

# Clinical Somatic Education

## A New Discipline in the Field of Health Care

by Thomas Hanna, Ph.D.

**The summer of 1990 saw the opening of the first class in Hanna Somatic Education. It is the flowering of a series of developments that have led to a discipline that is as consistently effective as any branch of medical science.**

### Preface

**SOMATIC EDUCATION** is the use of sensory-motor learning to gain greater voluntary control of one's physiological process. It is "somatic" in the sense that the learning occurs within the individual as an internalized process.

In its purity, somatic education is self-initiated and self-controlled. However, somatic education has emerged during the twentieth century as a procedure whereby this internalized learning process is initiated by a teacher who stimulates and guides the learner through a sensory-motor process of physiological change.

Prior to the advent of this teacher-learner form of somatic education, the same self-transformatory events have been a commonplace of human history. "Miraculous" cures and healings have always occurred. Extraordinary transformations of the body -- supernormal strength, radical changes in physical skills, stigmata appearing on the body -- are the common lore of martial, athletic, and religious history.

Before the twentieth century the closest approximation to teacher-learner somatic education was the work of shamans and Asian healers who helped initiate the sensory-motor learning process by means of symbolic manipulations and movements that evoked powerful physiological transformation in their "patients", healing them in extraordinary ways. Because the mechanisms of such healings are hidden within the internal process of individuals, they have always had the aura of mysteries -- a mythology of good and bad spirits or good and bad energies accounted for this hidden process. It is this same hiddenness that causes the work of twentieth-century somatic educators to appear to be "miraculous" in the same mysterious way that the prescientific world viewed shamanistic work.

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It is our task to achieve an understanding of the somatic realm in general -- and of somatic education in particular -- so that the mystery and the mythology will be dispelled. In this way, somatic education can become a discipline available to all humans. The salutary results of self-teaching, self-learning, self-healing, and self-regulation should not be understood as "miraculous," but as *somatic*: they are genetically-given capacities intrinsic to all human beings.

## Background

F. Matthias Alexander, father of the Alexander Technique, was the first person to take somatic education out of the realm of shamanistic mystery and establish it as a verifiable, pragmatic technique.

Alexander, during the years from 1904 to 1955, elaborated this internal self-teaching technique by means of discoveries he had made within himself in the course of a sustained effort to change his own posture. He had excessive habituation of the startle reflex -- a posture condition causing lordosis of the neck vertebrae, depression of the chest wall, and a too-forward carriage of the head. This distortion of the windpipe also distorted the projection of his voice.

Alexander attempted, at first, to change this habitual cervical curvature by main force, that is, by trying to force the neck to be straight; but, of course, the habituated muscles sprang back into their usual place.

By focusing proprioceptively on the "means-whereby", Alexander changed his posture.
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He then despaired of the "goal" of attempting to straighten his neck and, instead, concentrated his proprioceptive attention on the "means-whereby" his neck, shoulders, chest, and head moved together. Rather than focusing on the "end" of a straight neck, Alexander focused his attention on the "means" by which he was unconsciously using his neck, shoulders, chest, and head while doing any movement whatsoever. What he termed the "means-whereby" was an analytical procedure of breaking down the total movement of the body into its several component parts and of sensing those parts without any concern for the goal of neck straightening.

By "inhibiting" the "end" and focusing proprioceptively on the "means whereby," Alexander gradually, but surely, taught himself to control the muscles of the upper trunk, achieving an admirably tall neck and erect posture. He changed his posture -- something no one believed possible -- and he did so in a systematic, straight-forward manner.

This was the beginning of somatic education in the twentieth century. John Dewey, the philosopher, recognized and extolled Alexander's achievement as a major event. Dewey's personal experience of changing and mastering his own posture under Alexander's tutelage taught him that not all problems are solved by intellect, for some are solved by direct experience of oneself -- a somatic insight.

Specifically, what Dewey learned and extolled in the Alexander Technique was how it solved a physiological problem by experimentally interrupting a habitual pattern and then sensing its several components in order to enrich ones awareness of what one is unconsciously doing. What was habitually unconscious was made conscious by means of new sensory information. This allowed new motor control to occur. Dewey saw Alexander as the pioneer of a radically new venture in physiological self-education -- a procedure which achieved a better integration of the reflexive and voluntary elements in ones response patterns.

