

Improving Sensory Motor Function after a Spinal Cord Injury (SCI)

The Feldenkrais approach to sensory motor education



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February, 2009

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“If I have ever met a genius in the flesh, it is Moshe Feldenkrais.”
Avram Baniel, Professor of Industrial Chemistry, Hebrew University, Jerusalem. Rosenfeld
(1981)

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Introduction

“The system developed by Dr Feldenkrais...has as much potential for understanding the mind/body relationship as Einstein’s general theory of relativity had for physics.”
Bernard Lake, MD, Cardiologist, Author, Feldenkrais practitioner (Wildman, 2000)

Audience

This booklet is intended for people with spinal cord injury (SCI) and their support crew including family, friends, carers and health professionals.

Aim

This booklet is intended as a brief introduction to the Feldenkrais Method and it’s relevance to recovering sensory motor function in SCI. Other benefits, such as reduction in pain and spasm, are mentioned and a brief introduction to the sensory motor system is included. It is not intended to cover all the benefits people have experienced through the Method. For many with pain and disability, the Feldenkrais Method has been life changing.

At times I have included the academic qualifications of people I have quoted. This is to illustrate that many people with scientific backgrounds have scrutinised the Method.

1. The Importance of Relearning

“The execution of an action by no means proves that we know, even superficially, what we are doing or how we are doing it. If we attempt to carry out an action with awareness - that is, to follow it in detail - we soon discover that even the simplest and most common of actions, such as getting up from a chair, is a mystery, and that we have no idea at all of how it is done.”

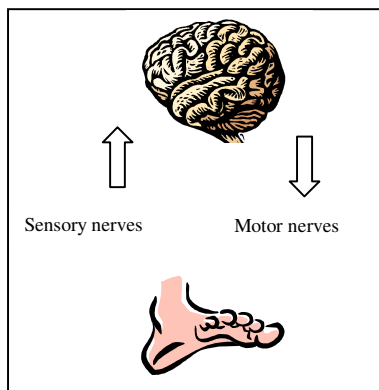
Moshe Feldenkrais, PhD (Feldenkrais, 1990, p.46)

Introduction

Relearning is a very effective (if not the most effective) way to enhance our movement capabilities. To understand how our movement can be improved, it helps to understand how we control movement and how we learn to move.

How we control movement

Movement is controlled by the sensory motor system via the central nervous system. Sensory information (such as proprioception or joint position sense) is sent via the sensory neurons (or nerve cells), up the spinal cord, to the brain. From the brain, a response is sent back down the spinal cord via the motor neurons. Neurons transmit a series of electrochemical impulses through the body. Impulses are sent from one neuron to the next, forming neuronal pathways from the brain to the muscles. As a movement takes place, proprioceptive information (or information about the body's new position in space) is sent back to the brain via the sensory neurons. Again this is as a series of impulses with each neuron connecting to the next neuron in the chain.



For instance, as the right heel touches the ground in walking, the sensory neurons provide information to the brain about the external environment (e.g. the ground surface under the foot, how much space there is in front of us) and our internal environment (e.g. where the left leg is in relation to the right leg, the position of the head in relation to the spine). This information is integrated and an instruction is sent to the muscles to perform the next action in the walking sequence.

Thus a constant interchange of information is sent via the sensory motor system allowing complex actions to take place without us having to constantly think about how to perform them. When the movements are well coordinated, they are smooth and controlled, muscle contractions are sequenced and timed to perform an intended function and you are simultaneously dextrous, strong and flexible.

How we develop movement and proprioception

Learning to move begins in childhood. During the first year of life, babies start to explore movement. As they explore movement, their image of themselves and where they are in their environment improves and thus their sensory motor system improves.



They explore grabbing objects, looking around; all the time using their whole body to perform movements. If the head moves, the whole body moves to assist with the movement of the head. As they develop, they learn to control their movement. They learn to transfer weight, to roll, to crawl, to sit, to stand and to walk. As the major joints, such as the shoulder joints, become more stable, they learn fine motor skills such as control of hand functions. As children develop further, they explore movements and find easier and more efficient ways of doing things. Thus movements that are initially clumsy and require a great deal of concentration will eventually become automatic and

graceful.

By the time movement becomes automatic, we are no longer aware of the detailed intricacies of our body image and movement; nor do we remember learning them. Coordinated movement has become so automatic and our body image such a natural part of ourselves that when we lose them (such as after an SCI) we have no idea of how to recreate them. This however does not necessarily mean we do not have the potential to recreate them. In many cases it may be a matter of relearning in a similar way to how we originally learnt.



Neuroplasticity

In the human nervous system there are numerous neurons and numerous possible neuronal pathways through which information could be transmitted. Yet we only use a fraction of our potential. Most of these pathways are developed in childhood. As we learn, neuronal connections are developed. After an SCI, neurons die and many of the pathways we have developed in childhood are destroyed.

Until the 1970s it was the belief amongst mainstream scientists that the adult brain was fixed; that it was not possible to make new neuronal connections beyond childhood. In the 1980s, Merzenich and colleagues demonstrated the ability of the monkey cortex to create new connections. This has been seen to be of value in rehabilitation including after stroke, repetitive strain injury and SCI (Holloway, 2004). By stimulating weak connections and inducing those neurons that are still alive to make new connections, it is possible to activate some recovery of function (Ginsburg, 1980).

Relearning: a paradigm shift

The traditional approach to SCI rehabilitation has focused on compensation. This is based on the assumption that the central nervous system is hardwired and unable to relearn. Typical approaches in SCI rehabilitation have been to compensate for lost function using assistive devices, to teach new strategies for achieving activities of daily living and to strengthen the still active muscles. However in recent years there has been a shift in

focus in SCI rehabilitation with a focus on relearning how to move in a coordinated way (Behrman, Bowden & Nair, 2006).



JM before walking lessons



JM after walking lessons

The presence of isolated muscle contractions (whilst encouraging) is not enough. We need to know how to organise those movements in a coordinated way. Without coordination, movements are characterised by spasms, tics and tremors and functioning is painful, tiring, slow and often impossible.

In recent years, some rehabilitation specialists have been investigating the ability of people with SCI to relearn how to coordinate movement. Much of this work has been done around walking. A number of studies have shown that, after injury, some people have been able to improve their walking skills using locomotor training (Behrman, Bowden & Nair, 2006).

