CALIFORNIA STATE UNIVERSITY, NORTHRIDGE

The Feldenkrais Method and Chronic Low Back Pain

A thesis submitted in partial fulfillment of the requirements for the degree of

Master of Science in Kinesiology

by

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ABSTRACT

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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.

INTRODUCTION

Up to 75% of adults will be affected by back pain at some time during their lives, and 15-30% of adults experience back pain (BP) in any given year (Andersson, 1999). In the United States the annual combined cost of BP, related medical care and disability compensation, is estimated to be $50 billion (Frymoyer & Cats-Baril, 1991; Deyo, 1998). In addition to being the second most frequent reason for visits to physicians (Hart, Deyo, & Cherkin, 1995), BP is also the most common reason for visits to acupuncturists, chiropractors, and massage therapists (Sherman, et al., 2006).

With the high prevalence of low back pain, and its impact on multiple areas in the life of individuals who suffer from this condition, new approaches to its management have become vitally important. Treatments and educational modalities that teach and offer individuals options for managing pain and restoring function are crucial. Complementary methods and interventions play an important role in the care of back pain (Wolsko, et al., 2003). This study investigated the effectiveness of the Feldenkrais Method in reducing perceived pain and disability for individuals with chronic low back pain (CLBP).

Low back pain (LBP) is usually defined as pain, muscle tension, or stiffness within the lumbosacral region, buttocks and thighs and it varies with physical activity and time (Waddell, 1998). CLBP lasts more than 7-12 weeks affecting an individual's physical ability to perform daily functions such as bathing and dressing oneself, lifting and carrying heavy objects, walking, standing and sitting for extended periods of time. CLBP is a condition of working-age adults, and it has an enormous impact in the

workplace. A variety of occupations have been linked epidemiologically with the occurrence of LBP, especially those which involved prolonged sitting, lifting, twisting, and driving (Deyo, Cherkin, Conrad, & Volinn, 1991). Additionally, persistent LBP can produce anxiety, depression and stress leading to disability (Campbell & Muncer, 2005). This is further confirmed through the research of Fritz and George (2002), who found that anxiety, coping strategies, and fear-avoidance beliefs, have been linked to chronic disability from LBP.

Although many studies have tried to identify the causes, non-specific LBP remains difficult and often 'impossible' to diagnose (Deyo, 2002). Due to the idiopathic origin and complexity of diagnosing LBP, it can be problematic to determine an optimal solution. Treatments range from traditional modalities such as pharmacology (oral and injected), surgery, bed rest, and limiting activities, to soft tissue modalities, chiropractic manipulation, acupuncture, and physical therapy. Typically, during these treatment sessions the role of the patient is passive; he or she is being "worked on" and receives a list of "do's and don'ts" to prevent further aggravation. The various treatments and interventions employed indicate uncertainty about the best possible approach and invite a broader understanding and a deeper investigation of alternatives to decrease pain and improve function in individuals with CLBP.

Another common form of treating LBP is physical exercise. Exercise allows the patient to have a more active participation in the healing process, and can help to modify pain perception (Bloodworth & Grabois, 1998). Therapeutic exercises are intended to help achieve reconditioning, improve muscle strength, and optimal range of motion, as well as indirectly providing pain relief and a better quality of life (Grabois, 2005). Strong

evidence has been found that exercise therapy is one of the leading treatments for LBP, but it is not possible to advocate one specific exercise method over another (Mannion, Muntener, Taimela, & Dvorak, 1999; Tulder, Malmivaara, Esmail, & Koes, 2002).

The Feldenkrais Method (FM) is an educational approach that focuses on expanding kinesthetic awareness as a basis for improving function (Stephens, 2000). FM has two different modes of instruction: Functional Integration (FI) and Awareness Through Movement (ATM). FI is individualized instruction where the individual receives hands on guidance through gentle touch. ATM consists of group lessons, verbally guided, where movements are self-directed and executed within each individual's comfort range. ATM is the focus of this investigation.

Awareness Through Movement is a learning process that seeks to change the organization of the nervous system by engaging cognitive, sensorial and physical faculties. It is a series of movement explorations that takes a specific learning theme/movement pattern (i.e. flexion, extension, rolling, etc) and guides the student through a multiplicity of options for that movement pattern. The student's attention is directed towards, "detecting changes in the feeling of stability, effort, relationship of body segments, use of momentum, elements of timing, and relationship to breathing and toward the sense of the body in response to this process" (Stephens, 2000, p. 378). This exploratory activity guides the process of learning and allows the student to discover by himself more functional ways to perform a particular motion. The student learns this new motion and can then replicate it in daily activities. This creates a more active and ongoing participation in the student's healing process.

ATM lessons are 30 to 60 minutes in length and movements are performed slowly and gently. Pain and effort during the lesson (straining and compensatory motions) are avoided, as the occurrence of pain would trigger a defensive muscle pattern, which would interfere with improvement. ATM begins with simple, minute movements, which are used to reduce latent tonus (degree of involuntary muscle contractions) and to learn how to direct and maintain attention. As the individual progresses, the movements become more advanced in their complexity, speed, size, and trajectory of motion until the movements are functional and can be applied to daily activities (Houglum, 2005).

Some studies have suggested that ATM produces a change in the amount of muscular activity as measured by electromyography (EMG). Perceptual recognition of the change in muscular activity is produced and this recognition is not the direct result of the use of suggestion, imagery, and visualization. Brown and Kegerreis' (1991) research supported the use of ATM clinically, for enhancing the ability of participants to pay attention to posturing and changes in muscular activity with movements. Stephens et al. (2001) investigated the effects of the ATM on balance and balance confidence in people with multiple sclerosis and found significantly improved balance confidence compared to controls.

The effectiveness of Awareness Through Movement for decreasing pain and disability has been tested. In a single-subject design across four subjects with rheumatoid arthritis (RA), Narula, Jackson, and Kulig (1992) showed decreased pain and improved function, including improved biomechanical efficiency, measured by motion analysis in a sit-to-stand transfer from a chair, following six weeks of ATM lessons. Lundblad, Elert, and Gerdle (1999), in a randomized controlled trial of 97 subjects, found significant

decrease in neck and shoulder pain and disability for participants in the Feldenkrais group (that included both modes ATM and FI) compared to the control and physiotherapy groups. Research by Bearman and Shafarman (1999), showed significant increases in functional mobility in seven participants, both immediately after an eight-week program of ATM lessons and in a one-year follow-up questionnaire. These studies demonstrate the benefits of the Feldenkrais Method on pain perception, mobility and improving body mechanics in participants with RA and neck and shoulder pain.

