I had a notebook filled with unanswered questions when Dr. Lulu Sweigard died. Over the six years that I studied with her and assisted her "Anatomy for Dancers" class in the Julliard School, she repeated some things so many times that I can still hear them echoing. Nonetheless, I was now terrified that I could never go back to her again to ask about real life students whose bodies refused to fit into any of the neat categories of size, shape, or movement that I knew. It was a long time before I understood that the often repeated words were themselves guidelines for reasoning out the answers to all the "new" questions and problems I found.

There were two main principles she established to use in aiding the performance of movement: the essence of dance and life itself. The first is that all postural alignment patterns, all muscle use and development, all human body movement is directed and coordinated by the activity of our nervous system, in other words, our thinking. Therefore, in order to change our body shape or our movement patterns we must change our neurological activity. Although most of this neurological activity is habitual and/or non-conscious, changing our exact conscious goals affects this extensive subcortical, unconscious process.

The second principle is that "dis-ease," joint and muscle pain, limited movement range and vocabulary are all products of imbalance. The human body, being an unstable structure, is constantly in motion, constantly vibrating like a tuning fork around the point of mechanical balance but never settling fixedly upon it. The more closely the body approaches this balancing point, the greater the balance of muscle action around joints. This minimizes the stress on the joints and ligaments and lessens the possibility of chronic pain or injury. If the muscles around the joint are all working in a balanced way, none of them is constantly contracted and none is constantly at rest.

Their alternating rhythmical activity serves an important function in pumping blood through the body and maintaining flexibility and strength. When there is poor balance so that weight is not transferred through the centers of joints, some of the muscles must contract continuously to counteract the pull of gravity. This then limits our movement range because a constantly contracted muscle is both a fatigued muscle and an inflexible one. Other muscles may be constantly relaxed resulting in excessively unstable joints, and rapid fatigue when movement is performed.

Both of these principles seem obvious. After all, we act on them continuously if not consciously. The way in which Dr. Sweigard applied them, however, was uncompromising and sophisticated, and
not at all obvious to me even after years of experiencing the dramatic effect of their application to my body. She sought the way to bring a balance of flexibility and strength to all of the muscles of the body, twenty four hours a day, no matter what the person's activity. To accomplish this aim, she taught people to visualize lines of movement traveling through their bodies, at first while they were lying down in what she called the constructive rest position, and then later while they were standing and moving about at their normal activities. These lines of movement had specific locations and directional pathways through the body which were based on the skeletal structure and muscular functions of the individual she was working with at the time.

Visualizing a line of movement through the body while not moving can change the habitual patterns of messages being sent from the brain through nerve pathways to the muscles. As long as this constructive new thinking pattern is activated during movement, a new pattern of muscle activity is automatically being used to decrease physical stress and maintain a more balanced alignment of skeletal parts. Over a period of time during which there is continual daily attention to new habit patterns in thinking and action, the body's shape will be transformed. Previously over-used muscles become more flexible and smoothed out, while previously under-used muscles develop greater tone, strength, endurance, and a fuller contour.

When Dr. Sweigard used the term "movement goal," she had something very precise in mind: what you want to be doing right now. Long term goals are a direction to follow, perhaps a philosophy or dream life. If your greatest aim is to be able to fly you will have to construct a step by step series of short term goals to achieve that end. Each short term goal must be something within your capability so that you can actually visualize yourself doing it and then actually do it. Begin with walking. If you can do this, it will give you positive reinforcement to take on the next more difficult goal. If walking is beyond your capacity, don't keep failing. Not even a worm will persist after repeated negative reinforcement. The solution is to go one step back to something you can do, crawling perhaps. By keeping your current movement goal at a level of possible attainment, you will be ready to go beyond it with success. If you are in pain, whether you are moving or not, your most compelling immediate goal is to get rid of the hurt. The next essential goal is to be able to move fully without getting into pain again.