In a study on walking with SCI, Merima Isakovic-Cocker (2006) discusses how, after SCI, coordination of movement must be re-taught. For a healthy walking person, walking is automatic. It is generally performed without awareness; the walker may not be conscious of the individual factors involved in the performance. After SCI, the ability to coordinate the movements that make up walking is often unavailable. This skill needs to be re-taught.

Isakovic-Cocker (who has herself sustained an SCI) worked with a man (JM) who had had an incomplete SCI at C4. He was able to walk but walked awkwardly, had a high degree of spasticity and felt dangerously unstable. Using a learning approach she taught him to walk with a normal, stable gait. Not only was he able to walk normally, but he experienced many of the other benefits that come with walking normally - less energy expenditure and fatigue, and greater feelings of confidence, comfort and pleasure.

Whilst for a number of people learning to walk is a huge advantage, for many there are other goals. For some, being able to operate a power wheelchair or bring their hand to their face is their immediate dream. There are many for whom proprioception is severely damaged and restoration of proprioception may be a pre-requisite to relearning movement.



Merima stands with a T12/L1 complete injury

Proprioception

Proprioception (or joint position sense) is the ability to determine where parts of the body are in space. Loss of proprioception is a significant consequence of SCI, yet it is frequently overlooked in rehabilitation (Committee on Spinal Cord Injury et al, 2005).

Proprioception is important for a number of reasons.

1. It is critical in coordinating walking and other movements (Committee on Spinal Cord Injury et al, 2005). With compromised proprioception, movement is awkward or impossible.
2. It has been found that decreases in proprioception have been associated with increases in pain (Schwoebel, Friedman, Duda & Coslett, 2001; Byl & Melnick, 1997).
3. Loss of proprioception has been found to result in people having negative feelings about their body (Sacks, 1990).
4. Proprioception is also important in our ability to stabilise joints and reduce injury (Alexander, n.d.).

Related to proprioception is kinaesthesia, the ability to feel ourselves moving. Kinaesthesia and proprioception are often used interchangeably, but with kinaesthesia there is more emphasis on the sense of motion. Without kinaesthesia, the input to the brain via the sensory nerves is adversely affected. This in turn affects the message to the motor nerves.

Proprioception and kinaesthesia can be relearned.

Proprioception and joint stability

In order to move easily, we need to be able to stabilise our joints. Joint stability is attained through the engagement of tonic muscle (type 1) fibres. Tonic fibres are found predominantly in the postural muscles and help one to stay upright. They are responsible for control and protection of the joint and are resistant to fatigue. In contrast, phasic muscles fibres (type 2) are generally responsible for producing movement and fatigue quickly (Alexander, n.d.). After SCI, tonic fibres change to become phasic fibres (Scelsi, 2001) which may compromise stability, movement and proprioception and increase the risk of injury. On the other hand, proprioceptive training has been found to reduce injury (Alexander, n.d.).

When one is unable to stabilise joints with tonic muscles, they may compensate by co-contracting phasic muscles. This means the phasic muscles are unavailable for movement.

2. What is the Feldenkrais Method?

The Feldenkrais Method (FM) "focuses on expanding kinesthetic awareness as a basis for improving function. FM offers guidelines for directing a learning experience for a patient that are individualized, yet based in common features of human anatomy and patterns of movement."

Jim Stephens, PhD, Assistant Professor, Physical Therapy Department, Temple University, Feldenkrais practitioner (Stephens, 2000, p.375)

Introduction

The Feldenkrais Method is a form of sensory motor education. It helps to restore proprioception and coordinated movement, by combining an understanding of the complexities of movement with an understanding of the learning process. This leads to improved function and reduced tension and pain. Functional improvement can be anything from learning to breathe more easily and balance more comfortably in your wheelchair to walking.

Learning how to learn

A key component of the Method is learning how to learn; both neurological and cognitive learning takes place. At the neurological level, you are forming new neuronal pathways by doing new movements in an easy way. The brain will naturally select the path of least resistance; it will adopt that pattern of movement which is easiest. This means that movement is automatically improved; your conscious mind doesn't have to be constantly reminding you of what you should be doing.

At the cognitive level, you can learn principles of movement so that you are able to explore the movements on your own. During lessons you discover for yourself the quality



A Feldenkrais Awareness Through Movement lesson

of coordinated movement and the principles that govern this. The more you begin to understand the Method and the more aware you become of your own body, the more you can facilitate your own learning and improve between sessions.

The Feldenkrais Method is not a therapy, an exercise program or a form of bodywork. It does not involve strengthening or stretching muscles and you will not experience any form of manipulation or forceful releases as

occur in many forms of bodywork. It is a scientifically-based tool for learning that effects long term change.

The founder of the Method

The Method was developed by Dr Moshe Feldenkrais (1904 to 1984), an Israeli born in Russia. Moshe (a physicist, engineer and martial artist) has been dubbed a genius by many. After developing a painful chronic knee problem in the 1940s, he combined his knowledge of martial arts, neurophysiology, anatomy, learning theory, child development, systems theory, physics and psychology, to develop a system to teach himself to walk again without pain.

This led him to teaching at universities in North America, Israel, Sorbonne in Paris and throughout Europe. Amongst his enthusiastic pupils were prominent individuals such as Professor Karl Pribram (Stanford University neurophysiologist and Nobel Prize nominee), Margaret Mead (world-renowned anthropologist) and David Ben-Gurion (Israel's first prime minister and named one of Time magazine's 100 most important people of the 20th century). Robert Schleip (1994) (PhD in Human Biology, MA in Psychology, Feldenkrais practitioner) relates an anecdote about Pribram in his foreword to the German edition of Moshe's book "Body and Mature Behaviour". Nobel prize-winning neurophysiologist, Luria, instigated a meeting of leading neuroscientists to discuss a new surgical procedure for epilepsy. Pribram realised that the intervention was not necessary; that the same outcome could be reached without invasive surgery. He left the room and returned with "Body and Mature Behaviour", the source of his inspiration.

Whilst even this century, other scientists have been exploring how to incorporate their knowledge of neuroplasticity into rehabilitation (Holloway, 2003), Moshe was taking advantage of the neuroplasticity of the nervous system almost 60 years ago.

