

muscles in new ways throughout his daily activities ("continuous") or whether the subject is required to spend a regular amount of time once or twice each day (e.g. 20 to 40 minutes or even longer) performing a special set of exercises ("intermittent").

Active continuous

An example is the Alexander technique (Barlow, 1973, 1978; Barker, 1978). Dealt with elsewhere in this Symposium by another participant (Dr. W. Barlow), this technique will not be dealt with at great length here. The subject is made aware of the effects of his muscle imbalance by pointing out to him such things as the way he stands up and sits down, the way he walks, and even the way he drinks from a cup. The great majority of people markedly protract and extend their head/neck upon rising or sitting. This is due to the action of the hypertrophied and shortened sternocleidomastoid muscles which cause the head to be protracted even in the resting position (Pierce Jones, 1978). These are in contrast to the relatively weaker antagonists (the extensors of the head/neck). This action is an involuntary habitual one perpetuated by the resting protracted (abnormal) position of the head. It is ergonomically wasteful. Drinking from a cup often reveals this similar wasteful movement which continues to strengthen the hypertrophied sternocleidomastoids. The subject is taught to retract his head and inhibit this movement thus maintaining the same angle between his head and trunk throughout the movement of rising and sitting. Dart (1947) has proposed that another method of strengthening the antagonists of the flexors of the head/neck is to spend some time each day kneeling on all fours, allowing the head/neck to be under the influence of gravity in the horizontal position. The author has advised patients and subjects to develop this habit (e.g. read the newspaper or a book in this position) with some success especially in patients with chronic cervical pain, the so-called cervical syndrome (Jackson, 1978) or "cervical spondylosis". Another manifestation of muscle imbalance brought to the attention of students of the Alexander technique is the way they walk on level ground and up and down stairs. Although gait analysts describe the phenomena of vertical displacement and (lateral) pelvic tilt as being normal, it is rightly diagnosed by Alexander teachers as revealing muscle imbalance (Gardner, Gray and O'Rahilly, 1975). The subject is taught or encouraged to inhibit such extraneous movements and to maintain the more ergonomically effective position of balance throughout the gait cycle, so that there is no vertical displacement (except for the initial lowering of the centre of gravity at the first step, and then its maintenance throughout the cycle in this position) and no pelvic tilt, either to the supported or the unsupported side. By continually inhibiting the action of muscles which are stronger than their antagonists, the subject is able to strengthen the antagonists. As these hypertrophy and increase their resting tone, they cause remodelling of the connective tissue in the opposing muscles with release of fascial adhesions at acupuncture points (see below). Although it takes months or even years to see the effects, there is a gradual progression towards muscle balance revealed in postural homeostasis.

Active intermittent

This type may again be subdivided into four groups.