The condition which seems to be a prerequisite for chronic pain is a habitual imbalance of muscle usage around a particular joint or joints. Some of the muscles crossing a joint are weaker than others, some are stronger. There is a situation of relative weakness but not of absolute weakness. Your own muscles have to counteract each other in order to cause movement. Furthermore, if weight is habitually never transferred through the center of a joint, some of the muscles which cross the joint are constantly being stretched while others are more contracted and unable to stretch nearly as much. Stronger muscles may be more massive than weaker ones, but if they are too massive they get in the way of full movement range. Depending on the relationship of the joint to the line of gravity, some muscles may be working to counteract the force of gravity almost continually and will therefore have great endurance. Muscles which are not functioning to hold the bone upright or initiate movement may become so weak that they are difficult to engage and have almost no ability to endure.

To complicate matters even more, there are three kinds of muscle contraction. A muscle can contract and shorten to cause movement at a joint. This happens in the muscles across the front of the hip joint as you flex to bring your leg up in front of you. A muscle can contract and neither shorten or lengthen, as when you are holding your leg up in the air for a while. A muscle can also contract and lengthen which is what happens in the muscles across the front of the hip joint as you gradually lower your leg back to the floor. If these muscles were not contracting, your leg wouldn't go down. Practicing one kind of contraction enables you to do more of just that kind, but it doesn't help you at all with the other two kinds. So, the exercise you do is very specific. In other words, what you practice is what you can do. There is no one all-around exercise which prepares you for everything else.
Even if you have a perfectly centered alignment and exceedingly pleasing contours with totally even muscle action around all the joints, holding yourself rigidly in this position may result in severe pain. You will certainly be unable to move freely. This is because all the muscles are constantly doing an isometric contraction, one in which muscle contracts and neither shortens or lengthens, but just holds still. If the person does not practice the two other kinds of contraction in their daily life the joint or joints around which the muscles are tightly contracted may eventually feel "locked" and either extremely irritated or even numb due to the extreme compression within the joint and decreased blood circulation in the area.

Clearly, the imbalance at a joint which is "out of line" does not just involve muscle weakness. It involves a relative imbalance in mass, endurance, and flexibility as well as strength. If a joint is being held in "perfect alignment," all the muscles are contracting just to hold you up and are therefore at a great disadvantage when called upon to make you move. Once we begin to move, of course, one of the major determinants of our ability to please ourselves and those who see us is our skill in coordinating the patterns of stretch and contraction of our muscles. A person with strong, flexible, enduring muscles may make a lovely statue but without skilled timing of their usage, this same person will be a hopelessly awkward and frequently damaged dancer.

Determining which abilities an injured muscle lacked or had in excess abundance is not simple. The likelihood of finding a single exercise which performed three times daily will cure us is very very slight. When even a single muscle or ligament is injured, the whole body compensates for its temporary weakness. Once the injury is healed, the whole body has to readjust so that the now whole part is not still favored and thereby further weakened by misuse or even non-use. Indeed, there is often a tendency to favor a particular body part before the injury. The injury only reinforces this habit pattern. Once an injured muscle is healed, it is inevitably a little weaker, less flexible, less enduring, and even smaller than the other muscles which were still functioning while it was hurt. For this reason, one can not immediately go back to making the same demands on it that one made before. One must gradually re-train it in all its functions if one does not want to run the risk of maintaining the idiosyncratic movement patterns of pain. This is, of course, a new training, learning to use the muscle more effectively than before the injury.

Before I set up a program of movement practice for anyone, I make clear to myself and the student that it is a teaching-learning process. Dr. Sweigard never tired of telling me, to her very last days, that she and I were teachers, not doctors, not therapists, not healers. She reminded me and showed me again and again that the work of a teacher is to give students the tools of knowledge and skills to help themselves change their own patterns of movement. The good teacher gives the student the ability to be self-responsible. Effective teachers make themselves obsolete in the end.

The task of teachers of movement is not diagnosing structural pathology and medically treating it. Our task is seeing how the structure functions and giving the understanding and useful tools to our students to perform movement more and more effectively so that in the process they themselves remove the habits which cause pathology.

