Body and Sole

by Christine Ackers

A discourse on the practice of wearing orthotic insoles in shoes as a means if remedying poor posture

Putting remedial arch supports in children's shoes as a means of correcting common postural defects, such as flat feet or hyper-extended knees, is both inappropriate and harmful. The inserts appear to be effective; but meaningful orthosis is not achieved, and the price paid for the apparent remedying of the problem has far-reaching destructive consequences.

Body shape is organised as a whole; so when it has become distorted — usually through bad habits of use — it can only therefore be restored as a whole, by changing those bad habits into good habits. Dropped arches, sore knees or round shoulders cannot occur in isolation, but are merely the more readily observable features of overall poor shape and mal-coordination.

Posture as such cannot be corrected. The character of a posture can be changed. The character of a posture is created by the person's manner of use — the way the body parts are held in relation to one another, and the muscular arrangement in which the whole self musters force for action. Sitting is a posture. The way you sit — whether in a collapsed over-relaxed shape; or in a tightened down shape; or in an opened out, lengthened and widened shape; or in an over-lengthened and narrowed and stiffened shape — gives the character of your sitting posture.

Good use

As two-year-old Roger Chen investigates his environment he adopts several postures. He reaches up, leans forward and around, reaches out, turns to look at Mum, holds his toy in his lap — and in each posture the lengthened out shape of his trunk is maintained as a constant. The parts of his body not required for a particular action remain free — his legs while he's sitting, his arms while his mother holds the bottle for him to suck. His legs don't need to be crossed over one another to help him stay balanced in sitting; his arms are not being held tensely while he's not using them. His overall shape is kept open throughout the flow of movements, so that in whatever he does the safety and well-being of his whole body is being taken care of. His manner of use is good, giving good shapes or what we perceive as "good posture".

Good shapes promote good function, that is: a gentle action of the parts on one another; a sharing of loads over the larger muscles and bones that are designed for weight bearing; no excessive stressing of the joints; and — in accordance with the principle of energy efficiency — a state of maximum lightness achieved with minimal effort. We see that Roger inhabits his body lightly and comfortably. He enjoys being alive.

Some activities put greater demand on co-ordination mechanisms

The body coordinates as a whole. The exacting degree of individuation needed for fingers to manipulate a dental drill in another person's mouth is dependent upon the integration and stability of the dentist's whole body, and especially on his ability to prevent activity in parts not directly engaged in the procedure. He needs to bring his eyes and hands close enough for fine work at a variety of angles, often maintaining a particular posture for some time. His arms and head need to support hands and eyes in a way that ensures that there is no wobbling, no missing the mark. Part of this intricate operation of balance and co-ordination entails preventing his legs from jumping about while this is going on. His breathing needs to continue throughout painstaking detailed work without allowing the movements of his ribcage to throw his fingers off track. This complex of co-ordination, requiring constant miniscule adjustment of the masses and weights of innervated body parts, takes place automatically, outside of his awareness. However, the quality — or character — of this process can be influenced consciously by his paying attention to his manner of use in the situation. Clumsiness is less likely to occur in a person who is neither too tense nor too slack.

Coordination disadvantage

As a normal baby grows, his nervous system gets better at individuating parts from the whole, better at moving one part at a time, and leaving the parts that are not being used acting minimally in support of the specific movement so that energy is not wasted. At three months when he smiles at you he flaps his arms and kicks his legs at the same time. It's delightful to see. When we see the expression of such wholesome pleasure in a twelve-year-old we recognise at once that there is something different going on. We do not expect a more mature body to have difficulty in keeping some parts still. It means that the person’s mechanisms are not working optimally, they are energy inefficient. For that person coordination is a struggle, hard work. He needs help to get the best out of his body.

Exercise can be harmful

When instead of sticking a hypodermic in someone’s mouth you decide to go for a game of squash, you are not caring for the other person now but it is still important for you to ensure the safe integration of all the parts of yourself. If every time you thwack the ball you jam your skull down obliquely on your atlanto-occipital joint, you are not doing yourself as much good as the frequently recommended taking of exercise would lead you to believe. There is more to exercising than simply contracting as many muscles as possible as hard as possible. You need to ensure that appropriate muscle groups are being exercised. You need to be well co-ordinated if the game is going to be good for you and not do you harm. You need to know what you are doing.