Examining the effect of Feldenkrais' Functional Integration (FI) for people with chronic low back pain, Ideberg and Werner (1995) assessed gait kinematics in 10 patients with chronic low back pain and in 12 healthy controls before and after 10 FI lessons. A significant increase in range of motion of pelvic rotation was found immediately and four weeks after intervention in the pain group. There was no assessment on the effects of FI on pain itself. Smith and colleagues (2001) assessed pain in three dimensions, affective, sensory and evaluative on 26 subjects. After a 30-minute ATM lesson, significant differences in pain reduction were found between the ATM and control groups in the affective dimension of pain. No significant differences were found in the sensory and evaluative dimensions.

Current research on the effects of Awareness Through Movement on CLBP is limited to less than five studies and more research is necessary to substantiate the effect on CLBP and explore implications for functional activity and disability. The purpose of this study was to assess the effectiveness of ATM as an intervention to decrease CLBP, and restore daily functioning in adults experiencing CLBP. The hypotheses are as follows:

1. There will be a significant decrease in pain perceived in a period of 24 hours after participation in a five-week Awareness Through Movement Program, as measured by the Visual Analogue scale.
2. There will be significant decrease in pain perceived in a period of one week after participation in a five-week Awareness Through Movement Program, as measured by the Visual Analogue scale.
2. There will be a significant decrease in disability after participation in a five week Awareness Through Movement Program, as measured by the Oswestry Disability Index.

DEFINITION OF TERMS

Awareness Through Movement: group classes where the Feldenkrais teacher verbally leads the student through a sequence of movements in basic positions: sitting or lying on the floor, standing or sitting in a chair.

Chronic pain: pain persisting beyond 7-12 weeks or beyond the usual course of an acute disease or reasonable time for an injury to heal, or it recurs at intervals for months or years.

Feldenkrais Method: named after its originator, Dr. Moshe Feldenkrais, twentieth century physicist, judo expert, mechanical engineer and educator. The Feldenkrais Method is a form of Somatic Education that uses gentle movement and directed attention to improve movement and enhance human functioning.

Functional Integration: individual sessions where the Feldenkrais teacher uses her or his hands to gentle guide the student through simple movements and changes in posture. The student, fully clothed, lies on a table as comfortable as possible. Outside sensory stimulation is reduced to enhance the awareness of internal processes.

Kinesthesia: the perception or sensing of the motion, weight, or position of the body as muscles, tendons, and joints move.

Low back pain: defined as pain within the lumbo-sacral region, buttocks and thighs that varies with physical activity and varies with time.

Pain: an unpleasant sensation, occurring in varying degrees of severity as a consequence of injury, disease, or emotional disorder.

Prone: lying on stomach or face down.

Proprioception: sensory nerve endings in muscles, tendons, and joints that provide a sense of the body's position by responding to stimuli within the body.

Somatic Education: a disciplinary field of somatic disciplines that focus on how human beings learn and become aware of their body as they move through space. According to Hanna (1986), "somatic awareness allows a person to glean wisdom from within".

Supine: lying on back or face up.

METHODS

Subjects

The study began with 16 volunteer subjects, all staff members of CSUN, who self-reported chronic low back pain (CLBP) (symptoms longer than three months). No documented physician diagnosis was obtained. Participants reported experiencing LBP from 6 months to 30 years. The final study sample consisted of 14 females and 2 males, whose ages ranged from 35 to 67 years (average age 52 years). One subject voluntarily withdrew for personal reasons after one class, one subject withdrew after 4 classes due to a change in work schedule, one participant didn't come to post measurements, and one participant injured her back the day before post measurement. Pre-test and post-test data was collected and analyzed on the remaining 12 subjects and used for the final analysis. Subjects were excluded if they:

- Experienced low back pain for less than 3 months of duration.
- Sought professional treatment during the study.
- Had acute injury or active neurological symptoms.
- Were heavily medicated (medication that interfered with their ability to function).

The initial intervention format included two, 45-minute classes per week, for four weeks for a total of eight sessions. Three make-up classes were offered for participants who missed classes. Since this study was part of a wellness program and many individuals requested to attend the make up sessions (even though they didn't miss classes) all participants were free to come to all 11 classes. Thus, the treatment offered in this study consisted of a total of 11 classes offered over a five-week period. The range of class participation varied from 6 to 11 classes (average 10 classes). None of the

participants reported any changes in their physical activities nor started other exercise programs during the duration of the intervention. Classes were presented and taught by the principal investigator, a Guild Certified Feldenkrais practitioner. Certified Feldenkrais Practitioners complete a 32-week program of classes (800 hours) over a four-year time period, that train students to integrate and develop observational and manual skills.

Procedures

After approval from the California State University Northridge Standing Advisory Committee for the Protection of Human Subjects (SACPHS), interested individuals were evaluated to meet inclusion criteria using a Par-Q questionnaire in an orientation meeting (Appendix A). The purpose of the study was explained and all participants signed a consent form (Appendix B). Subjects were assigned numeric codes to maintain confidentiality. Participants then completed the Visual Analogue Scale (VAS) and the Oswestry Disability Index (ODI) questionnaires to assess their perceived level of pain and disability respectively (Appendixes C & D).

An oral introduction of Awareness Through Movement, including a description of the methodology and its purpose, were presented to all participants at the beginning of the classes. Participants also received: 1. information on the duration of classes, 2. directions to class location, and 3. a list of expectations including a request to come to all classes wearing comfortable clothing, to sign an attendance record sheet, and to follow directions. All participants received a copy of their signed consent form the first day of class. Participants were volunteers and no payment or other incentive was offered.