The Feldenkrais Method today

The system Moshe Feldenkrais developed was both sophisticated and effective and has helped thousands to rehabilitate from both complex and debilitating injuries. Contemporary advocates include Jill Bolte Taylor (the former Harvard neuroanatomist who has gained popular international recognition after recovery from severe damage to the left hemisphere of her brain), Frank R. Wilson (neurologist and medical director of the Peter F. Ostwald Health Program for Performing Artists at the University of California School of Medicine) and Dr Norman Doidge (research psychiatrist, psychoanalyst and author of "The Brain That Changes Itself") who describes Moshe Feldenkrais as a "remarkable man and a genius" (Doidge, 1999).

In her book, "My Stroke of Insight", Bolte Taylor (2008) writes that one of the greatest challenges to physical recovery she faced after brain surgery was a problem with the temporal mandibular joint (jaw joint). However, with the use of the Feldenkrais Method, this recovered quickly. She describes it as a "lifesaver" (personal communication, July 31, 2008).

In his book "The Hand", Wilson (1999) devotes a chapter to the Feldenkrais Method and, in particular, the work of Feldenkrais practitioner, Anat Baniel. He writes "Before I met Anat I had already come to appreciate how potent an ally a Feldenkrais practitioner can be to a neurologist" (p.246).

There is now a growing number of people choosing to train in the Feldenkrais Method, drawn to it by its effectiveness in their own lives or the lives of their clients. One example is Ed Muegge (MA in Psychology) who came to the Method almost 20 years after sustaining an SCI at C5/6. He was so impressed with the benefits that he got from the Method that he went on to train to become a Feldenkrais practitioner. Another is Rich McLaughlin (also with an SCI) who is currently seeking funding to do the training.

How is the Method taught

The Feldenkrais Method is taught in two ways: Awareness Through Movement (ATM) lessons and Functional Integration (FI) lessons.



A Functional Integration lesson

The Feldenkrais practitioner verbally guides clients through a sequence of gentle movements. Many of these movements are based on functional activities such as reaching and looking behind yourself. Attention is drawn to the process of each movement so clients can learn to observe and feel how they do the movement, what parts could be more involved and how they may be hindering the movement.

Functional Integration lessons are performed one-to-one. The client usually lies on a low padded table or bed. With precise handling or instructions, the practitioner helps the client to feel new ways of organising their movement. When loss of movement is significant (such as with SCI) it is a good idea to have one-to-one sessions.

Awareness Through Movement lessons are usually taught in groups. In ATM classes, the

The learning experience

The learning is a relaxing and rewarding experience. People usually notice they feel better immediately after a session. Some of this new learning is lost and then recreated in a later session. Other aspects are retained and may often be really obvious to you in the next hour or so. Then they become an unconscious part of your repertoire and you may no longer notice them. Over the long term people notice gradual and cumulative improvements.

Although sometimes change can be dramatic, generally it is slow with more severe or long-term injuries. However, whether you have been diagnosed with a high level complete injury or a low level incomplete injury you may be able to learn to increase your feeling of comfort and stability and improve the way you move.

Practical examples

To view examples of Feldenkrais in practice, search for “Feldenkrais” on www.youtube.com.

3. Research into the Feldenkrais Method

The Feldenkrais technique “is likely to lead not only to musculoskeletal improvements but also to improvements for the cardiorespiratory systems and importantly to improved mood states and to an improved self-esteem and sense of personal control in having access to a procedure one can undertake oneself.”

David Garlick, BSc(MED), MB, BS, PhD, Senior Lecturer, School of Physiology and Pharmacology, University of New South Wales (Australian Feldenkrais Guild (NSW Division), 1994)

Introduction

Research has provided evidence of benefits with chronic illness, disability and the able-bodied. Some of those benefits are listed below.

Multiple Sclerosis

- improved ease of movement (Stephens et al, 1999)
- improved stability (Stephens, DuShuttle, Hatcher, Shmunes & Slaninka, 2001; Batson & Deutsch, 2005)
- improved balance confidence (Stephens et al, 2001)
- improved well-being (Stephens et al, 1999)
- decreased stress (Johnson, Frederick, Kaufman & Mountjoy, 1999).

Stroke

- improved stability (Batson & Deutsch, 2005)
- improved mobility (ibid.)
- greater recruitment of the affected part of the motor cortex (Nair, Fuchs, Burkart, Steinberg & Kelso, 2005).

Chronic pain

- decreased pain (Bearman & Shafarman, 1999; Lundblad, Elert & Gerdle, B, 1999; Malmgren-Olsson & Branholm, 2002)
- improved functioning (Bearman & Shafarman, 1999; Phipps et al, 1997 as cited in Stephens, 2000)
- improved coordination (Schon-Ohlsson, Willen & Johnels, 2005)
- improved body awareness (Dean & Yuen, 1998, as cited in Stephens, 2000)
- reduced fatigue (ibid.)
- improved sleep (ibid.)
- reduced psychological distress (Malmgren-Olsson & Branholm, 2002)
- improved quality of life (ibid.)
- improved self-efficacy (Malmgren-Olsson & Branholm, 2002)
- improved health locus of control (Dennenberg & Reeves, 1995, as cited in Stephens, 2000)
- improved self image (Malmgren-Olsson & Branholm, 2002)
- reduced costs (Bearman & Shafarman, 1999)
- improved posture (Lake, 1992).

Elderly

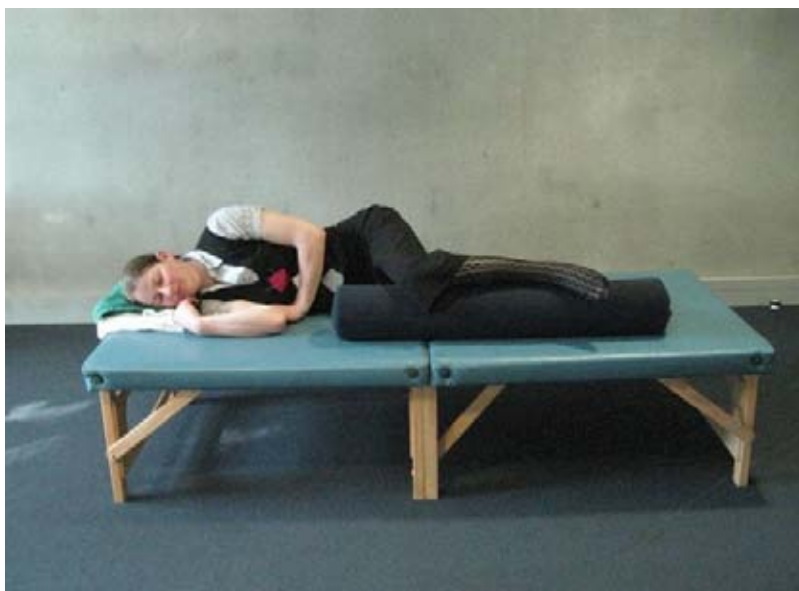
- improved coordination (Stephens, Pendergast, Roller & Weiskittel, 2005)
- improved vitality (ibid.)
- improved mental health (ibid.)
- improved balance (Hall et al, 1999, as cited in Stephens, 2007)
- increased gait speed (Connors, Galea & Said, 2007; Vrantsidis et al, 2009)
- improved balance confidence (ibid.).