Anti-gravity exercises. For instance, t'ai chi ch'uan (Chinese shadow boxing) (Huang, 1973) and yoga. The t'ai chi involves continuous but slow circular movements, but it must be performed correctly in order to improve posture (Plummer, 1980c). This means it does not feel "natural" and "easy". If done in this latter way it will only reinforce muscle imbalance. It should rather feel unnatural and awkward at least until sensory awareness is increased. The position of the feet and other parts of the body must be repeatedly checked by means of visual feedback (or by the teacher) because the resting position of the parts of the body, i.e. the position of muscle imbalance, has come to feel like the correct position. This is due to adaptation of proprioceptors. The vast majority of subjects when asked to stand with their feet apart and parallel (without visual feedback) fail to assume that position. Similarly if one attempts with one's eyes closed and arms extended to then bring the extended index fingers to touch each other at their tips, one almost invariably fails at the first attempt. These are two simple and easy tests of sensory awareness. In performing t'ai chi it is all very well to know that the foot should be facing in a certain direction and the upper limb should move through an arc to a certain position, but misinterpretation of proprioceptive information by the individual due to the adaptation just described will result in an incorrect position and movement unless the student uses visual feedback. To this extent t'ai chi also uses an element of increasing sensory awareness (see below). Another aspect by which t'ai chi increases sensory awareness is by making the individual aware of the weight of the individual parts of the body. This is usually something of which we are almost completely unaware (also due to adaptation) until we attempt to maintain an antigravity position, e.g. of one limb for a period of time. Legend has it that the ancient t'ai chi ch'uan masters developed their sensory awareness and reflexes to such an extent that if a bird alighted on his hand, the master was able to completely prevent the bird from flying off because the moment the bird flexed in preparation for take-off, the master imperceptibly moved his arm to nullify the bird's take-off force. However, the main effect of t'ai chi is to develop virtually every muscle in the body as an antigravity muscle, and thus to develop muscle balance or postural homeostasis. It is therefore claimed by some that if one wants to become a t'ai chi master, one must not perform other types of sports or exercises which are vigorous and develop muscle imbalance. The mechanism by which t'ai chi develops postural homeostasis is the same as that described under the Alexander technique. The weaker muscles hypertrophy and exert a stronger pull on their antagonists thus eventually causing muscle "lengthening" (see below). However, a small number of the steps in t'ai chi are also direct muscle "lengthening" procedures when the muscles concerned are put on full stretch for a short time with gravity still acting as the opposing force.

Yoga will not be discussed in detail here but it also involves the adoption and maintenance of certain antigravity postures for periods of time. However once again if the position is incorrect it will perpetuate muscle imbalance rather than improve it. Not only this, but the author has heard of several cases recently in which acute back pain had been precipitated during the practice of yoga. It would

seem that this procedure must be practised correctly and with extreme care under expert guidance if deleterious effects are to be avoided (Vithaldas, 1957; Hittleman, 1976; Dechanet, 1973).

Sensory awareness techniques. Several of these exist but they seem to have developed from two main sources. One is the work of the German psychotherapist Wilhelm Reich (1949, 1973). Also developed from this same source is a group of "passive" massage techniques which will be dealt with later. Reich himself used this latter method also known as Reichian vegetotherapy. He realised that every individual develops a muscular or character armouring in response to psychological trauma with which he cannot cope as a baby or child. The result is chronically "contracted" or "shortened" groups of muscles, those involved depending on the type of trauma experienced and the individual's reaction to it. Further discussion of the psychological aspects of this and the other techniques described in this paper have been presented elsewhere (Plummer, 1980b). Lowen is one of those who continued the work of Reich after his death and developed a set of exercises which help to dissolve the muscle armour and produce postural homeostasis. However, being a psychiatrist, Lowen dwells far more on the psychological effects than on the accompanying postural changes. His techniques and exercises are known as bioenergetics (Lowen, 1969, 1974, 1978; Lowen & Lowen, 1977). Other techniques developed from Reich's work are described by Chapman (1978).

The other source of sensory awareness techniques is the work of Moshe Feldenkrais (1975, 1977) although one cannot help but wonder from his writings if he also developed his ideas from Reich. He devised a series of exercises in the United Kingdom and later continued his work in Israel. His system is complicated and difficult to learn from written instructions but the principle is basically to increase the sensory awareness of the individual. Feldenkrais eventually came to know of the work of Rolf in the USA and realised the similarity to his own work. Cailliet (1978) has described Feldenkrais' proposition of deep-seated patterns of emotionally evoked postures. "He states that improper head balance is rare in young children except in structural abnormalities. However, repeated emotional upheavals cause the child to adopt attitudes that ensure safety. This, he claims, evokes contraction of the flexor muscles inhibiting extensor tone. His analogy to animals is that when they are frightened they react by violent contraction of all flexor muscles, thus preventing (inhibiting) the extensor musculature. This prevents running or walking. A similar reaction occurs in newborns as a reaction to the fear of falling. The attitude of the child from repeated emotional stresses is that of flexion with concurrent inhibition of the extensors. This attitude in the upright erect posture becomes one of flexing at the hips and spine with a forward head posture. This posture becomes habitual and feels "normal". Since the anti-gravity muscles work in this imbalanced posture without respite, fatigue and muscular discomfort results." As mentioned earlier the Feldenkrais technique is difficult to follow, requires great concentration and is very time consuming. Another set of exercises developed from Feldenkrais' work is called "Psycho-physical re-education" (Masters and Houston, 1979).

