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The *Feldenkrais Method*® of Somatic Education

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1. Introduction

The *Feldenkrais Method*® of somatic education is an integrative approach to learning and improving function among people of varying abilities across the lifespan. With an emphasis on increasing self-awareness through lessons that stimulate sensing, moving, feeling, and thinking, certified practitioners or teachers of the method propose to take advantage of the human capacity to self-organize behavior (Buchanan & Ulrich, 2001; Ginsburg, 2010).

People have used the *Feldenkrais Method* to enhance their function in many aspects of life, including performance at work, in sports, or in the performing arts. However, estimates are that many more have used it to recover from injury, manage pain, reduce stress, or improve other health-related conditions, either as complementary or alternative approaches to traditional Western medicine. Because of this usage, some groups, such as the United States National Institutes of Health's National Center for Complementary and Alternative Medicine (National Center for Complementary and Alternative Medicine [NCCAM], 2004), view the *Feldenkrais Method* as a form of complementary and alternative medicine, despite the broader self-identification as a learning method.

Method founder Moshe Feldenkrais, DSc, (1904-1984) was cautious about the constraints he perceived would be associated with establishing his method within a medical model and the broadly held allopathic emphasis on disease of his time (Feldenkrais, 2010). Despite medicine's growing biopsychosocial perspective, identification with it remains controversial today among practitioners. Some recognize the improved access that may be afforded by that association, while others express apprehension, as did Feldenkrais, about the limitations on this learning method that may follow.

Despite these concerns, Feldenkrais and practitioners of his method would likely agree with the broader definition of health espoused by the World Health Organization. Feldenkrais viewed health as the ability to be flexible and adaptable in life, to recover, and not simply be free from illness or injury (Feldenkrais, 1981, 2010). Similarly, the World Health Organization defined health in the preamble to its constitution as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (World Health Organization, 1946). Thus, in this context, the *Feldenkrais Method* is an approach to promoting health.

In this chapter, I address four purposes. First, I provide an overview of the *Feldenkrais Method* including background on its originator, descriptions of the two main approaches to

delivering lessons (*Functional Integration*® and *Awareness Through Movement*®), and a theoretical foundation grounded in dynamic systems theory. Second, I describe what is known about *Feldenkrais* practitioners (teachers) including the certification process, standards of practice, and the practice profiles of United States practitioners. Third, I place the *Feldenkrais Method* in context with other complementary and alternative medicine approaches. Finally, I review the English language peer-reviewed research regarding the *Feldenkrais Method* and summarize the available evidence regarding its efficacy and safety.

2. The *Feldenkrais Method*

Feldenkrais had a broad view of health and the role that learning plays in being healthy. He argued, "It is certainly not enough to say that not asking for medical or psychiatric help is proof of health" (Feldenkrais, 2010, p. 54). In recognition of the immense number of parts that comprise the human nervous system, he stated: "The health of such a system can be measured by the shock it can take without compromising the continuation of its process. In short, health is measured by the shock a person can take without his usual way of life being compromised" (Feldenkrais, 2010, p. 55). Feldenkrais was among early proponents of the critical role of life experiences in the differentiation of the nervous system and the refinement of our abilities to perceive, feel, act and think. The quality and content of these experiences foster organic learning capable of continuing across the lifespan. From this perspective, health may continue into old age, as is exemplified by artists, writers, musicians and scientists who excel as elders. "The outstanding difference between such healthy people and the others is that they have found by intuition, genius, or had the luck to learn from a healthy teacher, that learning is the gift of life. A special kind of learning: that of knowing oneself. They learn to know 'how' they are acting and thus are able to do 'what' they want—the intense living of their unavowed, and sometimes declared, dreams" (Feldenkrais, 2010, p. 54). This process of learning is what Feldenkrais wanted to promote with his method. The biographical sketch that follows offers insights into how he came to develop his method.

2.1 Founder, Moshe Feldenkrais

Moshe Feldenkrais was born in 1904 in what is now Slavuta, Ukraine and moved at age 5 to Baranovichi, Belarus (Feldenkrais, 1981, 2010; Kaetz, 2007). These towns were literally along the front lines of World War I. They were also Jewish communities that were instrumental in the rise of Hasidic culture that highly valued education grounded in questioning, critical inquiry, self-awareness, and learning for self-improvement. While his family managed to survive, nearly all Jews in these towns were killed in the pogroms (Kaetz, 2007). After the 1917 Balfour Declaration, Feldenkrais left for Palestine in 1918. He used his mathematics and surveyor skills, and his physical labor to help build Tel Aviv (Kaetz, 2007). He also developed skills in self-defense and shared those survival techniques with his peers.

In 1930, Feldenkrais moved to Paris, France to study engineering (Feldenkrais, 1981, 2010). During that time, he met Kano, the originator of Judo, and became one of the first Europeans to earn a black belt. He continued his studies at the Sorbonne and worked in the laboratories of the Joliot-Curies. When the Nazis came to Paris in 1940, Feldenkrais escaped to Great Britain and worked on anti-submarine defense through the remainder of World War II (Feldenkrais, 1981, 1996). During this time, Feldenkrais was functionally impaired by his knees that were first injured during a football (soccer) match in Palestine, and further

damaged by escaping France and moving about submarines. Medical options for relief were limited and not very promising. Instead, Feldenkrais began a process of self-exploration that helped him restore his function and developed into his method. He delved into the literature of many disciplines, from mechanics to psychology. Feldenkrais compiled a series of lectures that were well-received by the scientists with him in Scotland (Feldenkrais, 1981, 2010). After Feldenkrais moved to London at the end of the war, he published those lectures as his first book about his method, *Body and Mature Behavior* (Feldenkrais, 1996).

Feldenkrais returned to Israel in 1951; he was soon fully occupied with teaching his method. As the popularity of his work grew, he developed hundreds of lessons that could be delivered verbally to groups of students. Late in life, he taught others to teach his method, beginning in Israel and ending in the United States. He died in 1984 (Feldenkrais, 2010).

It is remarkable, while also understandable given his background, that Feldenkrais "would choose learning as the most useful path for serving the wholeness of both individual and society" (Kaetz, 2007, p. 87). Thus, the *Feldenkrais Method* is first and foremost a learning method, albeit one with reported therapeutic effects. It is an embodied process of self-inquiry that typically occurs in two formats: individual lessons called *Functional Integration*, and group lessons known as *Awareness Through Movement*.

