

Feldenkrais research and case studies

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Able-bodied

DellaGrotte, J., Ridi, R., Landi, M., & Stephens, J. (2008). Postural improvement using core integration to lengthen myofascia. *Journal of bodywork and movement therapies*, 12(3), 231-245.

Postural organization is controlled by the central nervous system in conjunction with the skeletal, muscular, and fascial systems. This paper explores the effects on static and dynamic postural misalignment of a neuromotor re-education intervention. In total, 13 control and 14 experimental subjects with postural deviations were studied. An individualized Dellagrotte core-integration intervention was performed with subjects in the experimental group over a period of 2 months. Twenty-five postural parameters were assessed pre- and post-intervention to give a global postural assessment score. There was significant improvement in the global postural score for the experimental group compared to the control group. Six core pathways are described along with the theoretical background from which they were developed.

Scorpiniti, A., Lorusso, A., & L'Abbate, N. (2007). A workplace intervention aimed at increasing awareness in nursing personnel performing manual handling activities. *G Ital Med Lav Ergon*, 29(3 Suppl), 857-858.

Here we describe a workplace intervention aimed at reducing the risk of low back pain in nursing personnel. The intervention we carried out included a specific ergonomic training and an exercise program according to the Feldenkrais Method. After the intervention, we evaluated its effect on the execution of manual handling activities in nurses. We found an increased rate of correct manual handling in the post-intervention period.

Stephens, J., Davidson, J., DeRosa, J., Kriz, M., & Saltzman, N. (2006). Lengthening the hamstring muscles without stretching using "awareness through movement". *Physical Therapy*, 86(12), 1641-1650.

Background and Purpose. Passive stretching is widely used to increase muscle flexibility, but it has been shown that this process does not produce long-term changes in the viscoelastic properties of muscle as originally thought. The authors tested a method of lengthening hamstring muscles called "Awareness Through Movement" (ATM) that does not use passive stretching. **Subjects.** Thirty-three subjects who were randomly assigned to ATM and control groups met the screening criteria and completed the intervention phase of the study. **Methods.** The ATM group went through a process of learning complex active movements designed to increase length in the hamstring muscles. Hamstring muscle length was measured before and after intervention using the Active Knee Extension Test. **Results.** The ATM group gained significantly more hamstring muscle length (+7.04 degrees) compared with the control group (+1.15 degrees). **Discussion and Conclusions.** The results suggest that muscle length can be increased through a process of active movement that does not involve stretching. Further research is needed to investigate this finding.

<http://physicaltherapyjournal.com/cgi/content/full/86/12/1641>

Netz, Y., & Lidor, R. (2003). Mood alterations in mindful versus aerobic exercise modes. *Journal of Psychology: Interdisciplinary and Applied*, 137(5), 405-419.

The results of most recent studies have generally indicated an improvement in mood after participation in aerobic exercise. However, only a few researchers have compared mindful modes of exercise with aerobic exercise to examine the effect of 1 single session of exercise on mood. In the present study, the authors assessed state anxiety, depressive mood, and subjective well-being prior to and following 1 class of 1 of 4 exercise modes: yoga, Feldenkrais (awareness through movement), aerobic dance, and swimming; a computer class served as a control. Participants were 147 female general curriculum and physical education teachers (mean age = 40.15, SD = 0.2) voluntarily enrolled in a 1-year enrichment program at a physical education college. Analyses of variance for repeated measures revealed mood improvement following Feldenkrais, swimming, and yoga but not following aerobic dance and computer lessons. Mindful low-exertion activities as well as aerobic activities enhanced mood in 1 single session of exercise. The authors suggest that more studies assessing the mood-enhancing benefits of mindful activities such as Feldenkrais and yoga are needed. (PsycINFO Database Record (c) 2010 APA, all rights reserved) (journal abstract)

Kerr, G. A., Kotynia, F., & Kolt, G. S. (2002). FELDENKRAIS awareness through movement and state anxiety. *Journal of Bodywork & Movement Therapies*, 6(2), 102-107.

The ability of the FELDENKRAIS Method to reduce state anxiety was investigated. Specifically, both a single FELDENKRAIS Awareness Through Movement lesson and a 10-week FELDENKRAIS Awareness Through Movement programme were studied. Participants volunteered to take part in one 1-hour class each week for 10 weeks. Individuals who declined to participate in the 10-week programme were given the opportunity to participate in a single 1-hour lesson during week 5. Participants were divided into two groups: new and returning students, based on previous experience with Awareness Through Movement lessons. Participants were administered the state scale of the State-Trait Anxiety Inventory (Spielberger et al. 1983) prior to the beginning of the first lesson (week 1--T1), immediately before and after the fifth lesson (week 5--T2 and T3), and after the final lesson (week 10--T4). Findings indicated that state anxiety scores decreased significantly over a single lesson (T2 T3) for both new (n=13) and returning (n=42) students. In addition, state anxiety scores were significantly lower after the 10-week programme (T4) when compared with baseline scores (T1) for new (n=3) and returning (n=42) students, with new students experiencing a significantly greater reduction than returning students. These findings can be interpreted as further support for the efficacy of the FELDENKRAIS Method in reducing state anxiety. Copyright © 2002 by Elsevier Science (USA).

Buchanan, P. A., & Vardaxis, V. G. (2000). Effects of Feldenkrais Awareness Through Movement on balance during standing. *Journal of Athletic Training*, 35(2).

This was an RCT study examining the effect of Feldenkrais on stability. 10 female subjects took part in a series of eight lessons over four weeks. Results indicated improvements in balance and postural control.

Dunn, P. A., & Rogers, D. K. (2000). Feldenkrais sensory imagery and forward reach. *Perceptual and motor skills*, 91(3, Pt 1), 755-757.

To investigate the effect of sensory imagery on subsequent movement, a unilateral Feldenkrais lesson of imaging a soft bristle brush passing over one-half of the body and in which no movement occurred, was given to 12 naive Ss (aged 18–28 yrs). Forward flexion for each side of the body was measured at a sit-and-reach box. For 8 and 10 Ss who reported the perception of a side as being longer and lighter following the sensory imagery, there was also a significant increase in the forward flexion range on that side. (PsycINFO Database Record (c) 2010 APA, all rights reserved)

Kolt, G. S., & McConville, J. C. (2000). The effects of a FELDENKRAIS Awareness Through Movement program on state anxiety. *Journal of Bodywork & Movement Therapies*, 4(3), 216-220.