Able-bodied

- improved stability (Buchanan & Vardaxis, 2000)
- increased range of movement (Ruth, & Kegerreis, 1992; Stephens, Davidson, Derosa, Kriz & Saltzman, 2006)
- increased ease of movement (Ruth & Kegerreis, 1992)
- improved reach (Dunn & Rogers, 2000)
- reduced anxiety (Kolt & McConville, 2000; Kerr, Kotynia, & Kolt, 2002)
- improved mood (Netz & Lidor, 2003)
- improved breathing (Saraswati, 1989, as cited in Stephens, 2000)
- improved body image (Elgelid, 2005; Dunn & Rogers, 2000).

More information

Information on research and case studies can be found in the folder labelled "Feldenkrais Research and Case Studies" in the Alan Bean Centre library (NZ).



4. SCI Rehabilitation Programmes and Case Studies

“One of the defects of spinal cord injury not often discussed or appreciated is loss of proprioception. As a C5/6 quadriplegic, I have no sense of where my lower limbs are placed and a minimal sense of the positioning of my upper extremities...I expect that loss of proprioception is an important aspect of motor function and its return after spinal cord injury is an important aspect of regaining function.”

Robert Schimke, Professor Emeritus of Biology, Stanford University (Committee on Spinal Cord Injury et al, 2005, p.134)

Introduction

Although there has been no systematic research with SCI and Feldenkrais, there is a growing body of evidence of its effectiveness. A number of rehabilitation providers have been using it as part of their practice and some practitioners have provided documented case studies of their work. What is interesting about the case studies is that many people report improvements over 10 (and even 25) years after their injury when it is normally presumed that SCI stabilises within two to five years of the injury.

Rehabilitation programmes

Nottwil Paraplegic Centre in Switzerland (one of the largest spinal hospitals in the world) has been using Feldenkrais for over 10 years. According to Dr Markus Meyerhans, Head of Psychology, it is used there to enhance body image, coordination, breathing and stability and to reduce pain. Many clients report on the importance of the Method in their rehabilitation and appreciate its sensitivity. Physiotherapists also notice that clients are better able to coordinate function after a Feldenkrais lesson (personal communication, February 2, 2007).

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.

It is also part of the inpatient programme at the Mount Sinai Rehabilitation Centre (n.d.).

Case studies and documented sessions

In 1980, Carl Ginsburg published two case studies on his work 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 (Ginsburg, 1980).

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 (Bost, 1997).



Compressing the legs gives Michael an image of his legs - and the pain diminishes

Helga and Michael have developed a film based on their work. The film includes an interview with Carl Ginsburg and helps to provide insights into the way the nervous



system processes information. Helga describes the learning process on the cover of the film - "Firstly, it begins with sensing oneself, continues with learning to become aware of one's movement which leads onto learning to control the intended movement, like in Michael's learning process." See her website www.helgabost.de. The DVD is available in the Alan Bean Centre library (NZ).

Movement of the leg is integrated with the spine

Feldenkrais practitioner, she learned to walk and documented her learning process in a book "Walking in one's own feet: Paraplegia - a somatic investigation." This was first presented as a Masters Thesis at Antioch University, San Francisco. The German version is entitled "Auf eigenen Füßen gehen - Somato-psychologische Erfahrungen einer ehemals Querschnittsgelähmten", Der grüne Zweig, 131 (ISBN 3-925817-31-X) (Helga Bost, personal communication, August 16, 2008).

Irene Lober, who translated the film into English, is a Feldenkrais practitioner with an SCI. Before becoming a

Foster (2004) reports what she describes as a "miraculous demonstration". She observed Gaby Yaron, a Feldenkrais practitioner, working for almost an hour with a woman with paraplegia. Towards the end of the hour the woman, coaxed by Gaby, stood and took a few tentative steps.

A Nottwil 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 (Swiss Paraplegic Research, 2007).

There is documented evidence of Moshe Feldenkrais doing functional integration sessions with people with SCI. Ginsburg (1980) reported observing Moshe working with a woman with paralysis in 1977. At the beginning of the session the woman did not know where her body was below the injury. During the session Moshe restored her body image and at the end of the session she was able to move her leg. In an article by Fox (1978) Moshe reports on a session where he restored muscle tone in the foot of a man who had been paralysed from the neck down for 32 years.

The International Feldenkrais Federation (IFF) North American Video library holds a video recording (recorded in 1980) showing Moshe completing 11 sessions over six weeks with Ronald who, 16 years before, had sustained an SCI after a fracture at T4. Spasticity of the legs was a particular issue for this Ronald. During these sessions Ronald learnt to improve his ability to rotate to look left and right, to organise his legs more effectively when rolling, to use his pelvis in flexing and extending, to engage his stomach muscles, to begin to abduct and adduct his right leg, to stabilise his legs when prone and to improve the connection between his neck and spine. The spasticity in his legs was reduced, proprioception was improved and functional improvements included an improved ability to do wheelchair transfers, an improved ability to come to stand with the standing frame, and an improved ability to stabilise himself in sitting meant he was more able to put his shoes on and off without overbalancing.