Quite independently of Alexander's work, another approach to somatic education was made by a teacher of physical education in Berlin -- Elsa Gindler. Gindler conducted classes in *Gymnastik*, where she invited her students to focus upon the sensations within their bodies as they went through various movements. Students were asked to focus their attention not on the movements themselves, but on the internal feelings of these movements; for example: How is one breathing during the movements? How does the weight of the body during movement shift over the heels, the hips, and so forth?

Gindler was making her students focus on the "means-whereby" rather than the "end" of external movement. The result was that "miraculous" changes began to occur in the bodies of those who trained with Gindler. Again, the principle was the same: Turn conscious attention inward to the proprioceptive background of an objective movement, and the quality of the objective movement begins to improve. Greater self-control is gained by means of greater sensory awareness.

From the 1930's onward, Gindler's students spread from Berlin throughout Europe and the United States in the work of such notables as Charlotte Selver,

Carola Speads, and Ilse Mittendorf. These early pioneers of somatic education taught others how to gain greater voluntary control of their physiological process by sensory-motor learning. Extraordinary changes occurred -- "miraculous" transformations exciting the interest of increasing number of people in the same way as John Dewey was excited.

This excitement was attenuated, however, by the singular inexplicability of these physical transformations. It appeared -- both to the scientific world as well as to the popular world -- to be a case of "mind over matter". Thus, the excitement was a spark that could not catch fire: mind-body dualism prevented the public from understanding the event. The fact that bodies were changed was an intriguing phenomenon; however, except for a small number of fascinated devotees, it was a curiosity that did not garner general interest.

Somatic education remained on the frontier of the health care field, but it could not enter; it was not yet clinically precise. There was no general theory as to its nature; there was no clear diagnostic procedure; there was no predictable consistency in its results.

Another presence was added to this burgeoning field by another Alexander: Gerda Alexander. She had no relation, intellectually or familiarly, to F. Matthias. Working from her center in Copenhagen, she expanded the field of sensory-motor learning with new emphasis: she taught her students to become masters of proprioception -- sensory awareness became almost an end in itself. The end was self-knowledge, and this sensory knowledge resulted not only in grace, coordination, and good carriage, but also in a calm, measured life of the spirit. This was similar to the effects of the other Alexander's methods.

Gerda Alexander's system of Eutony involved long and intense explorations of the minutiae of the sensory realm. As one's self-sensing became more precise, the usual somatic effects took place: there was always enhanced motor control of the body, and oftentimes there were "extraordinary healings" and bodily transformations.

Alexander's long, intense sessions of sensory exploration had an effect not only on her own students but also on an Israeli admirer of her work, Moshe Feldenkrais. Feldenkrais, already trained in the techniques of F. Matthias Alexander when he was living in London, devised his famous Awareness Through Movement exercises by following Gerda Alexander's format of intense sensory exploration while lying quietly on a floor.

Moshe Feldenkrais, who was both an electrical engineer and research scientist

in high-energy physics, was Europe's first black belt Judoka. He not only introduced judo to France during the 1930s, he even brought Kano, judo's great master, to Paris. In the wake of his activities, *Le Club du Jujitsu* centers gradually sprang up throughout France.

Feldenkrais was another pioneer somatic educator. He brought the tradition one step farther toward becoming a clinical modality by dealing directly with neuromuscular pathologies. From his point of view, however, the technique of Functional Integration (which he invented) was not clinical; it was purely educational. He was teaching others to "know what they were doing": that is to say, he was teaching sensory-motor awareness and control.

Throughout his career, Feldenkrais explicitly denied that his techniques were designed to be corrective of pathologies. He was resolute in holding a purely positive, educational viewpoint: he was teaching greater self-awareness so that a person could be increasingly freed from unconscious restraints of the brain. The result of his lessons in self-awareness sounds almost identical to the way in which Dewey described his Alexander lessons. In a statement published in the directory of the Feldenkrais Guild, Feldenkrais says that "after the lessons, upon receiving again the habitual stimuli, one is surprised to discover a changed response to them."