The effects of a FELDENKRAIS Awareness Through Movement program and relaxation procedures were assessed on a volunteer sample of 54 undergraduate physiotherapy students over a 2-week period. Participants were randomly allocated into a FELDENKRAIS METHOD group, a relaxation group, or a no-treatment (control) group, and state anxiety was measured using the Composed-Anxious scale of the Profile of Mood States-Bipolar Form (Lorr & McNair 1982) on four occasions: prior to the first intervention, prior to the fourth intervention, on completion of the fourth intervention, and one day after the fourth intervention. Analysis of variance showed that anxiety scores for all groups varied significantly over time and, specifically, that participants reported lower scores at the completion of the fourth intervention. Further, compared to the control group, females in the FELDENKRAIS and relaxation groups reported significantly lower anxiety scores on completion of the fourth session (compared to immediately prior to the fourth session), and this reduction was maintained one day later. These findings can be interpreted as preliminary evidence of the efficacy of the FELDENKRAIS METHOD and relaxation procedures in reducing anxiety.

Buchanan, P., & Thelen, E. (1999). *Changing standing behaviour: a comparison of Feldenkrais Awareness Through Movement, relaxation and stretching on postural control*. Paper presented at the Annual Conference of the Feldenkrais Guild of North America.

A single ATM lesson has effects that alter many standing posture variables compared with similar length interventions of relaxation or stretching.

Jackson-Wyatt, O., Gula, D., Kireta, A., & Steeves, M. (1992). Effects of Feldenkrais Practitioner Training Program on Motor Ability. A video-analysis. *Physical Therapy*, 72, 6.

The purpose of this case study (n=1) was to describe the effects of an eight week Feldenkrais Practitioner Training Programme (FPTP) on motor ability. The measure of motor ability in this study was a vertical jump. The parameters of the vertical jump analysed were the displacement of center of mass (COM), peak velocity, work, linear acceleration and power. The design of the study was single subject, quasi experimental using a retroactive paradigm. The subject was a female who self described as not active (aerobic activity less than once/week). The intervention was attending year two of an

FPTP five days/week, 5-6 hours/day for eight weeks. The taping was done four times. (Once to orient subject to protocol, pre-training, four weeks into training and last training day). A Panasonic 5100 camera with a 1/1000 shutter speed was used. Peak velocity was calculated directly using the video analysis system software. Standard equations were used to calculate the displacement of the COM, work, linear acceleration and power. The results show a 94% increase in the displacement of the COM, 29.9% increase in velocity, 89.6% increase in work, peak linear acceleration closer to the desirable point in the jump and maximum efficiency and power generated increased by 43.6%. The subject was instructed to only jump during videotaping. Results after 8 weeks of FPTP reflect a dramatic improvement in the efficiency of vertical jumping. The Feldenkrais method may be helpful alternative and promoting enhance motor ability for vertical jumping.

Ruth, S., & Kegerreis, S. (1992). Facilitating cervical flexion using a Feldenkrais method: awareness through movement. *Journal of Orthopaedic & Sports Physical Therapy*, 16(1), 25-29.

Feldenkrais methods appear to be gaining popularity and utilization by physical therapists. The need for scientific justification of their usage is indicated. The purpose of this study was to quantify the results of a Feldenkrais method -- Awareness Through Movement -- involving a neck flexion task. The study examined 30 normal subjects to determine if a Feldenkrais Awareness Through Movement sequence would result in an increase in neck flexion range of motion and if the subjects would indicate a significantly lower level of perceived effort posttest. Measurements of range of motion were taken using a gravity-based cervical range of motion goniometer. The subjects recorded their perceived efforts on a visual analogue scale. The range of motion data were analyzed using a one-way ANOVA. The visual analogue scale data were analyzed with a Mann-Whitney U test. The data supported both hypotheses. Based on these findings, further investigation of Feldenkrais methods in the treatment of patients appears warranted.

Brown, E., & Kegerreis, S. (1991). Electromyographic activity of trunk musculature during a Feldenkrais Awareness Through Movement Lesson. *Isokinetics and Exercise Science.*, 1(4), 216-221.

The purpose of this investigation is (1) to determine if a Feldenkrais awareness through movement technique creates a measurable physiological change in muscular activity, (2) to determine if there is a perceptual recognition of a physiological change, and (3) to determine if perceptual recognition may be induced as a result of suggestion, imagery, and visualization. Twenty-one subjects were divided into two groups. Both groups performed a Feldenkrais lesson. In the control group, suggestion, imagery and visualisation cues were removed from the lesson. Electromyographic (EMG) activity was recorded during a flexion movement with surface electrodes placed over the left lumbar paraspinal muscles at L1-L5 and over the right external oblique muscle. Ratings of perceived exertion (RPE) were taken after the EMG testing. Correlated tests were performed to test significant differences within each group, and small sample means tests were performed to test for significant differences between the two groups. The results show that there was a significant difference in EMG activity of the flexors and of RPE values within each group, however, there were no significant differences between the two groups. The results support the following conclusions: (1) the Feldenkrais method produces a change in the amount of muscular activity as measured by EMG required to perform a movement task (2) perpetual recognition of the change in muscular activity is produced, and (3) this perceptual recognition of change is not the direct result of the use of suggestion, imagery, and visualization. This study supports

the use of the Feldenkrais Method clinically for increasing attention to posturing, movements, and changes in muscular activity with movements.

Saraswati, S. (1989). *Investigation of Human Postural Muscles and Respiratory Movements*. Unpublished Master's Thesis, University of New South Wales, New South Wales, Australia.

This study was designed to examine the interaction of respiratory movement, postural muscle activity and kinesthesia in different groups of subjects. The aim was to see if improved postural (erector spinae) muscle function while standing affects respiratory movement. In the first series of experiments control subjects were measured in order to compare them with experimental subjects measured by other experimenters in this laboratory. In the second experimental series respiratory movement and postural muscle EMG were measured in 13 experimental subjects and nine control subjects before and after either one month of training in techniques which enhance awareness of movement and posture (Feldenkrais method) or normal activity. In the third series, respiratory movement, postural muscle EMG and kinesthesia were tested in 21 "untrained" experimental subjects before and after an audio tape, which directed the subject's attention to trunk movements. Six control subjects watched a documentary video.

A pneumograph system was devised using silastic tubing with conductive gel to measure respiratory movement at three levels of the trunk: upper chest, costal margin and abdomen. EMG was measured in the rectus abdominis, erector spinae and external oblique muscles. Kinesthesia was tested using elbow angle matching and weight matching tests. There was a good linear correlation between IEMG and force output ($p < 0.001$) as well as between respiratory movements at the three levels and volumes expired ($p < 0.001$).

