the best evidence on the topic that CADTH could identify using all reasonable efforts within the time allowed. HTIS responses should be considered along with other types of information and health care considerations. The information included in this response is not intended to replace professional medical advice, nor should it be construed as a recommendation for or against the use of a particular health technology. Readers are also cautioned that a lack of good quality evidence does not necessarily mean a lack of effectiveness particularly in the case of new and emerging health technologies, for which little information can be found, but which may in future prove to be effective. While CADTH has taken care in the preparation of the report to ensure that its contents are accurate, complete and up to date, CADTH does not make any guarantee to that effect. CADTH is not liable for any loss or damages resulting from use of the information in the report.

Copyright: This report contains CADTH copyright material and may contain material in which a third party owns copyright. **This report may be used for the purposes of research or private study only.** It may not be copied, posted on a web site, redistributed by email or stored on an electronic system without the prior written permission of CADTH or applicable copyright owner.

Links: This report may contain links to other information on available on the websites of third parties on the Internet. CADTH does not have control over the content of such sites. Use of third party sites is governed by the owners' own terms and conditions.

Randomized controlled trials

1. Gusi N, Raimundo A, Leal A. Low-frequency vibratory exercise reduces the risk of bone fracture more than walking: a randomized controlled trial. *BMC Musculoskelet Disord* 2006;7:92. [PubMed: PM17137514](#)
2. Iwamoto J, Takeda T, Sato Y, Uzawa M. Effect of whole-body vibration exercise on lumbar bone mineral density, bone turnover, and chronic back pain in post-menopausal osteoporotic women treated with alendronate. *Aging Clin Exp Res* 2005;17(2):157-63. [PubMed: PM15977465](#)
3. Rubin C, 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;19(3):343-51. [PubMed: PM15040821](#)
4. Verschueren SM, Roelants M, Delecluse C, Swinnen S, Vanderschueren D, Boonen S. Effect of 6-month whole body vibration training on hip density, muscle strength, and postural control in postmenopausal women: a randomized controlled pilot study. *J Bone Miner Res* 2004;19(3):352-9. [PubMed: PM15040822](#)
5. Russo CR, Lauretani F, Bandinelli S, Bartali B, Cavazzini C, Guralnik JM, et al. High-frequency vibration training increases muscle power in postmenopausal women. *Arch Phys Med Rehabil* 2003;84(12):1854-7. [PubMed: PM14669194](#)
6. Torvinen S, Kannus P, Sievanen H, Jarvinen TA, Pasanen M, Kontulainen S, et al. Effect of 8-month vertical whole body vibration on bone, muscle performance, and body balance: a randomized controlled study. *J Bone Miner Res* 2003;18(5):876-84. [PubMed: PM12733727](#)

Observational studies

7. Ruan XY, Jin FY, Liu YL, Peng ZL, Sun YG. Effects of vibration therapy on bone mineral density in postmenopausal women with osteoporosis. *Chin Med J (Engl)* 2008;121(13):1155-8. [PubMed: PM18710630](#)
8. Beck BR, Kent K, Holloway L, Marcus R. Novel, high-frequency, low-strain mechanical loading for premenopausal women with low bone mass: early findings. *J Bone Miner Metab* 2006;24(6):505-7. [PubMed: PM17072744](#)
9. Gilsanz V, 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;21(9):1464-74. [PubMed: PM16939405](#)

PREPARED BY:

Kristen Moulton, B.A., Research Assistant
Emmanuel Nkansah, BEng, MLS, MA, Information Specialist
Health Technology Inquiry Service
Email: htis@cadth.ca
Tel: 1-866-898-8439

APPENDIX – FURTHER INFORMATION:

Randomized controlled trials

10. Hannan MT, Cheng DM, Green E, Swift C, Rubin CT, Kiel DP. Establishing the compliance in elderly women for use of a low level mechanical stress device in a clinical osteoporosis study. *Osteoporos Int* 2004;15(11):918-26. [PubMed: PM15167985](#)

Observational studies

11. McDonnell P, Liebschner MA, Tawackoli W, Mc Hugh PE. Vibrational testing of trabecular bone architectures using rapid prototype models. *Med Eng Phys* 2008. [PubMed: PM18555727](#)
12. Rubin C, Pope M, Fritton JC, Magnusson M, Hansson T, McLeod K. Transmissibility of 15-hertz to 35-hertz vibrations to the human hip and lumbar spine: determining the physiologic feasibility of delivering low-level anabolic mechanical stimuli to skeletal regions at greatest risk of fracture because of osteoporosis. *Spine* 2003;28(23):2621-7. [PubMed: PM14652479](#)

Review articles

13. Prisby RD, Lafage-Proust MH, Malaval L, Belli A, Vico L. Effects of whole body vibration on the skeleton and other organ systems in man and animal models: What we know and what we need to know. *Ageing Res Rev* 2008. [PubMed: PM18762281](#)
14. Cardinale M, Rittweger J. Vibration exercise makes your muscles and bones stronger: fact or fiction? *J Br Menopause Soc* 2006;12(1):12-8. [PubMed: PM16513017](#)
15. Rubin C, Judex S, Qin YX. Low-level mechanical signals and their potential as a non-pharmacological intervention for osteoporosis. *Age Ageing* 2006;35 Suppl 2:ii32-ii36. [PubMed: PM16926201](#)

Additional references

16. Dolny DG, Reyes GF. Whole body vibration exercise: training and benefits. *Curr Sports Med Rep* 2008;7(3):152-7. [PubMed: PM18477873](#)
17. Cardinale M, Pope MH. The effects of whole body vibration on humans: dangerous or advantageous? *Acta Physiol Hung* 2003;90(3):195-206. [PubMed: PM14594190](#)