Feldenkrais estimated that he had created over a thousand Awareness Through Movement exercises. These movement patterns, which could be performed by oneself, were a combination of F. Matthias Alexander's practice of focusing on the "means-whereby" of ones movements and Gerda Alexander's practice of intense sensory scrutiny while lying quietly on the floor. It was a combination that was greatly effective in creating enhanced voluntary control -- a far more sophisticated version of the work of the two Alexanders -- and it not only improved posture but movement in general.

It was, however, Feldenkrais' method of hands-on somatic education -- termed *Functional Integration* --that constituted his own major advance in this field. He accepted F. Matthias Alexander's insight that control of the head leads to control of the entire body. He equally accepted Alexander's insight that the fundamental cause of postural distortion was the startle reflex. From a clinical standpoint, the startle reflex was his prime diagnostic tool.

Functional Integration was distinguished by two procedures: (1) like F. Matthias Alexander, Feldenkrais used his hands to provide sensory information (the "means-whereby") to make the learner aware of unconscious movement patterns in his body; (2) from his knowledge of judo he applied the principle of

going with another person's resistance and never going against it. This second procedure was a brilliant and fortuitous discovery of how habitual or spastic muscular contractions can be encouraged to relax.

The art of judo was almost instinctual to Feldenkrais; so much so that if he encountered muscular resistance when pulling a limb in a certain direction, he instantly went in the opposite direction: rather than trying to force the muscle to stretch, he brought the origin and insertion of the muscle together. The result was surprising: the muscle began partially to relax. This procedure, which I have termed *Kinetic Mirroring*, constitutes the unique efficacy of Functional Integration. As Feldenkrais describes it, "If you do the work of a muscle, it ceases to do its own work"; that is, it relaxes.

Kinetic Mirroring was Feldenkrais' prime method of starting the process of muscular relaxation. After Kinetic Mirroring, he could use various "means-whereby" techniques to show the person the new movements that become possible with the now-relaxed muscles and joints.

Initially, Feldenkrais' use of Kinetic Mirroring was so identified with judo that his early book, *The Higher Judo*, sounds not like judo but Functional Integration. Later, as he became more conversant with neurophysiology, he realized that he was using a sensory-motor feedback technique that was genuinely cybernetical: if the motor neurons have a set program of muscle contraction (painfully high tonus) and if the sensory feedback from the muscle cells informs the neurons that the programmed ratio of muscle origin to muscle insertion has been exceeded, then the motor neurons shut down their firings, causing the muscle to begin relaxing.

The cybernetical principle behind this induction of relaxation is the same as that of a thermostat: if the furnace is programmed to maintain the temperature at seventy-two degrees, and the feedback from the ambient air reaches seventy-three degrees, the furnace shuts off.

In the hands of a competent practitioner, Kinetic Mirroring plus the sensory information of "means-whereby" manipulation was more effective than any previous system of musculoskeletal therapy. The affected muscles relaxed in ways that were considered "impossible" by other therapies. Functional Integration was not, however, therapy; it was education.

In summary, then, Feldenkrais elaborated a procedure that was the first approximation of clinical somatic education. He stepped boldly into a room whose size appeared enormous in its promise, and he established the validity of

Kinetic Mirroring as well as richly confirming Alexander's use of the hands in teaching the learner the "means-whereby" his movements are controlled.

Feldenkrais created the fragments of a system which he could never bring together conceptually. His best effort was his early book, *Body and Mature Behavior*, which attempted to found an analysis of human movement on a description of gravitation's effects on muscular reflex actions. He later attempted to expand the theory in the ill-fated book, *The Potent Self*, which he decided was not publishable. Unfortunately, it was eventually published by his followers, but it only added theoretical confusion to his ideas.

Kinetic Mirroring was  
Feldenkrais' prime method.