The results for the second series showed that experimental subjects had increased their respiratory movement at the level of the abdomen. They significantly increased erector spinae EMG activity ($p < 0.02$). Experimental subjects also had a significantly increased ($p < 0.02$) peak flow rate. Control subjects showed decreased upper chest and abdominal respiratory movement. In the third series, the experimental group significantly increased abdominal movement after the tape in both the standing ($p < 0.05$) and lying ($p < 0.05$) positions. This was correlated with increased erector spinae muscle EMG activity. In the control group abdominal movements were significantly decreased ($p < 0.02$). There was a trend towards improved kinesthetic acuity in experimental subjects and a trend towards decreased kinesthetic acuity in control subjects in this series.

The results indicate that there is a link between increased use of erector spinae muscles and slower, deeper breathing at rest. Slower breathing can be of value physiologically and psychologically.

Brain injury

Batson, G., & Deutsch, J. E. (2005). Effects of Feldenkrais awareness through movement on balance in adults with chronic neurological deficits following stroke: a preliminary study. *Complementary Health Practice Review, 10*(3), 203-210.

The Feldenkrais Method is a complementary approach to motor learning that purports to induce change in chronic motor behaviors. This preliminary study describes the effects of a Feldenkrais program on balance and quality of life in individuals with chronic neurological deficits following stroke. Two male (48 and 53 years old) and 2 female participants (61 and 62 years old), 1 to 2.5 years poststroke, participated as a group in a 6-week Feldenkrais program. Pretest and posttest evaluations of the Berg Balance Scale (BBS), the Dynamic Gait Index (DGI), and the Stroke Impact Scale (SIS) were administered. Data were analyzed using a Wilcoxon signed-rank test. DGI and BBS scores improved an average of 55.2% ($p=.033$) and 11% ($p=.034$), respectively. SIS percentage recovery improved 35%. Findings suggest that gains in functional mobility are possible for individuals with chronic stroke using Feldenkrais movement therapy in a group setting.

<http://feldenkrais-method.org/en/node/1704>

Nair, D. G., Fuchs, A., Burkart, S., Steinberg, F. L., & Kelso, J. A. S. (2005). Assessing recovery in middle cerebral artery stroke using functional MRI. *Brain Injury, 19*(13), 1165-1176.

PRIMARY OBJECTIVE: To understand the temporal evolution of brain reorganization during recovery from stroke. **RESEARCH DESIGN:** A patient who suffered left middle cerebral artery stroke 9 months earlier was studied on three occasions, approximately 1 month apart. **METHODS AND PROCEDURES:** Brain activation was studied using functional Magnetic Resonance Imaging (fMRI). During each session, the patient performed a finger-to-thumb opposition task, which involved one bimanual and two unimanual conditions. Each condition consisted of overt movement of fingers and imagery of the same task. **RESULTS:** With recovery, greater recruitment was observed of the affected primary motor cortex (M1) and a decrease in activation of the unaffected M1 and supplementary motor area. In addition, the widespread activation of brain areas seen during the initial session changed to a more focused pattern of activation as the patient recovered. Imagery tasks resulted in similar brain activity as overt execution pointing to imagery as a potential tool for rehabilitation.

Cerebral palsy

Shelhav-Silberbush, C. (1988). *The feldenkrais method for children with cerebral palsy*. Boston University School of Education USA.

One of two case studies presented in detail was about a boy who had received conventional therapies since he was diagnosed with CP at 3 months of age. Yet, at six years of age the boy was unable to sit unaided, to crawl, or to lie on his back with his knees bent. He lacked motivation to draw or to move by himself.

The boy received ten Functional Integration® lessons with Chava over the period of a year. At the end of the year, the head of the boy's school reported that he "no longer needs special care. He can sit freely, alter his position and return to sitting without assistance... He has learned to relax separate parts of his body at will." The report continues, "He is now capable of doing arithmetic... His ability to paint and the enjoyment he derives from it have greatly increased... He has manifested for the first time the desire to move."

According to the boy's mother, the former methods created an atmosphere of tension; he was forced to remain in fixed positions causing him pain. Then, after participating with the Feldenkrais Method, the mother could work with the child in a way that was enjoyable for both. She reported, "He has changed, not only physically, but also in his whole being. He has found faith again... he himself has discovered his potential and this gives him self-confidence... Our relationship has become wonderful."

From:

http://www.feldenkrais.com/method/article/the_feldenkrais_method_for_children_with_cerebral_palsy/

Dystonia

Junker, J., Oberwittler, C., Jackson, D., & Berger, K. (2004). Utilization and perceived effectiveness of complementary and alternative medicine in patients with dystonia. *Mov Disord*, 19(2), 158-161.

The use of complementary and alternative medicine (CAM) is increasing worldwide, especially by patients with chronic diseases. To date, no data are available about utilization and perceived effectiveness of CAM in patients with dystonia. A questionnaire survey on utilization and costs of CAM was completed by 180 members of the German Dystonia Society, a patient advocate group. In total, 131 dystonia patients (73%) were current or former users of CAM, 55 patients used CAM in addition to botulinum toxin A injections, and 86 patients had experience with three or more CAM methods. The options used most widely were acupuncture (56%), relaxation techniques (44%), homeopathy (27%), and massages (26%). Among users of specific CAM methods, breathing therapy, Feldenkrais, massages, and relaxation techniques were perceived as most effective. On average, patients spent 1,513 Euro on CAM without reimbursement. There was no correlation between costs and perceived effectiveness of different methods. In line with other studies on chronically ill patients, our results show that dystonia patients frequently utilize CAM methods, often in addition to conventional treatment. There is a growing need to evaluate scientifically the effect of CAM methods on symptom severity and quality of life in dystonia, to prevent utilization of costly and ineffective CAM treatments.

Elderly

Ullmann, G., Williams, H. G., Hussey, J., Durstine, J. L., & McClenaghan, B. A. (2010). Effects of Feldenkrais exercises on balance, mobility, balance confidence, and gait performance in community-dwelling adults age 65 and older. *J Altern Complement Med*, 16(1), 97-105.

