

available at [www.sciencedirect.com](http://www.sciencedirect.com)journal homepage: [www.elsevier.com/jbmt](http://www.elsevier.com/jbmt)

# Does the Feldenkrais Method make a difference? An investigation into the use of outcome measurement tools for evaluating changes in clients<sup>☆</sup>

Karol Anne Connors, M PT, CFP<sup>a,\*</sup>, Carolyn Pile, B App Sc (OT), CFP<sup>b</sup>,  
Margo Elaine Nichols, MA, B SW, CFP

<sup>a</sup> Calvary Health Care Bethlehem, Melbourne, Australia

<sup>b</sup> Latrobe Valley, Victoria, Australia

Received 11 August 2010; received in revised form 1 September 2010; accepted 5 September 2010

## KEYWORDS

Outcome measures;  
Functional tasks;  
PSFS;  
Quality of life;  
Pain outcome profile  
(POP)

**Summary** Evidence-based practice confirms the need for outcome measures. Feldenkrais Method practitioners struggle to use such tools because of the broad range of applications of the Feldenkrais Method and the difficulty identifying suitable measurement tools. A pre/post-test design was used to investigate the use of three outcome measurement tools [Patient-specific Functional Scale (PSFS), Pain Outcome Profile (POP) and Short Form12v2 Health questionnaire (SF12v2)] for clients experiencing problems performing everyday functional tasks who attended Feldenkrais sessions. Eleven Feldenkrais practitioners submitted data on 48 clients. Changes were detected in the clients' ability to perform everyday tasks (PSFS improved 3.8 points,  $p < 0.001$ ), levels of pain decreased (POP improved in current pain  $p = 0.001$ , physical index  $p < 0.001$  and affective index  $p = 0.001$ ) and quality of life improved significantly in six of the eight SF12v2 domains. These three tools have been found to be suitable for detecting changes in client function before and after a series of Feldenkrais sessions. Crown Copyright © 2010 Published by Elsevier Ltd. All rights reserved.

## Introduction

### Background

Outcome measures have become increasingly important over the past few decades in many fields of endeavour. Particularly in the area of health, people have become interested in evaluating and comparing intervention outcomes, rather than relying on practitioners' assertions of efficacy. Outcome measures can be useful for identifying

<sup>☆</sup> *Institution:* This project was conducted under the auspice of the Australian Feldenkrais Guild.

\* Corresponding author. 29 Rusden St, Brighton 3186 Vic, Australia. Tel.: +61 39595 3441; fax: +61 39595 3249.

E-mail address: [database@feldenkrais.org.au](mailto:database@feldenkrais.org.au) (K.A. Connors).

changes due to an intervention both in research and in individual client–practitioner interactions.

Outcome measures attempt to determine the effects of an intervention by measuring certain elements associated with that intervention. It is important that researchers identify elements that are central to the intervention being studied. Outcome measurement tools must also be reliable and valid. In other words, the tool must be able to be relied upon to deliver consistent results and to measure what it sets out to measure. For this study, measurement tools needed to be quick and easy to complete as they were to be used in authentic client sessions.

The Feldenkrais Method<sup>®</sup> uses an exploratory learning approach to help people move with more ease, comfort and efficiency (Wildman, 2000 p. 4). There is plenty of anecdotal evidence to suggest that the Feldenkrais Method is beneficial for clients, but there have been relatively few studies which have vigorously investigated its effectiveness. Several studies have identified significant improvements in balance-related outcomes (Gutman et al., 1977; Bennett et al., 2001; Hall, 2001; Batson and Deutsch, 2005; Stephens et al., 2001; Connors et al., 2009; Vrantsidis et al., 2009; Ullmann et al., 2010). Other studies have found improvements in chronic pain (Bearman and Shafarman, 1999), back pain (Smith et al., 2001), hamstring length (Hopper et al., 1999; Stephens et al., 2006) and other musculoskeletal disorders (Lundbland et al., 1999; Malmgren-Olsson and Branholm, 2002) in clients receiving Feldenkrais<sup>®</sup> interventions. There have been relatively few studies investigating the effects of the Feldenkrais Method on musculoskeletal problems, despite these problems being a common reason why clients seek the assistance of a Feldenkrais practitioner.