Instrumentation

The following instrumentation was utilized pre and post intervention for all participants:

- The Visual Analog Scale (VAS) measured intensity of perceived pain (Appendix C).
- The Oswestry Disability Index (ODI) measured overall disability (Appendix D).

The VAS consisted of a 10 cm line that ranged from no pain (0) to excruciating pain (10). Participants marked an X along the line indicating the degree of perceived pain. The level of pain was establish by measuring from the beginning of the line (0) to the position of the X in cm. Pain was assessed in two instances: the perceived degree of pain in the proceeding 24 hours and the average amount of pain over a one-week period prior to the assessment. The reliability of the VAS has an intra-class correlation coefficient of 0.95 (McCarthy et al., 2005).

The Oswestry Disability Index (ODI) was developed by Fairbank & Davies (1980) at the Orthoepaedic Hospital in Oswestry (Sharpshire, England). The questionnaire was self-administered and composed of 10 items, which described the impact of LBP on different daily activities (lifting weights, walking, standing, sleeping, participation in social life, level of pain intensity, etc). Each item was ranged from A (0) to F (5), with 0 indicating full ability to function and 5 indicating the impossibility of performing the activity in question. The total score was doubled and divided by 100 to determine percent disability. From a psychometric standpoint, its reliability has been verified by test-retest (Intra-class coefficient = 0.94) and internal consistency (Cronbach's alpha = 0.93) (Rochi et al., 2005).

Intervention

The ATM (Awareness Through Movement) intervention was presented over a five-week period and consisted of 45-minute lessons. Individual lesson orientations included lying supine, side lying, and sitting on the floor. Classes took place from 5:15 to 6:00 PM (after work hours). All students started supine on a comfortable mat and towels were placed for added comfort. Each class started and ended with a body scan in the supine position designed to make participants aware of their quality of neuromuscular control, the level of muscle tension throughout the whole body, the relationship of their bodies with the floor, the rate and depth of breathing, and level of tightness, comfort and discomfort. Classes consisted of instructing participants to breathe and move slowly through simple, verbally guided, movements (such as rolling head left and right, bringing knees to chest, tilting to the sides, rolling pelvis.) (Appendix E). Participants' attention was also directed to the ease or difficulty in executing the movements, to rest when feeling pain or fatigue, and to stop before arriving at the maximum range of motion.

Each lesson had a specific learning theme (Appendix E):

- Class 1: "Activating flexors" (supine exercises, flexion as a main theme)
- Class 2: "Activating flexors" (adding larger and faster movements, such as rolling supine to sitting)
- Class 3: "The pelvic clock" (supine differentiated movements of the pelvis, involving rolling and twisting)
- Class 4: "Side lying lesson for improving the integration of arms, shoulders and spine" (reaching motion of shoulders in different directions)

- Classes 5 & 6: “Transitioning from supine to side lying to sitting” (lying supine involving flexion, extension, and twisting)
- Class 7: “Twisting on the side” (lying on each side to differentiate the movements of the rib cage from the movement of the shoulder blades)
- Class 8: “Twisting from supine with head fixed to the side” (by limiting the movement of the head, the rib cage is forced to participate in the twisting motion)
- Class 9: “Lengthening the hamstrings” (sitting and lying down)
- Class 10: “Arm circles” (lying on side, circling arms in different directions)
- Class 11: “Rolling from supine to prone via hip rotation” (extension and flexion at spine by hip rotation while rolling from supine to prone)

Data Analysis

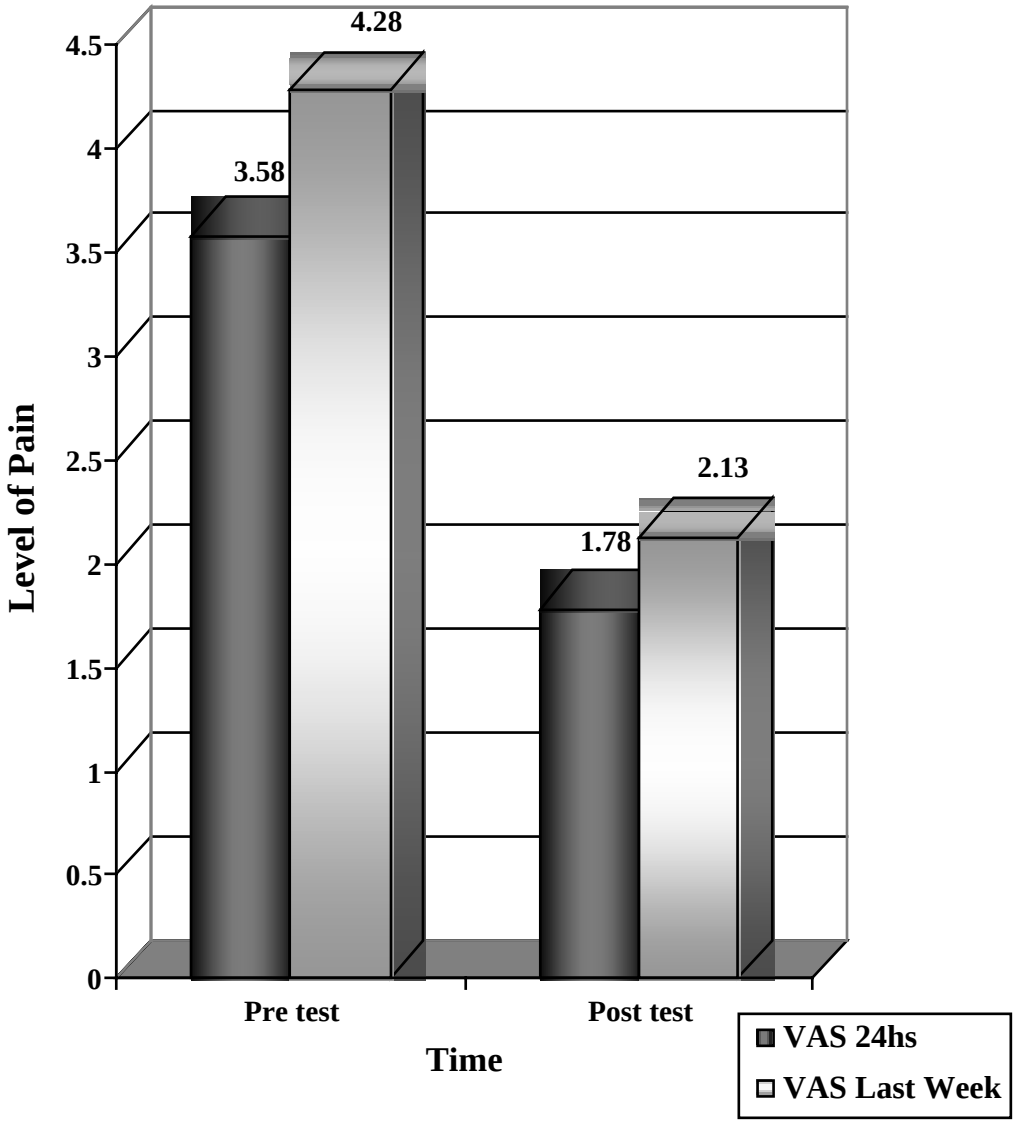
All statistical analyses were performed with SPSS for Windows version 14.0. MANOVAS were used to test the differences between pre and post intervention measurements in pain perceptions in two instances: previous 24 hours and previous week. Paired *t*-tests were performed to examine the differences in disability caused by chronic low back pain. Alpha level of significance, $p < .05$ was considered significant in all statistical tests.