BACKGROUND: Falls and fall-related injuries are a major public health concern, a financial challenge for health care providers, and critical issues for older adults. Poor balance and limited mobility are major risk factors for falls. **OBJECTIVE:** The purpose of this study was to examine effects of

Feldenkrais exercises in improving balance, mobility, and balance confidence in older adults. METHODS: Participants (N = 47, mean age 75.6) were randomly assigned to a Feldenkrais group (FG, n = 25) or to a control group (CG, n = 22). The FG group attended a 5-week Feldenkrais program, 60 minutes three times per week, while the CG group was a waitlist control. The outcome measures were balance (tandem stance), mobility (Timed Up and Go), gait characteristics (GAITRite Walkway System), balance confidence (Balance Confidence Scale; ABC), and fear of falling (Falls Efficacy Scale). Pre- and post-tests were conducted. RESULTS: After completion of the program, balance (p = 0.030) and mobility (p = 0.042) increased while fear of falling (p = 0.042) decreased significantly for the FG group. No other significant changes were observed. However, participants of the FG group showed improvements in balance confidence (p = 0.054) and mobility while performing concurrently a cognitive task (p = 0.067). CONCLUSIONS: These results indicate that Feldenkrais exercises are an effective way to improve balance and mobility, and thus offer an alternative method to help offset age-related declines in mobility and reduce the risk of falling among community-dwelling older adults. A long-term follow-up study of balance and mobility is warranted. Further research is needed to identify whether Feldenkrais exercises may impact cognitive processes.

Connors, K. A., Galea, M. P., & Said, C. M. (2009). Feldenkrais Method Balance Classes Improve Balance in Older Adults: A Controlled Trial. *Evidence Based Complementary and Alternative Medicine*, doi:10.1093/ecam/nep055 (in press).

The objective of this study was to investigate the effects of Feldenkrais Method balance classes on balance and mobility in older adults. This was a prospective non-randomized controlled study with pre/post measures. The setting for this study was the general community. A convenience sample of 26 community-dwelling older adults (median age 75 years) attending Feldenkrais Method balance classes formed the Intervention group. Thirty-seven volunteers were recruited for the Control group (median age 76.5 years). A series of Feldenkrais Method balance classes (the 'Getting Grounded Gracefully' series), two classes per week for 10 weeks, were conducted. Main outcome measures were Activities-Specific Balance Confidence (ABC) questionnaire, Four Square Step Test (FSST), self-selected gait speed (using GAITRite instrumented gait mat). At re-testing, the Intervention group showed significant improvement on all of the measures (ABC, P = 0.016, FSST, P = 0.001, gait speed, P < 0.001). The Control group improved significantly on one measure (FSST, P < 0.001). Compared to the Control group, the Intervention group made a significant improvement in their ABC score (P = 0.005), gait speed (P = 0.017) and FSST time (P = 0.022). These findings suggest that Feldenkrais Method balance classes may improve mobility and balance in older adults.

<http://ecam.oxfordjournals.org/cgi/content/full/nep055>

Vrantsidis, F., Hill, K. D., Moore, K., Webb, R., Hunt, S., & Dowson, L. (2009). Getting Grounded Gracefully: effectiveness and acceptability of Feldenkrais in improving balance. *Journal of Aging and Physical Activity* 17(1), 57-76.

The Getting Grounded Gracefully program, based on the Awareness Through Movement lessons of the Feldenkrais method, was designed to improve balance and function in older people. Fifty-five participants (mean age 75, 85% women) were randomized to an intervention (twice-weekly group classes over 8 wk) or a control group (continued with their usual activity) after being assessed at

baseline and then reassessed 8 wk later. Significant improvement was identified for the intervention group relative to the control group using ANOVA between-groups repeated-measures analysis for the Modified Falls Efficacy Scale score ($p = .003$) and gait speed ($p = .028$), and a strong trend was evident in the timed up-and-go ($p = .056$). High class attendance (88%) and survey feedback indicate that the program was viewed positively by participants and might therefore be acceptable to other older people. Further investigation of the Getting Grounded Gracefully program is warranted.

<http://www.humankinetics.com/JAPA/viewbio.cfm?jid=f7PT8ww2w8KK63ujk6WKNF8Vu2BVVMKru2GWPdvs a2PVQh&auid=3965436&site=f7PT8ww2w8KK63ujk6WKNF8Vu2BVVMKru2GWPdvs a2PVQh>

Stephens, J., Pendergast, C., Roller, B. A., & Weiskittel, R. S. (2005). Learning to improve mobility and quality of life in a well elderly population: The benefits of Awareness Through Movement. *Feldenkrais Research Journal*, 2, 9.

OBJECTIVES: This study tested the hypothesis that an alternative movement learning method, Awareness Through Movement, would produce improvements in coordination, mobility, economy of movement and quality of life in older adults. **METHOD:** A group of 31 older adults was studied using a prospective, repeated measures control group design. The SF-36 was used to assess health status - quality of life. Video motion analysis was used to collect data on walking and on a floor to stand transfer movement. **RESULTS:** Coordination of the transfer movement improved significantly in the experimental group. Vitality and mental health scores also improved significantly in this group. Interesting differences between young-old and old-old changes were observed. **CONCLUSION:** Awareness Through Movement may be an additional effective method for pursuing the objectives of Healthy People 2010.

Hall, S. E., Criddle, A., & Ring, A. (1999). Study of the effects of various forms of exercise on balance in older women. Unpublished Manuscript. Dept of Rehabilitation, Sir Charles Gardner Hospital, Nedlands, Western Australia.

Sixty well, elderly women were randomly divided into three groups -Feldenkrais, Tai Chi and a control group. Key conclusion points were:

- The classes were popular with the participants and the retention rates were high.
- There were significant improvements in the psychosocial health of the participants with decreases in fear of falling and improved socialisation.
- Tai Chi and Feldenkrais had a significant positive impact on function including walking speed and activities of daily living.
- Tai Chi had a positive impact on stability with a wider base of support.
- Feldenkrais had a positive effect on movement times leading to quicker correction of balance problems.
- A combination of Tai Chi and Feldenkrais may be the most effective in the frail elderly or those with significant balance problems from disease states.
- These two forms of exercise are suitable for use in this age group and can be used to develop successful health promotion initiatives.

Irani, S. F., Lebonette, L. S., Morley, J. D., Pankowski, K. M., Pell, K. L., & Stephens, J. (1998). *Awareness Through Movement: An Intervention Strategy for Improving Coordination and Economy of Movement in a Group of Well Elderly People*. Unpublished Masters Thesis, Widener University.