In diagnosing muscular problems, Feldenkrais echoed Alexander's discovery of the startle reflex, but got no farther. Muscular contraction in the anterior of the body and its consequences of shallow breathing and feelings of anxiety were, for Feldenkrais, the constants of neuromuscular pathology. The fact that the majority of adult humans suffer from chronic muscular contraction of the posterior muscles of the back and neck remained a mystery: he had no way of accounting for it. Nor did he have a way of accounting for the genesis of scoliosis, which is of equal significance in pathologies of human posture. This is ironical, inasmuch as Feldenkrais had a grand passion for the topic of neural reflexes. He put all his eggs in one basket, the startle reflex, having been encouraged to do so by his presumption that this reflex was beneath all neurosis and that teaching the neurotic to relax his abdominal muscles and breathe deeply was superior to psychoanalysis. This Reichian viewpoint, elaborated in *Body and Mature Behavior*, was also eventually abandoned.

Because of this theoretical confusion, Feldenkrais' practice of Functional Integration was far superior to his teaching of it. At an intuitive level, Feldenkrais was a master, but it was difficult for him to explain why. Accordingly, he was threatened by direct questions from his students, usually responding with angry tirades against the questioner.

It is a pity that Feldenkrais inaugurated a tradition of training that presented demonstrations, showed techniques, and taught hands-on practice, but left it to the student to figure the matter out. It was not intentional; he simply could not verbalize what he intuitively knew so well. Thus, an aura of mystical confusion swirled around his training, as if he were a Zen master waiting for his students to become enlightened.

This mystical confusion continues in the Feldenkrais Guild to the detriment of a teaching that had all the possibilities of becoming a truly clinical discipline of enormous value. Consequently, the work of his students has more nearly approximated the level of practitioners of the Alexander Technique; that is, they help movement to improve, but few practitioners are able significantly to alter serious neuromuscular pathologies, nor do they usually claim to be capable of this.

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Even so, Feldenkrais opened a door to the possibility of a system of clinical somatic education. What was lacking was (1) a comprehensive diagnostic theory for understanding the origin of the typical neuromuscular postural distortions; (2) a general somatic theory of sensory-motor process; and (3) a method of somatic education that not only gave the learner the *sensory* feedback of Kinetic Mirroring and "means-whereby" instruction, but also went the full route of engaging the learner's *motor* actions so as to use the full capacity of the sensory-motor feedback loop.

## Hanna Somatic Education

### 1. Diagnostic Theory

It is my understanding that perhaps as many as fifty percent of the cases of chronic pain suffered by human beings are caused by sensory-motor amnesia (SMA). This is a condition in which the sensory-motor neurons of the voluntary cortex have lost some portion of their ability to control all or some of the muscles of the body.<sup>1</sup>

Sensory motor amnesia occurs neither as an organic lesion of the brain nor of the musculoskeletal system; it occurs as a functional deficit whereby the ability to contract a muscle group has been surrendered to subcortical reflexes. These reflexes will chronically contract muscles at a programmed rate -- ten percent, thirty percent, sixty percent, or whatever --and the voluntary cortex is powerless to relax these muscles below that programmed rate. It has lost and forgotten the ability to do so.

Muscles held chronically in partial contraction will predictably (1) become

sore or painful; (2) become weak with constant exertion; (3) cause clumsiness because of their inability to coordinate synergetically with overall bodily movements; (4) cause a constant energy drain of the body; and (5) create postural distortions and poor weight distribution that will cause secondary pain typically mistaken for arthritis, bursitis, herniated disks, and so on.

Perhaps as many as fifty percent of the cases of chronic pain are caused by sensory-motor amnesia (SMA).

These symptoms of SMA are commonly misdiagnosed by traditional health care practitioners, for they attempt to treat them by intervening mechanically or chemically in the local musculoskeletal areas affected. Such local intervention has no lasting effect upon the symptoms, inasmuch as it treats a functional problem of the brain as if it were a structural problem of the peripheral body. The result is a chronic pathology that cannot be successfully treated by traditional health care: the condition seems medically incurable, leaving no option but the use of analgesic drugs that only mask the symptoms.