It has been pointed out to the author by Blomfield (pers. comm.) that another profession interested in muscle balance insofar as it produces freedom of movement is that of acting or drama. A recent major exponent of the primacy of physical methods for training for the actor was the Czechoslovakian Grotowski

(1969). The actor does not ask the question: How can I do this? but rather: What prevents me from doing this? What are the "blocks" (physical and psychological)? This is of course different for each individual and each actor's training then becomes a personal thing. The method is called "Via Negativa".

Muscle lengthening exercises. Many physiotherapy and sports manuals describe such exercises. We all know from personal experience what muscle "shortening" is. Are you able to completely abduct your hips? A whole list of tests has been developed not only by Lowen but also by the orthopaedic surgeon Michele (1971) who describes a series of exercises he terms "orthotherapy". Whereas Lowen deals almost exclusively with the psychological aspects, Michele deals absolutely exclusively with the physical aspects, and thus we see the perpetuation of the dichotomy of man.

Muscle "stretching" or "lengthening" exercises need to be performed slowly, gradually and carefully. If they are performed too rapidly, rupture of muscle fibres may occur. There seems to be no disagreement that muscle "lengthening" or "stretching" involves the reorganisation of connective tissue. However, is it the connective tissue of the whole muscle that is involved or only that in certain areas? My observations over the past year on the effects of Rolfing or deep painful massage at acupuncture points forces on me the conclusion that the connective tissue involved is virtually only at the sites known as acupuncture points (which are identical with the location of motor points and trigger points) (Melzack, Stillwell and Fox, 1977). Further confirmation of this comes from two other observations.

Firstly, if one attempts to force a movement beyond the range through which one normally moves a joint, careful attention of the individual concerned reveals that it is pain which prevents him from any further active movement. We normally stop involuntarily well before the position where pain is felt, due to feedback from receptors, and some individuals need to be encouraged to force the movement voluntarily even further before they admit to feeling pain. The pain which develops can be localised to definite sites, the same sites within certain groups of individuals although not the same site in every individual. The site in the individual depends on which of his muscles is exhibiting the greatest amount of shortening. The pain occurs at a definite site associated with that particular muscle which normally will evoke reflex contraction in that individual. Depending on the movement being tested, there is only a limited number of muscles involved and thus only a limited number of painful and tender sites. The interesting observation is that these sites correspond to definite acupuncture points (motor points/trigger points) and furthermore very strong deep massage at these sites (Rolfing or acupressure) apparently miraculously removes the pain within a few minutes. The subject immediately has increased range of movement — to the point where he develops pain at a different site, whereupon the procedure may be repeated (and repeated) until the range of movement becomes free and complete. He has lost his muscle shortening. However, the procedure is rather painful and it is extremely dangerous to carry it out to such a degree at too many sites in one sitting because of the known occurrence of the precipitation of an acute psychosis in some individuals (Plummer, 1980b).

The second observation involves the phenomenon of muscle tenderness and soreness after exercise, especially unaccustomed exercise. Although it

is true that it may involve the whole muscle if the exercise has been very vigorous, it is more often a localised tenderness (Asmussen, 1956). The sites correspond to acupuncture points and feel just like trigger points. As pointed out by Karpovich and Sinning (1971), the former explanation that the soreness is due to excessive accumulation of metabolites causing increased osmotic pressure inside and outside of muscle fibres and the excess water causing oedema and pressure on sensory nerves is not confirmed by Asmussen's study. "The soreness is evidently caused by a mechanical pull exerted by muscle fibres on intramuscular connective tissue . . . It is postulated that excessive pull traumatizes connective tissue, and local oedema gradually develops, causing pain."