### Outcome measurement tools

The cohort used for this study was adults with problems affecting their ability to physically function in their everyday lives. The outcome measurement tools were chosen to measure this capacity. Three tools were selected for this pilot program. They were the Pain Outcomes Profile (POP), the Patient-Specific Functional Scale (PSFS) and the SF12v2 (a health-related quality of life questionnaire).

The Patient-Specific Functional Scale (Stratford et al., 1995) evaluates how well a person is performing certain activities – activities which the clients self select as being important for themselves in their everyday lives. This tool was developed by Canadian physiotherapists and has been successfully used to evaluate responses to treatment for people with neck pain, knee pain, wrist and hand injuries and low back pain (Sterling and Brentnal, 2007; McMillan and Binhammer, 2009). The PSFS has also been found to have construct and predictive validity as an indicator of functional limitation in workers compensation claimants; the PSFS was able to predict return to work and recovery, with decreasing scores relating to delayed recovery (Gross and Asante, 2009).

As it could be expected that most of the clients in this study would be seeking assistance with musculoskeletal problems and experiencing pain, it was decided that the POP would be an appropriate outcome measure. This tool was developed by the American Academy of Pain

Management and has undergone reliability and validity testing which has demonstrated that it is a reliable and valid tool (Clark et al., 2003).

The Feldenkrais Method claims to engage the whole person, including how a person thinks, feels, acts and senses, therefore it was decided to also use a putatively more holistic tool that measures health-related quality of life. The SF12v2 questionnaire (entitled “Your Health and Wellbeing”) is a widely used and well recognized quality of life survey which investigates both the physical and emotional domains of health and wellbeing (Cheak-Zamora et al., 2009) that have been developed by the Quality-Metrics organization based in the United States. The questionnaire has undergone rigorous testing during its development to ensure that it is a valid and reliable tool for measuring self-rated quality of life (Ware et al., 2008).

### Study aims

The primary aim of this study was to establish if three selected measurement tools would be suitable for measuring client outcomes following Feldenkrais intervention. A secondary aim was to facilitate future research into the Feldenkrais Method.

### Methodology

#### Practitioners’ role

Australian Feldenkrais Guild (AFG) practitioners were invited to participate in the study. Each practitioner who registered to participate had a study mentor assigned to assist them. The mentors were three Feldenkrais practitioners with experience in research who designed the study, selected the outcome measures and arranged permission to use them, distributed and collected the surveys and collated the results.

Each participating practitioner was asked to administer the three questionnaires before starting the Feldenkrais sessions, with 5–10 new clients and to repeat the questionnaires at the end of these client’s series of sessions. A time frame of 6 months was set for data collection. The research methodology was approved by the Australian Feldenkrais Guild and written consent was gained from each client prior to commencing in the study. Clients were excluded from the study for three reasons: if they were under 18 years old, had insufficient English language skills to complete the questionnaires or did not present with any functional problems, for example, a client who wished to improve her professional singing was excluded.

Background data was collected on age; gender; purpose of visit and length of symptoms prior to presentation.

#### Procedures for use of the outcome measurement tools

The clients identified three activities targeted for improvement. The clients rated the performance of each activity (scored between 0 and 10 on the PSFS and then averaged) before and after the Feldenkrais series of lessons. The practitioner discussed these activities with

their client at the first session to assist in completing the form and as part of the practitioners' initial information gathering about the functional goals of their client. Although the practitioner assisted their client in describing the activities on the PSFS in a precise manner to make it easier to re-score the activities, the practitioner did not assist the client with choosing a rating score for each activity. For example, a client-identified activity which he/she wanted to improve may have been "sitting at work". This activity may have been refined by the client and practitioner jointly to read "sit at work at the computer for 1 h without pain".

The POP produces information about several aspects of the clients' self-rated pain. One question concerns the client's pain at that moment in time (Current Pain), rated from '0' (no pain) to '10' (worst possible pain). In accordance with the POP scoring guidelines, scores on the POP items relating to mobility, activities of daily living and vitality were aggregated together to comprise a 'Physical Index' and items relating to affect and fear were aggregated to form an 'Affective Index'. These scores indicate how much the pain is interfering with the person's ability to function, so a lower score means that the pain is having less of an impact.