2.2 Individual lessons: *Functional Integration*

Functional Integration lessons (see Fig. 1) use manual contact between teacher and student to guide the student to better understand current patterns of behavior and inform the student in a manner that facilitates self-organization of alternative, improved behavior (Feldenkrais, 1972, 1981, 2010). Students are comfortably clothed during lessons that usually last 30-60 minutes. Teachers use supportive, non-invasive touch that can be informative to both students and teachers. Teachers individualize lessons to target functional goals expressed by students, while using principles and techniques common to the *Feldenkrais Method*. Some of these include: creating a sense of safety with respectful touch and support of body parts; moving limbs through pathways of minimal resistance to suggest more optimal movement trajectories; clarifying existing habitual patterns of positioning and organization to facilitate reorganization; compressing, lengthening, or guiding other movements with emphasis on contact that is as if it were skeleton-to-skeleton; and positioning parts so as to shorten muscles, facilitate decreased contractile activity, and allow more lengthening without stretching (Feldenkrais, 1972, 1981, 2010; Ginsburg, 2010).



Fig. 1. Examples of *Functional Integration* lessons.

2.3 Group lessons: Awareness Through Movement

Awareness Through Movement lessons (see Fig. 2) are verbally guided explorations that are about 30-60 minutes long. They can be taught to groups of students or to individuals. As with *Functional Integration* lessons, but absent the manual contact, *Awareness Through Movement* lessons use principles to help students notice what they currently do, improve their ability to make finer perceptual distinctions, and guide them to explore modes of action that result in self-improvement (Feldenkrais, 1972, 1981, 2010; Ginsburg, 2010). Students are comfortably clothed, encouraged to move in pain-free ranges, and instructed to reduce effort and move slowly enough to be attentive to what they are doing, sensing, feeling, and thinking. Teachers rarely model movements, but may occasionally highlight alternative approaches students are using to express the verbal instructions. Lessons have one, if not several functional applications, but the overall movement pattern is usually not stated in advance to facilitate individually appropriate learning. Lessons often involve gentle, slow movements, but range from lessons that mainly involve the imagination to more challenging, athletic lessons (Feldenkrais, 1972, 1981, 2010; Ginsburg, 2010).



Photographs courtesy of Des Moines University

Fig. 2. Examples of *Awareness Through Movement* lessons.

2.4 *Feldenkrais Method* as an application of dynamic systems theory

As a scientist in the mid-twentieth century, Feldenkrais interacted with numerous leading researchers and scholars of the day. He was privy to and participated in advancing new approaches to understanding the behavior of living and non-living systems (Buchanan & Ulrich, 2001; Feldenkrais, 1981; Ginsburg, 2010). Concurrently, he made significant advances in his concrete application of the relatively abstract and nascent fields of cybernetics, systems theory, complexity, and dynamic systems theory (Ginsburg, 2010). Applications of these new theories to human behavior and development came to prominence during the 1980s and 1990s (Buchanan & Ulrich, 2001; Ginsburg, 2010). When Thelen and Smith published *A Dynamic Systems Approach to the Development of Cognition and Action* in 1994, several *Feldenkrais* teachers quickly saw that they were describing a highly plausible theoretical foundation for the *Feldenkrais Method* (Buchanan & Ulrich, 2001; Ginsburg, 2010; Spencer et al., 2006). This section identifies several of the parallels between the *Feldenkrais Method* and dynamic systems theory.

Feldenkrais explicitly valued life as a process situated in time that is reflective of evolution, culture, and individual history. All of these factors influence human behavior (Feldenkrais, 2010; Ginsburg, 2010). Dynamic systems theory holds that behavior emerges in the moment, while recognizing that change happens on differing time scales and that preceding events influence subsequent events (Spencer et al., 2006; Thelen & Smith, 1994). For example, an infant (or adult) lying on her back and holding her feet may turn the head and begin to roll to the side. Another roll of the head can bring her to her back again. As she goes back and forth, she may look up at someone entering the room and be surprised to find she rolls to sit.

Feldenkrais recognized the limitations of linear and cause-effect scientific approaches. Behavior is dependent on many interacting elements and change, for the better or for the worse, can occur suddenly or gradually (Feldenkrais, 2010; Ginsburg, 2010). Dynamic systems theory proposes that multiple subsystems interact in ways that are often nonlinear to softly assemble behavior. Increasing speed leads me to change from walking to running. A short series of *Awareness Through Movement* lessons can relieve my chronic low back pain.

Feldenkrais argued for the unity of mind and body: "I believe that the unity of mind and body is an objective reality. They are not just parts somehow related to each other, but an inseparable whole while functioning" (Feldenkrais, 2010, p. 28). In another paper, he wrote: "The mental and physical components of any action are two different aspects of the same function. The physical and mental components are not two series of phenomena, which are somehow linked together; but, rather, they are two aspects of the same thing, like two faces of the same coin" (Feldenkrais, 2010, pp. 19-20). Dynamic systems theory similarly argues for an integrated, embodied life of humans who have brains situated in bodies that exist in environments and interact with others such that perception, action and cognition are co-dependent and co-develop. While emotions or feeling are not ignored in dynamic systems, Feldenkrais gave early recognition to this component through his description of learning and development that emerge through sensing, moving, thinking, and feeling (Feldenkrais, 2010). The implications are: there are multiple approaches to facilitating change, and changing one aspect or subsystem can alter the organization of the whole.

Feldenkrais was among the earliest to argue for use-dependant changes in the brain. Early on he wrote that for the most part, "behaviour is acquired and has nothing permanent about it but our belief that it is so" (Feldenkrais, 1996, p. 6). With this perspective, he emphasized the importance of flexible and adaptable behavior, and warned of habits so strong that they "can be likened to a groove into which the person sinks never to leave unless some special force makes him do so. With time, the groove deepens, and stronger forces are necessary to remove him from it" (Feldenkrais, 1996, p. 118). In dynamic systems theory, these grooves are attractors. Strong attractors have little variability in their activity and require large perturbations to provoke change to another state; weak attractors are unreliable and highly variable. More useful are attractors that are sufficiently stable with enough variability to allow for change as needed (Spencer et al., 2006; Thelen & Smith, 1994). With sufficient motivation and clear intention, change—improvement—is available throughout life.