To return to muscle lengthening exercises, every group of muscles which is shortened must be dealt with if one is to move towards postural homeostasis. Otherwise the posture will change but the stress and strain will be transferred to a different set of structures which may result in injury to them.

The Chinese fighting method developed from t'ai chi is known as Kung Fu. Although the main preparation and training for Kung Fu should be the regular practice of t'ai chi, there is more often performed various types of muscle stretching exercises. Similarly with Karate in which one of the muscle stretching exercises is to perform repeated kicks aiming at an imaginary but definite point in the sky. This is in order to improve accuracy and overcome the perpetual problem of misinterpretation of proprioceptive information due to adaptation caused by patterns of muscle imbalance as described earlier.

Respiratory techniques. Reich was well aware that muscular armouring involved the respiratory muscles and he particularly described chronic (unconscious) breath-holding as evidence of chronic fear, anticipation or rage (1949, 1973). This author only became aware of the phenomenon on being "Rolfed" herself. The therapist or rolfer commented that the author's lower intercostal muscles did not move even with deep respiration, but that rather the whole lower rib cage only moved as a whole. Immediate self-observation revealed that the therapist was absolutely correct. The accessory muscles of respiration may also be involved. The failure of these muscles to completely return to a position of relaxation over a period of time results in the development of connective tissue adhesions and muscle "shortening" just as described earlier. It is often not realised that although posture affects respiration, the reverse is also true. The whole position and shape of the rib cage is affected by patterns of respiration and this in turn has a profound effect on resting habitual upright posture.

T'ai chi ch'uan actually includes respiratory techniques and throughout the exercise the subject is supposed to continue a regular pattern of respiration so that during YIN or centripetal movements he inspires, while during YANG or centrifugal movements he expires. This is the same pattern as in Karate when the subject suddenly lets out an unholy yell, that is, sudden expiration, as he attacks (centrifugal movement). However, other respiratory techniques have been developed as a complicated art by Taoist monks and these are associated with meditation and the maintenance of postures somewhat similar to some of the yoga postures. These techniques particularly involve deep diaphragmatic respiration which "lowers the centre of gravity of the body" by diminishing the weight (relatively) of the upper trunk. To the uninitiated this may seem rather far fetched.

This completes the group of techniques classified in this paper as "active". It is to be noted that all of them whether "continuous" or "intermittent" take many many months and even years to produce significant changes in posture and muscle imbalance. We have embarked on a long-term project at my University to monitor objectively the changes produced by some of these techniques.

Many have asked whether ballet exercises, gymnastic exercises, weight-lifting and biofeedback with EMG are also posture changing techniques. In the case of the first two it depends on whether the individual learns to allow for his muscle imbalance, i.e. become aware of it and compensate for it, or whether he deals with the basic problem itself. Unfortunately many training programmes, unlike Grotowski's psychodrama for actors, do not deal with the basic problem of muscle imbalance. People with virtual postural homeostasis and muscle balance do not have to strive to take up the position of balance. They are "always" in balance without any effort.

Many people have commented that according to the ideas presented in this paper, weight lifters with such obviously well-developed muscles should have perfect posture. They then point to the poor posture of so many of them and claim there is no validity to the arguments presented here. This, however, reveals their complete lack of understanding of the principles involved. It is not the degree of muscle hypertrophy that is involved, but rather muscle balance, or the relative development of agonists and antagonists. One never sees the Olympic weight-lifters slowly and gently returning the weight to the floor after achieving their objective of raising it above their head for the required period of time. Rather they return it to the floor in the quickest possible way commensurate with safety. If they took the trouble to maintain control on the way down they would begin to develop muscle balance. Furthermore the way of lifting the weights also affects muscle balance. Thus if one lifts in the way which "feels comfortable", he will to a certain extent perpetuate his individual muscle imbalance.

