

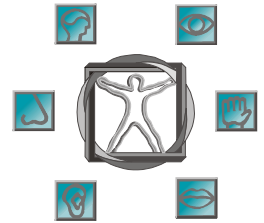
Feldenkrais- Ausbildung

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Feldenkrais Motor-Learning Approaches for Chronic Pain

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Unfortunately Mark passed away in May 2006.

Introduction

The Feldenkrais Method is a multi-faceted, motor-learning approach to education and rehabilitation. In pain clinics, hospitals and private practices worldwide, this approach is earning a positive reputation for its ability to eliminate, reduce, and manage chronic pain.

The method is named after its Israeli founder, Moshe Feldenkrais, a Russian-born physicist and judo teacher, author of many scientific papers as well as the first books on judo to appear outside of Japan. Feldenkrais began developing his methods in order to recover from soccer injuries to his knees. Finding no medical solution, he focused on how he could help himself. From years of scholarship and self-examination, he learned how to employ his kinesthetic awareness for altering his postural and movement habits and optimizing his body usage, thereby avoiding those patterns that exacerbated his knee troubles. With remarkable improvement in his knees, Feldenkrais regained a normal life and even excelled in his practice of judo.

Using the principles he developed in his solitary work, Feldenkrais began to generalize his insights through work with others. Although people sought his help for a great variety of reasons, his approach always addressed both mind and body, seeing them as a unity. From the beginning of his work in the early 1940's Feldenkrais helped people improve their level of mental and physical functioning. His work has benefited healthy individuals, people who suffered from physical pain and problems associated with movement, and



others who wanted to relieve emotional ills. Feldenkrais slowly elaborated a system of movement education with far-reaching implications. For more than forty years, until his death in 1984, Feldenkrais utilized a detailed investigation of movement to study the brain, the body, and the mind, as well as learning and emotions. Out of that investigation came two practical sets of techniques: Awareness Through Movement (ATM) which consists of movement sequences performed in group classes or individually; and, Functional Integration (FI) which uses touch and assisted movement in private lessons with a practitioner. Feldenkrais wrote six books and numerous articles, and trained a core group of students who have continued to use his system and train others to become practitioners. Today, graduates of four-year accredited training programs teach the Feldenkrais Method throughout the world.

The Feldenkrais Method comprises one of the most comprehensive systems of movement education known to date. At least 30,000 movements address such areas as: movements of spine, head, pelvis, shoulders, arms and legs; fine movements of the eyes, lips, tongue, fingers, and toes; developmental movements of the first year of life; dynamic movements of rolling over, moving from lying to sitting, sitting to standing, and standing to walking; gymnastic movements such as headstands and judo rolls; everyday movements of bending, reaching, balancing and turning; as well as explorations of the subtle movements present in perceptual, cognitive and expressive activities.

The Feldenkrais Method is widely applicable. In the field of rehabilitation, it is applied to pediatric and geriatric populations, orthopedic or neurological problems, and stress related complaints. The method is not limited to clinical settings; in fact, despite its health benefits, recipients of the educationally based Feldenkrais Method are called 'students,' not 'patients.' Feldenkrais students include actors, dancers, musicians and athletes who use these methods as part of their training and practice. The Feldenkrais Method is intended for the ordinary person as well. Feldenkrais work can benefit one's quality of life through improved self-awareness and body- image, increased physical and emotional health, and enhanced creativity and thinking abilities. For those who first seek out the Feldenkrais Method in order to overcome pain, once feeling better, they often continue its use to maintain a life of greater comfort, increased activity and enjoyment.

In the sections that follow, we will examine a Feldenkrais view of pain, action, and learning in order to illustrate how Feldenkrais strategies and philosophy can be used to eliminate, ameliorate, or control chronic pain. Finally, we will discuss how to implement a pain program based upon the Feldenkrais Method.

A Functional View of Pain Disorders

Ordinarily, pain is viewed as having a specific anatomical cause.. Thus, if one's thumb hurts, one typically assumes something is wrong with the thumb. Health practitioners, too, are predisposed to a localized view of pain. However, in many cases of chronic pain, local causes remain highly uncertain. For example, contrary to earlier assumptions, research has shown that most back pain cannot to be proven to result from disk or spinal abnormalities. The physiological mechanisms behind Fybromyalgia and many other pain conditions are likewise obscure. Nevertheless, chronic pain is often explained in terms of unsubstantiated mechanical assumptions. It would appear that both practitioners and patients have an emotional and intellectual need to simplify complex processes by naming and isolating causes. Unfortunately, treatments based upon incorrect

assumptions are often inadequate and unsuccessful. The Feldenkrais Method offers an alternative framework: a holistic, functional perspective based upon the biology and psychology of action and learning.

From this perspective, let us examine an example of chronic pain that originated from a traumatic injury: After a traumatic event, the body can display immense healing powers as tissues repair, inflammations subside, and pains gradually diminish. The course of healing, however, is not entirely predictable. The degree, duration, and nature of continuing pain are determined not only by local physiological and mechanical factors; equally important is how a person copes with the injury. Some people are better equipped than others for the rigors of recovery and may take a minor injury in stride. Others with poor kinesthetics, posture or self-image, negative beliefs, emotional difficulties, or minimal social support, are at a disadvantage. Such factors may impede one's ability to heal, and to learn efficient adaptations. Inefficient adaptations limit full recovery and increase the risk for subsequent problems, including chronic pain. But even where the conditions and attitudes attending recovery seem optimal, the adaptive motor patterns adopted under the conditions of injury or illness may be inadequate to forestall, and may even exacerbate, future pain.

When experiencing pain, a person seeks to avoid the pain by making dynamic, moment to moment adjustments. If pains persist over a longer time frame, these attempts crystallize into new habitual postures, and new ways of communicating and arranging his or her life. This intensive cognitive, emotional, and motor learning process does not occur automatically; each individual responds in unique ways. Specific alterations in posture and movement emerge from an exploratory, trial and error, semi-conscious learning process. The new behaviors reflect not only the limitations imposed by mechanical and physiological impairments, but also previous posture and movement patterns, psychological history, and learning abilities.

As the time period of pain experience lengthens, whether precipitated at first by trauma, stress or disease, compensatory adaptations may grow into highly stable habits, patterns that become inflexible and impervious to altering circumstances. The person comes to expect that certain movements or positions will be painful and, hence, will tend to avoid particular situations and learn to hold his or her body in ways intended to avoid painful movements and postures.

Unfortunately, the very muscular patterns resulting from self-protection contribute to future pain. It requires tremendous effort to maintain strong muscular defenses, and such efforts take their toll on muscles, soft tissues, and joints, as well as restricting breathing. Habitual self protection is accompanied by hypertrophic sympathetic nervous system activity that impedes circulation and further restricts movement. Poor oxygenation and nutrition weakens body structures, and exacerbates inflammatory reactions.

Self-protection goes together with fear and manifests as an immobility. The body works against itself. The movements and postures associated with self protection and the desire to avoid pain tend to be awkward, inefficient, and stressful. Under normal conditions, the nervous system relies on the skeleton to maintain upright posture. Muscular effort is kept to the minimum that is sufficient to maintain balance and the necessary orientation for movement. But when someone feels the need for defense against pain, normal use of anti-gravity muscles becomes unavailable, and the person will tend to try to 'hold up' the body by the muscles.

Self-protective stiffness results in reduced elasticity and 'spring', making a person less resilient to shocks, such as bumps or falls, or landing hard over a curb. Awkward movements are more likely to produce minor strains and injuries. As a result, normal activities can become increasingly difficult.

An attitude of self-protection, bringing with it extra efforts, inefficiencies, and self-limitations, can be maintained only at a significant cognitive cost. The person typically maintains a hypervigilant state, constantly on the look out for potentially risky circumstances or dangerous movements. Movements that would ordinarily flow spontaneously and naturally instead require explicit calculation and deliberation. It is difficult for the nervous system to sustain long periods of conscious control over movements that are normally organized semi-consciously. Such cognitive activity is mentally exhausting and can lead toward further strain and pain.

The Feldenkrais approach takes account of everything that has been discussed so far, and offers a new notion of chronic pain itself. The Feldenkrais approach suggests that chronic pain reflects patterns of activity in the nervous system associated not only with movements and postures related to an original pain-producing situation, but also with movements and postures acquired for the purpose of avoiding pain. On this basis we may be able to understand that chronic pain does not exist by itself 'in the body,' but may rather have its life through the self-protective behaviors that continue to embody and recreate the memory, expectation, emotion, and sensation of pain. Further, it is worth considering that most chronic musculoskeletal pain may not be the direct result of injuries. Even the notion of chronic pain as 'physically caused' may prove to be misleading, and chronic pain may defy comprehension on any basis which would be exclusively physical or psychological. Rather, a situation of chronic pain may develop in response to trauma, illness, stress or injury as a pattern of learned adaptations. When a condition of chronic pain results from such a response, the pain itself must be seen as embodied in a pattern of action and perception, a neuropsychological gestalt, which involves the entire organism.