Medical researchers are all too aware of this lack of success in the diagnosis and treatment of what they term "regional muscular illness." Rheumatologist Norton M. Hadler frankly expresses his professional embarrassment that "the primitive nature of our understanding of the pathophysiology of such regional musculoskeletal illnesses as backache, neck pain, or shoulder pain is a reproach to clinical investigation."<sup>2</sup>

Hadler sees this difficulty compounded by the fact that sufferers of regional muscular illness constitute the dominant health complainants: "In multiple studies, such individuals represent a major portion of the patients seen by family physicians, primary care internists, industrial physicians, rheumatologists, orthopedists, osteopaths, and chiropractors."<sup>3</sup>

The condition of SMA, so little understood and affecting such a large portion of the population, can be remedied by only one means: a reeducation of the voluntary sensory-motor cortex. The cortex must be reminded sensorially of what it has forgotten so that, once again, it has full motor control of the muscular areas affected. When it does so, the symptoms mentioned above disappear, and the chronic, medically incurable situation is alleviated.

SMA can only be overcome by education, not by treatment. An internal

process must occur whereby new sensory information is introduced into the sensory-motor feedback loop, allowing the motor neurons of the voluntary cortex once again to control the musculature fully and to achieve voluntary relaxation.

SMA occurs by three pathological processes: (1) the trauma reflex, (2) the startle reflex, and (3) the Landau response.

This is the general nature of SMA pathology. Specifically, SMA occurs by three pathological processes: (1) the trauma reflex, (2) the startle reflex, and (3) the Landau response<sup>4</sup>. Minor causes of SMA are atrophy caused by disuse (as with bedridden or wheelchair-bound persons) and habitual misuse of the muscular system (as with "dentist's hump," caused by working stooped forward).

**The trauma reflex** occurs as a protective muscular response to severe injury. It is the reflex of pain avoidance. Cringing, for example, is the overt manifestation of this reflex. When blows occur to one side of the rib cage, the muscles traumatized will go into chronic contraction. After hernia surgery, for example, the abdominal muscles on the herniated side will usually be in constant contraction. If the left leg is broken or the left knee is in long-term pain, the person will avoid the left leg and become noticeably pulled to the right side in scoliosis. These are examples of SMA caused by the trauma reflex.

**The startle reflex** occurs as a stress response to threatening or worrisome situations -- whether actual or imagined. If the threatening situation triggering the startle reflex occurs often enough and strongly enough, the muscular contractions of the reflex become chronically potentiated, resulting in the contractions of permanently raised shoulders, depressed chest, taut thigh adductors and, in severe cases, chronically contracted elbows and knees.

An indirect effect of a chronic startle reflex pattern is shallow breathing, which affects functions of the heart and the central nervous system -- the latter creating chronic dominance of the sympathetic nervous state. These are examples of SMA caused by the startle reflex, a subcortical brain mechanism not directly controllable by the volitional pathways of the cortex.

**The Landau response** is an arousal response that contracts the posterior muscles,

erecting the back in preparation for movement forward. The muscles affected are the central extensors of the spine, the rhomboids, gluteus medius/piriformis, and hamstrings. This response occurs in situations where action is demanded of the person, for example, a knock on the door, the ring of the telephone, a response to a request, and so forth; all unfortunately, are occurrences typical of daily life in urban-industrial societies. The constant repetition of these situations and the Landau response makes these muscular contractions chronic.

The world of business is a world where as much as eighty percent of those over the age of forty have pain and stiffness from spines that are chronically contracted from the pelvis to the neck. These are examples of SMA caused by the Landau response, a subcortical reflex which, once habituated, is beyond the control of the voluntary cortex. It becomes chronic.

It is important to note that the effects of these three chronic reflex patterns are universally mistaken for "the inevitable effects of old age." aging, however, is not a pathology, nor does longevity have any relation to these symptoms, except in the sense that the longer we live, the more the traumas and stress we have experienced. "Old Age" is a cryptopathology which further invalidates the ability of the medical practitioner to diagnose SMA.

## 2. General Somatic Theory

There are two distinct ways of perceiving and acting upon physiological processes: first, one can perceive a body and act upon a body; second, one can perceive a soma and act upon a soma. The first instance is a *third*-person standpoint that sees an objective body "there", separate from the observer -- a body upon which the observer can act, for example, a doctor "treating" the patient. The second instance is a *first*-person standpoint that sees a subjective soma "here": namely, oneself. The soma learns to change itself. **A soma, then is a body perceived from within.**

The word *soma* describes the rich and constantly flowing array of sensings and actions that are occurring within the experience of each of us. The somatic viewpoint offers insights and possibilities that are categorically not possible from the bodily viewpoint that is the established perspective of physiological science and medical practice.