Concerning relaxation training and biofeedback by EMG, these are usually used to produce generalised relaxation rather than dealing with the specific problem of muscle imbalance. It is only recently that the latter has been used to correct idiopathic scoliosis (often a manifestation of muscle imbalance) and to treat the after-effects of hemiplegia.

Passive techniques

We now come to the therapist-dependent group which produce postural changes by means of active intervention by the therapist. The results are often immediately obvious as described earlier. These techniques may also be subdivided into two groups. Firstly, peripheral techniques with treatment at acupuncture points and/or massage of whole muscles including the points. Secondly, central techniques which involve spinal manipulation.

In fact these two apparently quite different approaches are working at the same level. If one releases the connective tissue adhesions and tight muscles, the associated joints slip back into alignment by themselves providing there is no structural damage. This sometimes occurs immediately and sometimes later suddenly and unexpectedly when the patient makes a particular movement and

feels something "click into place". The manipulative techniques realign the joints first and the new position causes increased stress on the associated tissue and muscles. Reorganisation of connective tissues and breakdown of adhesions (with relaxation of muscles) follows, but this constitutes a tug-of-war as it were. Many patients and manipulators can testify to the fact that more often than not the joint slips back into misalignment very soon after manipulation rather than the adhesion and muscle spasm giving way. Repeated manipulation is therefore required thus making this method extremely therapist-dependent and expensive. Not only this but there is always the very real danger that the over-enthusiastic manipulator can cause fatal trauma particularly with manipulation of the cervical spine. Such tragic cases are reported in the literature from time to time.

Passive, peripheral

These techniques have at least two origins.

Firstly, those developed from acupuncture and acupressure which originated in China more than two thousand years ago. Shiatsu is the Japanese form of acupressure and polarisation a Western form. Trigger point and neural point therapy and also neural therapy apparently developed independently in Europe (Plummer, 1980a). They all involve stimulation at acupuncture points. In fact there are over fifteen different ways of stimulating acupuncture points, some invasive and some non-invasive (Plummer, 1977).

With Rolfing it was pointed out earlier that this is actually very strong massage at acupuncture points. The founder, a biochemist in the USA, Ida Rolf, never gave a really satisfactory explanation of how she "discovered" it and she took her secret with her to the grave in 1979. One cannot but wonder whether she originally had contact with Japanese or Chinese sources. She only admitted to having suffered from a form of crippling arthritis in her younger days and curing herself by self massage.

Secondly, those developed from Reichian vegetotherapy (see above). The Boyesen Institute in the U.K. has developed a form of "Psychoperistaltic Massage" (Boyesen, undated).

The tight muscles involved in the individual Reichian muscular (character) armouring are identified by means of careful physical examination. The individual's "body language" (Lowen, 1974) provides many clues. The subject is then massaged until the specific muscles involved relax and are released one by one. The accompanying memory flashbacks and emotional release (similar to that described with Rolfing: Plummer, 1980b), have given the technique the prefix "psycho-" while the borborygmi and increased intestinal peristaltic reaction which also occurs (even to the point of diarrhoea, or vomiting if done incorrectly) explains the suffix - hence psychoperistaltic massage. The latter is probably due to somato-visceral reflexes which are also responsible for many of the effects of acupuncture.

Passive, central

The techniques refer to methods of spinal manipulation. This technique has a long tradition in China and some believe that chiropractic and osteopathic techniques had their origin in Chinese manipulative techniques (Schiotz & Cyriax,