Everyday activity can be harmful

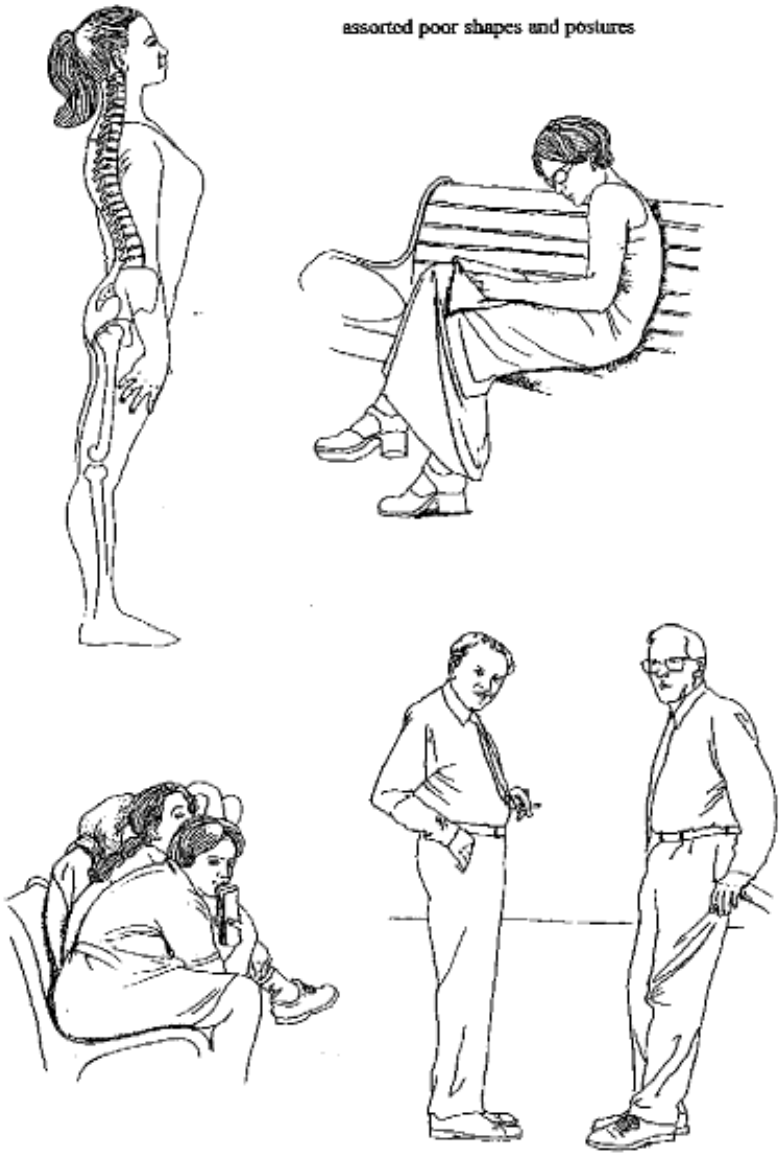
A person’s musculature can be so badly organised that each time she rises from a chair she thumps herself in the stomach and in the lumbar spine. Every click on a mouse may simultaneously be a violent attack on the delicate structure of her neck. It makes sense for her to be skilled in using an individuated finger on the end of a well-sprung arm and shoulder, and to be accomplished in leaving her neck out of it. She needs to be able to respond with appropriate strength and mechanical advantage for the economical requirements of an action, and to return from various positions and postures to an easy poise, relaxed and alert, ready for the next action.

When she uses herself inefficiently there is no return to an opened out shape after a specific movement.