Anthea finds that being able to use her pelvis helps with her horseriding



Andrew learns to engage his pelvis 24 years after injuring his spinal cord

About 2½ years ago I worked with three people diagnosed as ASIA A (complete SCI), two to five months after their injury. This was my first experience of working with SCI. All three reported improvements in proprioception in virtually every session. At least two of the people I worked with said they had had no change since the accident but noticed immediate improvement in proprioception from the first session. By the second week (after four to six sessions) they had movement below the lesion. One (for whom pain was a major issue) reported reductions in pain after the sessions. The

other (for whom spasm was a major issue) reported permanent reductions in spasm. Diagnosed T10/11 complete, she had a return of proprioception to her legs and she was able to feel and engage her pelvis by the fourth session. As a lover of horse riding, she has found the ability to use her pelvis valuable to her riding. The third (diagnosed C4/5 complete) noticed improved coordination from the first session. He too gained movement below the lesion and he reported reductions in both pain and spasms after sessions. He reported that he was able to feel where his whole body was (although sometimes he got a bit confused with his legs), could bring his hand to his face and his hand and arm function was good enough to turn pages.

It appears that sometimes those diagnosed as complete do develop movement below the lesion in the first two to five years. More pertinent then is my work with people at least 12 years after their accident. Since working with the initial three, I have been working with two people with incomplete SCI (12 and 24 years after injury) and one person with complete SCI (12 years after injury). All three have reported an improvement in proprioception and stability and ease of movement to varying degrees. For example one client who broke his neck 24 years previously noticed a reduction in spasms and is now able to engage his pelvis (of which he was previously unaware). This enables him to stand without spasm, makes activities such as rolling over in bed easier and reduces the amount of strain on his shoulders. Other benefits reported by people from this group of six have included improved posture, improved ease of movement, an improved feeling of confidence, improved mood, improved breathing, increased relaxation, and generally feeling better.



13 years after his accident Hamish finds a new awareness which he feels helps his stability and well-being



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PSY/BKR

TO WHOM IT MAY CONCERN

**APPLICATION OF THE FELDENKRAIS METHOD IN THE SWISS PARAPLEGIC CENTER
NOTTWIL**

Dear Mrs. Allison

Since over ten years the Feldenkrais Method is part of our rehabilitation program for Paraplegia, Tetraparesis, Tetraplegia, Pain Patients, and Patients with Multiple Sclerosis.

As it is a Method which works through Tactile Information to the ZNS and movement coordination, it demands from the Patient an attitude of learning. Many Patients report the importance of this method in their Rehabilitation Process, also because it uses their sensitivity and not the often painful muscle training. The general feedback of the patients is very positive. Also Physiotherapist often report better Coordination of Function during Physiotherapie after a Feldenkrais lesson. There is no research so far on the impact of the Feldenkrais Method in the Rehabilitation with Para or Tetraplegics.

The Feldenkrais Method is used to enhance:

1. The Self Image which is often distorted through the accident or illness which lead to the Paralysis.
2. Coordination of movement which has to be re-established with incomplete Para or Tetraplegics.
3. Breathing ability
4. To improve Stability either in sitting in the wheelchair or in learning to walk
5. To reduce Pain either through functional Disorder or Nerve Pain.

With kind regards yours

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5. SCI Endorsements and Testimonials

Feldenkrais "is the most sophisticated and effective method I have seen for the prevention and reversal of deterioration of function."
Margaret Mead, PhD, Anthropologist (Wildman, 2000)

Introduction

This section includes endorsements and testimonials from people with SCI. Again what is interesting is that people are reporting improvements years after their injury.

Endorsements from people with SCI

Gary Karp's book "Life on Wheels" provides advice on the many issues one faces when in a wheelchair, and in particular with SCI. Gary (guest speaker, NZ Spinal Conference (2000); NSCIA [Spinal Cord Injury Hall of Fame](#) Inductee as Disability Educator (2007)) injured his spinal cord in 1973. His book offers information on a wide range of areas including managing your rehabilitation, sex, wheelchair selection, identity issues and staying healthy. In his book, Gary speaks highly of the Feldenkrais Method saying that it has a lot to offer people with disabilities. It enables them to learn to use their bodies more efficiently and to make the most of their strength and functioning (Karp, 1999). For more information on Gary, see www.garykarpspeaks.com.

Molly Hale broke her neck in 1995. To begin with she was given the prognosis that there would be no movement below her shoulders. The primary practice of Aquatic Therapy has been enhanced by the inclusion of Aikido, Feldenkrais, Continuum, Hippotherapy, Meditation and breath work. Molly has made significant improvement and states that these practices support her ability to "redirect my energy away from the prognosis and work with my inner knowing". Seven years of continual focus enabled her to get her legs underneath her and she is now able to walk independently in water and on land with balance support. Thirteen years post injury, she continues to improve (Personal communication, September 6, 2008).



Molly teaches Aikido to kids

Molly became the subject of a documentary film "Moment by Moment: the Healing Journey of Molly Hale" which tells the story of the first seven years of her journey. She has also set up a website and not-for-profit organisation to inspire and provide resource information for others with disabilities, their families, friends and providers. She is developing a DVD called "Pathways to Wellness" which is an educational DVD

combining "Moment by Moment: the Healing Journey of Molly Hale" with a guide to healing practices and other pertinent information used by Molly in her ongoing rehabilitation. More information can be found on her website, www.abilityproduction.org. A DVD of "Moment by Moment: the Healing Journey of Molly Hale" is available in the Alan Bean Centre library (NZ).



Molly walking in the water in 2006

“Walk with Me” is an autobiography of Kevin Hitchcock, Director of News at Channel Ten, Sydney. Kevin, who broke his neck at C3/4, was told he would never get feeling below the neck or walk again. Despite this, he ended up walking and restoring arm and hand function. He attributes much of this to a programme devised by Des Donovan, a chiropractor and osteopath. Des, who has had significant exposure to the Feldenkrais Method, claims he bases the programme on Feldenkrais principles (Hitchcock, 1998).

SCI Testimonials

I was amazed at how much improved physical function I acquired after having completed the Feldenkrais training program, given that I was over 20 years post spinal cord injury at C5 &6 with partial paralysis in all extremities.

Edward Muegge, MA(Counselling Psychology), Feldenkrais practitioner

I came to the Feldenkrais Method (in 1997) nine years after my spinal cord injury. The Method has helped me see the intricacies of movement. Each session reveals new possibilities that can overcome a lifetime of conditioning. It has been and continues to be valuable to my ease in movement.

Rich McLaughlin, BA(Archaeology and Religious Studies), rtn7884@aol.com *Rich is currently seeking funding to train in the method. Any information on available funding would be much appreciated.*

It never ceases to amaze me how after one session with Cindy, I notice dramatic improvements in body awareness, often in places where I have little sensation or movement. Feldenkrais should be a mandatory part of the rehabilitation process I believe.