Pain involves myriad interrelated physiological, environmental and behavioral factors. If we realistically appraise the costs, benefits and risks, it is obvious that giving priority to the behavioral level offers many advantages. Individuals have the capacity for more direct control over their behavior than they do over their physiology or environment. People can change their behavior by means of re-education at a neuro-muscular level. Learning improved patterns of posture and movement, patterns which involve, reductions in muscular tension, brings about positive changes in the physiological factors implicated in chronic pain. Furthermore, when neuro-muscular re-education brings greater awareness of the physical and social environment, it then becomes easier to identify factors contributing to our well being, and we are enabled to make better choices. Thus, just as learned patterns of adaptation can perpetuate pain, the learning of new, more functional patterns, can reduce or eliminate pain. As a person learns to change his or her patterns of acting in the world, adopting more efficient postures and movements, those patterns in the nervous system maintaining chronic pain begin to dissolve, and, as a result, pain is alleviated.

This requires, however, a very special type of learning - one that is refined enough to affect the deepest sensorimotor substrates of behavior. The learning must connect with neural patterns, that involve emotions and body-self-image in order to modulate the triggering of protective reactions based upon memories and fears. The learning must be able to reform the fundamental muscular patterns of on- going postural and movement behavior. It must teach biomechanical efficiency, awareness of environment, reduction of muscular tension, and it must show the way toward more positive moods and expectations. The Feldenkrais Method is poised to meet all of these challenges.

Before describing some specific techniques for pain reduction, we must first discuss a few additional concepts concerning action and learning. These will prove essential to understanding the problem of chronic pain.

A Systemic View of Action and Learning

It is not possible to understand action by focusing on isolated parts of the body or purely mechanical factors. Human action must be understood in systemic terms: Every action involves an *interaction* between self and environment and a complex integration of many ingredients. As an example of a systemic perspective, consider the basic action of reaching toward an object while standing.

The action of reaching requires control of timing, force and direction. For this, we need proprioception to sense joint position, muscular effort, and the location of parts of the body in relation to one another. Through visual, tactile and other cues, we must also know where both our body and the desired object are located in space. The visual perception requires controlled movements of our eyes and head. There must be sufficient mobility and strength in the shoulder and arm for reaching to take place. Strength and mobility are also required for needed accessory motions in the chest, spine, hips, and legs, that provide added muscular strength and postural stability.

The reaching action, like all actions, relies on components of posture and movement. We must adopt a posture appropriate for reaching which is maintained through balance and orientation. Standing, itself, happens as a constant balancing act, and, as our arm then moves away from our body to reach for the object, balancing maneuvers must compensate for the displacements of mass. Our posture reflects our orientation and intention with respect to the object; this requires vestibular feedback, positional adjustments throughout the skeleton, and muscular changes of tonus in the legs, trunk, and elsewhere. Reaching also requires adequate energetic support from our breathing and heart, and makes mechanical and functional demands upon the viscera.

Cognitive and emotional dimensions are also embodied in the act of reaching; intention and attitude, together with feeling and mood. Reaching may function as a gesture, and it always implies a goal that someone anticipates, plans, and judges by the light of its relative importance. The action is subject to multiple evaluations that affect its real-time performance. Finally, we experience our actions aesthetically as well as practically - we feel and appreciate the difference between an awkward and a graceful motion. The details of our conduct are often affected as much by our aesthetic feelings as by practical requirements. It is apparent how complex are our most basic movements!

How do we learn to perform an action such as reaching? We will highlight a few important aspects of functional learning. First, learning depends on integrations which are inclusive of the entire body, and all those factors previously discussed: intention, environment, orientation, posture, balance, movement, perception, emotion and proprioception. All of these ingredients work together as a system and each cannot be learned in isolation from the others. Action in real-life situations requires real-time coordination of these components. Real-life further complicates action by its enormous diversity of situations and its varying demands. We may observe that actions are never performed twice in exactly the same way. Our actions vary according to our environment, goals, moods, and motivation. Thus, what we normally call a particular action is not a specific pattern of movement, but rather identifies a category which includes a variety of functionally similar behaviors.

Functional learning is not accomplished by the repetition of movements, nor does it entail the memorization of specific movements. Fixed, machine-like, movement patterns lack sufficient flexibility to work effectively in real-world situations. Learning a skill is a dynamic process: it is learning how to solve a problem of action.

Variation is an essential part of the learning process as we explore different ways of accomplishing similar goals in differing environments and settings.

For example, when we learn to reach, we learn to reach from different positions for objects of different sizes, colors, shapes and weights. Eventually we must learn to reach for moving objects which entails additional demands on our timing and control. Furthermore, occasions of reaching emerge from differing situations and motivations, such as hunger, curiosity, anger, play, and a host of practical needs. Every variation on reaching alters the mix between the ingredients that make reaching possible; with every variation reaching's system of action fits together in a different way. And it is by exploring reaching in a variety of ways that people learn how to reach with enhanced competence and skill.

Feldenkrais carried this idea of movement adaptability one step further in his concept of 'reversibility.' Reflecting the practical wisdom carried in the tradition of martial arts, Feldenkrais observed that the best human movement can be stopped or changed at any moment. When we attain qualities of 'reversibility,' we are skillfully able to adjust our movements and postures with remarkable fluidity, spontaneity, and openness to our changing needs and circumstances.

Another feature of skillful, or well-organized, action is what Feldenkrais described as 'a proportional distribution of effort' throughout the body. In other words, the larger muscles, given their strength, should do a proportionately larger share of work than the smaller muscles. For example, maximum arm strength requires coordination with the larger muscles of the shoulders, chest and back. When we force our wrists to do the work that should be done by our shoulders and back, the result is unnecessary wrist strain. In a comfortable, graceful movement, all the parts of a person's body work harmoniously, like that of a well tuned musical instrument.

Finally, we must appreciate the role of efficient posture in well organized action. We have already seen how posture and movement are integrally related with each other. Feldenkrais perhaps first became aware of this fact through his early acquaintance with jujitsu. The concept of a good posture as the ground of an ability to act belongs to the centuries old tradition of Japanese and Chinese martial arts. Modern science has only recently begun to clarify the active aspect of posture. In order to give proper emphasis to the dynamic property of posture, Feldenkrais coined the term 'acture.' Every efficient action requires an appropriate, balanced posture, from which an intended action can be initiated, sustained and completed. Different postures are required for differing actions such as reaching, typing, wrestling or running. In the most appropriate postures movements can be directly and efficiently initiated without making prior readjustments.

Considering once again a person who suffers chronic pain - for example, in the shoulder - it is easy to imagine how such pain could be exacerbated by reaching movements. In such a case, we would likely observe a systemic disorganization of this action as manifested by potential disruptions in posture, breathing, flexibility, effort, force, timing, balance, orientation, expectation, and mood. There would be no 'proportional distribution of effort;' small muscles would be over-worked, and the body would move with awkward inefficiency. Furthermore, we would be struck by the limited variety and spontaneity in the person's movements. The person's movements would appear overly deliberate and stereotypical, because self-protective postures would severely limit the field of his or her possible actions. Also, because such movements are likely to lack 'reversibility', are less capable of fluid, spontaneous readjustment, they are less resilient to disturbances. If the movement does not proceed as the person expects, the action is more likely to be interrupted by pain, awkwardness, or immobility and thereby fail to achieve its aim.

What is required for reorganizing such a sub optimal system of action? Once a person has acquired habitual, self-protective movement patterns that have outlived their functional utility, fundamental re-learning is necessary. While there may be some benefit from conventional stretching and strengthening, from relaxation regimes or psychotherapy, and from simple movement repetition or the mechanical treatment of individual parts of the body, none of these approaches address the systemic properties of action and learning. Hence, new, reliable and efficient patterns of action will not result. Fundamental re-learning depends on functionally based exploratory movements which involve the entire person, and which lead to increased self-awareness in action. Such a process offers a person suffering from chronic pain a way to overcome his or her habitual patterns of posture and movement, by learning healthier ways of functioning. This functional learning is the basis of the Feldenkrais Methods of Awareness through Movement and Functional Integration.

Let us take a moment to review the ground we have covered so far. We first introduced Moshe Feldenkrais together with the two highly original somatic methods he developed. Next we examined the hypothetical evolution of a chronic pain condition, emphasizing a behavioral rather than an anatomical or medical perspective. We then clarified a systems perspective of action and learning, and applied it to the situation of chronic pain. Our objective has been to show that movement and posture must be understood holistically and developmentally. Such an understanding requires that we emphasize the individualized, multi-leveled nature of learning, and that we assign a fundamental role to exploration and variation.

In the next sections we will offer a more detailed account of the Feldenkrais Method. We will make apparent how it is uniquely helpful for people suffering chronic pain who wish to gain better control of themselves and their lives.