A student who is in real pain first should be sent for a thorough medical examination to rule out any possibility of disease, endocrine imbalance, acute injury, or any other type of problem which requires medical treatment. Once it is clear that the student's problem stems from the way the body is being used I feel free to step in and work with him.

After obtaining a general history of the student, both medical and personal, I would first examine his basic skeletal alignment patterns and muscle structure when he was standing erect, sitting, lying down, and finally "folded-over" so that the entire spine was flexed. Sometimes this process alone would lead me towards the cause of the student's problem and an approach to the solution. Often, however, especially when I first began to apprentice to Dr. Sweigard, my examination would only leave me baffled. Whenever I went to Dr. Sweigard to question her about the nature of my
student's problems, she would inevitably ask "Did you look at movement?"

No matter how curious the student's muscular or skeletal structure seemed to me, if I paid close enough attention long enough to the way in which he moved this structure, I could eventually discover the nature of the problem and the tools for solving it. Sometimes, especially in the beginning when my eye was not attuned to subtle movement functions, I would have to watch students perform daily activities not just self-consciously before me, but also in their normal setting. Sometimes it was necessary for me to see them taking a strenuous dance class at the studio where they were on scholarship or performing on stage where adrenaline freed their usual physical inhibitions.

Occasionally, what seemed at first like a problem of chronic muscular tension or weakness when I observed the student at rest, gave evidence of a medical problem as I viewed the person in action over a period of time. One student was very tense, but his movement patterns didn't seem to warrant the excruciating headaches he suffered daily. It turned out that he had a brain tumor. Another student who had satisfactorily recovered from a bad knee injury was practicing all the movements that I gave her correctly and faithfully every day for months. Nonetheless, her muscles were not getting any stronger, in fact there were signs of atrophy. At last I questioned her thoroughly about her life style and discovered that she was suffering from protein deficiency.

Fortunately, these sorts of cases are rare, but they taught me a lesson: that I have the capacity and training to work with imbalances in movement and alignment patterns only. While such imbalances are responsible for a whole host of symptoms, they are not the cause of all ills. These others are beyond my ken. The best that each of us can do is know our strongest abilities and develop them fully while recognizing our limitations. Saying "I don't know" when you really don't is essential if we want to avoid injuring ourselves and the people we work with.

Whatever the nature of the skeletal deviations and resultant muscle imbalances practiced by the student which cause, for example, low back stiffness, having the person "think toward center," as Dr. Sweigard used to say, will aid him. The trick, of course, is to get the student to "think center" in the right location and direction without forcing movement and without losing concentration, even under the most pressured or emotional circumstances. Eventually one must succeed in finding a way for the student to be at ease in the low back not just when lying still but also while performing a full range of movement in the lumbar spine.

The student must start working in a position where he does not have to deal with gravity at all, much less fight it. The obvious position is lying down. I like to work with a slight variation of the supine position which Dr. Sweigard called the constructive rest position (CRP). In this position, (see image at beginning of article), the person is lying on his back with arms at ease and legs bent so that the feet stand onto the floor while the knees point to the ceiling. The feet can be braced against a wall or a cushion and the knees can be tied together with a sash so that no work is required to keep the legs in position. An alternative is to rest the legs on a chair seat or stool. The reason for assuming this position rather than one in which the legs are extended out along the floor is that in the latter position the pelvis is tipped downward in front while the lumbar spine is hyper-extended because of the action of the tight ileo-femoral ligament that crosses the front of the hip joint. When there is already discomfort in the low back area, an exaggerated arching of the lumbar spine is hardly desirable. In CRP the lower back is slightly off the floor, just enough so that you can slip the palm of your hand in the space between it and the floor. Flattening the back completely against the floor is just as much of a spinal distortion as over arching it. Both can cause pain and involve excess muscle work even though you may not feel it.

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What follows is the "script" of a hypothetical session in neuromuscular coordination with a student who has low back stiffness, not due to a medical problem.