The results for the SF12v2 are divided into eight domains with a maximum possible score of 100 for each domain. Both the POP and SF12v2 are standardized measures that have scoring instructions which transform the raw data into aggregated scores representing various emotional, physical and social domains (Ware et al., 2008). These instructions were followed to produce the scores which are presented in the results section. Both the POP and the SF12v2 involved the client circling numbers or words on the survey to complete the questionnaires. The clients completed the POP and SF12v2 on their own without assistance from the

Feldenkrais practitioner. Table 1 describes the domains for the SF12v2 produced by aggregate scoring.

### Sample size

The SF12v2 guidelines of "sample sizes needed to detect differences over time within one group" (Ware et al., 2008) (p 64), states that twenty-three subjects are needed to give 95% confidence that 5 points of difference in scores between pre- and post-testing is not due to measurement error. The study aimed for a sample size of 50 subjects to allow for potential missing data due to the community-based clinical setting used in this study. If clients did not complete all the questionnaires, practitioners were asked to include comments on why this had happened.

### Data analysis

To determine if there had been significant changes in the scores on the surveys before and after the Feldenkrais sessions, pre- and post-scores on each survey were compared, using two tailed paired samples *T*-tests. The results were analysed using SPSS statistical analysis software<sup>1</sup>. A significance level of  $p = 0.05$  was set.

## Results

### Practitioner involvement

Of the 29 Feldenkrais practitioners who originally registered interest in participating in the study, eleven practitioners submitted client data. Data was submitted on 48 clients. The practitioners who submitted data were spread across Australia (Victoria 3, Western Australia 3, New South Wales 2, Queensland 2 and South Australia 1). These practitioners had an average of 14.1 years since graduation from Feldenkrais training programs.

### Client attrition and incomplete data

There was complete data returned on 33 clients. There was missing data on re-testing for the other 15. Practitioners failed to report a reason why there was incomplete data for four of these clients. For three other clients, the practitioners forgot to do the post measures. Of the other eight clients with no 'post' data, three had moved away or went on holidays and the remaining clients were lost to the study due to a variety of reasons including a fractured ankle, surgery and not attending for re-testing. One data set was excluded during data analysis as the client was under 18.

### Participant and Feldenkrais sessions characteristics

Table 2 displays the characteristics of the clients involved in the study. Median scores are presented for the data on length of symptoms because the distribution of this data was skewed by one client having had symptoms for 20

**Table 1** Domains of the SF12v2 health survey.

Domain	Description
Physical functioning	Ability to perform activities ranging from dressing oneself to climbing a flight of stairs.
Role physical	How the health problems have impacted on the person's ability to accomplish and perform in their life.
Bodily pain	Pain severity and impact.
General health	Health in general and in comparison to others.
Vitality	Feelings of energy or feeling tired and worn out.
Social functioning	How the health problems have impacted on the person's social roles and activities.
Role emotional	How the person's feelings have impacted on what they do and how they do it.
Mental health	The person's state of mind related to feelings such as anxiety, happiness and sadness.

<sup>1</sup> Grad Pack 15, SPSS inc, Chicago, Illinois.

**Table 2** Participant characteristics.

Age (years)	Gender		Time period of symptoms prior to presentation (months)		Number of Feldenkrais sessions		Time period between pre- and post-testing (weeks)		
	Mean	Range	Female	Male	Median	Range	Mean	Range	Mean
50.3	25 to 79	38	9	12	2 to 240	6.5	2 to 20	11.6	2.5 to 31

years. The clients could be considered to have chronic symptoms, rather than acute, as the symptoms had been present for at least 2 months, and on average for 12 months. Clients had sessions on average once per fortnight during the treatment period, which averaged 11.6 weeks.

### Patient-specific Functional Scale

The mean scores for the clients before and after the series of sessions are displayed in Table 3. There was a statistically significant improvement between the pre- and post-scores ( $p < 0.001$ ).

### Pain Outcome Profile

Significant improvements between pre- and post-testing were found on all of the items on this questionnaire. A lower score represents less pain and the scores were found to nearly halve on the Current Pain item between pre- and post-testing (from 3.5 to 1.8). There were significant improvements in Current Pain ( $p = 0.001$ ), Physical Index ( $p < 0.001$ ) and Affective Index ( $p = 0.001$ ). The results are presented in Table 3. Two of the clients failed to answer some questions in this questionnaire, which meant that the scores could not be transformed into Physical Index for two clients and the Affective Index for one of these clients. Another question on the POP asked the client "How long have you had the pain for which you are now seeking treatment?" and the responses to this question were included in the participant characteristics data in Table 2.