Awareness Through Movement: An Active Motor Learning Approach

The Feldenkrais Method, as we have mentioned, is comprised of two complementary approaches: Awareness Through Movement (ATM) and Functional Integration (FI). In Functional Integration a teacher works privately with a student, and most of their interaction is nonverbal. The teacher uses the hands to support the student in comfortable positions, and make gentle and small, often minute, movements. The teacher uses touch first to help the student feel and release areas of muscular tension, and gain awareness of the ways in which the entire body must be coordinated for efficient movement. It is then possible to assist the student in learning more optimal posture, breathing, and ways to perform important functional actions. The teacher sensitively determines, with the student, the improved patterns of posture and movement that are needed, and that the student can accept and use.

In contrast with Functional Integration, Awareness Through Movement offers a very different kind of learning experience. Here the teacher provides *verbal* movement instructions, given without visual example or assisted touch. Students explore gentle, stress free movements that the teacher describes, giving attention to what is taking place in themselves, and on this basis they discover how the movements can be most easily accomplished.

Students can do ATM lessons either in groups, or in private classes, or from tape or book sources. A lesson typically lasts from 30 to 60 minutes and contains 10 - 30 different movements related to a functional theme. An entire lesson, for example, may consist of movements related to reaching, standing up, or turning. Sensorimotor feedback, afforded through touch in Functional Integration, develops in ATM through

movement explorations. ATM lessons increase body and self awareness, and are designed to enhance the efficiency, comfort and enjoyment of movement. Under these conditions there is facilitation of sensorimotor learning, leading to the adoption of improved patterns of both posture and movement, resulting in a reduction or even eradication of pain for the student.

Awareness through Movement students are asked to:

- 1) Move with a minimum of effort;
- 2) Avoid any movements or positions that produce pain;
- 3) Direct attention to how all parts of the body participate in any action;
- 4) Notice the thoughts, feelings, images and attitudes that accompany movements;
- 5) Learn to overcome movement restrictions through increasing skill, rather than the use of will.

Awareness Through Movement constitutes a fundamental rethinking of what exercise, movement therapy and physical education can be. It is holistic, sophisticated, and fully grounded in existing knowledge of biomechanical, physiological, and behavioral organization. By comparing ATM with more conventional approaches, we will try to make apparent how much it can offer to individuals suffering chronic pain.

ATM and Conventional Exercises Contrasted

The movement techniques belonging to Awareness Through Movement are not exercises in the usual sense, and pre-existing assumptions about exercise can obstruct one's understanding of ATM. Unlike conventional exercise, ATM is a method based upon functional-learning concepts. In order to appreciate the method's uniqueness and to assess its advantages for use with individuals with chronic pain, we will detail contrasts between ATM and more conventional approaches. An ATM lesson on the subject of reaching - continuing our previous example - would include systematically organized variations to facilitate each aspect of the action: flexibility, strength, balance, orientation and perception, posture, movement coordination throughout the body, visual guidance, and body-image. Conventional exercises would neglect many of these aspects. Because so many parts of the body must coordinate when reaching, the lesson's variations would include movements of the hand, arm, shoulder, eyes, head, neck, chest, spine, pelvis, and legs. Appropriate ratios of motion and force between the areas that are engaged in a movement are the keys to its coordination. Instead of attending to these multiple relationships, most conventional exercises would focus primarily on the strength and flexibility of the shoulder and arm components.

Flexibility and Strength

Flexibility *is* one important aspect of good movement: Conventional exercises use stretching to increase flexibility. Unfortunately, over- stretching can induce a stretch reflex that produces the negative consequence of increasing muscular tension. And stretching is especially difficult to control for individuals with pain - the fear that a movement will cause further pain reinforces a pattern of muscular holding. Also, many people with a long history of chronic pain have learned to dissociate from their bodily feelings. Without sufficient body awareness, stretching can force the body in unhealthy directions, and over-stretching can cause inflammatory reactions and increased pain or injuries, such as pulled muscles and strained ligaments. ATM increases flexibility virtually without these hazards. When people are guided to move slowly and with attention in Awareness Through Movement, they learn to decrease the muscular tensions limiting mobility. Gentle, and sometimes unusual, movements are taught that increase flexibility through altering the habitual

muscular tension patterns that the nervous system maintains. By aiming to organize more efficient skeletal alignment, balance, and coordination, an ATM lesson can release unexpected reserves of flexibility. Students are often surprised to find how much flexibility can be gained in less than an hour without any stretching at all. The kind of conventional approaches that work to increase flexibility through stretching typically try to promote increases in strength through the use of weight lifting or resistance training. It is unnecessary to question the value of strength, or the potential benefits of weight training, in order to recognize that strengthening exercises, like stretching, may result in injury or increased pain. For the individual with chronic pain, poor kinesthetic awareness, inefficient body mechanics, and who is fearful of injury, strengthening exercises may even intensify and increase the risk of overdoing. By comparison, ATM utilizes small, gentle movements to improve kinesthetic awareness, body mechanics, and skeletal alignment. Improvements in skeletal alignment can immediately increase the forces generated by muscles, and increase strength significantly. ATM thereby indirectly increases strength by eliminating counter-productive efforts, increasing movement coordination, and enhancing biomechanical efficiency. Just as importantly, the slow, careful approach of ATM helps to reduce fear and anxiety. These improvements promote natural increases in the duration and variety of normal activities. Subtle increases in activity are deceptively potent, for they involve repeating simple movements, such as standing, walking, turning, bending and reaching, perhaps hundreds of times over the course of a day - a far greater quantity of motion than would be provided by deliberate practice. Gradual expansions in activity can in this way yield further increases in both strength and endurance.

Conventional stretching and strength training requires *effort*, but sensorimotor learning requires the *reduction* of effort. The 'Weber-Fechner law,' a central principle of physiological psychology, discovered in the 19th century, states that the least noticeable change in a sensory stimulus is in a constant proportion to the magnitude of the original stimulus. In other words, the smaller the effort we make, the greater is our sensitivity. Thus, during ATM, students are encouraged to reduce their muscular effort in order to increase their perceptual awareness of the minor changes in muscular organization that signal an action's improved efficiency. Reduced effort also enables students to make more sensitive discriminations with regard to other crucial ingredients of action, such as breathing, timing and direction.

Conventional strength and flexibility exercises focus on specific muscle groups, because they are based on the assumption that improvements in strength and flexibility of the targeted muscles directly leads to improvements in physical abilities. While strength and flexibility are desirable, strengthening exercises in and of themselves do not increase skill, nor do they necessarily improve performance, because the contractions of muscles (considered by themselves) are only one isolated, though necessary, component of an action. Therefore, a Feldenkrais approach observes that that when people have pain while performing most ordinary movements, lack of strength is usually not the primary hindrance. Rather they are hindered by using their strength counter-productively, that is, without sufficient coordination and skill. Coordination requires, as we have mentioned, a 'proportionate distribution of effort' between all of the active muscle groups, and an inhibition of excessive activity in opposing, or, 'antagonistic', muscle groups. By systematically addressing an action as a whole rather than as a collection of muscular components, ATM reduces extraneous efforts and develops the musculo-skeletal coordination required for actions that are both efficient and functional.

In a conventional approach the sequence of specific exercises and their relation each other is dictated by the focus on specific muscles. Typically, people perform a series of discrete exercises that individually address

important muscle groups and their antagonists. Most often, however, each exercise in such programs is functionally unrelated to the others in the sequence. ATM, on the other hand, contains carefully orchestrated sequences of variations based upon central functional ideas such as bending, turning, or reaching. Each movement-variation in a particular lesson carries information pertinent to the improvement of all of the action's ingredients.

As has been detailed in the context of 'reaching', above, a person's posture is the ground of their ability to act. Posture is itself dynamic, and actively brings together many of the ingredients involved in action. So-called 'poor' posture has, in fact, long been implicated as a factor producing pain. The conventional approach to posture and its re-education, however, exhibits yet another stark contrast with Feldenkrais lessons. Conventional physical education conceives of posture as being static - a person's 'uprightness' is measured against a plumb line or grid. Furthermore, posture is often viewed in purely mechanical terms, as if standing consisted of balancing blocks, one on top of another. Postural reeducation typically reflects such ideas, often consisting of little more than the kind of admonitions one might expect to hear in the military: "Stomach in, chest up, shoulders and head back, chin in," and so on. In contrast, Feldenkrais, with backgrounds in the oriental martial arts and neuromuscular physiology, emphasized the fact that posture cannot be isolated from action. An ATM lesson on our subject of reaching, for example, is designed to reorganize the postural state from which the reaching movement is initiated and completed. When we address any particular action, we must also retrain its specific, underlying, postural organization. The practical result is an automatic improvement of posture as it relates to the requirements of the action.

