

About the Scoliosis Traction Chair



The Scoliosis Traction Chair is designed to be the ultimate tool to address & rehabilitate the scoliotic spine, especially once it has reached the advanced stages (i.e., the Cobb angle is above 30 degrees).

Traditional approaches to scoliosis such as bracing and surgery have neglected the importance of the cervical spine (the head & neck) in affecting spinal pathology, posture, and gait.

Scientific research¹ done by physicists – not physicians - has suggested a more optimal approach to achieve the desired corrections; by combining this new information with established principles of chiropractic & biomechanics, along with Whole Body Vibration therapy as a means of retraining the neuro-muscular proprioceptive pathways, effective and permanent corrections to scoliosis can be obtained much more rapidly than with isometric exercises or chiropractic adjustments alone.

Scoliosis is often accompanied by evidence of disc degeneration, osteoporosis, congenital malformation, and disc wedging². We believe these to be the symptoms of scoliosis, however, rather than the cause. Whole-Body Vibration therapy helps to address these symptoms in accordance with established laws of biomechanics. Wolff's Law states that a bone under stress will heal faster; Davis' Law is the corresponding equivalent that declares soft tissues such as ligaments & muscles will also re-heal more efficiently while under stress. These same principles apply to healthy tissues, as well.

Whole Body Vibration has been scientifically demonstrated to increase bone density³, relieve pain & inflammation⁴, and increase flexibility⁵ by stimulating the various tissues and systems of the body. Research⁶ suggests that each tissue of the body – bone, muscle, and collagen – responds most effectively when stimulated by a specific vibratory frequency, and we have incorporated this science into the Scoliosis Traction Chair.

Rotation and translation is a coupled motion when it occurs in the spinal column; it is impossible to address one dimension without affecting the other. For this reason, you cannot rehabilitate scoliosis unless you address it 3-dimensionally. In fact, research⁷ has proven that abnormal rotation of the spine develops either prior to or during the onset of scoliosis, but scoliosis CANNOT develop if this rotatory subluxation is not present! The Scoliosis Traction Chair is designed to incorporate de-rotation, de-compression, and lateral traction while simultaneously providing stabilization of the posterior thoracic rib arch. It also isolates the trunk rotator muscles ipsilaterally (on one side) to isometrically (without motion) strengthen the weakened core musculature.

1) Rib Cage-Spine Coupling Patterns Involved in Brace Treatment of Adolescent Idiopathic Scoliosis

Aubin et al, March 15, 1997, Dept. of Mechanical Engineering, Sainte-Justine Hospital, Quebec

“Boston brace treatment produces complex trunk motions that tend to shift the spine and rib cage anteriorly, with little de-rotation and lateral displacement to the left, whereas ideal expected correction would be the opposite.”

“A more optimal way to achieve trunk corrections could be made by applying loads laterally on the convex side and on the anterior thoracic opposite the rib hump, with a system that constrains mechanically the posterior rib hump from moving backward.”

2) Association of osteopenia with curve severity in adolescent idiopathic scoliosis: a study of 919 girls

[Osteoporos Int.](#) 2005 Dec;16(12):1924-32. Epub 2005 Sep 15.

Lee WT, Cheung CS, Tse YK, Guo X, Qin L, Lam TP, Ng BK, Cheng JC.

Department of Orthopaedics and Traumatology, The Chinese University of Hong Kong, Shatin, Hong Kong, China.

Generalized osteopenia and spinal deformity occur concomitantly in adolescent idiopathic scoliosis (AIS) during the peripubertal period. No large-scale study has been performed to reveal the link between scoliotic deformity and bone-mineral status in AIS. In a cross-sectional study, the extent of scoliotic-curve severity in relation to bone-mineral status was examined for 619 AIS girls and compared with those of 300 healthy non-AIS counterparts aged 11-16 years. Curve severity was categorized into a moderate (10-39 degrees) and a severe group ($>$ or $=$ 40 degrees) based on Cobb angle. Anthropometric parameters, bone mineral-density (BMD) and bone mineral-content (BMC) of lumbar spine, proximal femur and distal tibia were determined by dual-energy X-ray absorptiometry and peripheral QCT. Differences in anthropometric parameters and bone mass among control and the AIS-moderate and AIS-severe groups were tested by one-way ANOVA. Association between Cobb angle and bone mass was determined by univariate and multivariate analyses. Mean Cobb angle of the moderate and severe groups were 25 ± 6.3 degrees and 50.2 ± 11.3 degrees, respectively. Arm span and leg length among the moderate and severe AIS subjects were almost all longer than for the controls from age 13 years. Age-adjusted arm span and leg length were significantly correlated with curve severity ($p < 0.015$). Starting from age 13 years, most axial and peripheral BMD and BMC of the moderate or severe AIS group was significantly lower than for the controls ($p < 0.029$). Age-adjusted Cobb angle was inversely correlated with BMD and BMC of the distal tibia and lumbar spine among AIS subjects ($p < \text{or} = 0.042$). **The proportion of osteopenic AIS girls in the severe group was significantly higher than that in the moderate group** ($p < \text{or} = 0.033$). **Multivariate analysis indicated that Cobb angle was inversely and independently associated with axial and peripheral BMD and BMC** ($p < \text{or} = 0.042$). **To conclude, curve severity was an inverse and independent associated factor on bone mineral mass of AIS during peripuberty. The study implied that prevention of osteopenia could be as important as controlling spinal progression in the management of AIS.**