RESULTS

MANOVA within subject analysis revealed a significant statistical difference for the perception of pain (Visual Analogue Scale) before and after intervention in both instances: the perceived degree of pain in the proceeding 24 hours and the average amount of pain over a one-week period prior to the assessment. The mean value of pain perception in the last 24 hours before intervention was 3.58 and 1.78 after intervention (Figure 1). The mean difference of pain perception was 1.80 in the 24-hour period. The mean value of pain perception in the last week was 4.28 before intervention and 2.13 after intervention (Figure 1). The mean difference of pain perception in the one-week period was 2.14. Pillai's Trace value was $F_{(3,9)} = 12.62$, $p < .05$. Data were not spherical and the Greenhouse-Geisser F value was used, $F_{(1.89, 26.64)} = 18.97$, $p < .05$.

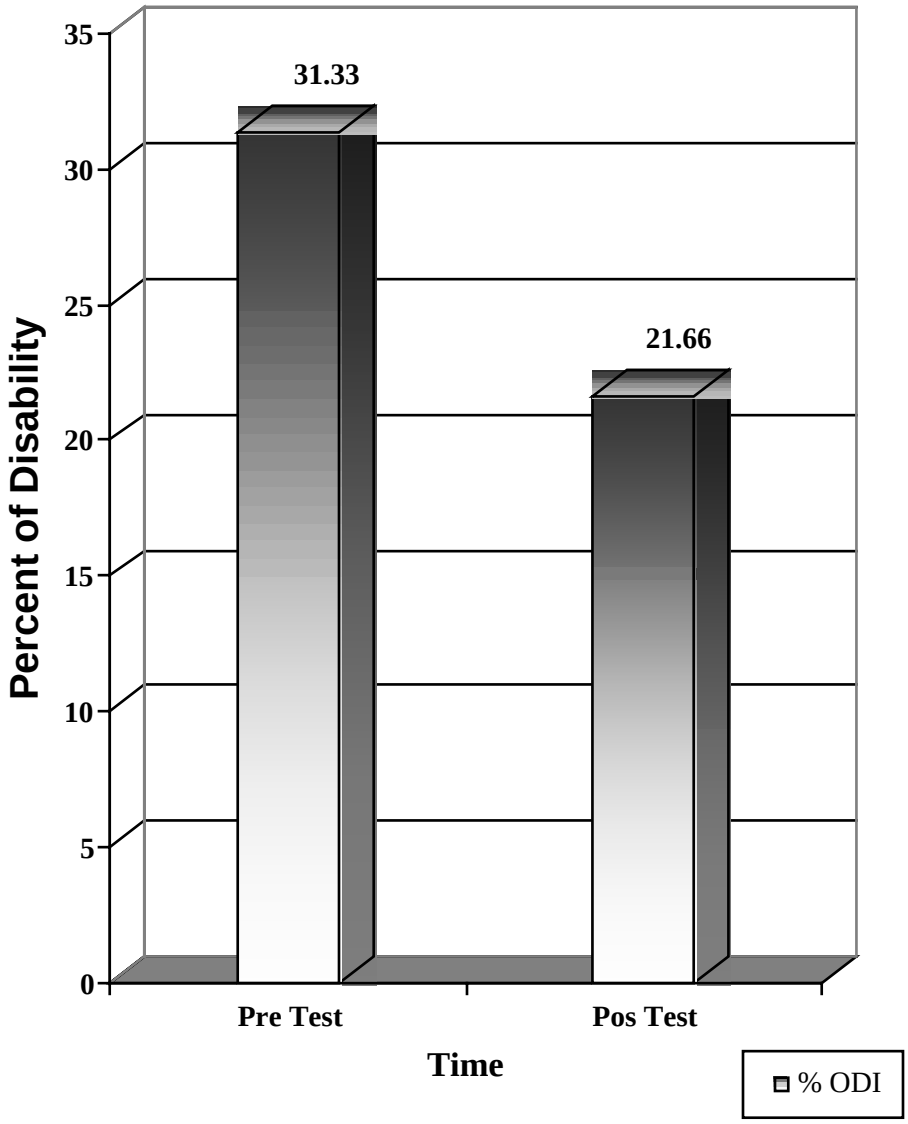
For the Oswestry Disability Index, paired *t*-test statistics analysis was used. The mean value of disability before intervention was 31.33 % and the mean of disability after intervention was 21.67 % (Figure 2). The difference in decreased perceived disability was 9.67%. There was a statistical significance between the pre and post-test, $p< .05$.

Figure 1. Mean Values of Pain Perception



* Note: Pain perception as measured by the Visual Analogue Scale (VAS) n=12

Figure 2. Mean Values on Oswestry Disability Index (ODI) N=12



* Note: Disability percentage as measured by Oswestry Disability Index (ODI) n=12

Participants completed an evaluation form at the end of the intervention in order to assess changes in their perceptions of pain and function. Qualitative data from the class evaluation was categorized as follows:

1. Learning how to care for their low back

-“I obtained a tool of gentle stretching to workout the discomfort before pain sets in.”