Posture cannot be understood solely in terms of the way movement is organized. A person's stance is a *behavior* that expresses their feelings, attitudes, and emotional state. Chronic pain usually brings with it emotional distress. Fear is the dominant emotion attached to pain, and the initial response to fear is the triggering of muscular patterns that freeze us in a fearful posture. One may here observe tendencies to hold the breath, suck in the stomach, flex the knees and hips, tighten the jaw, hike up the shoulders, and lower the head. ATM increases people's awareness of when and how they enact muscular tensions, sensitizing them to the emotional aspects, and teaching ways to let go of those habitual tensions. Successfully addressing the postural consequences of fear can have dramatic effects in restoring more erect and efficient postures, postures that embody feelings of greater security and confidence.

Effort Reduction vs. Relaxation

We have described how conventional approaches focus on specific muscles for the improvement of flexibility, strength, and posture. A similar emphasis is also characteristic of common relaxation exercises. Unfortunately, the muscular relaxation learned through specific techniques does not easily transfer into real life, because the ability to relax a particular muscle is not part of moving in the real world. Nor does a generalized approach that induces an overall relaxed state relate adequately to the real life requirements of driving a car on the freeway, for example, or engaging in other demanding activities. ATM creates relaxation effects as a byproduct of learning to move with reduced effort. Such muscular relaxation transfers more easily into everyday life because it goes with improvements in performance of practical actions such as bending, reaching, walking and the other functional movements which belong to daily life. Relaxation that is directly connected to increased efficiency of action is self-reinforcing and helps to consolidate new learning.

Such phenomena illustrate why the Feldenkrais Method eschews the goal of 'relaxation' in favor of the seminal principle of *effort reduction*. Through effort reduction ATM promotes heightened body awareness

and more efficient posture and movement, leading to lower levels of tension, stress, and pain. In ATM muscular relaxation is not given as a goal, but is rather supported implicitly and pervasively in the design and context of the lesson.

ATM is guided by principles of effort reduction. Many ATM lessons are performed while lying on a firm bed or on a floor cushioned by a mat or carpet. Lying down is associated with the calming effects of rest and sleep, and a pillow behind the head and/or knees helps to make the position more comfortable for those who cannot lie flat. Lying on the floor also allows us to move without having to work against gravity. Compared to sitting or standing, this lying position makes it much easier to learn new movement patterns, such as learning how to reach more efficiently, as in the example already discussed. Once a student has learned how to reach more efficiently while lying, it becomes more feasible to transfer the learning to the more challenging upright postures.

ATM movements are usually done very slowly, giving time for the student to attend to each movement so as to inhibit unnecessary efforts and to discover new movement possibilities. Also, ATM teachers choose those movements that will be relatively easy for students to accomplish in order to minimize stress and strain. Uncomfortable or painful movements are either strictly avoided or performed only in the imagination. It is worth noting that, though the movements are stress free, they are able to hold attention, for they are crafted both for their novelty and for their relevance to daily life.

ATM teachers direct their students to move only within their range of ease, without stretching, so that effort reduction occurs from the outset. Students are encouraged to find their own rhythm, move at their own rate, and rest whenever they feel the need. Teachers direct students' awareness to how breathing affects movement, as well as how movement affects breathing, because breath awareness reduces effort and helps to maintain attention.

ATM variations often involve using one part of the body to substitute for the work (and effort) of another. For example, one may be instructed to use the hands to help lift the head or leg or to lean on the arms to help hold the body upright. If a student bends forward while sitting on the floor, the back muscles must work to maintain balance. But, if the student leans forward on his or her hands, the arms support the work that would otherwise be performed by the back. This 'auxiliary movement' of leaning on the hands reduces the effort of bending and gives the student the experience of bending more efficiently. The student subsequently learns how to bend more easily without the auxiliary leaning.

Reduced effort in action means much more than simple relaxation in another respect. Relaxation is non-specific with respect to the way one performs an action; relaxation can result from medication, meditation, or any non stressful environment. In contrast, the Feldenkrais Method induces a 'dynamic' relaxation that is embodied in more efficient movement. Reduced effort is one of the defining features of motor learning. New, efficient movement patterns emerge through the gradual elimination of extraneous muscular efforts. The nervous system forms new pathways which result in more efficient biomechanical means for the realization of our intentions. This efficiency, in turn, reduces frictional and shearing forces, lessens wear and tear on all musculoskeletal components, and brings with it a more peaceful emotional state, *and* muscular relaxation.

Learning vs. Teaching

We have shown how Awareness through movement brings to bear a systemic approach in order to gain the benefits of improved posture, and increased strength, flexibility, and relaxation. Now we can begin to extend such systems thinking to include the relationship of teacher and student.

Let us look at some differences between how Feldenkrais and conventional exercise is taught. Exercises are usually taught through 'visual modeling'; the imitation of the teacher's movements. ATM, however, relies on verbal instructions that teach a person how to learn from his or her own performance, rather than by imitation. The student uses his or her own sensorimotor feedback to eliminate unproductive efforts and gauge the advantages and disadvantages of different movement strategies. The verbal instructions in ATM do not interfere with the student's inner-directed process. When we imitate others, we shift our attention away from our own feelings, sensations, and thoughts. It is especially important for individuals with pain to explore their own inner-workings and challenges, and discover how to move in ways that fit their unique make-up and capacities. Imitating others may mislead a person to attempt movements that are inappropriate or excessive. Imitation may also foster attitudes of competition or self-criticism which are counter-productive to learning.

We have already pointed out how individuals with long term pain learn to dissociate from their bodily feelings, and the focus of traditional exercise may contribute to further self-alienation. ATM instructions promote increased self-confidence, and enhance self-awareness concerning more comfortable ways to accomplish the tasks of daily living. Such improvements lead to a greater connectedness with the body, along with a more expansive, and more positive, self image.

Conventional approaches depend on telling the student what is correct and what is not, while the student imitates the teacher's example, and responds to detailed instructions given about proper posture, breathing, or movement. For ATM a true physical education must be rooted in our own internal sense of the physical, and cannot proceed from external visual or verbal indications. Even if a student can superficially mirror the postures and actions of the teacher it does not mean that the student is embodying a physical understanding. And if a student is unable to feel the meaning and value of suggestions, visual examples and explicit instructions may actually impede learning. Truly physical learning is grounded in kinesthetic sensibility and is guided by self-discovery. Infant motor development provides a striking paradigm for many ATM principles. Like the learning of a growing child, ATM is an experiential process of discovery through exploration. Rather than being given specific movement instructions, ATM involves structured, problem-solving explorations akin to real-life learning situations, where higher levels of skill emerge spontaneously from doing.

Conventional exercises entail mechanical repetition of movements. However, while this semi-automatic repetition may improve localized strengths and flexibilities, it fails to foster new learning. When we mechanically repeat a movement we only do what we already know, and that means repeating any inefficient and deleterious patterns that belong to our habitual ways of moving. In ATM lessons, students are discouraged from repeating movements in the absence of awareness. Instead, every movement is intended to present an opportunity for discovery. Many movement variations are included in each lesson in order to provide new information, increase attention, and engage the cortical aspects of brain function that are essential for learning.

The difference between practicing repetitive movement and exploring movement variations forms one of the core contrasts between ATM and exercise. Beneficial, functional learning does not have automated movements as its result. On the contrary, routine movements are often characteristic of emotional or physical troubles. People with chronic pain frequently display self-protective movement patterns that are so entrenched they seem almost robotic. ATM frees up this robotic kind of movement and creates more responsive, spontaneous, and variable behavior and experience.

Awareness Through Movement uses functional variations to help train the adaptability that is characteristic of healthy and skillful movement. ATM lessons are designed to reflect the variability of daily life by teaching students how to perform movements in many different ways. Some of the variations may appear subtle, and others less so, but these variations create capabilities that the student can carry over into real situations; they help instill the capacity to alter behavior appropriately and spontaneously according to our unpredictably changing life circumstances.

Feldenkrais asserted that his was a method of *learning*, not *teaching*, in order to emphasize how ATM differs from what is typical for other kinds of instruction. Awareness Through Movement works to create an environment where new learning can take place based upon the student's own explorations and choices. Such conditions help students reclaim a sense of their own autonomy, and supplant the importance of an authoritative, curriculum based method of teaching. It is the responsibility of an ATM instructor to establish and maintain a learning environment that enables students to alter the movements and muscular patterns that have limited their capabilities and made them more vulnerable to distress and injury.

Conventional approaches may try to 'correct' our movement or posture, but such efforts often prove superficial, because there is little effect on older, entrenched patterns. New learning must grow amidst the older, limiting, patterns that tend to maintain themselves, and these old habits typically interfere with the ability to form new patterns. The intransigence of habits can cause great frustration as one tries to learn new skills. One of Feldenkrais' most original and important contributions to movement education was his creation of an extensive repertoire of 'non habitual movements' and indirect techniques. These are specifically designed to break up old habits and make room for new learning. It is much easier to learn new patterns when the old patterns are inhibited or destabilized.