1975). Cyriax (1971) and Maitland (1973) are amongst many who have continued to develop this form of therapy within the framework of the orthodox practice of medicine. Many claims have been made for many and varied systemic effects arising from spinal misalignments. Unfortunately most of the explanations offered simply do not stand up under even the most cursory investigation, especially the usual line of explanation involving "pressure on nerves" as they leave the spinal column. At the request of a subcommittee of the United States Senate, a workshop was conducted in 1975 on the research status of spinal manipulative therapy. In the foreword of the Proceedings (Korr, 1978) it was pointed out that although claims are made that manipulative therapy intervenes in pathophysiological processes, specifically what those processes are and in what ways manipulation might be efficacious remain in the realm of hypothesis. However, "somato-autonomic" pathways were implicated. A detailed description of the symptoms of visceral disease and the somatovisceral and viscerosomatic pathways involved was provided by Pottenger (1953) many years ago. There is now no doubt that these pathways are also involved in the mechanisms of acupuncture (e.g. Mann, 1972) and thus all the other techniques capable of restoring postural homeostasis as well.

It should be obvious from all the foregoing that the effects of all these techniques including spinal manipulation are mediated in the same way. It has been proposed elsewhere (Plummer, 1980b) that all the receptors at acupuncture sites are involved in maintaining homeostasis in the broadest sense. The points are situated at biomechanically significant sites corresponding to sites where neurovascular bundles pierce fascial planes (Plummer, 1980d) and thus they also correspond to the motor points of muscles when acupuncture points are associated with muscles. Whether associated with muscles or tendons or other connective tissue, these points correspond to sites where there are a proportionately greater number of stretch receptors/muscle spindles (Zhang et al., 1980). In this sense they are immediately responsible for postural homeostasis. However, the receptors at these sites are also responsible for somatovisceral reflexes and seem to monitor the state of the extra-cellular fluid at these sites thus providing feedback to the pituitary/hypothalamic axis in order to assist in the maintenance of physiological homeostasis. The neurotransmitters involved are those same ones involved in the production of acupuncture analgesia (Han, 1979) and are no doubt responsible for the bizarre psychological reactions which accompany these techniques in some cases. If the so-called Reichian muscular armouring is suddenly and drastically changed, disorientation and acute confusion is sometimes precipitated with some degree of disintegration of personality. Personal experience of such a reaction makes one treat these techniques with care and respect. The disorientation can easily be explained in terms of the postural disorientation which occurs when the resting position of many joints is suddenly and dramatically changed and the central nervous system is suddenly bombarded with a tremendous amount of completely unfamiliar sensory input which it is simply unable to integrate. People who are Rolfed are advised not to continue to practice their regular sports for a time (e.g. tennis, golf, etc.) because the new position of their limbs is so foreign to them that they become clumsy and unable to play a sport at which they were expert before. However, after some weeks or months when the limbs have taken up a more biomechanically and ergonomically satisfactory position and sufficient time

has elapsed for the person to integrate the proprioceptive information (and become accustomed to it), the subject finds a new ease and freedom, and his game improves, although his method of hitting the ball changes, as does also his gait and posture, and so on (Hunt et al., 1977). It is no wonder if hourly sessions of Rolfing once a week result in clumsiness and inability to play a familiar sport so that too much change in posture produced over too short a time can result in temporary disorientation and confusion. The occasional euphoria produced is no doubt due to an increase in the release of neuropeptides such as endorphins etc. which also explain the insomnia and memory flashbacks (Han, 1979; Liu, 1980; Plummer, 1980b).

It is sobering to realise that nearly all these methods of changing posture also claim to have a profound long-term effect on a subject's psyche, bringing him towards a state of psychological homeostasis so that he is always in control of his emotions, rather than his emotions controlling him. In other words he dissolves and is released from his Reichian muscular or character armouring. He is free.

Conclusion

It would seem that with so many independent claims from different countries and cultures concerning the effects of these posture-changing exercises and techniques on health in its widest sense, serious consideration must be given to the possibility that a definite relationship does exist between postural (physical) homeostasis, physiological homeostasis and psychological homeostasis (Plummer, 1981). Why do we all have muscle imbalance or lack of postural homeostasis? It is not a sufficient explanation to say that we have developed "bad habits". The question must be asked, why have we developed bad habits?