A milder version of the poor shape she adopted remains after the action is finished. Gradually the normal shape of a person becomes moulded by her habitual patterns of use. If every time she sits down she flexes too much — that is: she tightens herself down in front; drags her cervical spine forward jamming her head back on her neck; her thigh muscles over-contract in taking too much of the responsibility for seeing her safely into the chair; and her knees pull together putting extra strain on her lumbar spine; — then this particular arrangement of body parts that she habitually employs will determine the character of her posture. When it occurs in children we call it "bad posture" because its more obvious features will include flat feet, round or raised shoulders and sway back. In adults it will be associated with a variety of spinal and limb injuries and ailments ranging from neck to lumbar spine, shoulders, knees, elbows, hands, feet and tempero-mandibular joints. Yet we fail to make the connection with her "bad posture" because those shapes we associate with the adult form are normal! Adult bodies look strange to us when the character of their posture gives them an opened out shape. Yet most of us used to have bodies like Roger’s. I hope his father and mother will help him to keep his good use for life.

Seeking solutions

Some parents do notice their children have bad posture before the onset of painful knees or random neck spasm. They may be recommended remedial shoe implants. This appears to answer the problem initially, but the habits of use that are cultivated by means of these prosthetics will only supplant one set of damaging postural habits with another.



Wholeness and complexity and special posture senses

Posture is dynamic, an activity of nerve and muscle organised in the brain to be in constant process while we are alive even while we hold very still for having a photo taken or for balancing on one toe. We know that ordinary activities like feeding and walking are organised in specific brain centres and are carried out by multiple reflexes and other neurological processes operating muscle which acts on the skeleton. The information flowing betwixt and between and to and from ourselves — ourselves in action, ourselves at rest, our inner selves, ourselves and our environment — is enormous. Not least of the constantly active reflex activities are the postural maintenance mechanisms that keep us upright. As well as depending on a certain relationing of the parts for the activation of some of these reflexes, the process also involves using information

from our senses. The vestibular apparatus of the inner ear and the specialised function of the soleus muscles, that lie directly beneath the calf muscles, keep the brain informed from instant to instant about our state of balance. Toes help too as they are sensitive to weight distribution and they are individuated, separated so they can make tiny individual adjustments.

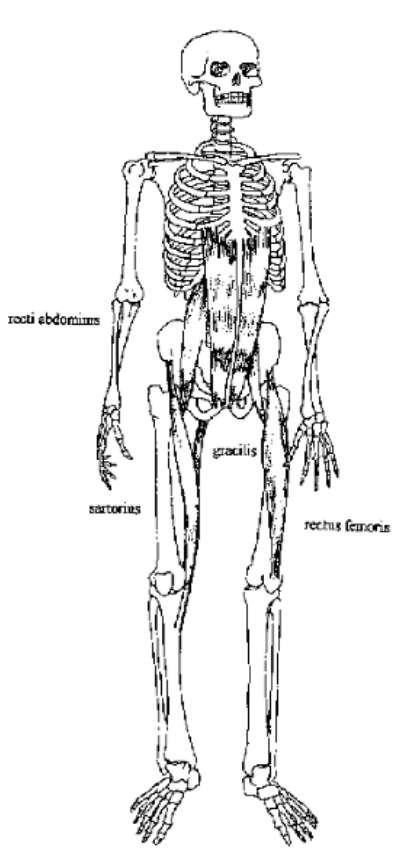
If you close your eyes while standing you can feel your soleus muscles and your toes twiddling and twitching as you sway slightly. Swaying is a component of balance as balance must continually be being adjusted. If it is not being lost and regained it is not a state of balance, it is a fixed state. If your legs are tightly gripped you will not be able to feel so much of this balancing process. Some of the activity will not be going on because muscle that is held constantly too tense loses its sensitivity. Feedback from specialised fibres within the muscle mass falls silent when the muscle is overcontracted. The further our use deteriorates, the less information we receive about our state of muscular wellness. We become less aware of the compensatory wrong muscle activity that is engaged when there is a shortfall of muscle tone where it is needed. If the erector spinae — the muscles that straighten the spine — are not working adequately, other muscle groups will be dragooned from their proper function into helping hold us upright. They will have to contract harder than is appropriate to the ir design in order to accomplish what has to be done — whether that is to run us rapidly out of the way of a heavy moving object, or to keep our eyes glued to a screen. When our toes and legs are gripped, the delicate responsiveness of the soleus muscle is diminished and the recti abdominis muscles are improperly deployed in helping to stop us from falling over. When a person’s overall use has deteriorated, when she is flexing too much and tightening down in front, her shape is distorted and becomes harder to balance. Her toes are bound to stiffen as part of the overall need to stop her from toppling over. Toes are sense organs, they are supposed to remain soft and feeling. When they are subjected to constant excessive tension they lose their responsiveness, so that parts normally acting in relationship with them are deprived of important information. Problems also develop in the feet because gripping toes distort the natural lie of the foot. Feet are also sense organs, equipped to interpret the texture, cant and stability of what they are treading on. To function well, feet and toes need gentle stimulation from the continual performance of their sensing job. Under well-sprung lengthened out legs and torso they are able to respond with delicate precision to the toppling and swaying above. They help keep the head balanced and free.