The first act in this supine position is non-action. This may be an extremely difficult under-
taking for you. Very often it is the inability to stop doing that creates major physical problems in the first place. There are a number of ways to stop doing. Check your body in its entirety, allowing yourself to be fully supported by the ground beneath you. You may think of every part of your body as being fluid, like sand or water, flowing outward and downward into the ground. If this doesn't work easily, try tensing each part of your body as hard as you can and then releasing all effort in that part completely. Go through every part of your body beginning with your head and moving on down through to your toes. If you have gone too quickly through this process, you will not have interrupted your state of extreme muscular control. Return to your head once more and let yourself gradually begin emptying or clearing yourself by visualizing movement along internal pathways. Your preliminary goal is to relax the muscles of facial expression, which in turn, facilitates the concentration required to proceed.

First visualize your skull as being a large and airy, totally empty room. Scan with your mind's eye (not your physical eyes) from the base of your skull where your neck meets your scalp, along the smooth expanse of space within your head, all the way over your forehead to your eyebrows. If your skull isn't quite empty, repeat the process of scanning again, sweeping its vast space clear this time. When you get to the center of your forehead, between your eyebrows, visualize all the unnecessary contents of your head, like breath or water, flowing out along your eyebrows to melt off into the ground. Visualize likewise a flow outward from your nose, along your cheek bones to your ears. Let all the excess drip from your ears to the ground. The sockets for your eyes are very large and deep. Let your gently closed (not squeezed shut) eyes expand and fill the entire space of their sockets. Perhaps your eye sockets can enlarge even more. Don't try to see the space with your eyes. Just allow them to expand gently and rest in the dark cool pools of space that grow softly in your head. Sometimes lightly resting your palms over your eyes so that your hands keep out the light allows the eyes to rest more easily. In the absence of light the eyes do not need to strain to see.

Place your fingertips on your jaw joints on either side of your head, just in front of your ears. Move your jaw a little to locate the exact place. Now think of there being space in the joint between the two articulating bones. Visualize your fingertips sinking through the space so that your hands move softly towards each other. Let your fingertips glide easily downward to your chin until they actually meet. Think of the bones beneath your fingers flowing with them.

There is a lot of space within the cavern of the mouth. With each breath you exhale, think that the air passing through your throat and into the cavern of your mouth enlarges the space within it just as underground rivers wear away subterranean caves into vast hallways and rooms. Allow the exhale phase of your breathing to be long and lazy, circulating around the base of your tongue, creating eddies in all the echo chambers, exploring and expanding your inner space as it effortlessly seeps out of you. Simply attending to the exhale phase of breathing, rather than the more active inhale, is sometimes all that is needed to give up excessive muscular controls or obsessive and distracting mental activity. Let what you don't want matter-of-factly flow out of you along with the air you exhale.

Cup your hands over your ears so that your fingertips are touching lightly around your ears but you are not pressing on the ears themselves. Visualize your ears expanding like the concentric circles of ripples in a pond when a pebble is dropped in it. You can think of the ears rotating as they expand like a pinwheel or a spiral nebula. Because there are so many muscles of skull and neck attaching all around the ears, imagining the ears "relaxing" or opening like budding flowers affects all these simultaneously. Once these muscles release their hold, the head may rest without any work at all, perfectly balancing on the top of the spine (the midpoint of a line extending through the head from ear to ear locates the place where the head sits on top of the spine).

Finally, let your fingertips rest on the bulges just below your ears. These are the mastoid bones, which serve as the attachments of the sterno-cleidomastoid muscles, a pair of muscles that are extremely tight in anyone who has a forward head or chin. Think of your fingertips melting right
through your neck and meeting at center. Let your fingers move down your neck to your collar bones and think of all the excess energy, no longer being contained as muscle tension, flowing out your shoulders, through your arms and out your fingertips like beams of light.