A *post hoc* analysis was performed on the POP 'Current Pain' item, to determine the effect on the results of the 17 clients who only scored less than three out of ten at the initial testing. It was found that this group of clients minimally changed their mean score from 0.94 to 0.76 points ( $p = 0.4$ ), whereas the 18 clients who scored three or higher for current pain improved from a mean of 5.86 down to 2.72; this is a mean difference of 3.14 points ( $p = 0.001$ ).

### SF12v2 health survey

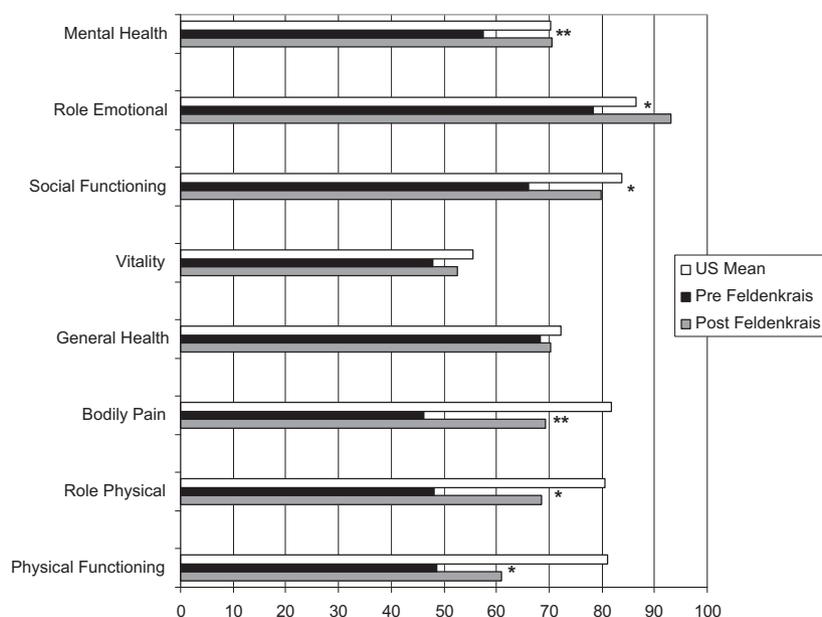
The mean scores for the participants before and after the Feldenkrais sessions are displayed in Fig. 1. All of the domains, except General Health and Vitality, were found to have changed significantly [Physical Functioning:  $-12.3$  (95% CI  $-23.8$ – $-0.8$ )  $p = 0.028$ ; Role Physical:  $-21.3$  (95% CI  $-34.7$ – $-7.8$ )  $p = 0.004$ ; Bodily Pain:  $-24.5$  (95% CI  $-32.7$ – $-16.2$ )  $p < 0.001$ ; General Health:  $-1.8$  (95% CI  $-8.4$ – $4.6$ )  $p = 0.56$ ; Vitality:  $-10.9$  (95% CI  $-27.4$ – $5.6$ )  $p = 0.24$ ; Social Functioning:  $-14.1$  (95% CI  $-25.5$ – $-2.6$ )  $p = 0.016$ ; Role Emotional:  $-15.1$  (95% CI  $-23.8$ – $-6.4$ )  $p = 0.002$ ; Mental Health:  $-12.9$  (95% CI  $-19.0$ – $-6.8$ )  $p < 0.001$ ]. Fig. 1 also shows the mean scores for these domains in the United States (based on 1998 General US population means using a sample of 7069 people drawn from across the country) (Ware et al., 2008). These scores have been included to provide a comparison with the data from the current study.

### Discussion

This study evaluated three outcome measurement tools to test their usefulness in detecting changes in subjects in a real life setting. All three tools showed significant differences between before and after the Feldenkrais sessions. Indeed all the changes indicated improvements in the clients' physical and emotional wellbeing. The clients and practitioners found the tools quick and easy to use with minimal explanation. Practitioners reported that the PSFS was the most useful of the questionnaires in practice. The PSFS helped the client to develop functional goals to be achieved in relation to attending the Feldenkrais sessions. The ratings of performance on these activities were useful for both the practitioner and client to track the clients' progress. However, clinicians and researchers must be aware that the PSFS can cause non-specific effects, as it identifies in advance particular changes which the client may then anticipate from the intervention.