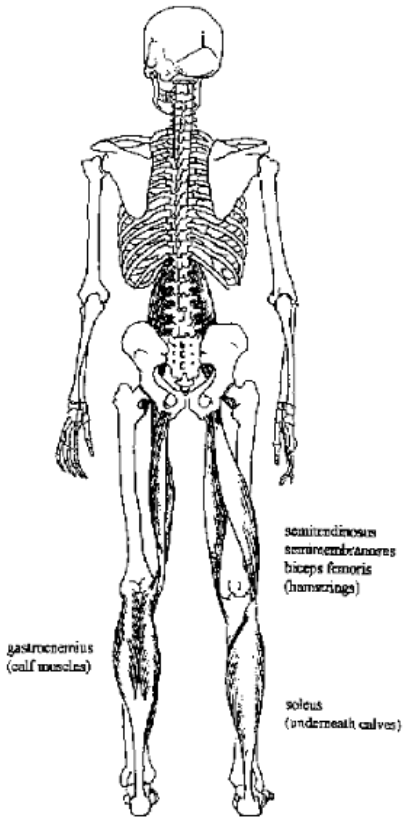
The body’s response to orthotic devices worn in shoes

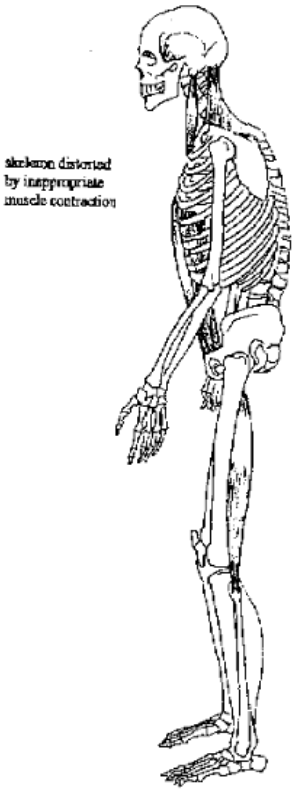
Gripped toes twist and tilt the feet; feet that are tilted and turned make the toes grip. This is going on all the time as an appropriate response to our stepping on variously angled and textured surfaces. But it is a response to a temporary situation, and a frequent return to standing on the whole foot on an even surface is a normal part of that response. When an orthotic appliance is placed in the shoe we are held off balance permanently, forcing the toes into perpetual crisis mode. They try to counteract the legs’ being thrust out from under the hip sockets by putting a lock on the feet. A state of simulated bandyleggedness is induced, which the body tries to deal with by making corrective adjustments all the way up through the pelvis and trunk to the neck and head. It is an unavoidable syndrome of compensatory tightening because the ankle joint can only flex the foot into positions of plantar- flexion or dorsiflexion.

It can only move the foot up and down to point the toes or to pull the toes upwards to stretch the back of the leg. It cannot move sideways; so when the foot is inverted and supinated, that is when the soles are turned to face one another by means of objects placed underneath their inner edges, the leg bone at the top end of the ankle joint is pushed over sideways and is forced to rotate at the knee and in the hip joint, making adjustments of muscle contraction imperative all the way up the

body. As the knee is flexed slightly and rotated outwards the hamstring muscles are tugged so they stiffen. As the hamstrings contract, they pull on the pelvis where they are attached to the sitting bones at the bottom of the pelvis. This pulls the pelvis back and down which makes the abdominal muscles which are attached to the front of the pelvis at the pubic bone, contract also — partly in reflex response to the movement of the pelvis and partly in response to the need to restore overall balance.