Learning and Growth vs. Therapy

In this overview of the principles underlying Awareness through Movement, we have seen how it embodies a multi-dimensional understanding of the processes of motor learning and development. It is important to realize that the relevance of ATM is not circumscribed by easily definable boundaries. Feldenkrais work is organized around insights into the nature of learning and action, and depends upon students closely engaging with their own experience of learning. In the absence of arbitrary boundaries, movement and learning draw on and affect all of the dimensions of our lives.

In conventional approaches, the attempt to improve movement goes no further than a level of function where the movement is adequate to the required task. But movement skills cannot be defined solely by the requirements of specific tasks. It is not a luxury to extend the process of re-education beyond the competence called for by specific tasks or purely practical objectives.

We have already described how 'reversibility,' the ability to start, stop, or change what we are doing at any moment, is an important aspect of behavioral flexibility. 'Reversibility' can be thought of as a 'second order' movement quality; rather than being characteristic of a good movement, it identifies the facility of transitions from one movement to another.

Smoothness and grace of movement, balance and poise of posture, are more than purely aesthetic: they are biologically important values and capabilities that have evolved over millions of years. The grace of a cat is an expression of its efficiency of movement. And for a human being, graceful motion carries significant personal, as well as biological, value. We long to feel graceful and beautiful, as much or more than we wish to be competent.

Aesthetics are only one example of the importance, for people with chronic pain, of their attitudes toward themselves and their movement. Whereas conventional exercises encourage active striving to achieve a goal, ATM encourages us to relinquish goal orientation and attend instead to the quality of moving and to our process of learning. It is an obvious but elusive reality, that learning occurs in the present, through the process, in real time, of trying out possibilities and perceiving their outcomes. Long term goals are necessary and important, but for the individual with chronic pain, the effort to achieve change immediately can result in increased muscular tension, protective guarding, and further pain.

Goal orientation obstructs learning not only by removing people from their present experience, goals also call for them to exercise their will. But for a person suffering from chronic pain, the use of will power is attached to feelings of insufficiency and self-criticism. Such emotions are apt to interfere with the sensitivity of perception and the execution of movement, resulting in unnecessary and inefficient efforts. Interestingly, when we let go of our conscious goals - for example, increasing our range of motion or straightening our posture - our efforts are reduced and our learning is facilitated. Being free of the pressure of goals helps students to gain the sensorimotor feedback that comes from focusing on movement qualities such as support, lightness, smoothness, and enjoyment.

People with pain problems, self-conscious of their limitations and desperately seeking relief, may especially feel pushed to do more than their comfort allows. The use of 'will power' may bring a person to dissociate from bodily feelings and try to do more than what is comfortable. And when conventional exercises are performed in a competitive atmosphere, the 'poor achiever' may become still more self-critical about his or her appearance or abilities. It serves neither healing nor learning to exacerbate feelings of self-criticism and uncertainty regarding one's capabilities. Some of the most important aims of ATM are to create feelings of safety, self-acceptance, and trust in our bodies and our abilities to change. When people feel more physically secure with themselves, there is improvement in the *quality* of their movement, and they find it easier to learn.

Conventional exercise often ignores the quality of movement in favor of such quantitative criteria as range and strength. ATM can successfully achieve measurable improvements by placing greatest emphasis on such qualitative gains as even distribution of effort throughout the body, reversibility, and elegance of movement, all of which deeply affect people's subjective experience. More than isolated changes in movement range and strength, such qualitative - and difficult to measure - factors often correlate with the reduction and elimination of pain, and the essential abilities to find comfort, competence, and enjoyment, in daily life.

Finally, the emphasis on learning in Awareness through Movement amounts to more than a means to increase comfort; it is a means of *learning how to learn*. Human beings require curiosity and learning to

thrive and be healthy. The thousands of problem solving variations in ATM aim toward an intensity of sensorimotor awareness that is reminiscent of a growing child. New combinations of movements are new *ideas* that stimulate the brain and the mind, helping us to think in new ways, enhancing creativity, imagination, and the sense of aliveness.

Unfortunately, people with chronic pain may find their lives centering around the pain that they experience, and the strategies and efforts they employ for its remediation. Awareness through Movement takes us far beyond specific treatments and exercises. We are beginning to glimpse how Awareness through Movement offers the potential for much more than increased comfort and health; it can lead us to a new conception and experience of wellness. Ease of movement and physical awareness can bring us to enjoy and appreciate better what it means to be alive. Awareness through Movement can guide us to a powerful sense of personal vitality, to a natural appreciation of the sensuousness of movement, to experiencing the wonderment of our senses in beholding the world. Such self-awareness extends even as far as our empathy and appreciation for each other.

The summary we have given of ATM began with the most concrete kinds of contrasts with conventional therapies, examining the more manifest issues of strength, flexibility, posture, and relaxation. Next we distinguished between Feldenkrais and conventional approaches with respect to their philosophies and methodologies of learning. But as we have continued to trace the differences we have come to a place where what becomes most conspicuous is that the conventional, apparently 'scientific' approaches try to avoid issues of aesthetics, personal development, and quality of life. However, if we do not include such considerations in our practical work with real people, therapies become bewildering compendiums of mechanical procedures and techniques, and their application may fail to bring results that are relevant for people's lives. The Feldenkrais approach begins as much from where we have come to at the end of this summary, as it does from where we began it: as much from the holistic and humanistic as from the local and biomechanical. Musical compositions show parallels with the organization of movement. Were one to focus only on a composition's individual notes or measures, the intended music would be lost. The music's meaning depends on both skillful attention to particulars and on the feelings and interpretation that bring the whole to expression. The details and the whole, the physiology and the intention, all come together in movement. Feldenkrais believed that movement is the very essence of life, and we should never forget that it is *we* who move, and not our *bodies*. Movement is not only a means to achieve an end; how we move expresses our quality of life, and when our movement improves we are realizing a measure of personal growth. The Feldenkrais method can bring powerful practical help because it is attuned to the developmental potentials that belong to each of us. Let us now turn to the more individualized approach of Functional Integration.

Functional Integration: A Manual Motor Learning Approach

Functional Integration differs from Awareness Through Movement. While ATM is entirely active and verbally led, in Functional Integration (FI) the practitioner's work is primarily hands-on and engages the student one-on-one. ATM and FI are complementary ways to learn new and improved ways to function, and in most cases a combination of both approaches works best. FI may consist exclusively of practitioner-assisted movements and touch, that require no muscular effort on the part of the student, or it can also

include the student actively doing directed movements. Together FI and ATM draw on a broad and deep repertoire of movements and learning strategies.

FI involves an extremely gentle and precise non-verbal dialogue between the practitioner and student. Feldenkrais likened his method to the mutual contact and communication between a mother and her infant, or how we can learn to dance by following our partner's movements. The practitioner moves and touches the student in ways that bring new awareness of relationships between different parts of the body, and to muscular contractions not normally under conscious control. The purpose of FI is to convey patterns of heightened coordination, and options for new ways to move and acquire movement skills. To make all of this possible the FI practitioner has been trained to exercise exquisite sensitivity to subtle changes of muscular tonus and breathing, and to minimal movements and adjustments of position. These delicate cues signal to the practitioner when the student is ready to release muscular tensions and indicates how the student is registering potentials for movement. Through the reciprocity of interaction and flow of information, FI guides the emergence of new patterns of posture and movement.

The enhancement of skills, health, and quality of life, results from both FI and ATM methods of motor learning. But ATM cannot be used - at least initially - for some individuals. These, infants with cerebral palsy or adults with limited cognitive or motor capabilities, as examples, *can* be effectively addressed through FI.

Similarly, people in severe pain may be unable to move comfortably enough to spare any attention to the details of their movements, even when asked to do movements gently and in supportive positions. People in pain may be insufficiently aware or capable of influencing the size, speed, or direction of movement for the avoidance of discomfort. Here again, FI is the best place to begin. A skilled practitioner can use his or her hands to show them directly how to move in ways that are pain-free and efficient. Such experience with FI usually enables them subsequently to participate in ATM.

FI and Therapies Contrasted

FI and ATM share common principles that set them apart from more conventional approaches. In an earlier section we illuminated contrasts between ATM and conventional methods of exercise. Much of what has already been said about ATM applies also to FI. But here we will focus on distinguishing FI's educational approach from the corrective techniques, based upon a medical model, of massage, physical therapy, chiropractic and osteopathy. For the sake of simplification, we will use the term 'therapy' to refer to any such methods that are based upon a medical model.

Positions of Comfort

At the outset, therapies may minimize the importance of a person's comfort in order to place him or her in positions that are convenient for performing intended techniques. In contrast, FI gives foremost emphasis to the comfort of the student. For example, students are invited to lie in their sleeping position or they are assisted to find positions that are particularly comfortable. A comfortable position puts the student at ease, reduces tension, and frees the student's attention for learning.

Initial FI lessons, as also ATM lessons, are usually given with the student lying down. In lying down the body can find its largest possible basis of support; there is no need for muscular work against gravity and no

need for balancing. Rollers and supports are placed behind the head or knees to put the person further at ease. Later lessons are given with the student in the many positions of normal life: lying on the back, side or stomach, and kneeling, sitting, standing, or walking.