Claire Freeman, BDesHons, PG Dip Rehab, PG Dip Mk; graphic designer, NZ Spinal Trust, injured 1995

The Feldenkrais method taught me to refine my sensory awareness by combining visualization with intelligent moving, leading to more mobility. Becoming a Feldenkrais practitioner was then a four-year physical and mental therapy and teaching how to maintain, improve, and refine my balance and awareness of myself as a whole.

Irene Lober, MA, Feldenkrais practitioner, incomplete paraplegia after lesion L 3/4

Feldenkrais has made a huge difference for me. I did Feldenkrais work with a physical therapist after having developed bilateral elbow and wrist tendinitis from computer work. The symptoms became chronic enough for me to stop my work as a computer graphics designer and manager in 1992.

To have gained a full sense of how my body moved and where my power was made a huge difference. Three examples:

- Given my T12-L1 level, I have full use of my hips. When I do transfers into and out of the wheelchair, I now use my trunk and hips while rotating my body, rather than doing it mostly from the arms and shoulders.
- When I open a door, likewise, I don't just use my triceps to pull with my arm, but rotate my trunk.
- When I push my chair, I involve my trunk much more.

After doing the Feldenkrais work in 1993, people noticed the difference in how I was using my body as I pushed. I share your view that it has much to offer people with SCI.

Gary Karp, BArch; Guest Speaker, NZ Spinal Conference (2000); Speaker; Author; Trainer, injured 1973

I have been using Feldenkrais for almost a year now and as a result have a new awareness of my body which I feel not only benefits my wellbeing but also helps with my posture and balance.

Hamish Ramsden, BACom; company administrator; Spinal Network News Editorial Team Member; C5/6 tetraplegia; injured 1994



Anthea (with a diagnosis of T10/11 ASIA A) stabilises her leg, September 2008

ease and to use my body more economically...I am very grateful to Cindy for introducing Feldenkrais to me.

Anthea Gunner, 28/6/06; PA to South Island Manager, CourierPost; initial diagnosis – T10/11 ASIA A

My first session with Cindy was incredible - I experienced tingling on the soles of my feet and I could sense a circling motion as well. Previously my partner had massaged my feet and I had not been aware of any sensation at all. This continued throughout our sessions and by the time it came for me to go home to Wellington I was able to have a sense of where my legs were and constant tingling in my feet. I am still experiencing this now...Cindy also taught me how to roll onto my side with

I had experience with Feldenkrais prior to rolling my car and sustaining the C5-6 spinal cord injury. I was able to call upon its basic premise, that of bringing awareness to the parts of the body where the energies are blocked or stagnant, feeling from the inside-out and the outside-in.

From the beginning, even though I was “paralyzed” from the shoulders down, I could feel the difference in my right and left sides energetically. Feldenkrais work assisted my body’s cellular knowing, allowing what was ordered in my left side to inform my right side. The consistent patterning practice of Feldenkrais, whether the movement was a visualization or actual hands on work with a practitioner, enabled my body to keep reclaiming more of itself.



Molly getting ready to drive 2007

Molly Hale, BS(Psychology); Keynote Speaker, “Endless Possibilities” Conference, G.F. Strong Rehab Hospital, Vancouver, 2005; Aikido 3rd degree black belt; Olympic torch bearer, 2002; injured 1995

You feel so relaxed, and at the same time, you're doing something really good for yourself in a physical sense.

Andrew Hall, BAgCom, CEO NZ Spinal Trust, injured 1983, www.spinaltrust.org.nz.

In the beginning, I was surprised that unexpected movements were possible again. Important for me, above all, was to learn to feel myself once more, although I have a complete loss of sensation. I could feel once more my feet and legs through pressure, movement, warmth and the orientation of my legs in space.

In the session, I could feel myself whole again, as Helga gave me an impulse for organisation to stand, compressing from the foot to the head. And because of that, the pain diminished. (Translated from German)

Michael Willems, Marpingen, Germany

I really enjoy working with Cindy and her ideas make a lot of sense to me...I found that over the course of our sessions I noticed improvements in awareness and sensation... I have adopted Cindy’s techniques into my daily routine and believe as a result they relieve my pain and spasm, keep my body supple, and increase the potential of recovering sensation so much more than if I was to neglect these techniques.

I totally recommend the ideas and techniques that Cindy offers.

Johnny Bourke, Psychology student, Massey University; Spinal Network News Editorial Team Member; initial diagnosis - C4/5 ASIA A

6. Some Feldenkrais Principles in Practice

The Feldenkrais Method "is not just pushing muscles around, but changing things in the brain itself so that the patient can gradually adjust his whole muscular dysfunction to what we call a normal image... Feldenkrais transmits the image, and you organise your brain to meet it".

Professor Karl Pribram, MD, PhD, Neuroscientist, Stanford University, Nobel Prize nominee (Fox, 1978, p.5)

Introduction

This section describes a few of the principles of the Method in order to give you a feel for what the Method is about. It by no means covers the complexities of the Method.

A number of authors describe the principles and the science underlying the Method in more detail and from a variety of perspectives. For example, Yochanan Rywerant (PhD, Feldenkrais trainer and former physics teacher) outlines at least 47 of the "principles" or



"working concepts" in his book "Acquiring the Feldenkrais Method" (Rywerant, 2000). In his book "Corollary discharge: The forgotten link" (Rywerant, 2008) explains how the Method addresses the issue of "corollary discharge" proposed by neuroscientist Professor Hans Lukas Teuber. Yochanan Rywerant has also produced a DVD demonstrating his work with a man who had had a stroke. The DVD is available in the Alan Bean Centre library (NZ). Whilst it is useful

to have an intellectual understanding of the Method, many believe that the best way to appreciate its effectiveness is to experience it.

Focus on function

A key component of the Method is focusing on function. Each function requires a complex array of actions, which we each perform differently. Take for example, the function of eating a bowl of porridge (or ice cream if you prefer). One component of eating ice cream is the action of bringing the spoon to the mouth. One way of performing this component is described below.