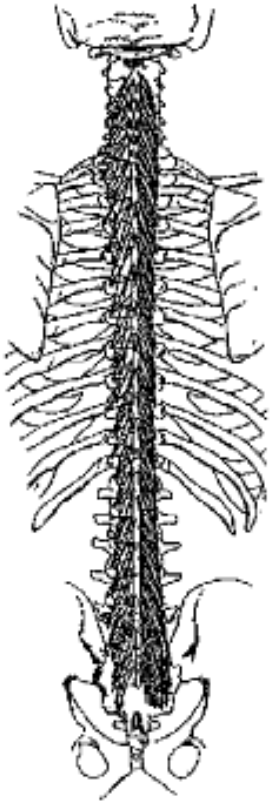






Structural, sensory and functional requirements for good use

Try supinating your feet (standing on their outer edges) and leaving your stomach muscles relaxed. It’s hard to balance. As the pelvis is drawn back and down, the lumbar spine flattens which subdues the responsiveness of the multifidus muscles. The tiny multifidus muscles straddle the vertebral joints obliquely so that as they contract they pull each vertebra into line, straightening out the spinal curves a bit. They form part of the erector spinae group, and their job is to maintain posture, keep us upright. They need constant gentle stimulation to retain their responsiveness. The spinal curves need to be maintained through good use at degrees of intensity that are somewhere in the middle of too little or too much. "Somewhere-in-the- middle" is a place that is difficult for the laboratory technician to get a hold of but it is easily recognisable by an Alexander Technique teacher by the feel of the whole body he has his hands on because, when the multifidus muscles are doing their job, the whole body responds with an increase in stature. It visibly and palpably lengthens and widens. When there is either too much or too little curvature in the lumbar spine this opening out and enlarging will not be happening. The person will be slumped down and will have a lifeless feel, a lack of springing, a lack of muscle tone; or, — as is the case when her feet are supinated — she will be fixed and not springy, from making too much muscle contraction. Within the same scenario, the shortened recti abdominis also pull the front of the chest down, diminishing the breathing capacity and increasing the curvature of the thoracic spine; the cervical spine is drawn forward so that balance of the head on the neck is made impossible.



multifidus muscles

inverted foot

healthy planted foot

foot inverted and supinated by prosthetic arch

Quadrupeds and bipeds

A four-legged creature is more stable than we bipeds but he still needs to hold himself off the ground. He has shorter legs positioned under four corners of his trunk giving him a broader base than ours is, relative to height, making balance easier. But he still needs to hold himself up to move along the ground. Living in air requires this, unless you pull along the ground by contracting along one side and then the other as snakes do, or you invest in mechanisms that make leaping or jumping the energy efficient option. Fish don’t have a problem with holding themselves up as they are supported by their medium. We have special problems because we stand particularly tall on

our narrow base, precariously balanced on only two of our limbs. Long and thin, we must hold ourselves erect without becoming exhausted in the process. Fortunately we are designed so that this holding upright takes place with least expenditure of energy — provided that we don't spoil the delicate mechanisms that subtly effect it for us.

Relaxation is an oversimplification of our needs

Although the holding upright does itself, is automatic, it nevertheless requires a great deal of muscle contraction. An unconscious person lying on the ground is arbitrarily shaped, just prevented from falling apart by the ligament and connective tissue and muscle wrapped around her bones. When she wakes and begins to get up she'll need to gather some tension, perhaps by stretching out. She doesn't need to know which muscles to contract because that's taken care of by co-ordination programming centres in her brain. As she gets to her feet, it doesn't make sense to exhort her at this moment to "Relax!" It would be more helpful to suggest she draw herself up to her fullest stature. We can also urge her to guard against fixing down into her hips, locking herself down. We can help her to stand up and ensure that only the postural maintenance musculature is engaged, the least and best that she needs for standing. She hasn't decided yet what she's going to do. She's in a state of suspended action, she's remaining free, inhibiting unnecessary muscle contraction while remaining ready to move quickly once she's decided where to go.

