CSM
FEBRUARY 6-10
NASHVILLE, TN

Presentation by
Sara Meeks
Exercise and Movement Guidelines for the Frail Elderly
Sponsored by the
Home Health Section
Saturday February 9, 2008
1:00-4:45 P.M.
(If you can't be there,
consider ordering the
audiotape from APTA)

"Step Down"
"Err on the Side of Caution"
and take exercise to the
"Frailest of the Frail"
in
Home Care, ICU, Acute Care and more
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IOWA STATE
CONFERENCE
April 18-19, 2008
YOGA
AND
PILATES
FOR
BETTER BONES

COMING IN 2008: CERTIFICATION IN THE MEEKS METHOD

In 2008, I will be starting a Certification Process in **The Meeks Method**
Driven largely by demand from many therapists who have taken my trainings, the Certification Process will include exams, written materials (e.g., case reports, evidence-based articles) and observed clinical
practice. Those completing the certification process will be encouraged to develop courses on the
Physical Therapy management of persons with compromised bone strength.
STAY TUNED FOR DETAILS

ARTICLE IN THE NOVEMBER-DECEMBER ISSUE OF GERINOTES

To Bend or Not To Bend, Another Point of View.
Sara Meeks, PT, MS, GCS
Contact Section on Geriatrics for reprints and copies of Gerinotes

WHOLE BODY VIBRATION

Juvent's Device

The Science-Based Dynamic Motion Therapy

The Juvent Dynamic Motion Therapy (DMT) technology is based on over 25 years of research that started with Clinton Rubin, PhD, investigating signals that would stimulate bone cells to stop bone loss and/or increase bone density. Much of Dr. Rubin's work was funded by NASA to develop a countermeasure to prevent bone loss which occurs in weightless conditions encountered in space exploration. Signals in the "micro-strain" range (less than 1 G) were explored because the targeted bone would already be compromised with low bone density. In the 1980's, signal identification was accomplished and demonstrated anabolic effects in various laboratory models, duplicating the same anabolic effects in myriad laboratory experiments[1]. Following that, the Juvent plate was developed to allow delivery of the signal to the human body. Its first human use was a pilot study, performed in Sweden, in which percutaneous pins were placed in the greater trochanter and lumbar spine and fitted with accelerometers to measure the signal delivered to those regions of interest[2]. This demonstrated that 80% of the signal is seen in the lumbar spine. Knowing that the signal was transmitted into specific skeletal regions of interest, pilot clinical trials, in populations with low bone density were initiated.

WALK TALL! The Message January – March 2008

A prospective, randomized, placebo controlled trial, in post-menopausal women (n=62) demonstrated safety and efficacy in inhibiting bone loss. A 0.2 g, 32-37 Hz signal was used and subjects performed two ten minute treatments on a daily basis for one year. In subjects in the actively treated group, who were compliant with the recommended treatment, increases of <1% were seen at the femoral neck, trochanter and lumbar spine, while, in the placebo group, decreases of >1 to >2% were seen in the same regions. Efficacy in inhibiting bone loss was clearly demonstrated[3].

At the same time, in a small study, 5 pre-menopausal women with low bone mineral density were studied for one year of use with the plate for one daily ten minute session (0.2g, 32-37 Hz). At 12 months, bone mineral density values improved at all measured sites (lumbar spine, proximal femora, and whole body), indicating the potential for effect in a premenopausal age group[4]. Based on the inhibition of bone loss with this signal, later studies to evaluate anabolic effects were performed with a 0.3 g signal.

A study was performed in children (n=20) with Cerebral Palsy with the aim of examining whether the signal (0.3 g, 90 Hz) could effectively increase tibial and spinal volumetric trabecular bone mineral density (vTBMD) in children with disabling conditions. Subjects were randomized for ten minute treatments 5 days per week for six months with the active group demonstrating an increase of tibial vTBMD of 6.3% and the placebo group demonstrating a decrease of 11%. The spinal results, though not statistically significant, demonstrated a 4.7% difference between active and placebo groups [5].

Adolescent females with idiopathic low bone mineral density and a history of at least one healed fracture (n=48) were enrolled in a clinical trial. Twenty four underwent 10 minutes daily treatment on the plate (0.3g, 32-37 Hz) and twenty four served as controls. Muscle and bone mass were evaluated by QCT at baseline and at the end of the study. Cancellous bone in the lumbar spine increased by 2.1% and cortical bone in the mid-shaft femur increased 3.4% in the treated group compared to 0.1% and 1.1% respectively in the controls. Cross-sectional paraspinous musculature was 4.9% greater in the treated group versus controls[6]. Additional research focused on sarcopenia seen in the aging process. Dr. Rubin and his researchers were able to demonstrate the

loss of activity of certain muscle fibers that are key in maintaining balance[7].

The research continues looking at musculo skeletal effects of the Juvent DMT Therapy. Preliminary results of a NASA funded study by Rubin, et al, reported recently at the American Society for Bone and Mineral Research demonstrated the inhibition of bone and muscle loss in a 90 day bed rest study which simulates the weightless conditions of space[8]. Ongoing work is testing the effects of Juvent on postural stability (balance) in aging populations.

While the body of scientific work done by Rubin, et al, was reviewed by the European Commission which accepted its validity and allows for the technology to be marketed for the treatment and prevention of Osteoporosis, the US Food and Drug Administration requires more clinical data before it will allow the device to be marketed in this country with claims for Osteoporosis. Clinical trials are ongoing, but complete data will not be available for at least 4 more years. In the meantime, Juvent is marketed in this country for muscle restoration and mobility maintenance to prevent falls due to poor balance, which often lead to fractures.

Juvent Medical is a member of the International Osteoporosis Foundation and supports their musculoskeletal approach to combat the issues that develop as a result of the aging process.

1. Rubin CT, Lanyon LE. Kappa Delta Award Paper. Osteoregulatory Nature of Mechanical Stimuli:Function as a Determinant for Adaptive Remodeling in Bone. Journal of Orth.Res, 5:300-310(1987)

2. 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:Vol. 28, No. 23, pp 2621-2627, 2003.

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. JBMR: Vol.19, No. 3, 2004, pp.343-351.

4. Beck B, 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;24:505-507

5. Ward K, Alsop C, Caulton J, Rubin C, Adams J, Mughal Z. Low Magnitude Mechanical Loading Is Osteogenic in Children With Disabling Conditions. JBMR: Vol. 19, No. 3, 2004, pp. 360-369.

6. Vicente Gilsanz, Wren T, Sanchez M, Dorey F. Judex S, and Rubin CT. Low-Level, High-Frequency Mechanical Signals Enhance Musculoskeletal Development of Young Women With Low BMD. June 26, 2006, JBMR Volume 21, Sept. 9, 2006.

7. Huang RP, Rubin CT, McLeod KJ. Changes in Postural Muscle Dynamics as a Function of Age. J. of Gerontology:Biological Sciences 1999, Vol 54A, No. 8, B352-B357.

8. J.W. Muir, Y. Xia, N.Holguin, S. Judex, Y. Qin, H. Evans, T. Lang, C. Rubin. Low Magnitude Mechanical Signals Reduce Risk-Factors for Fracture during 90-Day Bed Rest. JBMR.Vol 22 T426 ASBMR: Hawaii, September 26, 2007.