Bringing the spoon to the mouth involves sliding the shoulder blade over the ribs, which occurs at the same time as the humerus (or upper arm) supinates (or rolls backward), the elbow bends and the forearm supinates. Whilst the shoulder blade slide downwards, the collarbone rolls upwards which requires an articulation of the tip of the shoulder. An opening of the chest supports the movement. At the same time there are adjustments in the eyes, the head, the neck and the mouth to track the food and enable entry to the mouth. There are also simultaneous adjustments in the trunk to prevent one tipping over

as the changing position of the arm shifts the centre of balance. All these actions are sequenced in a timely manner to enable coordination of this component of eating ice cream.

If the amount of learning required to perform this action sounds overwhelming, take heart. Many of the components of bringing the spoon to the mouth are also involved in other functions such as brushing your hair, using a computer or operating a wheelchair (power or manual). The task of the practitioner is to facilitate your learning of these functions.

Introducing new movement options

Generally after SCI, when the condition has stabilised, people move in the same way, from thereon in, without knowing that they have other options. For example, they may not be aware that they have the capability of sliding the shoulder blade down whilst the collarbone rolls up, thus enabling the upper arm to supinate. The Feldenkrais practitioner



introduces new possibilities to the client. In time these new possibilities become part of the client's repertoire.

Often I find that as a new movement becomes part of the client's repertoire, proprioception and kinaesthesia expand. For example, teaching a client to articulate the shoulder and roll the upper arm, can lead to increased awareness of the shoulder, elbow, forearm and hand. Teaching a client to move the pelvis can lead to increased awareness of the legs.

Modifying the image of movement

Often (in the absence of SCI) an inability to move is perceived as a structural issue (at the site of the joint or muscle) over which one has no voluntary control. For example the inability to move the leg in relation to the pelvis may be thought to be due to stiffness in the hip joint or tightness in the hamstrings. Attempts to remedy this include stretching or using various forms of bodywork to release muscles or manipulate joints. This does not address the fact that the tightness or stiffness is a consequence of an inaccurate image of how to perform movements. Our actions do not match our intentions if our self-image and image of the action is inaccurate. By changing our self-image and the way we move, we reduce the tightness in the muscle. A study assessing the ability of able-bodied participants to lengthen the hamstring muscles using Feldenkrais found Feldenkrais to be significantly more effective than stretching (Stephens et al, 2006).

Modifying habitual responses

In the presence of SCI, the inability to move is frequently perceived as a consequence of messages not getting through the damaged spinal cord. This may not always be the case. The inability to move may be a consequence of the way in which one is attempting the movements. For example, every time you try and move using the agonist muscle, the

antagonist muscle may be activated simultaneously, thus restricting the movement of the joint. This may be a consequence of how the brain is processing information. The co-contractions of agonist and antagonist muscles are a habitual response. Often this response is initially triggered as a result of injury or disruption to the central nervous system (e.g. pain, SCI, stroke) and, with repeated attempts to perform the movement, becomes habitual.

Common ways of trying to overcome co-contractions of agonist and antagonist muscles is to apply more effort, i.e. work the agonist muscle harder. This causes the antagonist muscle to work harder in response thus limiting any gains in movement.

The Feldenkrais practitioner has a number of ways of facilitating the client's ability to modify their habitual response. For example, they may change the client's orientation in space and teach them to move the hip joint in a different way. One way is to move the trunk against the leg, rather than the leg against the trunk. Thus we have "tricked the brain", the habitual response is not triggered and the hip joint is no longer so "stiff".

Enhancing kinaesthetic awareness

A key feature of the Method is enhancing awareness of how you move. As Moshe Feldenkrais said "How can you change what you're doing if you don't know what you're doing?"

When we lose the ability to perform a function such as eating a bowl of ice cream, we often end up contracting muscles that, rather than supporting the function, interfere with it. Clients are encouraged to pay close attention to the kinaesthetic experience of how they move. With the help of the practitioner, they can discover how they interfere with movement.



For example, one of the ways that people tend to interfere with the sliding of the shoulder blade over the ribs is to contract the muscles around the shoulder blade, thus inhibiting the movement of the shoulder blade. Another way that people interfere with the function of eating ice cream is by co-contracting muscles around the chest which inhibits the movement of the shoulder. One of

the roles of the Feldenkrais practitioner is to help the client become more aware of how they are interfering with the function.

In order to know that one is inhibiting the sliding of the shoulder blade, one may first need to know or feel the position of the shoulder blade and how it moves. Feldenkrais practitioners spend many years learning how to touch and move their clients so that proprioception and kinaesthesia are heightened.

Frequently as the proprioceptive and kinaesthetic experience increases, clients experience a decrease in spasm. For example, I was working for the first time with a woman who had continuous spasms in both legs. She told me that this happened night and day and kept her awake at night. She said she had no sense of where her legs were and could not feel them being touched. Within a minute of my working with her right leg she said the sensation in her right leg began to return. At the same time, the spasms in her right leg stopped. In the next session, we worked in the same way with her left leg and the spasms in her left leg reduced. Later, she told me the spasms never returned to their previous level.

Frequently the reporting of proprioception and kinaesthesia is the beginning of a process that eventually culminates in coordinated movement and improved motor functioning.

Engaging the whole body



When the large muscles of the trunk are used well, it becomes easier to control the limbs. Trying to move the limbs when there are massive co-contractions in the trunk (which is usual with paralysis) is difficult, if not impossible. Bringing the hand to the mouth, for example, does not involve just the movement of the shoulder and arms. It also involves adjustments in the trunk that support the movement of the shoulder. In addition, how you move the head and eyes affects the control of

the trunk and limbs. In the Feldenkrais Method, much of the focus is on learning to move (or at least being aware of) the trunk, head and eyes so that they support the use of the limbs.

For some, working with the whole body might seem counterintuitive with SCI. However, my observations and client feedback suggest that working with the whole body is valuable regardless of the diagnosis (complete or incomplete) or the number of years since the accident. For some this may mean an increase in proprioception and stability. For others, this can mean learning to use parts of the body (such as the pelvis) that they have not previously been able to use. This leads to increased ease of movement and less overwork of the shoulders. Even decades after the injury, some people are capable of learning to use parts of themselves that they could not previously use.

Reducing external stimuli

In order to enhance learning, we reduce stimulation to the nervous system that may distract the client. This means ensuring that the client is relaxed and able to focus. For this reason many of the lessons are done with the client lying down. This reduces the effect of gravity, making it easier for the client to learn new skills. Once the new skill is learned, we can then introduce gravity. The client can come to sitting or standing and try the new skills in this orientation.