But making too much tension is not quite it either

Try getting up from the floor without contracting muscle. You'll discover it's not possible. Once you are upright, grip yourself tightly, make too much tension, make your legs rigid and try to take a step.

You'll notice that you have to release something to move. You won't know exactly what you had to release; that will be taken care of by your brain. Our nervous system operates a rippling mix of contraction and release. Sometimes there's a less than optimal balance of ingredients in the mixture: we may be contracting or releasing some parts too much, or other parts may be contracting and releasing too little. We can help the organising centres produce the best mix by consciously intervening, by inhibiting our harmful habits of use so the centres are free to arrange best co-ordination for us. Prevention of the wrong thing from happening is fundamental to the process of learning how to use ourselves well.

Education in use of the self is needed

Prevention is the sine qua non of postural re-education. Getting our bodies to do this thing or that from commonplace exhortations to "sit up straight", "push your shoulders back", "tuck your tail down", or "pull your tummy in", to the more insidious inducements by means of harnesses, braces, orthotics and ergonomic furniture only damages the apparatus further, making the restoration of poise ever more elusive.

Illusory benefits of wearing orthotics

Orthotics induce a tightened down holding pattern on the body which appears to improve posture. A person who has developed bad habits of use, shows a postural syndrome of pulling or collapsing down which will include pushing the knees too far back and flattening the arches of the feet. We see that what is required is that the knees must not be hyper-extended because this means the weight they are carrying will be falling on the wrong part of the joint; and Nature lets us know this is not satisfactory because they start to hurt. The foot has spread out, it is no longer forming a springy arch to help distribute weight and protect bones and joints from stress. So it would seem

logical to recreate an arch by raising the collapsed part with a prosthesis. We observe that muscle contracts when the orthotic is in place, and since we know that one of the features a foot with dropped arches lacks is tone in the muscle and strength in the ligaments, it would seem to be a good thing to induce the foot to use more muscle contraction. At the same time we observe that the tug on the pelvis from the hamstrings flexing the knees, gets rid of the sway back and the slack tummy all in one.