You may feel quite pleasurable sensations. If so, enjoy them but do not be distracted by them. They are only side effects of achieving your goal. Now that your head is cleared of distraction, the "internal dialogue" interrupted, you can begin to think with new, positively focused direction into the area that has perhaps been a source of limitation or pain in the past. Do not think about the unpleasant sensations which you may have previously associated with the low back or pelvis, for example. Instead allow the space you have created in your now clear and focused mind to flow like water or air or light down through your trunk to create even more room within your body. Expand to your full size on the ground like a lake which cannot help but fill its basin.

Each time you inhale, you might think of your breath expanding your spine (which it actually does) so that all the little tight-held places in your back melt outward and downward on to the ground that holds you. Each exhale may drain out the old soreness and tensions and debris along with the excess carbon dioxide. If it is easy for you to think of your breath without forcefully controlling its rate or depth, you can visualize it going more deeply into and through your body until your spine has grown long and free without any muscle action on your part. If, for any reason, you do not wish to think of your breath moving you, make up a new form of imagined activity which is both vivid and pleasurable to you. Any force you want to imagine can lengthen your spine by sinking your sacrum weightily toward your heels and shooting your central axis out the top of your head. Do not dwell on any kinks, twists or knots in your spine. Simply let strong forces of energy act within you to ease your spine to its full length and width and depth without distortion. Let these forces balance each other until you rest centered, vibrating around your central axis.

Having allowed yourself to come to neutral, you are finally ready to perform any movement in your mind's eye. Do not rush to this state of readiness. Being neutral or centered, euphemistically called "being relaxed," is the best preparation for any action, particularly a challenging one. More preparation than this only involves extra muscle work and strain. Obviously, it is impossible to concentrate on your movement goal if you are all tied up in preparing for it. In a state of receptive neutrality, it will be easiest for you to visualize the movement you wish to perform without any ineffectual old habits of muscle action, pain, and strain coming into play.

This next part is up to you. Start visualizing the simplest most basic components of the more complex movement pattern you wish to achieve. For example, you might visualize performing easy arm or leg movements which leave your spine long and stable. Progress to actually flexing at the hip joint of one leg so that your leg swings easily off the ground without your pelvis having to shift or your spine distort. Perhaps you want to try making small circles of the thigh bone in the hip socket. Think of the movement as being frictionless in a well-lubricated and roomy joint. Try alternating legs and imagine that both move with the ease of the one that had previously been "the good leg". Perhaps you will allow your hands and arms to caress and sculpt the air. You might even try coordinating the movement of your arms and legs in opposition. Whatever small, rounded joint movements you perform, arcing your limbs through external space maintains all the internal space you found before. All the while, your mind's eye is travelling along the continuous length of your spine which grows more spacious even as you pass along it.

Warmed and made more fluid by your rhythmic swinging of arms and legs, rest quietly again for a moment. Maintaining your sense of energetic unity, visualize movement which is more difficult for you to perform in real space. If it has been a challenge to swing your leg behind you, now see it, in your mind's eye only, sweeping into the backward curve of an arabesque, spine arching effortlessly and evenly throughout its entire length. If you can picture the growth of a single curve from big toe to top of head, a flawless arabesque, move on to an arabesque turn or leaps through space, all
the while seeing your spine as a whole, now spiraling as well as arcing. Practice visualizing any movement pattern you desire which you have found painful or difficult in actual physical performance but which you can now imagine with perfect clarity. Practice the movement in your mind until you can repeat it with the right tempo and dynamics and energy and dramatic intent, again and again. Without the interference of your habitual and less efficient patterns of action, it is possible to visualize perfection. In simply visualizing you are nonetheless activating the precise neurological pathways that may allow you to accomplish your full movement goal. You are actually establishing new habit patterns in your nervous system which can replace the old ones you no longer desire.

If at any time you notice that you are drawing your eyebrows together, clenching your teeth, gripping your back, pulling your shoulder blades together, grabbing in your buttocks, etc., simply go through the process which brings you back to neutral. Do not keep practicing your imagined action until you have given up your wasteful physical effort. Otherwise you will just be further reinforcing undesirable habits before you even stand up.