Feldenkrais clearly recognized the influence of one's experience and circumstances in development. Here, his multicultural experiences are evident in his recognition of the influence of sitting styles (e.g., in chairs or on the ground) on the function of the hips and back, and of language on the usage and structure of the vocal apparatus (Feldenkrais, 1981,

1996, 2010). While knowledgeable of human structure and function, he was not prescriptive with his method. Instead, his approach was to help individuals clarify their self-images in order to self-organize individually relevant and appropriate options for acting (Feldenkrais, 2010; Ginsburg, 2010). Dynamic systems theory has similar regard for individual pathways to species-typical behaviors, such as reaching or walking (Spencer et al., 2006; Thelen & Smith, 1994). Learning can be viewed as "carving out individual solutions to the real-world problem" (Spencer et al., 2006, p. 1534). Through exploration, people form stable patterns and ideally conserve their ability for "improvisation on a theme" (Spencer et al., 2006, p. 1534). People can access more than one solution to a problem as conditions change: to walk on pavement or on cobblestones, to sit in a chair or on the floor, to live in the midst of peace or the midst of war.

In this section, I presented an overview of the *Feldenkrais Method* of somatic education and its two components, *Functional Integration* and *Awareness Through Movement*. I shared historical background on its originator, Moshe Feldenkrais—engineer, physicist, martial artist, and survivor of two World Wars. Finally, I presented parallels suggesting that dynamic systems theory offers a foundation for understanding the *Feldenkrais Method*. The next section provides information about *Feldenkrais* practitioners and their training. I present an estimate of their numbers and locations, and offer a profile of United States practitioners.

3. Practitioners/teachers of the *Feldenkrais Method*

People who wish to teach the *Feldenkrais Method* must successfully complete professional education programs that are taught by highly experienced Certified *Feldenkrais* Trainers and Assistant Trainers. All programs follow similar standards established by recognized training accreditation boards (*Feldenkrais Guild*® of North America, 2011; International Feldenkrais Federation). Minimally, students complete 740-800 hours of a structured curriculum over a 3 to 4 year period (*Feldenkrais Guild* of North America, 2011; International Feldenkrais Federation). Consistent with the philosophy of the method, students spend considerable time experiencing lessons, as well as developing teaching skills and learning information from disciplines that are complementary to the method. Usually midway through training programs, students have a practicum in teaching *Awareness Through Movement* lessons. Once they pass, students are authorized to teach *Awareness Through Movment* lessons to the public. They cannot offer *Functional Integration* lessons until they obtain full certification. Graduates can promote themselves as teachers or practitioners of the *Feldenkrais Method*. Actual terminology varies among countries or accreditation boards. For example, Australians use Certified Feldenkrais Practitioner (CFP) (Australian Feldenkrais Guild Inc), while the *Feldenkrais Guild* of North America uses either *Guild Certified Feldenkrais Teacher*® (GCFT) or *Guild Certified Feldenkrais Practitioner*℠ (GCFP) (*Feldenkrais Guild* of North America, 2011).

The International Feldenkrais Federation is the association of 17 *Feldenkrais Method* membership organizations. Its representative body adopted a model Standards of Practice in 1994 that describes the *Feldenkrais Method* and its practice (International Feldenkrais Federation). It clearly states "The Method is not a medical, massage, bodywork, or therapeutic technique. The Method is a learning process". The *Feldenkrais Guild* of North America added that "The Method may function as a complement to medical care" (*Feldenkrais Guild* of North America, 2011). The Standards of Practice describe in more detail

what a practitioner does and knows than I have presented here. As is typical of professional organizations, member associations have codes of professional conduct and procedures for ethical grievances (*Feldenkrais Guild* of North America, 2011).

3.1 Distribution and numbers of practitioners

Through a review of the International Feldenkrais Federation member organizations' websites and personal communications, I estimated there are at least 6000 *Feldenkrais* teachers in approximately 32 countries in 2011. This estimate is likely quite conservative, as not all certified teachers belong to their country's professional association; therefore, many of those teachers were not counted. Teachers are primarily in Europe and North America. Table 1 lists the ten countries with the most *Feldenkrais* teachers.

Country	Estimated number of *Feldenkrais* teachers
Germany	1700
United States of America	1287
Switzerland	421
Italy	305
Israel	260
Austria	243
Australia	236
Canada	122
United Kingdom	101
France	98

Table 1. Ten countries with the highest estimated number of *Feldenkrais* teachers.

3.2 Practice profile for United States practitioners

Studies of the practice profiles of *Feldenkrais* practitioners are very limited. In a preliminary survey of United States practitioners, most responders did not have additional credentials as traditional health care providers or in other complementary and alternative medicine approaches (Buchanan, 2010). Among responders who did have traditional licenses, most (22.7%) were physical therapists. Of responders with complementary and alternative medicine credentials, massage therapists were most common (10.4%). Information about client visits suggested that most practitioners had part-time practices. On average during a week, they saw 7.6 ± 8.1 students for individual lessons, and 8.4 ± 11.5 students for group lessons. More detailed study of United States teachers is underway. Practice patterns are likely to vary considerably in different countries, but this premise needs to be investigated.

Regardless of country, *Feldenkrais* teachers meet similar certification requirements and follow comparable standards of practice. Most practitioners live in Europe and North America. Much more needs to be investigated about practice profiles, but early studies with United States teachers suggest most have part-time practices, and physical therapy and massage therapy are the most frequent additional credentials. The next section situates the *Feldenkrais Method* among other complementary and alternative medicine approaches.

4. The *Feldenkrais Method* in context

The *Feldenkrais Method* self-identifies as a learning approach for self-improvement. Given its therapeutic applications, it has been identified by others within the broad collection of complementary and alternative medicine approaches.