What each human experiences is himself -- an acting, sensing being. Experience (this is a cognate of the more traditional terms "consciousness" and "awareness") is a sensory-motor event, in which sensing cannot be separated from moving and moving cannot be separated from sensing -- they are the warp

and woof of personal reality. This inseparability means that what we do not sense, we cannot move; what we cannot move, we cannot sense.

Our experience is comprised of two layers: the phylogenetic and the ontogenetic. What is given to us phylogenetically are the myriad sensory-motor programs that have evolved through the mammalian, vertebrate lineage back to the earliest life forms. These programs, reflexive and autonomic in nature, are the ancient biological ocean upon which experience floats. I have termed this biological *unterlage* the *Archesoma*<sup>5</sup>. It embodies the "unconscious" processes upon which somatic life depends. Its functions are "involuntary".

The ontogenetic layer is composed of the myriad sensory-motor programs that have been learned since birth. They are elaborated during childhood growth out of the ocean of reflexes beneath them. The ontogenetic layer of experience is, then, the result of learned adaptations. It constitutes that part of our experience which we call "conscious" and that part of our actions which we call "voluntary".

Our conscious, voluntary experience arises out of -- and totally depends upon -- our unconscious, involuntary layer of experience. At birth, we are little more than involuntary reflexes and autonomic processes. Only gradually do we learn our way into the realm of conscious, voluntary control. If, however, something occurs to evoke strong involuntary, autonomic reflexes, we can find our sensory-motor realm taken over by unconscious control against which we can do nothing directly; we can only, once again, *learn* our way out of this loss of volition.

Neurologically, this distinction between phylogenetic and ontogenetic layers is the distinction between subcortical, lower brain structures and cortical, upper brain structures. When sensory-motor amnesia occurs, we can say with certainty that subcortical reflexes have robbed the cortex of its learned controls. *Somatic education is the only pathway we can take in order to overcome SMA and gain greater voluntary control of our physiological processes.*

This, briefly, is the theoretical context upon which clinical somatic education rests. The larger outlines of somatic philosophy have been discussed elsewhere  
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### **3. Sensory-motor Education**

Sensory-motor amnesia is overcome by a sensory-motor process reminding the

voluntary cortex of what it has ceased sensing and doing. This can be done in several ways, two of which have already been discussed: (1) by helping the person become sensorily aware of his unconscious, involuntary movement patterns (the "means-whereby"); and (2) by Kinetic Mirroring, which begins a process of relaxation of involuntarily contracted muscles.

A third method of overcoming SMA -- and one that is far more effective than the other two -- is *the Pandicular Response*.

*Pandiculation* is the name given to an action pattern that occurs generally throughout the vertebrate kingdom. It is a sensory-motor action used by animals to arouse the voluntary cortex by making a strong voluntary muscle contraction in order to feed back an equally strong sensory stimulation to the motor neurons. It is a way of "waking up" the sensory-motor cortex.

Pandiculation is a way of "waking up" the sensory-motor cortex.

When you see a dog or cat wake up, it will pandiculate; namely, it will strongly contract the large extensor muscles of the back that are essential for running. Then it may pandiculate in reverse, by contracting the anterior muscles into a flexed posture. Pandiculation prepares the animal for normal sensing and moving, readying its voluntary cortex for efficient functioning.

Birds pandiculate by lifting one wing in a backward direction while also extending the homolateral leg backward. A.F. Frasier, who is the acknowledged authority on this phenomenon, has verified that pandiculation occurs even in the foetal stage. Through fluoroscopic study of lamb foetuses, he has observed this event of cortical programming occur as an occasional extension of the limbs of the foetus<sup>7</sup>.

Pandiculation occurs in human beings. Pregnant women report not only "kicking" of their foetus but also slow extension which distends their bellies. The fact that pandiculation occurs generally in vertebrate and mammalian animals, both prenatally and postnatally, indicates the phylogenetic depth of this ancient action pattern.

Upon awakening, human beings also pandiculate: they extend their backs, legs, arms, and jaws in a typical stretch. Young humans stretch their limbs in much the same way as other mammals. In every case, it is directly linked with awakening -- it is an ancient sensory-motor pattern of cortical arousal.