There are two reasons for this sad state of affairs and they both result from the same experience, that of pain. The secret and crux of the matter is that we react to pain, both that produced by physically traumatic experiences and that produced by psychologically traumatic experiences. A simple example will serve to clarify. You fail to see a pot-hole in the pavement. Your foot plunges into it and you sprain your ankle. You walk off limping. Why are you limping? This is the reaction to the pain, and the muscle contraction is the body's attempt to protect itself from pain. If you like, it develops an armour; the contracted muscles. However the persistent contraction and immediate new position in which the limb is put causes a whole new set of proprioceptive information to be signalled to the central nervous system. Biomechanically significant points (i.e. acupuncture points) are under stress and the receptors at these sites send off a barrage of signals which are carried especially via the large sized fibres into the reticular formation of the thalamus and limbic system, where the nerve endings will liberate endorphins and other neurotransmitters (Han, 1979) causing a transmission blockage of nociceptive impulses at the synaptic regions so that pain can no longer be perceived (Liu, 1980). Thus is triggered off nature's dual method of tackling the problem of pain. However, the effectiveness of the latter method depends on the supply of these neurotransmitters available for immediate release. This in turn depends to a certain extent on the resting state of the muscle armour or the degree of muscular armouring the individual has. Variation in pain thresholds thus exist.

To continue the story of the sprained ankle, one continues to protect it for a period of time. If this extends to weeks or even longer, and during this time the full range of movement of all the tissues and structures involved is not carried out, then the new lines of biomechanical force resulting from the abnormal resting position of the limb cause the reorganisation and laying down of connective tissue probably by means of its piezoelectric effect. This is one of the mechanisms by which bone is laid down according to the direction of the lines of stress to which it is being subjected. Fascial adhesions at the biomechanically significant points (acupuncture points) are the unwelcome and pathological result, and these have come to be known as trigger points or neural points. This means that even though the sprain heals, "scar" tissue forms elsewhere and an almost imperceptible limp results. The trigger points thus developed in the affected muscles perpetuating the armour may exhibit localised stretch reflex initiated by the biomechanically incorrect resting position of the muscle. It is in this way that the signs of unresolved physical trauma develop. Muscle imbalance is the result, with continuing protection of the formerly painful sites, now to the detriment of the person rather than his benefit. But it is not necessary and can be treated, and even prevented.

This brings us to the second reason for the development of muscle imbalance and "bad habits". It is as the result of psychological trauma which also produces a form of pain. Both Reich and Feldenkrais have described this in detail. When a person is subjected to a psychologically traumatic experience he seeks to protect himself and to avoid the pain. This begins from the moment of birth (or even before?) with what some people describe as the traumatic experience of birth itself. In Primal Therapy, experiences of this trauma may even be re-lived (Janov & Holden, 1977). This is claimed to be therapeutic and it is plausible that the re-use of the same group of muscles involved in the original (primal) experience, in exactly the same way as in the original traumatic experience, may result in tension on, and release of, the fascial adhesions already described.

The way of protecting oneself seems to vary with the individual so that for example some will react with fear (flight), and some with aggression (fight). However, no matter which reaction is provoked, certain patterns of muscular contraction are evoked. The particular pattern depends upon the particular response. As explained earlier when discussing the Feldenkrais technique, repeated emotional upheavals cause the child to adopt attitudes that ensure safety. The new resting positions of the muscle groups involved once again result in the development of new lines of biomechanical force with increased stress at biomechanically significant points (acupuncture points). The story continues the same as for the result of physical trauma.

We thus see that muscle imbalance or lack of postural homeostasis is due to the accumulative effects of all unresolved trauma whether it be physical or psychological. It is tragic that most of us carry with us throughout life the scars of such trauma, when it seems possible to erase them by one or any or a combination of the techniques described in this paper. Any method capable of reversing the long-term effects is surely worthy of more serious and concerted scientific investigation.

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