4.1 Classifications of the *Feldenkrais Method*

Classifications of the *Feldenkrais Method* vary and include these eight categories: manipulative and body-based practices (Barnes et al., 2008, Mamtani & Cimino, 2002; NCCAM, 2004), movement therapy (Kiser & Dagnelie, 2008; Lee, 2004; NCCAM, 2011a), mind and body interventions (Mehling et al., 2005; NCCAM, 2011b), somatic education (Cheever, 2000; Jain et al., 2004), biomechanical-noninvasive/manipulation (Jones, 2005), body work-nonconventional manual manipulation (Nayak et al., 2003), energetic therapy (Witt et al., 2008), and manual healing (Weber, 1998). Classifications of the *Feldenkrais Method* as a mind and body intervention or somatic education seem most fitting, given the integrated approach to self-organized learning through sensing, feeling, moving and thinking espoused by its teachers.

4.2 Comparisons with other approaches

Within these categories, authors grouped the *Feldenkrais Method* with up to 19 of 41 other approaches. The most frequently related approaches were Alexander Technique (12), Trager Approach (11), spinal/peripheral joint manipulation (all forms, 9), Rolfing Structural Integration (8), massage (all forms, 5), Pilates (5), and reflexology (5). The parallels between these approaches and the *Feldenkrais Method* vary considerably. I do not discuss massage since the *Feldenkrais Method* does not use massage techniques and students are fully clothed (*Feldenkrais Guild* of North America, 2011).

The *Feldenkrais Method* has the most in common with the Alexander Technique. Indeed, Feldenkrais studied the Alexander Technique while living in London after World War II and before returning to Israel in 1951 (Feldenkrais, 2010). Both approaches emphasize the organization in upright postures to optimize the carriage of the head, the integration of the spine and pelvis, and the action of the diaphragm in functions that include, but are not limited to, breathing, speaking and singing (Gilman & Yaruss, 2000; Ginsburg, 2010). Both approaches describe themselves as learning methods and use manual and verbal cues to guide awareness and suggest alternatives to existing habits (Jain et al., 2004; Schlinger, 2006). The key distinction may be that the Alexander Technique is more directive in what constitutes improved organization, whereas the *Feldenkrais Method* guides students to discover individually appropriate options for acting (Jain et al., 2004).

The Trager Approach and the *Feldenkrais Method* share perspectives on the need to reduce effort, avoid pain, and perceive differences as part of the process of reorganizing habitual patterns. The Trager Approach utilizes distinctive rhythmical, wavelike movements to release tension and create ease, and offers instruction in self-care movements (United States Trager Association, 2010). The *Feldenkrais Method* includes oscillatory movements in its repertoire, but they are not a hallmark of the method as they are in the Trager Approach. *Feldenkrais* lessons can range from simple, quiet movements to complex, vigorous actions.

Moshe Feldenkrais and Ida Rolf were contemporaries interested in optimizing human function in an environment that is greatly influenced by gravity. Both recognized the relationship of structure and alignment with function, including its emotional and psychological aspects (Gilman & Yaruss, 2000). Rolf developed an approach that emphasizes reorganization of the connective tissue through specific soft tissue mobilization techniques (Rolf Institute of Structural Integration, 2011). Rolfing Structural Integration typically begins with a classic series of ten sessions. Rolf later in life developed a series of movement lessons to increase understanding of more efficient movement patterns. Thus, Rolfing has established protocols for working with individuals and has a major component directed toward physically altering the connective tissues, including fascia. These features are distinct from the *Feldenkrais Method*, which is much more individualized in the application of lessons and does not promote manual techniques to directly alter connective tissue.

Spinal and peripheral joint manipulations are common to chiropractic and osteopathic medicine, as well as rehabilitation approaches such as physical therapy. The effectiveness of the specific application of controlled forces to joints, whether oscillatory or thrusting at end range, may derive from mechanical changes in neighboring tissues and/or be more centrally mediated in response to sensory input (Maitland et al., 2005). The *Feldenkrais Method* does not use thrust manipulation. Students have experienced sensations ("pops" or "cracks") that are consistent with self-mobilization/manipulation within the context of lessons as reorganization occurs. There are techniques within the *Feldenkrais Method* that have some similarities to oscillatory joint mobilizations that are intended to be informative, provide support, increase awareness, and thus facilitate self-reorganization.

Joseph Pilates developed a series of exercises for total body conditioning that emphasizes strength, length, use of the breath, and awareness. The difficulty that many people had with his exercises led him to develop a variety of devices that often incorporated springs (e.g., Reformer, Cadillac trapeze table, chair, etc.) to assist their development (Friedman & Eisen, 1981; Balanced Body). This mindful mode of exercise is attentive to form and is often quite specific in the use of the breath. The *Feldenkrais Method* has numerous lessons that focus on breathing, yet emphasizes the many options for using the breath that varies with context and intention. The use of equipment in the *Feldenkrais Method* typically includes a firm, wide table; rollers of various diameters and densities; and an assortment of pads, towels and other supportive props. Movement activities are framed and intended as lessons that afford self-exploration of habitual patterns and less familiar options that promote individually appropriate self-organization of improved function.

The basis of reflexology, known earlier as zone therapy, is that specific regions of the feet and hands correspond reflexively to organs, glands, and other body areas (International Institute of Reflexology). Techniques that stimulate these reflexes may positively influence the function of the corresponding tissues. The premise and application of reflexology are distinct from the *Feldenkrais Method*. Embodied self-awareness techniques such as the *Feldenkrais Method* can influence the functioning of various organs through the interactions among perceiving, acting, and feeling (Fogel, 2009). Placing muscles in shortened positions can facilitate decreased activation; eye movements can help organize the action of the neck, and breathing explorations can impact the autonomic nervous system to either calm or excite the individual (Fogel, 2009; Ginsburg, 2010). These and many other *Feldenkrais* techniques are used within a learning context to guide self-organized improvement.

The *Feldenkrais Method* self-identifies as an approach to learning that can have therapeutic effects. With the growth in complementary and alternative medicine, it has been categorized, more or less appropriately, with other approaches. A variety of stakeholders are interested in the effectiveness and safety of these approaches, regardless of the claims made by proponents. The next section reviews the literature to address those interests.

5. Systematic review of *Feldenkrais Method* research

Given the relative newness of the *Feldenkrais Method* and limited number of practitioners, research into its effectiveness and safety is still in its early period of development. While some users of the method and a portion of practitioners are quite satisfied with anecdotal accounts and direct experience, others prefer to have access to results from more Western traditional scientific study. This evidence can guide decision making by the public and health care providers, and also suggest future research directions. As this review will document, a growth spurt in *Feldenkrais* research occurred in the past decade. Thus, this review provides a current perspective on the developmental status of *Feldenkrais* research.