The pathophysiology of the intervertebral disc

Joint Bone Spine 2001 Dec;68(6):537-42

Bibby, Jones, Lee, Yu, Urban

Physiology Laboratory, Oxford University, UK

“Scoliosis is associated with decreased endplate permeability, a factor that may play a role in disk degeneration and scoliosis progression.”

3) Anabolism: Low mechanical signals strengthen long bones

Clinton Rubin*, A. Simon Turner†, Steven Bain‡, Craig Mallinckrodt† & Kenneth McLeod*

* Musculo-Skeletal Research Laboratory, Department of Biomedical Engineering, State University of New York, Stony Brook, New York 11794-2580, USA

† Department of Clinical Sciences, Colorado State University, Fort Collins, Colorado 80523, USA

‡ Skeletech Inc., Bothell, Washington 98021, USA

e-mail: clinton.rubin@sunysb.edu

Although the skeleton's adaptability to load-bearing has been recognized for over a century, the specific mechanical components responsible for strengthening it have not been identified. Here we show that after mechanically stimulating the hindlimbs of adult sheep on a daily basis for a year with 20-minute bursts of very-low-magnitude, high-frequency vibration, the density of the spongy (trabecular) bone in the proximal femur is significantly increased (**by 34.2%**) compared to controls. As the strain levels generated by this treatment are three orders of magnitude below those that damage bone tissue, this anabolic, non-invasive stimulus may have potential for treating skeletal conditions such as osteoporosis.

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 (ISSN: 0884-0431)

Verschuere SM; Roelants M; Delecluse C; Swinnen S; Vanderschueren D; Boonen S
Laboratory of Motor Control, Department of Kinesiology, Faculteit Lichamelijke Opvoeding en Kinesitherapie, Katholieke Universiteit, Leuven, Belgium.

High-frequency mechanical strain seems to stimulate bone strength in animals. In this randomized controlled trial, hip BMD was measured in postmenopausal women after a 24-week whole body vibration (WBV) training program.

Vibration training significantly increased BMD of the hip. These findings suggest that WBV training might be useful in the prevention of osteoporosis. INTRODUCTION: High-frequency mechanical strain has been shown to stimulate bone strength in different animal models. However, the effects of vibration exercise on the human skeleton have rarely been studied. Particularly in postmenopausal women—who are most at risk of developing osteoporosis—randomized controlled data on the safety and efficacy of vibration loading are lacking. The aim of this randomized controlled trial was to assess the musculoskeletal effects of high-frequency loading by means of whole body vibration (WBV) in postmenopausal women. MATERIALS AND METHODS: Seventy volunteers (age, 58-74 years) were randomly assigned to a whole body vibration training group (WBV, n = 25), a resistance training group (RES, n = 22), or a control group (CON, n = 23). The WBV group and the RES group trained three times weekly for 24 weeks. The WBV group performed static and dynamic knee-extensor exercises on a vibration platform (35-40 Hz, 2.28-5.09g), which mechanically loaded the bone and evoked reflexive muscle contractions. The RES group trained knee extensors by dynamic leg press and leg extension exercises, increasing from low (20 RM) to high (8 RM) resistance. The CON group did not participate in any training. Hip bone density was measured using DXA at baseline and after the 6-month intervention. Isometric and dynamic strength were measured by means of a motor-driven dynamometer. Data were analyzed by means of repeated measures ANOVA. RESULTS: No vibration-related side effects were observed. **Vibration training improved isometric and dynamic muscle strength (+15% and + 16%, respectively; p < 0.01) and also significantly increased BMD of the hip (+0.93%, p < 0.05).** No changes in hip BMD were observed in women participating in resistance training or age-matched controls (-0.60% and -0.62%, respectively; not significant). Serum markers of bone turnover did not change in any of the groups. CONCLUSION: **These findings suggest that WBV training may be a feasible and effective way to modify well-recognized risk factors for falls and fractures in older women** and support the need for further human studies.