No matter how slowly you have had to proceed through your internal adventures, it is never a good idea to remain immobile in any position for very long. There is little reason to stay supine for more than about twenty minutes at a time. I seldom work myself for more than five or ten minutes, although I may keep a student under my direction down for a longer time period. Even if you have not finished going through the process you should get up after twenty minutes. There is always time to finish later in the day or tomorrow. Too lengthy a practice, physical or mental, tends eventually to prove counter-productive, since our patterns of movement and thought when we are fatigued are not always our most efficient ones. Conversely, more frequent shorter practices have been shown to speed the training process. It is also true that serious injuries often take place when strenuous practice has gone on too long and the participants are fatigued. While you are unlikely to injure yourself in CRP, you are also unlikely to be working constructively when you are exhausted or bored.

Once you have gotten up, stand quietly for a moment or two and see if you can allow head, rib cage, and pelvis to be centered in relation to each other and effortlessly supported and connected by your spine. Let your sacrum hang down to connect you to the ground just behind your heels. Let your central axis, soaring out through the top of your head, suspend you from the sky.

Stable and yieldingly tall, warm yourself up gradually by doing small, fluid, rhythmic whole body movements which gradually increase in their range and speed. When you have lubricated and heated all your joints with easy activity, begin performing the simplest movements which are most basic and of little technical challenge to you, move along through to the most difficult and complex ones. You will probably find that at least the very first movement you perform will be surprisingly easy and full. Make sure that you really start with the most basic movement elements: a small thigh flexion before a walking step, a walking step before a tendu, a loose leg swing before a battement, a tendu to the back before an arabesque, a balance before a turn, etc. Congratulate yourself on each success no matter how small it seems. If you couldn't do it as well before, you have progressed. Repeat the successful movement until it feels "natural" and predictable instead of "weird" and accidental. Repeated daily practice until you get "the feel of the movement" not only reinforces the necessary neurological patterns but also starts to develop your muscles in the necessary way to produce the patterns.

If you find that the movement you are performing is no longer successful, STOP! Do not keep practicing a pattern which is non-functional. This will only train you to fail more consistently in the future. Instead, pause and clear your mind of everything. Return to neutral and then visualize the perfect execution of the movement pattern that you want to achieve. Now you are ready to perform the movement again. If you continue to fail you have either skipped the practice of an essential intermediate, simpler pattern of action or you have reached your limits for the moment. If there is a more basic pattern that you need to practice, turn
your attention to performing it. Only after you have mastered it should you return to the more complex activity. On the other hand, if you have reached your limit for now, quit. Take a break. Either your muscles are fatigued by new and unusual usage not required by your old habits of action, or else you are mentally fatigued by an unfamiliar intensity or duration of concentration.

It is time to do something totally different and unrelated. Don't even think about what you have just been doing. Forget it entirely until your next practice session which can be a little later in the day or the next day. If you practice too infrequently, the next time will take you back almost to your starting point, severely slowing your progress in neuro-muscular conditioning.

Do not expect your next session to begin with a perfectly transformed body. While it is true that you are changing constantly, the changes that take place from day to day are extremely subtle. It takes about two months of daily practice from the time you have started to think about your movement differently to the time that your muscles visibly change shape. While sixty days into the future seems like a long time to wait before a new internal balance brings tangible results, it isn't very long at all in comparison to your whole life which you have already spent developing the form you now have.

Remember also that not even the greatest teacher can speed the process of change or do it for you. What someone says or writes or shows you can draw your attention to aspects of your movement which can be improved and can spark your imagination with appropriate imagery. But it is your sustained concentration on your own balance of energy usage, visible and invisible, that will move you to achievement of your full movement potential. There is no "right image" or "right posture" or even "right movement". There is only a way of functioning which is both unifying and expansive for you at this moment. Furthermore, this way of functioning will change continuously throughout life. Plasticity of mind is what makes movement possible at all. If you can conceive of the human body doing a particular movement, then you can learn to do it. The miracle is when you don't fall down in shock when you find yourself doing it, every cell moving in perfect harmony, no room for a tiny knot that says, "I can't".