The objective of this review was very open, reflecting the small number of peer-reviewed studies available with any one population. Thus, the purpose was to examine the effectiveness and safety of the *Feldenkrais Method* for persons of any age and condition without limitations on comparator groups, outcomes, or study design.

5.1 Methods

Best practices from several sources guided my search and review of the literature (Centre for Evidence Based Medicine; Cochrane Collaboration, 2010; Liberati et al., 2009). I adapted these procedures to extract information from the selected studies, including indicators of possible risk of bias (e.g., description of randomization process, blinding procedures, documentation of attrition, etc.). I did not attempt to contact authors for further information about their studies, but relied solely on the publication contents.

5.1.1 Eligibility criteria

This review included studies of human participants of any age and with any condition who received a *Feldenkrais Method* intervention. Reports of such studies needed to be available in English and published in peer-reviewed journals without limitation on year of publication.

5.1.2 Information sources and search

Between 10 June 2011 to 4 July 2011, I searched several electronic databases for relevant studies. The single search term "Feldenkrais" was sufficient for use in all databases, as the number of records was no greater than 121 in any single search. When available, I added limiters for English language and peer-reviewed journal articles. I queried PubMed and utilized EBSOhost to individually search Academic Search Elite, CINAHL, MEDLINE, PsycINFO, and Rehabilitation & Sports Medicine Source.

In addition to this latest search, I included the results of prior literature searches that I had conducted from September 2001 through April 2009. I incorporated the *Feldenkrais Guild* of North America research bibliography (*Feldenkrais Guild* of North America, 2011). Finally, I added two references obtained through screening of article references.

5.1.3 Study selection

To facilitate screening for duplicates, I entered all search citations into a Microsoft Excel worksheet, sorted entries, and removed duplicates. I identified records for exclusion through review of titles, abstracts, and types of records. Excluded during this screening were materials that clearly were not full research reports published in peer-reviewed journals (e.g., book chapters, dissertations, conference abstracts, other unpublished works).

Another round of screening included electronic searching of full-text documents for the term "Feldenkrais". This process led me to eliminate articles that had minimal relevance to this review. Several records did not study *Feldenkrais* interventions (e.g., referred to the method or to Dr. Feldenkrais, provided background information, or reported on research published elsewhere). This closer screening also identified a few previously unrecognized records that should have been removed earlier.

Through more thorough review of the full-text articles of the remaining records, I pared the list of studies for full review to those that were the original reports of *Feldenkrais Method* interventions. This excluded review articles, tutorials, and studies about knowledge of the *Feldenkrais Method*. Figure 3 summarizes the study selection process.

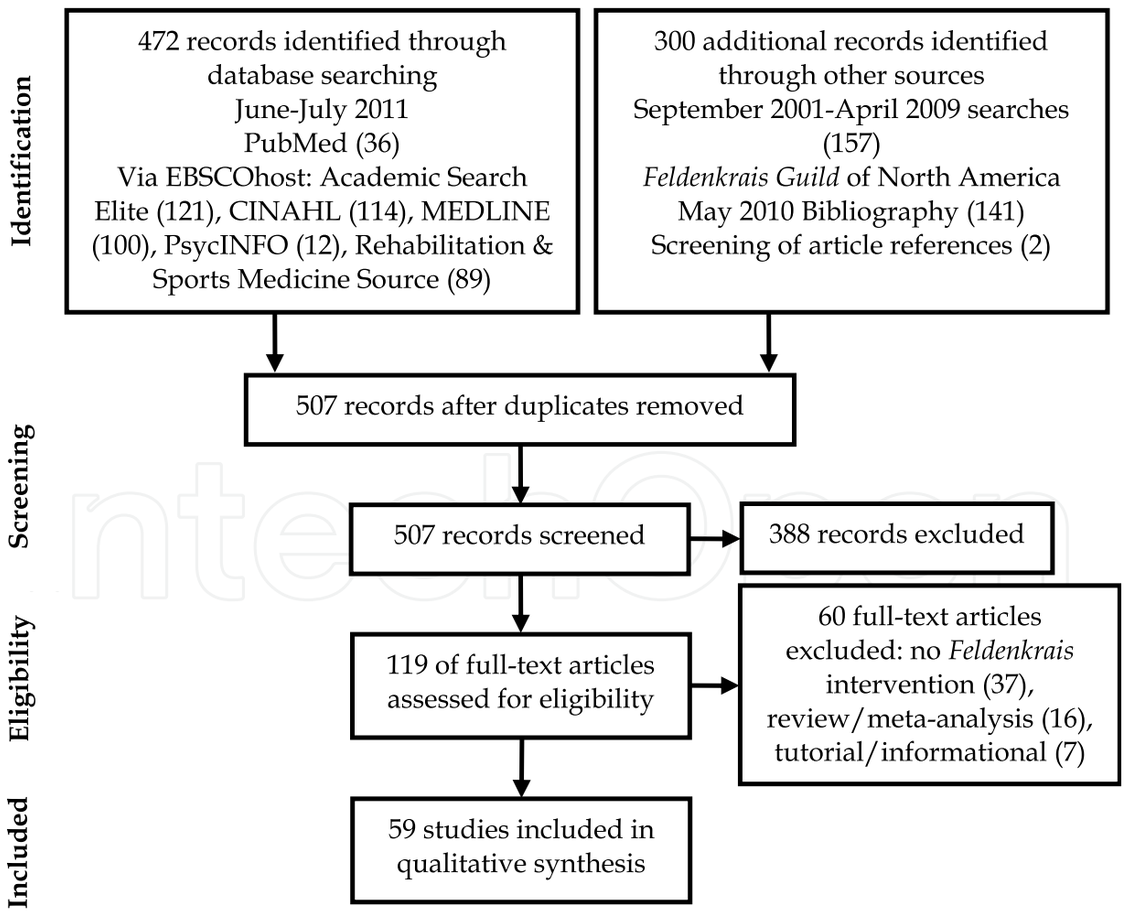


Fig. 3. Flow diagram of study selection.

