

Body Mechanics

by Joseph E. Muscolino | Photography Yanik Chauvin



Table Mechanics

BODY MECHANICS ARE COMPROMISED WHEN TABLE MECHANICS ARE POOR

Massage therapy can be hard work and physically stressful to the body. This is especially true if deep pressure techniques are being employed and/or if the therapist is small and the client is large. And when stretching the client, this size differential is even more challenging than when practicing massage therapy. For this reason,

a lot of attention is paid to proper body mechanics, as well it should be. But perhaps there is not enough attention paid to *table mechanics*. After all, the best body mechanics in the world are compromised if the mechanics of the table do not allow for efficient use of our body when generating force to work on the client.

Table photos courtesy of Oakworks Inc. and Comfort Craft.

Following are some key points about what to look for in a massage table, as well as how to employ efficient body mechanics to take advantage of the table mechanics. Employing optimal body and table mechanics cannot eliminate all physical stress to the therapist's body, but it can help minimize it.

Table height

The single most important criterion of table mechanics is the height of the table. There are two ways to create and transfer force into the client's body: taking advantage of gravity by using body weight, and by contracting musculature. Muscular contraction requires effort and can be exhausting, whereas using gravity does not create fatigue. For this reason, it makes sense that we should take advantage of gravity whenever and as much as we can. The problem is that gravity only works in one direction—downward. So we must be above the client to employ our body weight. This requires the table to be low. The lower it is, the more of our body we can position above the client.

SIMPLY LEAN IN

There is a very simple demonstration that shows the effectiveness of having the table low to utilize gravity. We place a weight scale on a table that is positioned at three different heights. In each instance, we simply lean into the scale without exerting any muscular effort; our force will be measured by the scale. The greatest force is created when the table is lowest (Figure 1).

RELATIONSHIP BETWEEN CONTACTS AND TABLE HEIGHT

Of course, taking advantage of gravity is only effective if we are working on the surface of the client's body that is oriented upward, for example on the paraspinal musculature of the client's back when the client is in a prone position. The ideal height of the table varies depending on the size of the client; whether the client is prone, supine or side-lying; and which contact we are using. Ideally, we want to be able to have the joints of our upper extremities stacked (in extension), allow our shoulder girdles to be relaxed downward, and have a stable stance with our feet on the floor. Using finger pads, thumb pads, knuckles or palms requires the lowest table height. Elbow and forearm contacts allow for the table to be relatively higher. A general guideline when using thumb/fingers/palm is to have the top of the table at or just below the level of our knee (Figure 1B). For elbow/forearm contacts, it can be mid-thigh (Figure 1C).

THE NEED FOR A LOW TABLE

The problem is that many tables do not go low enough. Their design has not advanced from the era of massage being only a gentle, soothing modality that required only light pressure. But with the increasing popularity and recognized effectiveness of deep tissue/deep pressure work, therapists who choose to do clinical orthopedic work on higher tables often end up overexerting by “muscling” the massage, and consequently become injured. The obvious solution is to buy a table that can be adjusted to be low (preferably an electric-lift table; see later section: *Electric lift tables*).



FIGURE 1. A weight scale placed on a table at differing heights shows the force created at each height when the therapist simply leans on the scale. A, Just below therapist's knee. B, Just above therapist's knee. C, Height at therapist's mid-thigh.

Before practicing any new modality or technique, check with your state's or province's massage therapy regulatory authority to ensure that it is within the defined scope of practice for massage therapy.

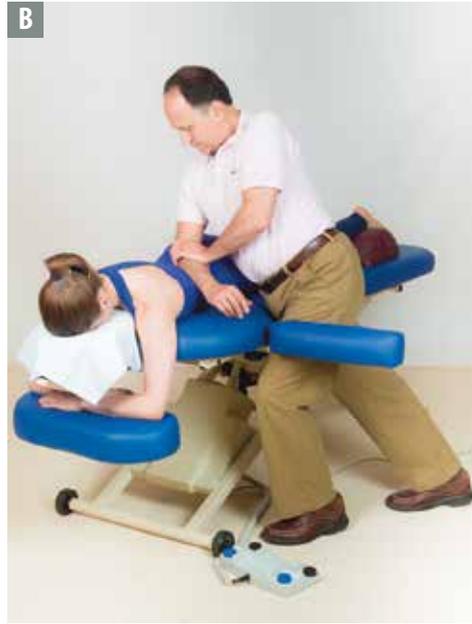


FIGURE 2. A, Table height needs to be lowest when using finger pads, thumb pads, knuckles or palms. B, The table can be higher when using elbow or forearm contacts.



FIGURE 3. Possible mechanical compensations are available when having to work on a table whose height cannot be sufficiently lowered. These include: A, Using a platform. B, Removing entirely the “extension” legs (note: pads placed under the main legs to offer grip and prevent the table from sliding).

COMPENSATING FOR A HIGH TABLE

Unfortunately, there are times when a therapist does not have access to a low table. When, for whatever reason, this is the case, there are a few ways to adjust the mechanics to compensate and protect the health of the therapist’s body. Following are three compensations. As always, follow common-sense safety precautions.

PLATFORM A platform can be bought and kept under the table. When more height is needed, it can be taken out to stand on. It is important that this platform is wide enough and long enough to allow for a comfortable and stable stance. A step aerobic platform usually works very well (Figure 3A). It can be found at most

sporting goods stores or online. And depending on the additional height needed, multiple platforms can usually be stacked.