**Table 3** Results of Patient-specific Functional Scale (PSFS) and Pain Outcome Profile (POP).

	PSFS ( $n = 34$ )		POP current pain ( $n = 35$ )		POP physical Index ( $n = 34$ )		POP affective index ( $n = 33$ )	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Mean score (SD)	3.6 (1.9)	7.4 (2.0)	3.5 (3.0)	1.8 (2.0)	28.8 (17.5)	20.6 (16.7)	39.7 (22.9)	26.9 (16.2)



\* denotes  $p < 0.05$  difference between pre and post scores, \*\* denotes  $p < 0.001$  difference between pre and post scores.

**Figure 1** SF12v2 scores pre and post-Feldenkrais sessions.

The 3.8-point average improvement in the Patient-Specific Functional Scale score was well above the 2 points identified as being the 'Minimal Detectable Difference' (90% Confidence Interval) needed to be sure that the change was not just due to measurement error (Sterling and Brentnal, 2007). The 'Minimal Clinically Important Difference' using the Patient-specific Functional Scale has also been reported to be a change in score of more than 2 points (Berghuis-Kelley and Scherer, 2007). The clients attending the Feldenkrais sessions improved their scores by an average of 3.8 points, suggesting that these clients were achieving clinically significant changes in their ability to perform functional tasks. Furthermore, Sterling and Brentnal (2007) identify how the PSFS helps the client to focus on positive aspects of functional recovery rather than dwelling on levels of pain. This approach is very congruent with the Feldenkrais Method approach, which seeks to return clients to their full potential rather than focusing on their impairments. Feedback from the pilot study suggested that both clinicians and clients found this tool to be the most acceptable of the three for use in a clinical setting. The PSFS can therefore be recommended for use both at the individual practitioner level for tracking client progress and setting functional goals, and also for future research studies into the Feldenkrais Method.

The Pain Outcome Profile provided useful information about a client's current pain as well as their physical and affective profile. This tool also provides the option of a simple and effective graph for feedback to clients and practitioners. Clark et al. (2003) investigated the reliability and validity of this tool with United States veterans with current pain. They described Clinically Significant Differences for the Current Pain item to be 0.34, 0.85 and 1.35

for small, medium and large differences respectively. The clients in the current study had an improvement of 1.7 points, which can therefore be considered a large Clinically Significant Difference. When only the clients who initially scored three or over on Current Pain at baseline are included, the improvement of 3.14 points is well above the 1.35 points needed to be considered a large difference.

A test-retest reliability study (Clark et al., 2003) on the POP found there was no change in score over time for people with chronic pain on this questionnaire when there was no intervention. The change in scores found in the current study was therefore unlikely to be solely due to re-testing. The clients in this study had their symptoms for a significant length of time (a median time of 12 months) so to achieve almost uniform improvement in pain scores certainly warrants further investigation into the Feldenkrais Method. It is important to note too that the improvements were found after an average number of only 6.5 sessions.

The SF12v2 was quite quick and easy for the clients to complete but the scoring is very complex and it is not necessarily suitable for use as a clinical tool. For research purposes however, it is a valuable tool which has been thoroughly investigated and is frequently used in clinical trials. The client group in the current study was below the United States norms on every initial measure, particularly on the physical items and for Bodily Pain. This suggests that they are indeed attending the Feldenkrais sessions because they are experiencing difficulties in their everyday lives. The results demonstrate an improvement in each item between pre- and post-testing, and the Emotional Role and Mental Health actually improve to higher than the United States norm on re-testing. This improvement in emotional

items as well as physical ones is important, as it shows the close relationship between physical and mental health, and captures some of the emotional changes that the Feldenkrais Method claims to effect (Feldenkrais, 1990 p. 10–11,19).