-“I gained awareness of movements that either increase or decrease pain.”

-“Knowing how to help myself by stretching and breathing”

-“Soft and slow movements that help relax my back when needed”

-“How I move affects my back: attention to movement and the way I do things affects my back and neck.”

2. General increased body awareness

-“ I was favoring my right side, I walked different now.”

-“That my left side is stronger than my right”

-“I learned to pay more attention to my body.”

-“I can feel improvement in my whole posture and relief of stiffness.”

-“My jaw is amazingly looser. Range of motion for neck has improved”

-“My back pain forces me to compensate and change other movements in my body.”

-“I catch myself when I tighten up muscles unnecessarily.”

-“That my body is far more capable than what I thought: through these exercises my pain decreases, my energy increases and overall well-being advances”

3. Relationships and interconnections

-“May sound silly, but my back is connected to the rest of my body.”

-“TMJ is connected to the low back.”

-“That everything is interrelated and that movement should be done with the entire body”

-“The connection between my low back and my arching neck and shoulders”

-“Tightness in other areas affects my overall movement, which in turn is felt in my back.”

-“My back is not an independent area of my body: it communicates/moves with the other parts.”

4. Take-home tools

-“Moving slowly and breathing lessen my pain.”

-“Ability to isolate movements in my back to decrease pain levels”

-“New, easy exercises”

-“Knowing how to help myself by breathing and moving slowly”

-“Basic, slow movements can have a huge effect: what I found useful are pelvic tilt lessons and rolling side to side.”

DISCUSSION

The first two hypotheses stated that Awareness Through Movement was effective in decreasing LBP pain, as measured by the Visual Analogue Scale (VAS) and that pain perception was significantly decreased in the two time spans measured: 24-hour period and one week period ($p < .05$). The mean difference of pain perception for this sample population was 1.80 in the 24-hour period (from 3.58 in pre-test to 1.78 post-test) and 2.14 in the one-week period (from 4.28 in pre-test to 2.13 post-test). These findings confirmed the hypotheses.

The third hypothesis stated that Awareness Through Movement was effective in decreasing perceived disability percentage (functioning in daily activities) of the participants, as measured by the Oswestry Disability Index (ODI) ($p < .05$). The decrease in perceived disability of 9.67% (from 31.33% pre intervention to 21.67% post intervention), confirmed this hypothesis.

These findings lend support to previous research done on the Feldenkrais Method. The results of this study indicated, as other researchers have found, that the Feldenkrais Method can alter pain through increased body awareness (Apel, 1992; Feldenkrais, 1984; Smith, Kolt, and McConville, 2001; Lundblad, Elert, and Gerdle, 1999) and can improve function (Lake, 1985; Narula et al. 1992; Bearman and Shafarman, 1999).

The significant reduction in pain perception can be attributed to the Feldenkrais Method emphasis on executing movements slowly with reduced muscular effort through which the participant experienced enhancement of proprioception and kinesthesia. After the first week of classes, participants reported new awareness of the relationships between body segments and feelings of pain found in other areas of their bodies

(shoulders, neck, chest). They realized that the sensations of pain and stiffness were not limited to the lower back area, but included other areas of which they were previously unaware. By the end of the intervention, participants described a reduction of pain and improvement in range of motion. This awareness of internal processes gave participants a tool to prevent further aggravations, thus having more participation in their rehabilitation process. A participant reported to have, “obtained a tool of gentle stretching to workout the discomfort before pain sets in.”

Awareness Through Movement emphasized motions that caused no harm or strain and gave students a positive experience of the treatment and learning process. Most participants considered themselves sedentary and experienced low back pain for as long as 30 years. Participants reported enjoying coming to classes and that “it is the first time I have stuck to an exercise program”. A study by Mannion et al., (2001) concluded that an active therapy program, where participants, contrary to their expectations, had the positive experience of completing the prescribed exercises without undue harm, appeared capable of modifying important psychological factors. Kolt and McConvile (2000) found that the Feldenkrais Method was effective in reducing anxiety in a group of undergraduate physiotherapy students who underwent a four-session program of ATM.

Another assumption of the Feldenkrais Method was that the quality of human beings functioning in daily activities (driving, sitting, walking) is the result of the way they move. Additionally, changes in the process of movement awareness influences their ability to function and their perception of pain. Pain, when straining, stiffening or moving inefficiently causes movement difficulties (poor mechanics of movement) and the converse is equally true; inefficient patterns of movements cause pain. In this study, as

shown by the Oswestry Disability Index, Awareness Through Movement reduced disability, i.e., increased their ability to function. In particular, participants reported significant improvement in the degree of pain intensity they experienced when lifting objects and sleeping. It is important to keep in mind that, “The goal of the Feldenkrais Method is not necessarily to cure pain, but to manage it and restore function through movement”(Wildman, 1990).

The Awareness Through movement program was tailored to the abilities of the participants. The first two classes presented lessons on flexion and small range of motion and then progressed to more complex spinal motions such as twisting and turning. Lessons lying prone were avoided as participants reported discomfort in their chest and difficulty breathing when face down.

Class sessions emphasized slow and gentle movements, comfortableness, and awareness. Outside of class recommendations were also suggested. For example, it was recommended to apply what was learned in class to daily activities: “don’t rush through things”; “notice strain and effort”; “move easily and slowly”. One participant was excluded from final data analysis because she injured her low back moving furniture the day before final testing. When asked about what had happened, she stated, “I felt so good that I thought I could do all kind of things and I forgot about the pain…” A greater emphasis on prevention and activity progression needs to take place so that individuals do not attempt to perform outside their capabilities.

An additional relevant point to examine is the presentation of the Feldenkrais Method, and to what extent this may have affected the changes in pain perception. The Feldenkrais Method used a pedagogic approach emphasizing the subject’s experience and

perceptions and their ability to rely on their own feelings to monitor and improve their experience. Words were clearly used to describe the movements and the tone was soft. The emphasis was on moving slowly and reducing muscular effort and resting when feeling fatigued. The instructor was not trying to achieve a certain range of motion, level of flexibility or strength, but rather was guiding students to develop proprioceptive and sensory awareness, both in stillness and in motion. Such awareness was assumed to be responsible of the improvement of neuromuscular efficiency and decrease in pain.