The purpose of this study was to examine the effects of a series of eleven Awareness Through Movement® (ATM®) classes on specific functional tasks and self-reported health status in a group of elderly subjects. The Feldenkrais learning method involves learning to do a task using the least amount of effort by improving coordination. A nonequivalent pretest-posttest control group design was used with a convenience sample of sixty-nine to ninety year old retirement community residents. Functions assessed included sit to stand, supine to stand, economy of gait and self-perceived health status. The PEAK/Motus motion analysis system was used to collect kinematic data necessary to measure coordination and economy of movement and the Medical Outcome Survey short form (SF-36) was used to evaluate overall functional status and well-being. We hypothesized that a significant improvement would be observed from the pretest to posttest measurement of coordination and economy of movement related to the functional activities of treadmill walking, sit-to-stand and supine-to-stand as well as in self-perceived health status indicated by score on the SF-36. Data from this study demonstrated trends toward improvement in functional movement in the older ATM® group and differences in response to ATM® between younger and older subjects confirming an earlier study. Also, an improved change in response was revealed between fast and self-paced movements in the other ATM® groups

Bennett, J. L., Brown, B. J., Finney, S. A., & Sarantakis, C. P. Effects of a Feldenkrais Based Mobility Program on Function of a Healthy Elderly Sample. *Issues on Aging*.

Purpose: The purpose of this study was to investigate if a program of mobility exercises, based on the Feldenkrais method, would result in an increase in range of motion and function as measured by the Dartmouth COOP Measures of Function Status, Functional Reach, modified Functional Reach, Timed Up and Go and goniometric measurements. Subjects: Twenty three healthy elderly subjects participated in this study. Control group n=11 with average age = 71 and experimental group n=12 with average age = 75. Methods: Pre and post test scores for the above mentioned assessment tools were recorded for all participants. The experimental group participated in a sitting exercise program based on the Feldenkrais exercises published in the book Relaxercise (Zemach-Bersin, Zemach-Bersin and Reese, 1990) three times per week for six weeks. The exercise class was led by a Guild Certified Feldenkrais Practitioner. Analysis: Wilcoxon rank-sum test was used to investigate the difference in age distribution between groups and also the change in functional scores from pre-test to post-test. A Chi Square test of Independence was used to investigate the difference in gender distribution between groups. A multiple regression analysis was run for all variables to adjust for significant age differences between the two groups. Alpha levels of 0.05 were used to test for significance. Results: The Timed Up and Go test demonstrated significance between groups. Raw data demonstrated improvement for all other functional scores but did not demonstrate statistical significance. Conclusion: As measured by the Timed Up and Go test, a Feldenkrais based program may improve function in healthy elderly individuals.

General

Connors, K. A., Galea, M. P., Said, C. M., & Remedios, L. J. (2010). Feldenkrais Method balance classes are based on principles of motor learning and postural control retraining: a qualitative research study. *Physiotherapy*, 10.1016/j.physio.2010.01.004(in press).

Background: Feldenkrais Method balance classes have been found to be effective in improving balance in recent studies, but there has been little research into possible mechanisms behind the effectiveness of these classes. Indeed, there has been little research into the content of any balance training classes.

Objectives: To analyse the content of a series of Feldenkrais Method balance classes to gain an understanding of how the results in these studies may have been achieved and the principles through which the method may be effective.

Design: Qualitative research approach (content analysis).

Method: Feldenkrais Method Awareness Through Movement lessons were transcribed and the contents were analysed. An intercoder reliability study was undertaken.

Results: The content analysis revealed that the classes used motor skill acquisition elements of internal feedback, repetition and variability of practice using an exploratory learning approach. Postural control skills of intersegmental coordination of ankle/hip/trunk synergies were practised, with control of the centre of mass over the base of support explored in anterior/posterior, medio/lateral, diagonal, rotational and circular directions. Key findings were the extensive involvement of trunk flexibility and control in the balance activities, and also the intensive attention to internal feedback which was linked to body awareness training.

Conclusion: The Awareness Through Movement lessons contained many elements consistent with current theories of motor skill acquisition and postural control, providing a sound theoretical basis for the effectiveness of the Feldenkrais approach in improving balance. The methodology used in this study may provide a useful model for similar investigations into other balance training approaches.

Stephens, J., & Miller, T. (2009). Feldenkrais Method in Rehabilitation: Using Functional Integration and Awareness through Movement to Explore New Possibilities. In C. M. Davis (Ed.), *Complimentary Therapies In Rehabilitation: Evidence Of Efficacy In Therapy, Prevention, And Wellness* (3rd ed., pp. 227-244). United States: SLACK Incorporated.

In a review of research into the Feldenkrais method, Stephens reported outcomes from clinical practice that demonstrate a greater than 80% rate of clients achieving 100% of initial goals, and a greater than 90% rate of clients achieving at least 75% of initial goals over a total of nearly 200 clients and more than 90 different ICD-9 diagnostic codes. The number of visits per episode of care fell well within the guidelines suggested by the Guide to physical therapist practice (American Physical Therapy Association. Guide to physical therapist practice. 2nd ed. Physical therapy. 2001;81(1).

Wildman, F., Stephens, J., & Aum, L. (2000). Feldenkrais Method®. In D. W. Novey (Ed.), *Clinician's Complete Reference to Complementary and Alternative Medicine* (pp. 393-406). St. Louis, MO: Mosby.

One of the authors (JS) reports on the efficacy of using Feldenkrais Method® as part of a rehabilitation process with 166 patients over the last five years in his private practice. Outcome has been judged on percentage of the original goals established at the initial visit that were achieved by the time of discharge. Four levels of outcome were used: 1) 100% achieved; 2) 75% to 90% achieved; 3) 50% to 75% achieved; and 4) less than 50% achieved.

Orthopedic cases made up 84% and neurologic cases made up 16% of the population. Age range was from 8 to 84 years, with most people being between 30 and 60 years. In thirty-five cases of back pain, 77% reached level 1 outcome and 91% reached a level 1 or 2. Of twenty cases of osteoarthritis, 80% reached level 1 and 95% reached level 1 or 2. 76% of seventeen people with a primary diagnosis of neck pain reached level 1 and 88% reached at least level 2. In thirteen shoulder diagnoses, 69% achieved level 1 and 92% reached at least level 2. Of six people with fibromyalgia, 83% reached level 1 and all reached at least level 2. Of fourteen people with tendonitis or bursitis or other hip and knee problems, 85% reached level 1, an additional 7% reached level 2, and another 7% reached level 3. Of eight people with back and leg pain from spinal stenosis of spondylolisthesis, 63% achieved level 1, an additional 12% reached level 2, and 25% achieved level 3 or 4. Of three TMJ cases, 2 reached level 1 and the other reached level 2. And of five people with scoliosis, 80% reached level 1 and 20% reached level 3. Reaching level 1 does not mean that the scoliosis was reversed. It means that pain was significantly reduced and function improved with long-term success.