The smaller changes in General Health and Vitality compared to the other domains is interesting. It could be suggested that less change in these areas adds validity to the results, as one would not necessarily expect that a clients' general health be affected by the Feldenkrais Method, as this is generally determined by illnesses which the Feldenkrais Method does not address. Another explanation might be that the clients in this study were closest to the United States norm score for General Health and Vitality at pre-testing, so there was less room for improvement in these domains. The average scores on the Vitality item did in fact change by 4.8 points – almost the 5 points recommended by Qualitymetrics as the amount of change needed to be sure the changes are not caused by measurement error (Ware et al., 2008). Whatever the reasons for the variations between the domains in the change scores, the fact that clients reported more changes in some domains than others suggests that the clients did not just uniformly score themselves higher on every item at re-testing but gave considered responses.

The primary aim of this study was to facilitate future research into the Feldenkrais Method, partly by identifying suitable outcome measurement tools to use and partly by using an approach which could be followed by others. The involvement of several practitioners was a key element in this study. It enabled the recruitment of sufficient numbers of clients to make the study robust, without placing too much burden on any individual practitioner and their practice. Using data collected from several practitioners also eliminated problems of bias which may have arisen if all the data came from just one practitioner. Readers may have been concerned about both the skill of a single practitioner and if this data was truly representative of the Feldenkrais Method, but by including data from eleven practitioners in five different states we can confidently generalize these results to the Feldenkrais Method as a whole.

Future research could build on this study in several ways. These measurement tools can now confidently be used by Feldenkrais researchers to evaluate changes to clients in other countries (how does data from the US or UK or Europe compare to these results?) or with specific client groups (eg. do clients with arthritis respond in the same way as clients with chronic back pain?). More importantly, research could be conducted using a Control group, who did not receive Feldenkrais intervention, and compare the results with those who did. That type of study (Randomised Controlled Trial) would provide the most solid evidence about the effects of the Feldenkrais Method.

The researchers in this study appreciated the support from the Australian Feldenkrais Guild, who facilitated communication with practitioners and paid for the administrative costs of the project such as postage, printing and licenses for the measurement tools. To encourage and support future research, more efforts need to be made to develop funding bodies which can support research in non-traditional areas and emerging areas of health.

## Study limitations

There was a relatively high level of dropouts and incomplete data in this study (15/48). This may have been due to the nature of the study. It was conducted in authentic clinical settings, by clinicians, spread across all of Australia with minimal research support. In hindsight, assisting practitioners to promptly follow-up clients who did not return for re-assessment would have been beneficial, as several participants did not have re-assessment data completed despite having attended several Feldenkrais sessions.

Another limitation of this study is that it only included adult clients with difficulties performing everyday tasks. There are many applications for the Feldenkrais Method and the suitability of the outcome measurement tools examined in this study cannot be generalized for use in other client groups, such as performers or children with disabilities. Further research will be needed to assess the use of these or other measurement tools with different client groups.

The authors also caution that there are many outcome measurement tools available for practitioners and researchers, and the three chosen for this study were considered to be the most useful for the purposes of this study. This does not mean that other measurement tools will not also be found to be useful, even with the current client group. Furthermore, the Feldenkrais Method endeavours to engage the client in a process of learning about themselves and how they act out their lives in the world. Some clients will continue to pursue this learning into exploring new ways of moving and acting that can result in profound changes in their lives. The types of quantitative outcome measurement tools used in this study only brush the surface of such changes in a person's life, and need to be combined with more qualitative studies to fully understand the potential effects of the Feldenkrais Method.

## Conclusions

This study has demonstrated that the three outcome measurement tools selected in this study [the Patient-specific Functional Scale, the Pain Outcome Profile and the SF12v2] all showed statistically significant improvements in daily function, pain and health-related quality of life (except in the domains of General Health and Vitality in the SF12v2) after a series of Feldenkrais sessions. This suggests that these three outcome measurement tools are suitable for measuring changes resulting from Feldenkrais Method sessions for clients presenting with difficulties performing everyday functional tasks.

The length of time clients had been experiencing their symptoms prior to commencing Feldenkrais sessions (a median time of 12 months) suggests that the changes were not simply due to spontaneous recovery. The authors recommend that further research is conducted into the effectiveness of the Feldenkrais Method as an intervention to improve the ability of clients with pain and functional limitations to perform everyday activities.