A limitation of this study was to what extent we can attribute the significant differences in pain perception and disability levels to the Feldenkrais intervention due to the absence of a matched control group. Subjective perceptions of improvement following participation in an exercise program may not have necessarily been due to the exercises themselves. Other causes influencing results could have been the instructor, the individual attention, psychosocial impact of group dynamics, or unknown factors.

A delimitation of this type of intervention was the individual approach towards each person with chronic pain. Each participant learned a particular thing about himself or herself. None of the participants complained in any way about the method and all agreed on the positive effect of moving slowly and thus becoming aware of feelings and perception never felt before such as finding relationships between knees and low back, and jaw and chest. The results obtained from data analysis and the reports given by the participants confirmed these points.

CONCLUSION

The results of this investigation show that the Feldenkrais Method, Awareness Through Movement, is effective in decreasing perceived pain and disability in adults experiencing CLBP. One issue that remains unclear is how much ATM participation is required to produce benefits. Although to determine frequency or duration was not the purpose of this study, our findings confirm that 6 to 11 classes over a five-week period created significant differences. The use of Awareness Through Movement in the clinical setting could provide a means of enhancing body mechanics and functioning and thus decreasing pain perceptions and disability levels. Additional research investigating and authenticating the ATM would enhance the scope of knowledge.

Suggestions for further research include replication of this study using a control group, sampling a larger number of subjects that could give statistical power, and to provide a following up assessment for long term results.

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APPENDIX A

Modified Physical Activity Readiness Questionnaire (Par-Q)

User Number:			*Date*
DOB	Age	Home Phone	Work Phone

Regular exercise associated with many health benefits, yet any change of activity may increase the risk of injury. Completion of this questionnaire is a first step when planning to increase the amount of physical activity in your life. Please read each question carefully and answer every question honestly:

Yes	No	1) Has a physician ever said you have a heart condition and you should only do physical activity recommended by a physician?
Yes	No	2) When you do physical activity, do you feel pain in your chest?
Yes	No	3) When you were not doing physical activity, have you had chest pain in the past month?
Yes	No	4) Do you ever lose consciousness or do you lose your balance because of dizziness?
Yes	No	5) Do you have a joint or bone problem that may be made worse by a change in your physical activity?
Yes	No	6) Is a physician currently prescribing medications for your blood pressure or heart condition?
Yes	No	7) Are you pregnant?
Yes	No	8) Do you have insulin dependent diabetes?
Yes	No	9) Are you 69 years of age or older and not used to being very active?
Yes	No	10) Do you know of any other reason you should not exercise or increase your physical activity?

If you answered yes to any of the above questions, talk with your doctor BEFORE you become more physically active. Tell your doctor your intent to exercise and to which questions you answer yes. If you honestly answered no to all questions you can be reasonably positive that you can safely increase your level of physical activity **gradually**. If your health changes so you then answer yes to any of the above questions, seek guidance from a physician.

Participant signature	Date

CSUN Exercise Physiology Laboratory Health Status and Exercise Survey

User Number: _____ *Age:* _____

Note: Your responses will remain strictly confidential.

1. Do you take any prescription medications? _____Yes / No
2. Do you take any non-prescription medications? _____Yes / No
3. Do you use alcohol? How much and how often? _____Yes / No
4. Do you use tobacco? How much and how often? _____Yes / No
5. Do you use recreational or performance enhancing drugs? _____Yes / No
6. Are you allergic to any medicines, pollens, foods, insects or pets? Yes / No
7. Have you ever fainted, been knocked out, or lost consciousness? Yes / No
8. Do you have problems with headaches? Yes / No
9. Have your ever had seizures, “fits”, convulsions, or epilepsy? Yes / No
10. Have you ever been told that you have/might have high blood pressure? Yes / No
11. Have you ever been told that you have a heart problem or murmur? Yes / No
12. Have you ever been told that you have an abnormal EKG or ECG? Yes / No
13. Have you ever been told that your blood cholesterol level was high? Yes / No
14. Have you even been told that you have diabetes? Yes / No
15. Do you ever have problems with chest pain? Yes / No
16. Do you ever have any difficulty breathing? Yes / No
17. Has anyone in your family died suddenly other than in an accident? Yes / No
18. Do you ever get cramps in your legs when you walk or exercise? Yes / No
19. Have you ever had surgery? (*Specify*) _____Yes / No
20. Have you ever had problems from heat or cold exposure? Yes / No

21. Have you ever had abnormal bleeding tendencies or anemia? Yes / No

22. Is there anything you would like to ask us about? _____Yes / No

23. When was the last time your saw a Doctor? _____ Why? _____

24. (Women only) How many menstrual periods have you missed this past year? _____

25. Have you any other medical conditions? _____Yes / No

If you have had any of the following, please circle if on your right or left side, and indicate if these occurred in the past year or more than a year ago:

Injuries or problems with your shoulders or arms?	R	L	past yr	earlier
Injuries or problems with your elbows, wrists or hands?	R	L	past yr	earlier
Injuries or problems with your hips?	R	L	past yr	earlier
Injuries or problems with your knees?	R	L	past yr	earlier
Injuries or problems with your ankles?	R	L	past yr	earlier
Injuries or problems with your feet?	R	L	past yr	earlier
Broken bones? (*Specify*) _____	R	L	past yr	earlier
Dislocated joints? (*Specify*) _____	R	L	past yr	earlier
Muscle pulls or strains? (*Specify*) _____	R	L	past yr	earlier
"Shin splints"?	R	L	past yr	earlier
Neck or back pain for more than one day?			past yr	earlier
Pinched nerve?			past yr	earlier

1. How many days per week do you normally exercise? 0 1 2 3 4 5 6 7

2. For what duration (in minutes) do you normally exercise at each session? (*Circle one*)

   Less than 15 15-30 30-45 45 or more

3. Please check the activities in which you participate at least once per week:

   Aerobic dance___ Tennis___ Bowling___ Golf___

   Jump rope___ Bicycling ___ Swimming___ Basketball ___

   Walking ___ Running___ Jogging___ Other_____

4. *Circle* the number which best describes your physical effort during normal exercise:

0	None at all	5	Strong (heavy)
0.5	Very, very weak (just noticeable)	6	
1	Very weak	7	Very strong
2	Weak (light)	8	
3	Moderate	9	
4	Somewhat strong	10	Very, very strong

5.How long have you been regularly participating at the activity level described in questions 1, 2 & 4 above?