Of the twenty-seven neurologic cases, 60% were people with multiple sclerosis or stroke. Of the people with stroke, 50% achieved level 1 and 50% achieved level 2. Of the multiple sclerosis cases, 50% reached level 1 and only 17% were discharged below level 2.

Overall, out of one hundred sixty-six patients, 70% reached level 1, 22% reached level 2, 6.6% reached level 3, and 1.2% were at level 4 at discharge.

Multiple sclerosis

Stephens, J., DuShuttle, D., Hatcher, C., Shmunes, J., & Slaninka, C. (2001). Use of Awareness Through Movement improves balance and balance confidence in people with multiple sclerosis: a randomized controlled study. *Journal of Neurologic Physical Therapy*, 25(2), 39.

This study examined the effectiveness of a structured, group motor learning process, Awareness Through Movement (ATM), on balance, balance confidence, and self-efficacy. Twelve people with multiple sclerosis were randomly assigned to either ATM or control groups. The ATM group participated in 8 classes, 2 to 4 hours each while the control group participated in educational sessions, over 10 weeks. Six outcome measures were used: the Basic Balance Master modified Clinical Test of Sensory Interaction in Balance (mCTSIB) and Limits of Stability tests; the Activities-specific Balance Confidence Scale; prospective falls; Equiscale; and the Multiple Sclerosis Self-Efficacy Scale. The ATM group exhibited significantly improved mCTSIB scores indicating an average center of pressure position closer to theoretical center, had significantly fewer abnormal mCTSIB tests, and demonstrated improved balance confidence compared to controls. There was a trend toward improvement in all other measures in the ATM group compared to controls. These results suggest that this type of motor learning intervention can be effective in improving a variety of physical and psychological parameters related to balance and postural control.

<http://www.psych.utah.edu/feldenkrais/articles.php>

Stephens, J., Call, S., Evans, K., Glass, M., Gould, C., & Lowe, J. (1999). Responses to ten Feldenkrais awareness through movement lessons by four women with multiple sclerosis: improved quality of life. *Physical Therapy Case Reports*, 2(2), 58-69.

Four women with multiple sclerosis who were ambulatory and worked full-time participated in 10 Awareness Through Movement classes over 10 weeks. Assessment before and after the series of classes included the Incapacity Status and the Environmental Status Scales of the Minimal Record of Disability, the Fatigue Severity Scale, and the Index of Well-Being. Before each class and at the final data collection, each person was asked several questions about her medical and functional status. Analyses of walking and supine-to-stand were done using the PEAK Motus video motion analysis system. A follow-up interview was done with two women one year after the classes ended. Three of the four participants experienced an increase in symptoms at some time during the 10 weeks; nonetheless, all made improvements. Outcomes show that two broad areas of improvement were ease and steadiness of daily movements, and sense of well-being. These Outcomes suggest that Awareness Through Movement is beneficial for some people with multiple sclerosis, although in different ways for each person.

Pain and injury

Alexander, A. (2006). *The Feldenkrais Method and Chronic Low Back Pain*. Unpublished Masters Thesis, California State University Northridge.

The purpose of this study was to determine if the Feldenkrais Method of somatic education was effective in decreasing pain perception and disability of adults who self-reported experiencing chronic low back pain. Subjects were staff members of California State University, Northridge, who voluntarily recruited for this study. The final sample (n=12) was comprised of ten females and two males, aged 35 to 67 years (average age 52 years). The intervention consisted of eleven 45-minute Awareness Through Movement classes offered over a five-week period. Attendance ranged from 6 to 11 classes with average class participation of 10 sessions. Pain was assessed using the Visual Analogue Scale and disability was measured using the Oswestry Disability index questionnaire, both administered pre and post intervention. Multivariate Analyses of Variance showed significant differences ($p < .05$) in both instances of degree of pain measured (in a period of 24 hours and the average amount of pain over a one week period prior to the assessment) and in disability pre and post testing. The investigation concluded that the Feldenkrais Method was effective in reducing pain perception and in decreasing disability in a population experiencing chronic low back pain. These findings support the use of the Feldenkrais Method for decreasing pain and increasing function in daily activities for adults experiencing chronic low back pain.

Schon-Ohlsson, C. U. M., Willen, J. A. G., & Johnels, B. E. A. (2005). Sensory motor learning in patients with chronic low back pain - A prospective pilot study using optoelectronic movement analysis. *Spine*, 30(17), E509-E516.

Study Design. The effect of sensory motor learning (SML) on chronic low back pain (CLBP) patients' movement capacity was evaluated with the optoelectronic Posturo-Lo-motion-Manual (PLM) test.

Objective. To study SML changes of an intentional dynamic behavior of daily life in a group of CLBP patients and compare the performance with an age- and sex-matched group of back-healthy individuals. Summary of Background Data. In a previous study, the PLM test was found reliable when used in CLBP patients. SML addresses dynamic movement capacity. There is little scientific evidence of the effectiveness of educational interventions in improving motor behavior. Methods. Twelve patients with treatment-resistant CLBP were selected by two orthopedic spine surgeons. Twelve back-healthy age- and sex-matched individuals were included as controls. The patients participated in weekly SML lessons during a maximum of 12 months. All study participants were investigated with the PLM test, before intervention, directly after intervention, and 10 to 12 months after completion of the intervention, and patients were compared with controls. Results. Before intervention significant differences in performance were found between the group of patients and the healthy control group. After the intervention, the CLBP patients had improved their performance so there were no longer any significant differences between the groups. The results were retained 12 months after intervention. Conclusions. The study shows that the CLBP patients had learned and retained a more efficient behavior. The results suggest that SML is an effective intervention for nonspecific CLBP patients.

Malmgren-Olsson, E., & Armelius, B. (2003). Non-specific musculoskeletal disorders in patients in primary care: subgroups with different outcome patterns. *Physiotherapy Theory & Practice, 19*(3), 161-173.