Use of Force

The techniques of many therapies involve force. But the use of force induces resistance and may bring about unconscious avoidance of the forced movement. FI never imposes movements that induce resistance. By using gentle, indirect techniques to elicit movement without resistance, FI practitioners can avoid movements that are associated with previous difficulties. Feelings of safety, trust, and enjoyment create the greatest receptivity for learning. Forceful techniques, on the other hand, induce defensive reactions that block kinesthetic processing of information.

Even when forceful techniques can be used without discomfort or resistance, forceful movements bypass nervous system sensorimotor circuits that are necessary for the formation of new motor patterns. FI invites participation, eliciting the student's attention and cooperation, and involving the learning capabilities of the nervous system. New movements are gained along with awareness, and are experienced as comfortable. Such movements are self-reinforcing and will tend to be repeated spontaneously in the course of everyday life.

Posture and Pain

On the basis of biomechanical and physiological principles, postural asymmetries are sometimes thought to be a cause of pain. Under this justification therapists may try to correct asymmetries with force or exercises as if a person could be straightened like a rod. While it is true that increases in symmetry often accompany reduced pain, it does not follow that imposed symmetry is necessarily beneficial. Living beings are never completely symmetrical, and the asymmetries that exist derive from the entire life history of an individual. People's habitual postures should not be treated independently of their behavior as a whole. Forcefully imposed symmetry can lead to increased pain and functional *dis*-integration. A Feldenkrais approach incorporates the principle articulated by the Bauhaus school of design: form should follow function, rather than expecting function to fit into concepts of form. In FI, the practitioner follows the movement of the student by contouring to the existing curvatures and biases, so as not to contradict the organization of the nervous system. No attempts to 'straighten' are made. The improvement of movement coordination nevertheless facilitates a spontaneous tendency toward reduced biases and increased symmetry.

A misplaced emphasis upon symmetry also inclines therapists to place their patients or clients only in symmetrical positions for their manual procedures. Most often these positions involve lying symmetrically on the back, or on the stomach (with the head resting in a face cradle), and sometimes on the side. Such positions may accord with a static conception of symmetry, but they do not encompass the more common asymmetrical dispositions observable in ordinary actions. The more naturalistic Feldenkrais approach places students in a great variety of positions, including asymmetrical ones, in order to reflect situations encountered in the real world, and to improve the student's ability to function in a wider variety of circumstances.

Consider an individual with chronic pain who, for the purpose of pain avoidance, has learned to assume an essentially rigid posture. This person is highly susceptible to accepting still another fixed idea about posture,

through which they are led to attempt to 'hold' a position for the sake of its purported therapeutic value. But any posture that is artificially held cannot be truly efficient, since as we have explained, good posture occurs in fluid linkage with action.

Moreover, when people become involved in attempts to improve their posture or symmetry, cultural and aesthetic factors are inevitably interwoven with health considerations. It is important to recognize that comparisons made with encultured images of beauty commonly wound people's self images. The model, the athlete, and the soldier offer ideals of postural symmetry that attract striving and emulation, in fantasy, even if not in fact. Such images are rarely far from people's minds when they learn static therapeutic principles of 'good' posture. A patient undergoing treatment may therefore assume a posture based upon their imagined ideal. But this results in a false posture, disconnected from the real person, and dissociated from biological values and sensorimotor experience.

The Feldenkrais approach often calls for a deconstruction of the student's attitudes about posture as part of redirecting them toward a more kinesthetically guided postural regulation. In cases where long standing feelings of poor self esteem are connected with body image issues, the Feldenkrais method of postural re-education affords opportunities for emotional learning, in addition to improved physical functioning.

Whole and Part

Most therapies work directly on specific, isolated areas of the body in order to stretch or relax muscles, mobilize joints, remove movement impediments, or effect structural changes. These local approaches stand in contrast to FI's systemic emphasis on how the whole person is organized in action. Each 'move,' use of support, or touch, in an FI lesson, conveys information about integrated action and teaches how all parts of the body can better coordinate with one another.

When most therapies identify a problem area, they work on it directly. FI often begins with engaging the parts of the body that can move most easily, and by supporting the directions of movement that are pain free. The movements a practitioner selects are a careful match with the student's abilities. FI builds on where a person is healthy in order to extend efficient, integrated movement through all of his or her behaviors. Because painful areas are most usually avoided until they are no longer painful, the practitioner's pleasant touch yields positive physical sensations, and teaches that movement can be comfortable and enjoyable.

An FI practitioner, tuned to the pattern of interconnections that shape the way a person moves, can usually alleviate painful movement without directly touching a painful area. Working with areas remote from the site of pain, but which belong to its functional coordinations, the practitioner can completely bypass the protective reactions which could get in the way of learning new ways to do things. Indirect effects like this are possible because every movement involves the entire skeleton, muscular system, and nervous system.

Practitioners with FI skills are able to use the kinematic linkages between skeletal segments to generate movement throughout the body from any location. The term 'kinematic linkage' derives from engineering and refers to how movement is transmitted from one unit to another, for example, as a key turns the inner parts of a lock.

Similarly, if a practitioner gently pushes the bottom of a student's foot in the direction of the head, movement is transmitted through the bones and articulations of the leg, pelvis, spine, chest, shoulders, arms, neck, and head. Now, the presence of muscular tension will result in forces that dampen and limit the transmission of

motion, or divert its upward direction. As this movement of the foot is performed, the practitioner helps the student sense how the movement is constrained, together with possibilities for freer movement. The student's nervous system is highly responsive to this kind of information, because it bears upon the organization of efficient skeletal alignment necessary for good posture and movement. In light of what is sensed, the nervous system reorganizes skeletal linkages. Better organized movement, more efficiently 'linked', involves more of the entire body, and usually eliminates or reduces pains that had taken hold in specific areas.

Variety

Therapists often repeat the same techniques with different people, and may use the same techniques over and over with the same person. Even when they successfully address symptoms, standardized techniques lack an educational focus, and ignore both the ways in which we actually learn to act in the real world, and the individualized needs of people.

Motor and cognitive learning relies on a balance between variation and novelty, on the one hand, and stability and reliability, on the other. Functional Integration addresses this balance to enable new patterns of movement to take root and consolidate as they integrate with diverse previously learned movements and contexts. Varied movements are essential to meet the adaptive requirements of daily life, and skills are generalized as they come to be applied in different situations. This means that effective motor re-education, as it occurs spontaneously, or in a more formal setting, requires a wide range of positions, orientations, tempos and movements.

Functional Integration draws on thousands of different handling techniques. These are employed not only to provide valuable functional information and to achieve optimal conditions for learning and consolidation, but also to specifically address each person as an individual. Every person is unique, with a unique history, and unique limitations and capacities. People learn in different ways and at different rates, and deserve an approach suited to their individual characteristics and goals. The extraordinary range of approaches--verbal and nonverbal, simple and complex, direct and indirect--belonging to Functional Integration make it possible to meet each person with methods uniquely suited to them.

Labels

When a therapy addresses a problem with movement, it usually begins with a diagnosis or assessment that labels the problem. Diagnosis belongs to a medical model and, when efficacious, may provide the basis for advised evaluations and/or effective treatment. However, where medicine is unable to establish definitive causation or provide a solution, diagnosis may be no more than a naming, or renaming, of a problem, that sheds no real light on its nature. Such labels imply an artificial isolation of the problem, and may contribute to a negative self-image or sense of hopelessness and helplessness. The educational approach of FI, in contrast with a medical orientation, does not attempt to label problems, or establish their etiology; FI focuses on projecting functional goals, and helping a student learn how they may be achieved. To this end, the emphasis shifts away from problems, and towards enlarging movements and choices that are within the student's control. The student is positively empowered by being encouraged to identify with what they can do rather than meeting a situation of therapy on the basis of what they cannot do. At each step of the way FI aims to improve the student's self image, confidence and self-esteem.

Therapists often distinguish between 'normal' and 'compensatory patterns' - such distinctions are often based on unexamined assumptions. First of all, it is very difficult to evaluate what is 'normal.' The science for analyzing complex movements remains primitive, and has mostly limited itself to studying artificial, isolated actions, and measuring isolated parameters, such as range of motion, strength, or force. For an outside observer the distinction between a 'compensation' and what is simply a personal way of doing something, is far from obvious.

The term 'compensation' is itself unfortunate because it carries the negative connotation of abnormally substituting one behavior for another. It is possible to imagine and describe, at least theoretically, a movement that is biomechanically optimal, based upon knowledge of physics and biology. Such a yardstick is useful, but it falls short when prescribed to an individual, because it neglects that person's genetic uniqueness and developmental history. When a person's performance of complex movements is under evaluation, the paramount criteria should be the person's self experience, their ability to function in the world, and to accomplish what is desired. In the end, the most important criteria must be subjectively determined; whether one can realize one's intentions and perform in accord with one's own potentiality.