Not regular Less than 1 year 1-2 years 2-3 years 3 or more

6. How physically demanding is your occupation? (Amount of physical activity required by your work?)

Sedentary Mildly active Moderately active Very active

7. How often do you use the stairwell instead of an elevator or escalator?

Almost never Occasionally Frequently Most of the time

8. How often do you ride a bicycle or walk on short trips as opposed to using an automobile?

Almost never Occasionally Frequently Most of the time

9. How physically demanding would you rate the time normally spent in your leisure time activities? (*Please use the examples under each category for assistance*)

Sedentary	*Mildly active*	*Moderately active*	*Very active*
Television	Sailing	Tennis	Running
Reading	Bowling	Swimming	Basketball
Golf (with cart)	Golf (no cart)	Rowing	

10. Would you rate yourself as physically more active, less active, or about as active as other persons your age?

Less active As active More active

11. Considering a 7-day period (1 week), during your leisure time how often do you engage in regular activity long enough to work up a sweat (heart beats rapidly)?

Never Rarely Sometimes Often

APPENDIX B

California State University Northridge

The Effectiveness of the "Awareness Through Movement" Method On Low Back Pain

Informed Consent Form

Low back pain (LBP) is the most common musculoskeletal disorder among people of all ages and backgrounds. Chronic back pain limits one's ability to perform daily tasks, such as bathing and dressing oneself, lifting and carrying heavy objects, walking, standing or sitting for extended periods of time. Additionally, persistent LBP can engender anxiety, depression and stress leading to disability. Moreover, LBP is a complex disorder and cannot be attributed to any one cause. Approximately 90% of cases of LBP have no identifiable cause and are designated as nonspecific.

The purpose of this study is to assess the effectiveness of various exercises/movements on low back pain. You will be asked to complete pain, functional and health status questionnaires, and to perform range of motion, strength and posture assessments. The posture assessment will involve posing for front and side view pictures in comfortable clothing. Specific points on the body (e.g. Ear, shoulder, hip, knee and ankle) will be measured against a plumb line at a later time. You will be provided with a user-number in order to maintain confidentiality. Your information will be kept by the researcher under locked file at her private office for three years after completion of the study. After three years of completion of study, data will be destroyed. Participants will be the only ones allowed access to their files and can withdraw their data at anytime.

This study requires that you attend a 4-week program (45 minute classes, 2 times per week) guided by the researcher at CSUN. This study poses little risk as the method is both conservative and safe. You may experience normal risks associated with body movements and stretching (such as overstretching or muscle soreness) especially since this may be new to you.
Your risk is limited by**:**

- Par-Q Questionnaire—will identify any health risks and disqualify your participation.
- CSUN Exercise Physiology Laboratory Health Status and Exercise Survey
- You will cease activities immediately if you feel pain or aggravate symptoms.
- The group leader will rotate and monitor subjects for safety and pain.
- Flexibility and body positioning (including posture) are fundamental components in any low back pain rehabilitation program, which is supported by research and medical and allied health professionals.

Participating in this study is completely voluntary, and participants may withdraw from the study at any time without jeopardizing any relationships with California State University, Northridge. In the event of an injury, all medical costs and responsibilities are of the participants of the study.

You will not be compensated directly for your participation. However, benefits include knowledge of your range of motion, strength, posture and functional status. You will also participate in an exercise class at no cost.

This study will serve a large public population of individuals that seek relief from chronic low back pain. It may find a solution for people experiencing chronic low back pain to increase not only their hip range of motion, but also their vitality and strength.

If you wish to voice a concern about the research, you may direct your question(s) to Research and Sponsored Projects, 18111 Nordhoff Street, California State University, Northridge, Northridge, CA 91330-8222, or phone 818-677-2901, University Hall 265.

If you have specific questions about the study you may contact the student Researcher Aerin Alexander (310) 234-0630, aerin@tilomedical.com or Dr. Shane Stecyk, faculty adviser 818-677-4738, 18111 Nordhoff Street, Northridge, CA 91330-8287

I have read the above and understand the conditions outlined in this document. My signature indicates that I am both qualified and willing to participate as a subject in the described study.

Participant's Name _____

Participant's Phone Number _____

Participant's Signature _____

If you have signed this form, you may give it to the Researcher Aerin Alexander or you can return it in an envelope by mail to:

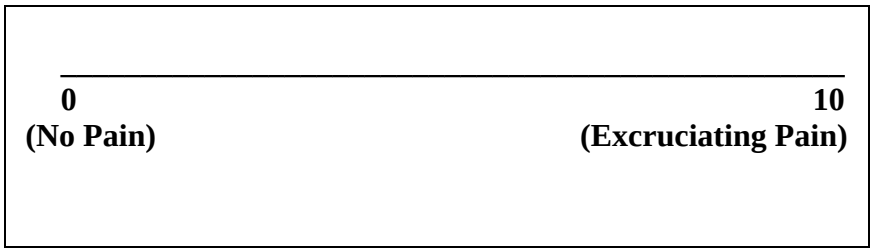
Dr. Shane Stecyk
Department of Kinesiology
California State University, Northridge
18111 Nordhoff Street
Northridge, CA 91330

APPENDIX C

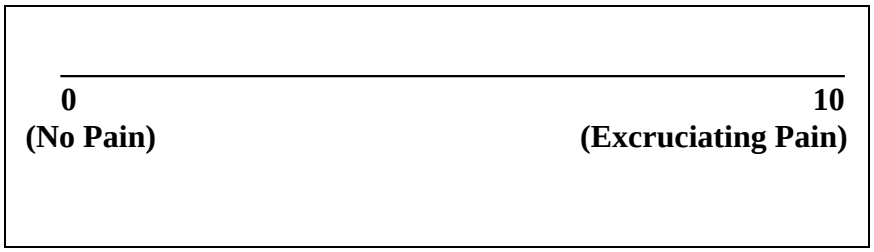
Visual Analog Scale (VAS)