## References

- Batson, G., Deutsch, J., 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.
- 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, 22–27.
- Bennett, J., Brown, B., 2001. Effects of a Feldenkrais based mobility program on function of a healthy elderly sample. In: Stephens, J. (Ed.), *Research Studies. Feldenkrais Education Foundation of North America, USA*.
- Berghuis-Kelley, D., Scherer, S., 2007. Outcome measures in cardiopulmonary physical therapy: use of the Patient Specific Functional Scale. *Cardiopulmonary Physical Therapy Journal* 18 (3), 21–23.
- Cheak-Zamora, N., Wyrwich, K., et al., 2009. Reliability and validity of the SF-12v2 in the medical expenditure panel survey. *Quality of Life Research* 18 (6), 727–735.
- Clark, M.E., Girona, R., et al., 2003. Development and validation of the ain outcomes questionnaire. *Journal of Rehabilitation Research and Development* 40 (5), 381–396.
- Connors KA, Galea M, et al. 2009. Feldenkrais Method balance classes improve balance in older adults: a controlled trial. Evidence based complementary and alternative medicine advance (accessed 24.06.09).
- Feldenkrais, M., 1990. *Awareness through Movement: Health Exercises for Personal Growth*. Arkana, London.
- Gross, D., Asante, A., 2009. The Patient-specific Functional Scale: validity in workers compensation claimants. *Archives of Physical Medicine and Rehabilitation* 89 (7), 1294–1299.
- Gutman, G., Herbert, C., et al., 1977. Feldenkrais versus conventional exercises for the elderly. *Journal of Gerontology* 32 (5), 562–572.
- Hall, S., 2001. Study of the effects of various forms of exercise on balance in older women. In: Stephens, J. (Ed.), *Research Studies. Feldenkrais Educational Foundation of North America, USA*.
- Hopper, C., Kolt, G., et al., 1999. The effects of Feldenkrais awareness through movement on hamstring length, flexibility and perceived exertion. *Journal of Bodywork and Movement Therapies* 3 (4), 238–247.
- Lundbland, I., Elert, J., et al., 1999. Randomised controlled trial of physiotherapy and Feldenkrais interventions in female workers with neck-shoulder complaints. *Journal of Occupational Rehabilitation* 9 (3), 179–194.
- 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. *Disability and Rehabilitation* 24 (6), 308–317.
- McMillan, C., Binhammer, P., 2009. Which outcome measure is best? Evaluating responsiveness of the disability of the arm, shoulder and hand questionnaire, the Michigan hand questionnaire and the Patient-specific Functional Scale following hand and wrist surgery. *Hand* 4, 311–318.
- Smith, A., Kolt, G., et al., 2001. The effect of the Feldenkrais Method on pain and anxiety in people experiencing chronic low back pain. *New Zealand Journal of Physiotherapy* 29 (1), 6–14.
- Stephens, J., Davidson, J., et al., 2006. Lengthening the hamstring muscles without stretching using “Awareness through movement”. *Physical Therapy* 86, 1641–1650.
- Stephens, J., DuShuttle, D., et al., 2001. Use of awareness through movement improves balance and balance confidence in people with multiple sclerosis: a randomized controlled study. *Neurology Report* 25 (2), 39–49.
- Sterling, M., Brentnal, D., 2007. Clinimetrics: Patient Specific Functional Scale. *Australian Journal of Physiotherapy* 53, 65.
- Stratford, P., Gill, C., et al., 1995. Assessing disability and change on individual patients: a report of a patient specific measure. *Physiotherapy Canada* 47, 258–263.
- Ullmann, G., Williams, H., et al., 2010. Effects of Feldenkrais exercises on balance, mobility, balance confidence, and gait performance in community-dwelling adults age 65 and older. *The Journal of Alternative and Complementary Medicine* 16 (1), 97–105.
- Vrantsidis, F., Hill, K.D., et al., 2009. Getting grounded gracefully: effectiveness and acceptability of Feldenkrais in improving balance. *Journal of Aging and Physical Activity* 17 (1).
- Ware, J., Kosinski, M., et al., 2008. *User’s Manual for the SF-12v2 Health Survey*. QualityMetric Incorporated, Lincoln, RI.
- Wildman, F., 2000. *The Busy Person’s Guide to Easier Movement*. The Intelligent Body Press, Berkeley.