5.2 Results

Table 2 categorizes 59 studies by level of evidence (1 highest, 4 lowest; level 5 studies were excluded from review) and summarizes their designs, conditions, and participant numbers, genders and ages. Nearly all studies reported some positive effects from interventions that exclusively or partly involved the *Feldenkrais Method*. Three studies found no differences between participants who received *Awareness Through Movement* interventions and those in other interventions or control groups (Brown & Kegerreis, 1991; James et al., 1998; Kolt & McConville, 2000). Only three studies reported any adverse effects. One participant with Alzheimer's disease refused further lessons after three sessions and said the practitioner had hurt him, contrary to staff reports of his improvement (Ann, 2006). One patient in a small study of people with acute myocardial infarcts felt worse after the first *Functional Integration* lesson, but continued the study (Löwe et al., 2002). Lastly, one participant mentioned "giddiness" during a tandem walking activity that was part of an *Awareness Through Movement* series focused on improving balance in the elderly (Vrantsidis et al., 2009).

Lead author	Year	Study design[a]	Condition	Number, Gender[b]	Age in years
Level of evidence: 1					
Smith	2001	RCT	chronic low back pain	16 F 10 M	26-78
Vrantsidis	2009	RCT	elderly with some functional impairments	42 F 13 M	56-94
Level of evidence: 2					
Apel	2006	analytic x-sec survey	Multiple Sclerosis	187 F 67 M	44 +/- 11.6
Bearman	1999	CBA	chronic pain	7 E, 365 C, slightly more F	unclear, wide range
Brown	1991	Q-RCT	healthy adults	9 F 12 M	19-39
Chinn	1994	Q-RCT	neck-shoulder pain	21 F 1 M	18-59
Connors	2011	CBA	various	63, unclear	~75
Gutman	1977	CBA	elderly residents	51 F 16 M	~70s
Hopper	1999	Q-RCT	healthy adults	1: 46 F 29 M 2: 23 F 16 M	17-33
James	1998	Q-RCT	healthy adults	28 F 20 M	~22
Junker	2004	descriptive x-sec survey	dystonia	127 F 53 M	7-79

Lead author	Year	Study design[a]	Condition	Number, Gender[b]	Age in years
Kemp	2005	descriptive x-sec survey	pain	197 F 38 M	65-99
Kirkby	1994	CBA	serious prementrual syndrome	48 F	18-47
Laumer	1997	CBA	disordered eating	27 F 3 M	18-51
Löwe	2002	CBA	acute myocardial infarction	12 F 48 M	60s
Lundblad	1999	Q-RCT	factory workers with neck-shoulder complaints	97 F	~30s
Malmgren-Olsson	2001	CBA	chronic pain	64 F 14 M	~40s
Malmgren-Olsson	2002	CBA	chronic pain	64 F 14 M	~40s
Malmgren-Olsson	2003	CBA	chronic pain	64 F 14 M	~40s
Netz	2003	CBA	healthy adults	147 F	middle aged
Ruth	1992	Q-RCT	healthy adults	18 F 12 M	11-36
Schön-Ohlsson	2006	CBA	chronic low back pain	14 F 10 M	~40s
Schön-Ohlsson	2005	CBA	chronic low back pain	24 unclear	25-65
Stephens	2001	Q-RCT	Multiple Sclerosis	8 F 4 M	~40s-50s
Stephens	2006	Q-RCT	healthy adults	20 F 13 M	21-36
Stephens	2005	CBA	well elderly	19 F 12 M	68-89
Ullmann	2010	CBA	well elderly	33 F 14 M	65+, ~70s
Level of evidence: 3					
DellaGrotte	2008	CBA	chronic pain	11 F 17 M	13-55
Dunn	2000	unimagined side as control	healthy adults	8 F 4 M	18-28

Lead author	Year	Study design[a]	Condition	Number, Gender[b]	Age in years
Johnson	1999	cross-over	Multiple Sclerosis	15 F 5 M	33-54
Kendall	2001	CES no C	fibromyalgia	39 unclear	15-55
Kerr	2002	CES no C	healthy adults	Single: 8 F 5 M Series: 30 F 15 M	adults
Kiser	2008	descriptive x-sec survey	retinitis pigmentosa	50 F 46 M	all ages
Kolt	2000	Q-RCT	healthy adults	35 F 19 M	17-38
Mehling	2011	qualitative	various	Practitioners: 4 F 4 M Clients: 7 F 1 M	adults
Öhman	2011	qualitative	chronic neck-shoulder pain	14 F	32-57
Peper	2004	Q-RCT	adult computer users	23 F 5 M	~30s-40s
Seegert	1999	CBA	healthy adults	25 F	18-25
Level of evidence: 4					
Ann	2006	case series	Alzheimer's disease	4 F 2 M	76-96
Batson	2005	BA no C	post stroke	4 unclear	48-61
Fry	1988	case series	overuse syndrome	175 mix	~12-54
Ginsburg	1986	case series	spinal cord injury, traumatic brain injury	9 F 24 M	adults
Ginsburg	1999	case series	varied	2 F 1 M	adults
Goebel	2006	case series	tinnitus	79 F 165 M	39-77
Halperin	2009	case study	mental illness/disorder	1 F	18-65
Honig	2007	case study	sciatica with piriformis syndrome	1 F	43

Lead author	Year	Study design[a]	Condition	Number, Gender[b]	Age in years
Kepner	2002	case study	chronic low back pain	1 M	45
Lake	1985	case series	back pain	4 F 2 M	26-60
Lyttle	1997	case study	chronic low back pain	1 F	35
Nair	2005	case study	post stroke	1 M	65
Nelson	1989	case study	violinist with neck pain	1 F	20s
Nelson	2005	case series	singers, one post motor vehicle accident	1 F 1 M	19, ?
O'Connor	2002	case series	various	5 unclear	not reported
Schenkman	1989	case series	Parkinson Disease	2 M	67, 68
Stephens	1999	case series	Multiple Sclerosis	4 F	30-46
Stephens	2000	case series	musculoskeletal problems	117 F 63 M	15-86
Wennemer	2006	BA no C	fibromyalgia	20 not reported	not reported
Wilson	2001	case study	disseminated encephalo-myelopathy	1 F	26
Zunin	2009	BA no C	chronic pain	21 F 14 M	25-76

[a]RCT: randomized controlled trial, Q-RCT: quasi-randomized controlled trial, CBA: controlled before and after study; x-xec: cross sectional; BA no C: before and after study, no control; CES no C: comparative effectiveness study, no true control.
[b]F: female participants, M: male participants, E: experimental group, C: controls

Table 2. Summary of reviewed studies' designs and participants' conditions, numbers, genders, and ages; grouped by level of evidence.