Assigned User Number _____ *Date* _____

1. Please indicate with X in the red line below how much low back pain have you experienced in the last 24 hours



2. Please indicate with X in the red line below how much low back pain have you experienced on average in the last week



APPENDIX D

Revised Oswestry Low Back Pain Disability Index

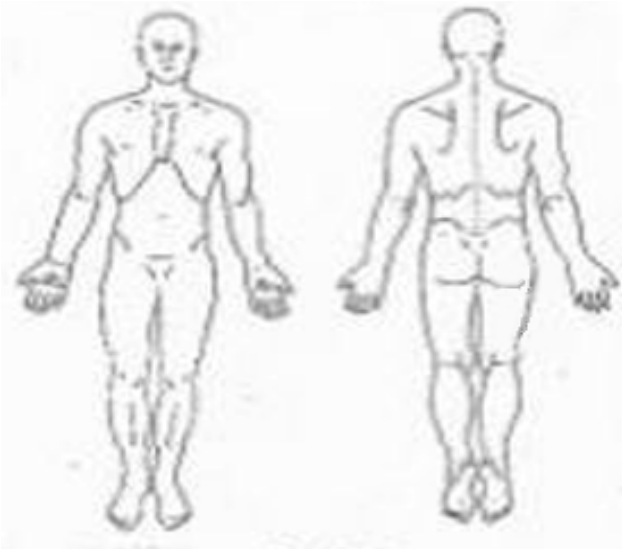
Assigned User Number _____ *Date* _____

How long have you had low back pain? ____ Years____ Months ____Weeks

Is this your first episode of low back pain? ____Yes ____No

Use the letter below to indicate the type and location of your sensations right now:

A: Ache	N: Numbness	S: Stabbing
B: Burning	P: Pins & needles	O: Other



Please read: This questionnaire is designed to enable us to understand how much your low back pain has affected your ability to manage your everyday activities. Please answer each section by circling the ONE CHOICE that most applies to you. We realize that you may feel that more than one statement may relate to you, but PLEASE JUST CIRCLE THE ONE CHOICE WHICH MOST CLOSELY DESCRIBES YOUR PROBLEM RIGHT NOW

SECTION 1-- Pain Intensity

A. The pain comes and goes and is very mild.
B. The pain is mild and does not vary much.
C. The pain comes and goes and is moderate.
D. The pain is moderate and does not vary much.
E. The pain comes and goes and is severe.
F. The pain is severe and does not vary much.

SECTION 2-- Personal Care

A. I would not have to change my way of washing or dressing in order to avoid pain.
B. I do not normally change my way of washing or dressing even though it causes some pain.
C. Washing and dressing increases the pain, but I manage not to change my way of doing it.
D. Washing and dressing increases the pain and I find it necessary to change my way of doing it.
E. Because of the pain, I am unable to do some washing and dressing without help.
F. Because of the pain, I am unable to do any washing or dressing without help.

SECTION 3-- Lifting

A. I can lift heavy weights without extra pain.
B. I can lift heavy weights, but it causes extra pain.
C. Pain prevents me from lifting heavy weights off the floor.
D. Pain prevents me from lifting heavy weights off the floor, but I can manage if they are conveniently positioned, e.g., on a table.
E. Pain prevents me from lifting heavy weights, but I can manage light to medium weights if they are conveniently positioned.
F. I can only lift very light weights, at the most.

SECTION 4-- Walking

A. Pain does not prevent me from walking any distance.
B. Pain prevents me from walking more than one mile.
C. Pain prevents me from walking more than 1/2 mile.
D. Pain prevents me from walking more than 1/4 mile.
E. I can only walk while using a cane or on crutches.
F. I am in bed most of the time and have to crawl to the toilet.

SECTION 5-- Sitting

A. I can sit in any chair as long as I like without pain.
B. I can only sit in my favorite chair as long as I like.
C. Pain prevents me from sitting more than one hour.
D. Pain prevents me from sitting more than 1/2 hour.
E. Pain prevents me from sitting more than ten minutes.
F. Pain prevents me from sitting at all.

SECTION 6 -- Standing

A. I can stand as long as I want without pain.
B. I have some pain while standing, but it does not increase with time.
C. I cannot stand for longer than one hour without increasing pain.
D. I cannot stand for longer than 1/2 hour without increasing pain.
E. I cannot stand for longer than ten minutes without increasing pain.
F. I avoid standing, because it increases the pain straight away.

SECTION 7 -- Sleeping

A. I get no pain in bed.
B. I get pain in bed, but it does not prevent me from sleeping well.
C. Because of pain, my normal night's sleep is reduced by less than one-quarter
D. Because of pain, my normal night's sleep is reduced by less than one-half.
E. Because of pain, my normal night's sleep is reduced by less than three-quarters.
F. Pain prevents me from sleeping at all.

SECTION 8--Social Life

A. My social life is normal and gives me no pain.
B. My social life is normal, but increases the degree of my pain.
C. Pain has no significant effect on my social life apart from limiting my more energetic interests, e.g., dancing, etc.
D. Pain has restricted my social life and I do not go out very often.
E. Pain has restricted my social life to my home.
F. I have hardly any social life because of the pain.

SECTION 9-- Traveling

A. I get no pain while traveling.
B. I get some pain while traveling, but none of my usual forms of travel make it any worse.
C. I get extra pain while traveling, but it does not compel me to seek alternative forms of travel.
D. I get extra pain while traveling which compels me to seek alternative forms of travel.
E. Pain restricts all forms of travel.
F. Pain prevents all forms of travel except that done lying down.

SECTION 10-- Changing Degree of Pain

A. My pain is rapidly getting better.
B. My pain fluctuates, but overall is definitely getting better.
C. My pain seems to be getting better, but improvement is slow at present.
D. My pain is neither getting better nor worse.
E. My pain is gradually worsening.
F. My pain is rapidly worsening.