Patients with non-specific musculoskeletal disorders are considered to be a heterogeneous group with multifactorial problems. Appropriate and effective treatments for these patients have been hard to find. The purpose of this study was to identify subgroups of patients with different patterns of treatment outcome and to find possible predictors of outcome. A total of 78 patients, 64 females and 14 males, with non-specific musculoskeletal disorders were recruited consecutively to three different treatment approaches, Body Awareness Therapy, Feldenkrais, and conventional, individual physiotherapy in primary care. The outcome variables were calculated as effect-size values and consisted of dynamic balance; pain measurements according to pain drawing and MPI; psychological variables such as psychological distress and self-image; and health related factors with regard to quality of life, self-efficacy and sense of coherence. A cluster analysis revealed three subgroups of patients with significantly different treatment outcomes, which were systematically related to the treatment approach. With Body Awareness Therapy and Feldenkrais, the possibility to achieve positive treatment effects increased significantly in comparison to individual physiotherapy.

Malmgren-Olsson, E. B., & Branholm, I. B. (2002). A comparison between three physiotherapy approaches with regard to health-related factors in patients with non-specific musculoskeletal disorders. *Disabil Rehabil, 24*(6), 308-317.

PURPOSE: The main aim of this study was to compare the effects of Body Awareness Therapy (BAT), the Feldenkrais (FK) method and conventional physiotherapy on changes of health-related quality of life (HRQL), self-efficacy and sense of coherence (SOC) in patients with non-specific musculoskeletal disorders. A second aim was to explore the relationships between SOC, HRQL and self-efficacy and to examine whether SOC could be a predictor of the treatment outcome. METHOD: A total of 78 patients, 64 women and 14 men, were recruited consecutively to the three treatment groups. The instrument used

were the Swedish version of SF-36, the 20 items Arthritis Self-efficacy Scale and the 29-item questionnaire by Antonovsky. RESULTS: The results showed that there were significant improvements on all subscales of SF-36 except for one. By using effect-size values it was found that the BAT and FK groups reached larger effect-size than did the conventional therapy group. These two groups also improved in self-efficacy of pain and stayed stable while the third group deteriorated at the one-year follow-up. There were significant correlations between the mental dimensions of SF-36 and SOC indicating that the instruments may measure aspects of the same global construct. CONCLUSIONS: Although few significant differences between the three treatment groups the BAT and FK seemed to improve health-related quality of life and self-efficacy of pain to a somewhat higher degree than the conventional physiotherapy. SOC seemed to be a stable trait measure over time.

Bearman, D., & Shafarman, S. (1999). The Feldenkrais Method in the treatment of chronic pain: a study of efficacy and cost effectiveness. *American Journal of Pain Management*, 9(1), 22-27.

A preliminary study was undertaken to determine both the efficacy and cost effectiveness of the Feldenkrais Method for treatment of Medicaid recipients with chronic pain at the Santa Barbara Regional Health Authority (SBRHA). SBRHA staff wished to offer treatment for chronic pain patients beyond what is provided for in the Medicaid scope of benefits. Conventional intensive chronic pain treatment programs costs range from \$7,000 to \$30,000 and are not covered by regular Medicaid benefits. Patients with chronic headaches and/or musculoskeletal problems were enrolled in the study. Seven patients began the program; all completed it. Patient satisfaction, function, and perception of pain were evaluated by using the National Pain Data Bank (NPDB) protocol of the American Academy of Pain Management. Participants reported more mobility and decreased perception of pain, both immediately after the program and in a one-year follow-up questionnaire. Results compared quite favorable with NPDB comparison groups. Cost effectiveness calculations were based on Medicaid costs for one-year periods pre- and post-intervention. Patient costs dropped from an average of \$141 per month to \$82 per month. This represents a 40% savings.

<http://www.iffresearchjournal.org/shafarmaneng.htm>

Lundblad, I., Elert, J., & Gerdle, B. (1999). Randomized controlled trial of physiotherapy and Feldenkrais interventions in female workers with neck-shoulder complaints. *Journal of Occupational Rehabilitation*, 9(3), 179-194.

The present study aimed to investigate whether physiotherapy or Feldenkrais interventions resulted in a reduction of complaints from the neck and shoulders (prevalence, pain intensity, sick leave, and disability in leisure and work roles) in 97 female industrial workers (not on long-term sick leave). Range of motion of neck and shoulders, VO₂, endurance score (i.e., summation of pain intensity ratings during a static shoulder flexion), cortical control according to the Feldenkrais methodology, and physiological capacity according to a dynamic endurance test of the shoulder flexors with simultaneous surface EMG were also recorded. The workers were randomized to: (1) physiotherapy group (PT-group; treatment according to the ergonomic program of the PTs of the occupational health care service), (2) Feldenkrais group (F-group; education according to the Feldenkrais methodology), or (3) control group (C-group; no intervention). Pre- and post-tests were made at one-year intervals. The two

interventions lasted 16 weeks during paid working time. The F-group showed significant decreases in complaints from neck and shoulders and in disability during leisure time. The two other groups showed no change (PT-group) or worsening of complaints (C-group). The present study showed significant positive changes in complaints after the Feldenkrais intervention but not after the physiotherapy intervention. Possible mechanisms behind the effects in the F-group are discussed.

Dean, J. R., Yuen, S. A., & Barrows, S. A. (1997). *Effects of a Feldenkrais ATM sequence on fibromyalgia patients.*

The purpose of this study was to describe the effects of a Feldenkrais Awareness Through Movement (ATM) sequences of fibromyalgia patients. Subjects met twice a week for a one hour group ATM lesson, and were instructed to follow through daily with practice tapes. After two months, subjects were placed on a one month home program. Pre-test and post-test data, which included a modified Fibromyalgia Impact Assessment (FIA) questionnaire, a pain scale, photographic postural analysis, and observational video analysis of walking, were collected and analyzed on five fibromyalgia patients. A paired T-Test on the modified FIA and other descriptive analyses showed moderate improvement in the subjects. It was concluded that the Feldenkrais Method had potential value as a possible adjunct to the physical therapy treatment of selected fibromyalgia patients.

Dennenberg, N., & Reeves, G. D. (1995). *Changes in health locus of control in activities of daily living in a physical therapy clinic using the Feldenkrais method of sensory motor education.* Unpublished Masters, Oakland University, Rochester, MI.

This pilot study investigated the effects of a physical therapy program which included the Feldenkrais Method of sensorimotor education on patients with chronic orthopedic problems. The Multidimensional Health Locus of Control (HLC) Questionnaire (n=21) and the timed Activities of Daily Living (ADL) Test (n=15) were administered before and after four to eight weeks of treatment at one outpatient clinic.

As in other patient samples, this group's belief in another's (e.g. the therapist's) control over their health increased after receiving care. The Powerful Others HLC increased significantly. When compared to previous studies, however, this group attributed far less control to powerful others than had other chronically ill patients.