Ease and efficiency

The practitioner will only move the client (or encourage them to move) within their comfort zone even if that means encouraging them to work with their imagination only. Forcing, pushing through pain or initiating spasm to move is not encouraged. Using force stimulates the sympathetic nervous system and causes co-contraction of agonist and antagonist muscles. In other words, working hard causes a stress reaction which makes it harder to move. This interferes with our ability to learn.

Take the example of sliding the shoulder blade across the ribs. If the practitioner were to try and pull or force the shoulder blade across the ribs, the immediate reaction in the client's neuromuscular system would be resistance. In fact, rather than the shoulder blade sliding further, the contractions that inhibit the movement of the shoulder blade would become stronger and may lead to spasm.

Clients learn to recognise comfort by developing an internal sense of what feels good. The practitioner can assist them in recognizing when they are pushing too hard. Evidence of pushing, for example, includes stopping breathing, clenching the jaw or hardening the eyes. As they learn to move with more ease and efficiency, strength and flexibility are significantly increased in a way that improves functioning in everyday life.



Process orientation

In order to facilitate learning, clients are encouraged to be process oriented and pay attention to the quality of their movement. For example, observing how you move, as you attempt new movements, can be enough to bring about improved movement. As long as you stay process oriented, you are always learning. As soon as you become goal oriented and try to “get it right” you begin to exert effort which interferes with your learning.

Responsive to individual needs

Feldenkrais is not prescriptive but is responsive to the individual needs of the client. Each of us has our own way of moving (or not moving). The practitioner explores with the client and works to develop a course of learning that will meet that client's needs, working at a pace that is appropriate for that client.

For example, when I work with a client, I am continually noticing how they respond to what I'm doing and adjusting my behaviour in response to this. Is this pressure too much, too little? Is this trajectory a little off? Does their breathing improve? Are they easier to move when I bring their attention to their pelvis? How do they feel? How do I feel when I move them in this way? Am I noticing resistance? Am I asking them to do something that is too challenging for them at this point in time?

This quality of attention produces results. Often, I have heard clients make comments such as "when other people touch my foot it spasms, but when you touch it I can feel it" or "when other people move my leg it spasms, but when you move it I can feel it moving".

Pleasure

Feldenkrais lessons are in themselves rewarding and a key principle of the Method is a focus on pleasure. When movement has become a source of pain, involves a lot of effort or is impossible, it is a relief to once again feel that movement can be pleasurable and easy.



7. Feldenkrais Practitioners and Resources

“Training in the method is intensive, active and inspiring...In addition to the self-exploration and development crucial to the learning process, practitioners in training must gain considerable experience developing kinesthetic and tactile skills...Students learn the theoretical principles of several disciplines, including biomechanics, the evolution of human movement and communication skills.”

Frank Wildman, PhD, Feldenkrais trainer (Wildman,1999, p.36)

Practitioner training

Feldenkrais practitioners complete a professional training programme over four years. During this time, trainees learn to develop a deep understanding of movement and its formation, to become astute observers of movement in others and to teach others to enhance their awareness and movement skills. Certified Feldenkrais practitioners are required to meet continuing education requirements to maintain certification.

Contacting practitioners

The FELDENKRAIS® Guild website (www.feldenkrais.org.nz) gives names of practitioners and their contact details throughout New Zealand.

For countries outside New Zealand, check the International Feldenkrais Federation (IFF) website www.feldenkrais-method.org.

The New Zealand FELDENKRAIS® Guild Inc

The New Zealand FELDENKRAIS® Guild guides the professional development, quality and integrity of the FELDENKRAIS® Method in New Zealand. It acts as the regulatory body governing the ethics and standards of practice. The Guild is a member of the IFF which is represented in 17 countries. FELDENKRAIS®, FUNCTIONAL INTEGRATION® and AWARENESS THROUGH MOVEMENT® are registered Service Marks of the New Zealand FELDENKRAIS® Guild Inc.

Funding (NZ)

There are some physiotherapists that practice the FELDENKRAIS® Method. If you use a FELDENKRAIS® practitioner who is also a physiotherapist, you should be able to get your sessions funded by ACC.

You may also be able to get funding for some sessions through local funding organisations such as the Canterbury Community Trust.

The Feldenkrais library (NZ)

The Feldenkrais library www.feldenkraislibrary.org.nz contains books on the Feldenkrais Method and tapes and CDs with Feldenkrais lessons. Contact Caroline Maze (ph. 03 3517375).

About the Author

Background

I became a certified FELDENKRAIS® practitioner in 2003. Since then I have run Awareness through Movement classes, both privately and for the Christchurch City Council Pioneer Leisure Centre. I have been working part-time with people with SCI since the end of 2005. I have a Masters Degree (with Distinction) in Psychology and have honours level (first class) papers in Education and Psychology including counselling, education of children with disabilities, clinical psychology and social psychology. I have worked in a range of fields including movement education, Equal Employment Opportunities, research, training and facilitation, and mental health.

Publications, presentations and interviews include:

- *Restoring proprioception, kinaesthesia and co-ordinated movement with the Feldenkrais Method of sensory motor education*. Poster presented at the Annual Scientific Meeting of the Australian & New Zealand Spinal Cord Society, November 2008.
- Response to Gregory C. Murphy: Criterion problems in rehabilitation outcome research (2005). *The Australian Journal of Rehabilitation Counselling*, vol. 11, no.1.
- The assessment of pain beliefs and their role in predicting recovery from repetitive strain injury (2004). *The Australian Journal of Rehabilitation Counselling*, vol. 10, no 1 (co-authored with Dr Christine Stephens).
- Playing with movement 'heaps of fun' (January, 2002), *The Christchurch Press*.
- The relationship between beliefs about pain and perceptions of recovery in Occupational Overuse Syndrome (2001), *Masters Thesis*.
- Interview on the FELDENKRAIS® Method (2001), *Now TV*.
- Interview on the Move Over OOS programme (which received a New Zealand Recreational Award) (1998), *Future Indicative, National Radio*.

I came to the FELDENKRAIS® Method as a result of pain and loss of movement and proprioception. I tried many different techniques - alternative and conventional. I found that most of what I tried relieved symptoms only, made no difference or made me worse. FELDENKRAIS® was the only intervention that made a long term difference.

Contact details

Feel free to contact me for more information or if you have testimonials, case studies or research or other information that I can add to the next edition of this booklet.

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