Researchers in the United States conducted most of these studies (27), with one study by a *Feldenkrais* teacher who lives and works part time in the United States and Germany. Australian researchers published 12 studies, Swedish investigators reported eight studies, and Germans conducted five studies. Investigators in Canada (2), Israel (2), England (1) and Italy (1) produced the remaining studies.

The most frequent design was controlled before and after (16), followed by case series (11), quasi-randomized controlled trial (10), case studies (7), comparative study without true control (6), cross-sectional survey (3 descriptive, 1 analytic), randomized control trial and

qualitative (2 each), and cross-over (1). As suggested by the distribution of study designs, very few studies were of the highest quality. I only assigned the level of evidence 1 to two studies (Smith et al., 2001; Vrantsidis et al., 2009). I rated several studies that reported being randomized controlled trials as level 2 due to the risk of bias in the allocation process (Brown & Kegerreis, 1992; Chinn et al., 1994; Hopper et al., 1999; James et al., 1998; Kolt & McConville, 2000; Lundblad et al., 1999; Peper et al., 2004; Ruth & Kegerreis, 1992; Stephens et al., 2001; Stephens et al., 2006). The most common assessment was level 2 (25), followed by level 4 (21), and level 3 (11). The average level of evidence was 2.8 (SD ± .95). Overall, I assigned a (low) B grade of recommendation to the current body of peer-reviewed literature.

5.2.1 Growth over 35 years

Clearly, the number of studies of the effectiveness and safety of the *Feldenkrais Method* is limited. Readers should remember the relative youth of the discipline and small numbers of practitioners/teachers while evaluating the extant literature. For another perspective (see Table 3), I totaled the numbers of studies across the decades that include the years since Gutman et al. published the first study in 1977. Notable increases in research occurred during the 1990s and 2000s. It remains to be seen if that growth continues in the 2010s.

Set of studies	1970s	1980s	1990s	2000s	2010s
119 screened	1	6	20	79	13
59 eligible	1	5	14	37	3

Table 3. Growth in *Feldenkrais* research, 1977 to mid-2011.

5.2.2 Breadth of studies

Feldenkrais teachers and students have applied this method to numerous situations in which people desire to learn to improve their function. This breadth of utilization is reflected in the range of conditions among the reviewed studies (refer to Table 2). Most studies (11) examined the effects of *Feldenkrais* lessons on healthy persons, primarily adults. Another four studies focused on elderly participants who were generally healthy community dwellers. Many studies focused on people with non-specific pain (7), and with back pain (7). Four studies included people with Multiple Sclerosis, and another four had participants with varied and/or unspecified complaints. Musicians were the focus of three reports. Another three studies involved people with neck, shoulder or other upper quarter conditions. Researchers conducted two studies of people with fibromyalgia and two investigations of persons post stroke. Single projects evaluated the effectiveness of the *Feldenkrais Method* for people with acute myocardial infarct, Alzheimer's disease, disordered eating, disseminated encephalomyelopathy, dystonia, mental illness/disorder, musculoskeletal problems, Parkinson Disease, retinitis pigmentosa, spinal cord injury or traumatic brain injury, serious premenstrual syndrome, and tinnitus.

5.2.3 Discussion

The present body of *Feldenkrais Method* research collectively supports its effectiveness and safety. This assessment must be couched in the recognition that the number of studies

remains small and dispersed, findings are often constrained by design limitations, and more rigorous investigations with appropriate methodologies are needed. When I first reviewed the *Feldenkrais* research in 2001 (Buchanan & Ulrich, 2001), I referenced nine articles that evaluated the effects of *Feldenkrais* interventions on nine different populations (Bearman & Shafarman, 1999; Brown & Kegerreis, 1991; Chinn et al., 1994; Gutman et al., 1977; Johnson et al., 1999; Lundblad et al., 1999; Ruth & Kegerreis, 1992; Seegert & Shapiro, 1999; Stephens et al., 1999). This review adds 50 more studies to the mix. Multiple studies targeted healthy adults, persons with non-specific pain and chronic low back pain, and elderly adults. While investigations have increased considerably in the past decade, there is substantial room for improvement and development.

Ives (Ives & Shelley, 1998; Ives, 2003) has been a notable critic of *Feldenkrais* research based on the limited quality and quantity of studies. He pointed out design concerns and I concur there is need for more studies with quality designs. Ives concluded, "From a clinical standpoint, it seems difficult to recommend the *Feldenkrais Method* above other techniques" (Ives, 2003, p. 118). His point is valid in that there are only a handful of studies demonstrating superior results from *Feldenkrais* interventions vs. traditional physical therapy treatment (Lundblad et al., 1999; Malmgren-Olsson et al., 2001; Malmgren-Olsson & Branholm, 2002; Malmgren-Olsson & Armelius, 2003; Schön-Ohlsson et al., 2005).

Ives also argued, "any effects noted appear to be psychological and not physiological" (Ives, 2003, p. 118). I would counter this criticism on two fronts. First, there are now additional studies documenting "physiological" changes; for example, performance on the Posturo-Locomotion-Manual test (Schön-Ohlsson et al., 2005), Timed Up and Go test (Ullmann et al., 2010), Active Knee Extension test (Stephens et al., 2006), Berg Balance Scale (Batson & Deutsch, 2005), and changes in brain activation patterns based on fMRI analyses (Nair et al., 2005). Second, Ives posited a mind-body dualistic perspective as a rationale for disputing the effects of the *Feldenkrais Method*. This is a common criticism levelled against many mind-body approaches. Researchers and practitioners who hold an integrated perspective that can be grounded in dynamic systems theory would argue, as did Feldenkrais (Feldenkrais, 2010), for the unity of mind and body. Self-organization of behavior occurs through the coupling of perception-action-cognition of an organism (human) within an environment (Buchanan & Ulrich, 2001; Ginsburg, 2010; Spencer et al., 2006, Thelen & Smith, 1994). In turn, these theoretical stances impact the methodology choices of researchers and the interpretations that scientists, practitioners and consumers place on studies.