The Pandicular Response is the prime sensory-motor method used by

practitioners of Hanna Somatic Education. Rather than the practitioner focusing on providing sensory feedback by his own manipulations, the learner is invited to make a strong voluntary contraction of the amnesic muscles, thus creating his own strong sensory feedback and providing a simultaneous sensory reinforcement to the motor neurons while they are continuing their voluntary contractive activity.

The Pandicular Response is the  
prime sensory-motor method  
of Hanna Somatic Education® .

The effects of the Pandicular Response are startling. Muscle groups that may have been in continual contraction for forty years or more will not only release but, with minor reinforcement, will also stay in this relaxed state. The sensory-motor change is both immediate and comfortable. The fact that long-term chronic muscular contractions can disappear so quickly is, neurologically, not surprising. If the change is made at the heart of sensory-motor experience, the peripheral musculature has no option but to lower its contractile rate. Muscles are the servants of the brain and have no will of their own.

Looked at closely, we can see how the Pandicular Response operates. If, for example, the afflicted client has lost forty percent of his cortical voluntary control to subcortical reflexes, he still retains sixty percent of his voluntary control; however, he is unable to relax the muscles below the level of forty percent. But the use of the Pandicular Response opens a main avenue for regaining voluntary cortical control: the client cannot relax the muscles below forty percent, but he can voluntarily contract them *above* that ratio -- say, seventy percent. This voluntary contraction, if both strong and prolonged, creates exactly the sensory feedback the cortex is lacking. If this strong contraction is released very slowly, the sensory arousal of the motor neurons is such that, when the muscles are released to the point of their original contractile rate, they continue to release below that rate --to thirty percent, then twenty percent, then ten percent, until the ideal state of zero involuntary stimuli in the muscle is reached.

Learning to teach the client to perform pandiculation in this exact manner is neither obvious nor easy, but, once learned, the practitioner has added a major component to the edifice of clinical somatic education: authentic achievement of voluntary sensory-motor control. Greater cortical control is the attainment of greater freedom and autonomy -- the apparent species goal of a race that is

endowed with a cerebral cortex of enormous learning capacity.

An authentic clinical somatic educator can predict with accuracy the overcoming of a specific malady.

**I**n summary, clinical somatic education requires a comprehensive understanding of how pathological functions can occur, a general theory of human sensory-motor functioning, and a powerful set of methods of reversing this pathology with predictable efficacy. When all three conditions are fulfilled, we have a new modality in the field of health care: one whose practitioners know what they are doing, know what needs to be corrected, and know how to correct it.

An authentic clinical somatic educator is one who so clearly sees what is the case that he can predict with accuracy the overcoming of a specific malady. The clarity and predictive certainty of Hanna Somatic Education are the qualities needed in a clinical modality in order to stand the test of scientific scrutiny and verification. It is what is necessary if we are to have a clinical modality that will solve widespread problems of human suffering that are clearly not being taken care of through medical and other therapeutic means. It is what is necessary if we are to begin constructing a positive science of human health and autonomy.

#### NOTES

1. For a discussion of sensory-motor amnesia, *vide* Thomas Hanna, *Somatics* (Reading, MA: Addison-Wesley Publishing Co., Inc., 1989), pp 37-92.
2. Nortin M. Hadler (ed.), *Clinical Concepts in Regional Musculoskeletal Illness*. (Orlando, Florida: Grune & Stratton, Inc., 1987), p. xv.
3. *ibid.*, p. xvi.
4. For a discussion of these reflexes, *vide* Hanna, *Somatics, op. cit.*, Part Two.
5. *Vide* Thomas Hanna, *The Body of Life* (New York: Alfred A. Knopf, Inc., 1980), pp. 193ff.
6. *Vide* "What is Somatics?" in *Somatics* Vol. V., No. 4, and Vol. VI, Nos. 1, 2, 3.

7. A.F. Frasier, "The Phenomenon of Pandiculation in the Kinetic Behaviour of the Sheep Fetus," *Applied Animal Behaviour Science*, 24 (1989), pp. 169-182.

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