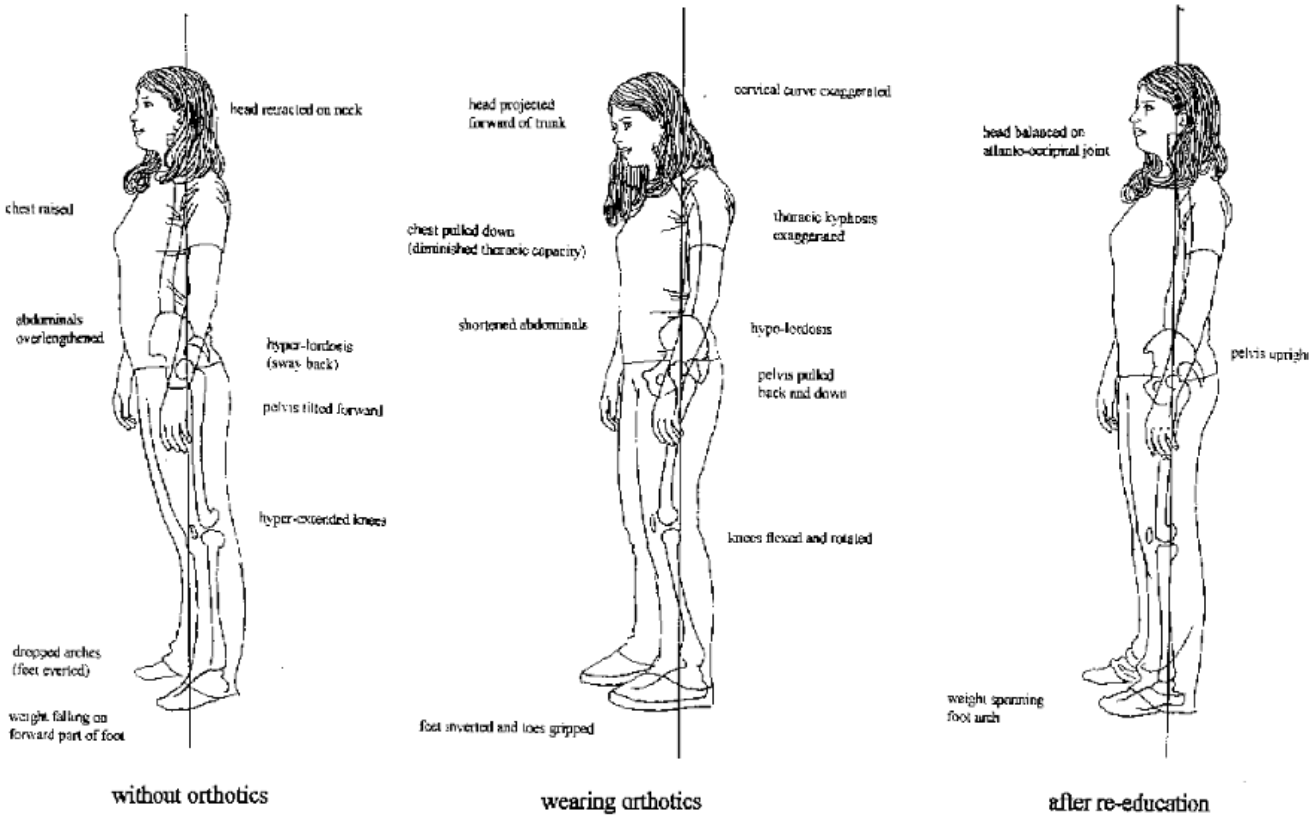
A short view is unsatisfactory

But we do not see far enough. The design of the human body is not as straightforward as that. The apparent improvements will have been arrived at by forcing and fixing, and in the process one of the vital features of our structure will have been sacrificed, that is, its springing. We will have cancelled out components of lightness and balance, and find ourselves even further from the attainment of true poise. Springing is energy saving, it lends lightness and moveability. When we tighten ourselves down we lose it. The ecology of the operation has not been brought into the equation.

The actual result of wearing orthotics

When remedial appliances are worn in shoes the body weight is no longer distributed on the proper six points of the feet but is thrown onto the fleshy sides of the feet and onto the heels at an angle.

Recreation of the arches is achieved by inverting and supinating the feet, forcing the heels to tilt and twist away from one another, and making the toes hold on tight. The knees are put under even greater strain by being rotated and adducted too far as they are drawn into the conflict of over-contracting musculature.



Learning takes time

If body shaping is to be improved the long axis of the body must remain free to respond economically and ecologically to the requirements of movement and balance. It must not be fixed, but must be capable of safely deploying strength, speed, and agility when called on. Piecemeal intervention without reference to the relationing of the parts and their co-ordinating functions damages the whole. Once you stand a child on a permanently distorted surface, habits of gripping and pulling down will become entrenched. Further deterioration of her sensory and proprioceptive apparatus will follow.

The solution to common aches, pains and malfunctions such as the inability to sit upright or stand without hurting, lies in re-education of the person's manner of use. We must take the time that learning takes to address this problem of epidemic proportions.

The need for lessons in the Alexander Technique

The study of structure and function in human movement demands more than the skilful assemblage of esoteric nomenclature and the regurgitation of established views and procedures for the purpose of passing exams. The larger part of knowledge derives from familiarity with the material gained through plenty of hands-on work. The more-or-less, somewhere-in-the- middle nature of ourselves does not lend itself to the kind of experiment that is readily set up in a lab. But as our findings are repeated through experience, our resource of knowledge grows significantly and should not be discounted.

The assessment of a person's use is made by a teacher of the Alexander Technique largely with his hands, in the same way as a judgement of musicality in a pianist is made with a musician's ear. Hands and ears are instruments of our sensory apparatus whose potentiality can be developed by training.

Acknowledgements:

These comments are made from my 35 years experience as a teacher of the Alexander Technique.

Thanks to David Garlick for editorial advice, and to Bradley Newman who wore orthotics for a week as an aid to our research.

Drawings by Jing Sheng Wang (02) 9872-7958