Although there was no significant mean increase in Internal HLC, this subscale was strongly negatively correlated with both Powerful Others and Chance HLC ($r=.46$, $r=-.65$). Patients who felt greater personal control also felt that chance or the social environment had less control over them.

The time to complete the ADL Test decreased significantly by 10-15%, suggesting an improvement in function. Increased speed was moderately negatively correlated with reduced Chance ($r=-.46$) and Powerful Others ($r=-.65$) HLC. This suggests that as their functioning improved the patients apparently did not attribute their success to external causes. This may be due to sensorimotor education's emphasis on teaching self-reliance and problem-solving skills.

Lake, B. (1992). Photoanalysis of standing posture in controls and low back pain: Effects of kinaesthetic processing (Feldenkrais Method) in posture and gait. In M. Woollocott & F. Horak (Eds.), *Control Mechanisms* (Vol. VII). Eugene, OR: University of Oregon Press.

Reported changes in posture in 61 patients with low back pain compared with matched controls after a mean of four FI lessons.

Lake, B. (1985). Acute back pain: treatment by the application of Feldenkrais principles. *Australian Family Physician*, 14(11), 1175-1178.

Case summaries of six patients with back pain who had been unresponsive to other interventions. All patients achieved relief from pain and accompanying postural changes were documented.

Parkinson's disease

Johnson, M., & Wendell, L. L. (2001, October 2001). *Some effects of the Feldenkrais Method on Parkinson's symptoms and function*. Paper presented at the Annual Conference of the Feldenkrais Guild of North America, San Francisco, CA. .

Reports improved function in patients with Parkinson's disease.

Wendell, L. L. (2000). Some effects of the Feldenkrais Method on Parkinson's symptoms and function. Unpublished case study.

This is a brief single case study by LL Wendell, PhD (client) and Marilyn Johnson, M.Ed. (Feldenkrais Practitioner). It documents observations on changes in function before and after a year of Feldenkrais lessons, 15 years after the author/client had been diagnosed with Parkinson's Syndrome. He report improvements in the areas of function, posture, movement, gait and emotional outlook.

Spinal cord injury

Wong, V. (2007). Case study 9: Sport interventions for SCI patients. *2008*(August 28). Retrieved from http://www.icf-casestudies.org/case_studies.php?id=77&cat_id=21&k=8

A Nottwil paraplegic hospital case study describes the experience of Lisa, a keen sportswoman, who had an injury at T8 (ASIA A). A significant issue for her was feelings of instability ("fear of falling"). She found that she continually toppled over when sitting and sometimes exhausted herself performing

tasks such as dressing and doing wheelchair transfers. It also limited her ability to participate in physical activity. Interventions included counselling, swimming, fitness training, circuit training, hippotherapy, body balance training, repetitive training of transfers, wheelchair training, sports activities, drugs and Feldenkrais. Of all the interventions, she felt Feldenkrais to be the most helpful with her instability, which she felt had almost gone.

Bost, H. (1997). Case description: Michael-incomplete paraplegia after a motorbike accident-A five-year learning process. Retrieved August 28, 2008, from http://www.helgabost.de/Dokumentation/case_study/case_study.html

Helga Bost (Feldenkrais practitioner and teacher) documents a case study that takes place over five years beginning in August 1991 with a pause in 1995/96. During this time she worked with Michael, with T12/L1 incomplete paraplegia, almost 2½ years after his accident. To begin with he could walk with two braces and two crutches but he couldn't sense where his legs were. In the second session, he felt more connected to his lower spine and pelvis. In the sixth session, he could feel where his right leg was. From when they started working together, Michael repeatedly noticed "a sudden leap in muscular coordination". At the end of the case study, Michael is walking without crutches. He reports walking back and forth across black ice with a bucket of hot water to remove ice from his windscreen, without feeling unsafe.

Ginsburg, C. (1986). The shake-a-leg body awareness training program: Dealing with spinal injury and recovery in a new setting. *Somatics, Spring/Summer*, 31-42.

The Shake-A-Leg programme in Rhode Island, founded in 1982, is a holistic rehabilitation programme designed mainly for people with SCI and related conditions. The programme was initiated by Harry Horgan, a young man with a T5/T6 injury. Harry offered a range of approaches that he found helpful. Among them was Feldenkrais so Carl Ginsburg (PhD, Feldenkrais practitioner and former chemistry teacher) was invited to join the programme. Carl has documented some of the changes that took place for participants of the Shake-A-Leg programme (Ginsburg, 1986). For example, Providencia recovered leg movements after 16 years in a wheelchair. Jack, who came to the programme with strong spasms in his legs and limited use of his hands, recovered near-normal use of his right hand and significantly reduced his spasms.

<http://home.clear.net.nz/pages/cindyallison/shakealeg.pdf>

Ginsburg, C. (1980). On plasticity and paraplegia: Some clinical observations on the ability to recover from severe injury to the spinal cord. *Somatics, Autumn*, 34-40.

This article includes two case studies with long-term paraplegia. The first was with a woman with a complete T11/12 injury, 10 years after her injury. With a combination of Biofeedback, Rolfing and Feldenkrais she had a reduction in painful spasm and a return of sensation and movement in her legs and she learned to stand. The second was with a woman with a T10 injury, also 10 years after her

injury. With a combination of Acupuncture and Feldenkrais she regained sensation, stability and movement in her legs.

<http://home.clear.net.nz/pages/cindyallison/plasticity.pdf>

Stuttering

Gilman, M., & Yaruss, J. S. (2000). Stuttering and relaxation: applications for somatic education in stuttering treatment. *Journal of Fluency Disorders*, 25(1), 59-76.

This paper argues that the use of somatic education (such as that used in Alexander, Rolfing and Feldenkrais) may facilitate the development of new behaviour patterns. Whereas passive relaxation approaches have not tended to generalise outside the treatment environment, these methods achieve relaxation through an active, dynamic process involving coordinated movement of the entire neuromuscular system.

The article describes a study of two women with a history of chronic stuttering who participated in an eight week series of Feldenkrais lessons. The experimental design was based on multiple base line across subjects single-subject experimental design. Both subjects reported an enhanced ability to consciously respond to and reduce their level of anxiety and physical tension in speaking specific situations. Both were able to release tension during stuttering and so felt more "in control" of their speech. Results tended to generalise outside of the treatment setting. They had not previously experienced this in traditional stuttering therapy.