The ability to act effectively in the world, even with less than ideal efficiency, is the expression of a positive capacity. This fact is easy to miss when adaptations are interpreted as 'compensations,' on the basis of a medical mindset. In cases of injury or disease, perhaps it is impossible to perform actions in the way that they were previously done. Here, 'compensations' indicate the healthy adaptations of a well functioning nervous system - they are the best the person can do under the circumstances.

A 'limp', for example, is not necessarily bad; it may be an efficient realization of the person's capabilities. Still, however, some compensations are better than others, and not all limps are created equal. It is possible to teach someone a better way to 'limp,' one that results in less pain or fatigue. The question thus shifts from categorical distinctions between 'abnormal' and 'normal', or normal and compensatory, movement to a consideration of the relative ease or efficiency of a given action in the context of the person's needs and capabilities.

The avoidance of anything which would resemble 'textbook' or diagnostic manual descriptions of students' conditions, or the adaptations they have learned, is a hallmark of the Feldenkrais method. From the perspective of Feldenkrais work, such labels get in the way of new learning for both the teacher and the student.

Active/passive

Most tactile therapies characterize their patient's role as essentially passive. To an untrained observer, FI may appear to follow suit. After all, one may observe an FI practitioner gently touch a student who lies at rest on a table, and hold or slowly carry his or her limbs, head or trunk. What is happening, however, is an engagement of the student's active participation, though sometimes at a micro level. The practitioner uses subtle movements to elicit an active re-organization of the nervous system into new movement patterns. For the student, therefore, it is manifest that their role in a Functional Integration session is far from passive. And Functional Integration may additionally involve the student in some of the more active components of Awareness Through Movement. The motor learning that occurs in Functional Integration resembles learning to dance by feeling the movement of one's partner, and also the ways an infant and parent learn to mirror and move in relation to one another.

Muscular activity generates internal forces, while external forces include: gravity; the elasticity of ground support; consequences of muscular activity such as momentum and centrifugal force; and forces generated from another actor's muscular activity. It is not possible to comprehend the generation and control of movement solely on the basis of muscle activity, because of the facilitating, dampening, and otherwise perturbing, effects of external forces.

The kinds of non verbal communication, and facilitation of learning, that occur between infants and care givers, dance and martial arts partners, and lovers, involve a give and take that amounts to an especially complex interplay of internal and external forces. From his training and experience, Feldenkrais was led to emphasize the participation of external forces in ways that anatomists and kinesiologists studying muscle action have typically neglected.

Functional Integration employs active engagement as a dynamic training ground that prepares the student for navigating through the exigencies of interplay with the 'external forces' that necessarily frame behavior in everyday environments.

Educating the Teaching Touch

While experienced therapists may accumulate considerable clinical experience, the bulk of their basic education was characteristically academic. FI skills, in contrast, are garnered through an extensive practical and experiential training through which the practitioner must acquire great self-awareness about their own movements and learning processes, and achieve a refined sensitivity of touch. An FI practitioner is able to avoid distressing movements, because they can sense, even before the student can, which movements would be uncomfortable or painful. FI practitioners constantly pay attention to nonverbal cues, such as stoppage, shallowness, depth, location, and tempo of breathing; altered receptivity or resistance to movement; changes in muscular tonus, and more. These subtle cues inform a practitioner what is acceptable to a student and suggest when and how to adjust rhythm, pressure, direction, and location of touch.

Touch as it is brought to bear in FI implicitly expresses respect and appreciation for the person as they are, and the movements an FI practitioner explores with a student are ones that enlarge the person's sense of their own capabilities.

Many other approaches explicitly attempt to change the person to fit a particular model of what is 'right' or 'normal.' It is as if they are saying through their touch that 'You are not good as you are. Your back is crooked, and it should be straighter. Therefore we will bend it until it is straight and stretch these muscles until they are no longer tight.' The implicit message is, 'You are not OK as you are, and we will fix you.' The person may find initial relief in the hopes of being 'fixed' or 'corrected.' But, inwardly, as the practitioner pulls against them, they may feel a lack of rapport as they encounter limits in their ability to do what the practitioner is demanding. In response to meeting a perceived limit, recipients must implicitly choose between distancing themselves from their internal feelings, or from their practitioner.

By contrast, when an FI practitioner moves a student's body in directions it can go, the implicit message is, 'You're OK as you are, there is concord in our relationship with each other, and I'm not asking you to do anything you are not willing to do.' Movement experience in FI is grounded through this kind of interpersonal relating. The student experiences, moment by moment, pleasurable sensations and feelings, and a sense they can easily move in increasingly varied, and often unexpected, directions. The student

remembers what it is like to feel like a healthy person and gains the benefit of being led toward further integrative learning by their own sense of wholeness and well-being.

Among the benefits of FI, the enhanced sense of wholeness and well-being amounts to more than one of the outcomes; it is also part of the path and plays a central role in organizing the learning on which FI depends.

To summarize the comparative perspective on Functional Integration we have developed here, most therapies focus on parts of the body in isolation, and use techniques that further isolate movement functions. In contrast, FI is based upon a systemic, person-centered, multi-leveled approach, fostering simultaneous improvement in: muscles, circulation, tissue quality, flexibility, skeletal alignment, kinesthetics, functional abilities, self-esteem, communication skills, and self-image. As the nervous system reorganizes, pain is reduced, function is improved, and the student becomes increasingly able to learn on their own through ATM, and through the normal course of life.

Strategies for Bypassing and Overcoming Pain

Feldenkrais advised, 'Do not contradict the nervous system.' He meant: the nervous system maintains patterns in the musculature that are necessary for the organism's well-being. The nervous system cannot successfully be forced to change. The most one can do is create conditions where learning can occur, and increase the options that the brain can accept and use. For these reasons, all Feldenkrais methods work with, not against, the nervous system and the coping strategies it has devised over the course of phylogeny, ontogeny, and the individual person's history. In order not to oppose the nervous system, Feldenkrais invented many gentle and indirect ways to build on a person's strengths while coaxing the nervous system to relinquish inefficient patterns in favor of more optimal organization.

The Role of Support

As discussed above, in order to ensure the comfort of a student in the course of FI, the practitioner gives careful attention to how the student's body is being supported. The principle of support is well developed in FI, and it is essential to understanding many FI pain strategies. Movement for all terrestrial vertebrates requires a supportive surface, such as the ground under our feet or a seat to sit on. The kind of support that is available profoundly affects how much work is required for basic actions. For example, it takes more work to walk on soft sand than firm sand. When we stand on an unstable surface, the coordination required to maintain balance or to make a movement such as reaching becomes more difficult. Increased support not only reduces muscular work; it also reduces the complexity of organization required of the nervous system for remaining stable and upright.

As previously mentioned, a floor or a firm Feldenkrais work table provides a stable, large base of support that enables a reduction of muscular tension. In addition, the practitioner may take over the work of the student's musculature by holding the body in positions that the muscles are working to maintain. This is analogous to resting one's arm on a table in order to relieve the muscular work of holding the arm in the air. Similarly, the practitioner can relieve effort by sensing where muscular work is going on and by then holding or moving the body in the direction in which the student is making an effort.

When a practitioner takes over the student's work of maintaining a posture and performing a movement, there is an inhibition of the neural activity that sustains a habitual pattern of action. It is as if the nervous

system recognizes that it does not need to do the work because the intention is satisfied. When a practitioner takes over a student's effort, the effort naturally subsides, and the student senses, perhaps for the first time, how they have maintained that pattern of muscular contraction. Taking over the student's muscular work provides a kinesthetic mirror that gives the student increased awareness of what they are doing. When students feel where and how they make efforts, they can learn to inhibit them. Better kinesthetics makes it possible for students to release the effort of muscular tension patterns in the course of acting in daily life.

Understanding how to find and use support is especially important for individuals with chronic pain. Pain discourages people from trusting the support of their skeletons, the seat on which they sit, or the ground on which they stand. Pain, in fact, undermines a person's sense of 'life support,' bringing a sense that the ground of their life is shaky. Protective reactions to pain become so habitual that people then continually over-use their muscles to create the feeling of stability - to literally hold themselves up. When FI practitioners substitute their effort for their students' effort, the students re-learn how to trust and use the support of their bodies and the environment, thereby enabling recovery of many abilities present before the chronic pain developed. It may herald the beginning of a renewed sense of a foundation for living.

Auxiliary Movements

The movements a person spontaneously performs to avoid pain can even be used as a technique to teach healthier movement patterns. For example, individuals with back pain might well lean on their hands as a protection against the pain. In ATM we make use of such coping strategies, and call them auxiliary movements. If they are done with awareness and as part of a learning process, they can teach a person much of value.