Efforts to apply broadly held scientific methodology and research standards common to the evidenced-based practice of medicine to complementary and alternative approaches has been problematic. In its 2011-2015 Strategic Plan, the National Center for Complementary and Alternative Medicine noted the challenges of developing rigorous studies of mind and body approaches. Four common characteristics pose methodological concerns: 1) blinding of participants and/or practitioners is difficult, 2) benefits are often subjective in nature, 3) interventions are often individualized and can be complex, creating difficulties for standardizing protocols and assessing outcomes, and 4) objective measures may not exist to adequately measure biological processes that are not yet well understood (NCCAM, 2011a).

Mehling (2005) examined the challenges of reducing the risk of bias in quantitative studies with various forms of mind-body therapies, including the *Feldenkrais Method*. After

reviewing existing higher quality studies, he offered several suggestions associated with the lack of blinding. First, researchers should include more objective outcome measures and blind assessors to allocation. Second, investigators can ask participants at the end whether they thought they were in intervention or control groups, and make similar inquiries of assessors. Third, researchers may track participants' expectations for their group's activity in order to evaluate for effectiveness expectations. Fourth, researchers need to recognize and monitor the expectations associated with different kinds of control groups. Lastly, the use of pre-consent randomization may minimize expectations by limiting knowledge to the allocated group activity and restricting information about alternative activities. For challenges with control, Mehling suggested that researchers: control the amount of time, settings, and provider characteristics; control the amount and quality of attention given to participants without mimicking the specifics of the target intervention; include a no-treatment control along with a placebo; and consider a multimodal control intervention parallel to the multimodal approach that includes the targeted method. To better manage volunteer bias and attrition, Mehling proposed that investigators: offer meaningful control interventions; recruit from settings with patients open to research but without existing preference for complementary and alternative approaches; in particular, recruit through physician referral; and consider partial randomization in which participants can declare their preferences for allocation and those without strong preferences are randomly assigned.

Traditionally trained researchers may reasonably evaluate the *Feldenkrais* literature and conclude that it is too heavy in case studies situated near the bottom of the level of evidence ratings, and is in need of more level 1-2, third person objective, analytical studies of the quality of Lundblad (1999), Schön-Ohlsson (2005), Smith (2001), and Vrantsidis (2009). Others would argue that more phenomenological and qualitative, first person subjective studies similar to Ginsburg (1999), Mehling (2011), and Öhman (2011) would advance knowledge of this method. Ginsburg (1999, p. 82) is among those who have argued the value of both research perspectives, stating: "the phenomenology of the Feldenkrais method allows one to connect changes in the domain of inner experience with changes in the organization of outer behaviour. It thus provides a way to observe the correlations between the domain of phenomenology and the domain of external observation." Whether within individual investigations or across the body of literature, there is value in a mixed methods approach to deepening knowledge of the effectiveness and safety of the *Feldenkrais Method* and enhancing understanding of its underlying mechanisms.

In sum, research into the effectiveness and safety of the *Feldenkrais Method* has developed considerably since 1977. The number of studies has increased, with multiple reports of interventions with healthy adults, adults with chronic pain, and well elderly groups. Still, the available support for the effectiveness and safety of the *Feldenkrais Method* should be viewed cautiously. Much more research needs to be done utilizing a range of methodologies with appropriate rigor befitting a learning method that is grounded in the self-organization of human behavior that emerges in relation to intention, others, and the environment.

6. Conclusion

Feldenkrais encapsulated his method in this statement: "Organic learning is essential. It can also be therapeutic in essence. It is healthier to learn than to be a patient or even be cured. Life is a process not a thing. And, processes go well if there are many ways to influence

them. We need more ways to do what we want than the one we know—even if it is a good one in itself" (Feldenkrais, 1981, p. 29).

In this chapter, I have expanded on Feldenkrais' statement and made these key points:

- The *Feldenkrais Method* of somatic education self-identifies as a learning method that may have therapeutic effects. It presents itself as an approach to health promotion, when health is viewed broadly and not just as the absence of disease or injury.
- Through individual *Functional Integration* lessons and group *Awareness Through Movement* lessons, *Feldenkrais* teachers guide students to sense, move, think and feel in ways intended to facilitate self-improvement and create more individually appropriate options for functioning.
- The *Feldenkrais Method* shares many principles with dynamic systems theory, including: emergence of self-organized behavior via subsystem interactions; perception-action-cognition coupling; and an ideal of reliable, yet flexible and adaptable, behavior.
- Practitioners around the world complete similarly structured curricula typically spanning four years to earn certification, and follow comparable standards of practice.
- Others have categorized the *Feldenkrais Method* with a range of complementary and alternative medicine approaches, most appropriately with the Alexander Technique.
- *Feldenkrais Method* effectiveness and safety research has increased considerably in the past decade. Results are mostly favorable, but remain sparse and subject to design limitations. Much more research is needed that rigorously combines appropriate quantitative and qualitative methodologies to further evaluate the *Feldenkrais Method*.

I encourage readers unfamiliar with the method to gain direct experience with a few of the widely available *Awareness Through Movement* lessons or via *Functional Integration* lessons from area practitioners. In particular, I invite researchers and practitioners to collaborate on quality investigations of the *Feldenkrais Method* for the benefit of all stakeholders.

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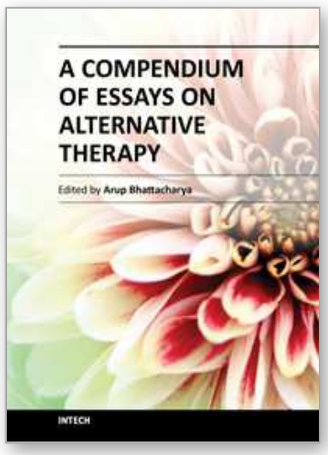
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A Compendium of Essays on Alternative Therapy is aimed at both conventional and alternate therapy practitioners, besides serving as an educational tool for students and lay persons on the progress made in the field. While this resource is not all-inclusive, it does reflect the current theories from different international experts in the field. This will hopefully stimulate more research initiatives, funding, and critical insight in the already increasing demand for alternate therapies that has been evidenced worldwide.

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