4) Dr. David G. Williams from his "Alternatives For The Health-Conscious Individual" Newsletter, September 2003, Volume 10, No. 3.

"Vibratory stimulation can help alleviate acute and chronic pain. 82 percent experienced at least some degree of relief using vibratory stimulation. "

Whole-body vibration exercise leads to alterations in muscle blood volume.

Kerschan-Schindl K, Grampp S, Henk C, Resch H, Preisinger E, Fialka-Moser V, Imhof H
Clin Physiol 2001 May 21:377-82

Abstract

Occupationally used high-frequency vibration is supposed to have negative effects on blood flow and muscle strength. Conversely, low-frequency vibration used as a training tool appears to increase muscle strength, but nothing is known about its effects on peripheral circulation. The aim of this investigation was to quantify alterations in muscle blood volume after whole muscle vibration—after exercising on the training device Galileo 2000 (Novotec GmbH, Pforzheim, Germany). Twenty healthy adults performed a 9-min standing test. They stood with both feet on a platform, producing oscillating mechanical vibrations of 26 Hz. Alterations in muscle blood volume of the quadriceps and gastrocnemius muscles were assessed with power Doppler sonography and arterial blood flow of the popliteal artery with a Doppler ultrasound machine. Measurements were performed before and immediately after exercising.

Power Doppler indices indicative of muscular blood circulation in the calf and thigh significantly increased after exercise. The mean blood flow velocity in the popliteal artery increased from 6.5 to 13.0 cm x s(-1) and its resistive index was significantly reduced. The results indicate that low-frequency vibration does not have the negative effects on peripheral circulation known from occupational high-frequency vibration.

5) Will whole-body-vibration training increase the range of motion in the hamstrings?

Van den Tillaar, R (2006), *J Strength Cond Res* 20:192-96

The range of motion in the hamstrings increased by 30% in the vibration group, compared to only 14% in the control group.

6) Energy Medicine: the Scientific Basis, by James Oschman

7) Natural History of Progressive Adult Scoliosis

Catherine Marty-Poumarat, MD; Luciana Scattin, MD; Michele Marpeau, MD; Christian Garreau de Loubresse, MD; Philippe Aegerter, MD, PhD
Spine. 2007;32(11):1227-1234. ©2007 Lippincott Williams & Wilkins
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Study Design: A retrospective analysis of the progression of adult scoliosis.

Objective: To establish an individual prognosis.

Summary of Background Data: Most studies have investigated the adolescent scoliosis after skeletal maturity, but the results are discordant.

Methods: Two senior physicians measured all the radiographs of 51 adults who had a progressive scoliosis. The mean delay between the first and last radiograph was 27 years. For each patient, a diagram was established with the Cobb angle on the y-axis and the corresponding age on the x-axis. We noted the age and Cobb angle of the first radiograph showing a rotatory subluxation and the age of menopause. We used linear regression and the analysis of variance test.

Results: The mean number of radiographs per patient was 6. The linear test was significant in 46 patients. Two main types exist. Type A is an adolescent scoliosis that continues to progress after skeletal maturity, whereas type B appears or progresses late. There were 13 type A and 20 type B of which 11 progressed around menopause. Significant differences were noted between groups A and B regarding loss of body height (group A, 5 cm and group B, 9.5 cm; $P < 0.001$), rate of progression in lumbar single and thoracolumbar single curves (group A, 0.82°/y and group B, 1.64°/y; $P < 0.004$), Cobb first radiograph (group A, 37° and group B, 20°; $P < 0.0001$), age rotatory subluxation (group A, 42 years and group B, 56 years; $P < 0.0001$), and Cobb rotatory subluxation (group A, 52° and group B, 29°; $P < 0.0001$).

Conclusions: The originality of our study is the diagram. We demonstrated that the rate of progression was linear, and it can be used to establish an individual prognosis. The diagrams visualized 2 main distinct types. There was a significantly faster rate of progression in type B. **In type A, rotary subluxation occurs during progression of the curvature. In type B, it seems to be the initial event.** Menopause is a period of deterioration in type B.