We may find as an example a person with pain in their shoulder who, for that reason, is unable to reach overhead by extending their arm. Such individuals typically adopt what is termed a 'compensatory' pattern of substituting trunk and scapular movements for the normal movement of the shoulder joint. They have learned to lift the arm by hiking up the shoulder, and to elevate the arm further by lowering the trunk on the opposing side of the body. Let us assume further that the person would have the ability, under the best circumstances, to reach in a more efficient way by using the shoulder joint, but that pain habits are preventing them from changing their behavior. In such a case, it is essential to bring awareness to the person's way of lifting their arm, since the pattern is probably not under the student's voluntary control. The practitioner might bring attention to how the student shifts their weight, bends to the side, moves the clavicle and scapula, etc. None of the proposed movements would oppose what the nervous system had become used to doing, but the increased attention would nevertheless bring about a shift in the pattern of action and perception.

We may continue along these lines, in the direction of learning how to improve the 'compensatory' movement that the student had substituted for reaching directly overhead. There is, in consequence of that learning, an increase in the comfort, fluidity, awareness and control which accompanies the 'compensation'. In this manner, without overstepping the constraints of the 'compensatory' habit, and hence without threatening subconscious defenses, the student has in fact begun a process of 'breaking up' the habit. This is because increased awareness undermines habituated behavior and potentiates the receptivity needed for learning. The Feldenkrais teacher might next teach several different ways to lift the arm, a set of variations that would offer a natural bridge from less efficient to more efficient ways to accomplish the action of

reaching. Given the enlarged range of choice, and the inherent advantages of efficiency, it becomes far easier for the student to fall into more integrated and efficient modes of action.

A therapeutic interpretation that opposes compensatory behaviors where possible, may often find the Feldenkrais approach paradoxical. The paradox disappears, however, when we view the issue from the perspective of learning. When a Feldenkrais practitioner relates to a 'compensation' that the student has learned in order to adapt to their situation of pain, and brings it into the framework of 'auxiliary movements', the purpose is to possess the student with a path of learning. A useful auxiliary movement has its place as part of a strategy of learning. If we look at how a child learns to walk we find numerous transitional coordinations and emphases that make new learning possible at each stage of the unfolding competence. We could easily term these 'auxiliary movements' if we exclusively focus on the milestone of walking. That, however, would be a distortion, because each learned variation possesses validity of its own as it is knitted with its current circumstances. Even if we view the learning 'steps' in terms of their 'final' outcomes, what we should see as most important is how each act of learning makes sense both in its own right, and as how it may serve as an ingredient for further development.

The perspective of the Feldenkrais Method enables us to see behaviors freshly and without prejudice. In the Feldenkrais work, the much more general notion of 'learning' with its rich spectrum of possibilities, ultimately takes the place of categorical and colorless clinical interpretations of 'compensations'.

Non Habitual Movements

There is widespread agreement about the value of movement for most people who have problems with pain. Lack of activity leads to increasing muscular weakness - including that of the heart. Poor breathing and a general decline in health also accompany inactivity. But often, when a person in pain tries to move, the activity exacerbates the pain, and discourages further movement. Medication can reduce the level of pain, but all medication has side effects. And though medication, by attenuating pain, may minimize defensive reactions, it blunts, rather than enhances, kinesthetic awareness. Without adequate kinesthetic awareness, however, it is not possible to learn more efficient, and hence less painful, patterns of movement.

We can find a way out of this dilemma by bringing to bear a practical understanding of the nervous system, and the mechanisms of motor learning. Learning, be it motor or cognitive, is known to be both *state specific* and *task specific*. Learning occurs under chemical conditions in the brain that are influenced by emotions, mood, and drugs. State specificity signifies that when a person learns to do something under the influence of a drug or in a particular emotional state, access to what was learned, and further learning within the same set is facilitated by the person being once again in that state. Conversely, a different state, be it emotional or drug induced, impairs access to the material and its further learning. We believe that painful movement patterns exemplify a situation of state specific learning, a state characterized by anxiety, hypervigilance, and muscular tension. The individual with chronic pain is trapped in such a state; a 'world of pain' where every behavior recalls the 'painful lessons' previously learned. But the interwoven factors under which this state arises are susceptible to disruption. For example, if anxiety is reduced by creating interpersonal and physical conditions of safety and security, the state is altered. Movements and behaviors are then less strongly bound to the recall of instances of pain, and to the learned reactions and recoils that circumscribe the person's repertoire of movement. Pain is reduced and the opportunity arises for learning behaviors that do not have associations with pain.

Task specificity presents an analogous situation, but the accent is on the task being learned. 'Task specificity' refers to how we compartmentalize our learning, and it applies to both cognitive skills and motor skills. Learned skills do not easily generalize from one situation to another, but assume boundaries and are circumscribed by situationally specific sets of references and cues.

Feldenkrais invented a diversity of functional learning techniques based upon his practical and theoretical understanding of state dependent and task specific learning. Recognizing the intransigence of pain patterns towards techniques that are direct, Feldenkrais discovered strategies to bypass patterns of pain in order to improve movement efficiency and expand movement repertoire.

The indirect learning strategies employed in Feldenkrais work often need to be understood on the basis of his concept of 'non habitual movement'. But there is nothing mysterious about non habitual movements; any novel movement, that is, any movement that has not yet been learned is perforce non habitual. It is essential to keep in mind, however, that our behavior and nervous system organization is very different when faced with a novel task or setting compared to when it is engaged in familiar activities.

If a student is presented with a radically new movement, it will have no association with painful movements that are already familiar. Hence, the person will likely have neither the pain nor the emotional response that has become associated with the painful pattern of movement. They will learn a new movement pattern much more quickly than one that has pre-existing associations with pain. Thus, the use of non habitual movements can greatly increase the efficiency with which someone can learn good biomechanical organization, coordinated motion, pleasure of motion, improved circulation, and better joint/muscle function.

The inversion of proximal and distal movement offers an example of how non habitual movements can bypass pain patterns. When we reach we typically experience the action as being led by the body's most distal component, the hand. Proximal components of the movement, the shoulder and upper arm, are barely conscious, and felt to follow and support the reaching movement. If, instead of lifting the arm, the arm is kept fixed and the scapula of the shoulder is moved in relation to the upper arm, then the sequential and spatial relation between distal and proximal movement is inverted. We have created the same movement pattern in the shoulder joint, as if *it* were doing the distal movement, i.e., elevating the arm. But because the normal relation between proximal and distal movement of the body has been inverted, the movement done through the proximal shoulder will usually be free of pain. This use of skeletal and muscular relationships similar to what is involved in reaching, but with a revised orientation, appears to disrupt the stability of the painful movement pattern because, when the original reaching movement is repeated, it is no longer painful.

Another example of inversion of proximal and distal movement involves the pelvis and leg. Someone might have pain when abducting and rotating the leg. But if the leg is fixed and the pelvis is moved opposite to the leg, it creates an a similar abduction and rotation in the hip joint. Even if there had been pain in the hip joint under normal conditions of the same movement, there is none now. Once the experience of pain-free motion is given in this inverted situation, the original movement that had been painful can now usually be done without pain.

A pain pattern can also be disrupted by altering a student's habitual relationships to gravity. For example, someone may experience pain when lying on the back and attempting to bring the head and knee together in flexion. But the pain may be absent when doing the same movement while lying on the side or standing on the knees. One reason is that a component of the lifting that ordinarily has to work against gravity has been eliminated. On one's back, one lifts the head against gravity. But if upside down or on one's side, there is less

gravitational work. Moreover, a change of physical orientation is itself sometimes effective for reducing pain, because it presents a different perceptual gestalt. Even in a situation where the change of orientation is fairly neutral from the muscular or energy-cost point of view, it can be sufficient to eliminate the pain because of the changed association to previous movements.

Other kinds of non habitual movements are generated from separating out movements that normally go together. When we turn to look at something of interest, the head and eyes move congruently in the same direction. These movements can be 'differentiated'; the eyes can move oppositely to the head. This non habitual movement can bypass pain patterns associated with habitual movements of the head and neck. Doing such *differentiated movements* releases unnecessary tension in the neck and improves overall coordination. Such a process of differentiation has the further advantage of promoting a "higher, i.e. cortical and voluntary level of control, in place of the habituated pain behavior.

In the context of reaching, the habitual pattern may be for the eyes and head to follow the trajectory of the hand, or to move in the direction of the final destination of the hand's reach. But the eyes can be redirected to some other place, rather than following the arm's path. This differentiates the movement and tends to break up the habitual pattern in the brain of how the muscles of the eyes, neck, and rest of the body normally participate.

Among the ensemble of events that coalesce in an act of reaching, are also important balancing maneuvers. When these balancing strategies are habitually linked to disadvantageous or painful patterns of movement, we may assist a process of improvement by disrupting them. The more common habitual pattern for reaching is to shift weight in the same direction as one is reaching. An ATM lesson might ask a student to shift weight away from the reaching, or with rotational or diagonal movements, playing with shifting weight in different ways. This disrupts the habitual pattern, and opens up new possibilities.