REMOVE THE EXTENSION LEGS Another mechanical compensation that might help is to entirely remove the “extension legs” of the table.* Often, the extension legs, even when placed at the lowest possible setting, cause the table to be higher than if they were simply removed. For these tables, removing the extension legs can drop the table by an inch or two, or more. The problem is that the legs that remain usually do not have any sort of grip on the bottom, so if the table is being used on a wood or tile floor, it may slide when working on the client. One

* If the extension legs are removed from the table, it is possible that this might weaken the structural stability of the table. To be sure that this is safe, contact the manufacturer before removing the extension legs.

solution is to place small pieces of material that offer grip under the legs to prevent sliding (Figure 3B). If the extension legs are removed, it is also a good idea to cover the screws that jut out by replacing the knobs. Another possible idea is to drill new holes in the extension legs (if they are wooden legs) that allow them to be on the table without raising its height.

USE ELBOW AND FOREARM CONTACTS If neither of these two ideas work, then the last alternative is to work primarily with elbow and forearm contacts.

WHEN THE TABLE SHOULD BE HIGH

As important as it is to have a table that can adjust to be low, it is not always advantageous to work with the table low. For example, as mentioned, using elbow and forearm contacts is best performed when the table is higher. If these contacts are employed with a lower table, the therapist must bend. Unfortunately, many therapists bend at the spine, creating a stooped and imbalanced posture that is unhealthy for the spinal joints because they are in an unstable open-packed position, and unhealthy for the paraspinal (erector spinae and transversospinalis) extensor musculature because it must contract to prevent the trunk from falling into flexion (Figure 4A). Other therapists bend by anteriorly tilting the pelvis at the hip joints. This is better in that the spine is straight, therefore the spinal facet joints are in a more stable, closed-packed position; but the spine is inclined diagonally forward and still imbalanced, continuing to place stress on the paraspinal musculature (Figure 4B). It is best to bend at the ankle, knee and hip joints so that the spine can be both straight and vertical, with the center of weight of the trunk better balanced over the pelvis (Figure 4C). The downside to bending from the lower extremity joints is that if the therapist's knee joint is unhealthy, this position may be painful.

There are many other instances of massage therapy in which a higher table is desired or necessary. For example, when light work is being done, utilization of body weight is not an important factor. In these cases, a higher table is likely desirable. Working into the myofascial tissue on the side of the client's body is also facilitated by having a higher table. When working into the side of the client, the force production must be horizontal in direction. This necessitates force production not from core body weight, but rather by pushing off from the lower extremities (Figure 5ABC).

Electric lift tables

As discussed, there are times when the optimal table height is low and there are other times when the optimal height is higher. For this reason, it



FIGURE 4. Working on a low table with elbow/forearm contacts requires bending. A, Stooped bend. B, Inclined bend. C, Bending from the lower extremities.



WHEN LIGHT WORK IS BEING DONE, UTILIZATION OF BODY WEIGHT IS NOT AN IMPORTANT FACTOR. IN THESE CASES, A HIGHER TABLE IS LIKELY DESIRABLE.



FIGURE 5. Working on a higher table is often advantageous or necessary. A, Horizontal work into the side of the client's body with the table low. B, Horizontal work with the table higher. C, Working down on one knee, which can allow for horizontal work on a lower table.

is imperative that the table height be adjustable. Nowadays, it's rare to find a table that is not adjustable; most tables allow for the height to be changed. However, as advantageous as this seems, many therapists never utilize this feature. They simply decide on a height they believe to be best for them (often too high because it was chosen early on in school when the massage they were practicing involved only light pressure) and leave it there. The reason is that changing table height on most tables is a somewhat onerous procedure of adjusting the height of each of the four legs, one at a time (there are a few table models that do allow for height adjustment of two legs together at the same time at each end of the table, but these tables are relatively rare). Even though changing the height of the legs does not seem to be the most time-consuming or difficult of chores, it is sufficiently annoying to discourage most therapists from bothering, especially if the client is already on the table! As a result, the therapist keeps the same table height whether the client is big or small; whether the client's position is prone, supine or side-lying; whether the area being worked is the neck, low back or an extremity; or whether they are massaging or stretching. Most of the time, the table is too high and the therapist loses the assistance of body weight. Instead, the therapist must rely primarily or solely on muscular effort,

AN ELECTRIC LIFT TABLE IS NOT A LUXURY; IT IS AN INVESTMENT IN THE QUALITY AND SUCCESS OF THE THERAPIST'S PRACTICE.



FIGURE 6. Electric lift tables. A and B, Electric lift tables that optimize most parameters that a massage/manual therapy table should have. C, An electric lift base, as a short-term solution that allows a portable table to be placed on top of it.

often concluding that they are not strong enough to do deep pressure, and often injuring themselves. The problem is not strength; it is compromised body mechanics caused by an excessively high table.

INVESTMENT IN QUALITY

There is only one solution to this problem, and it is one that unfortunately most therapists do not even consider. That is to buy and use an electric lift table. An electric lift table is not a luxury; it is an investment in the quality and success of the therapist's practice. An electric lift table's mechanics will not only improve the therapist's body mechanics, increasing the likelihood of a long and injury-free practice, it will also increase the efficacy and success of the therapist's work. And this increase in the success of the practice will more than compensate for the cost of the table.

When one considers the finances of becoming a massage therapist (or any type of manual therapist for that matter), there are really only two major financial investments: the cost of the initial education and the cost of the table (a third possible cost would be the lease and furnishings if the therapist chooses to work for himself/herself). These are both upfront costs that in the short run seem challenging, but in the medium and long run are the smart decisions. Your education will last your entire career. And a quality electric lift table will last for decades, if not for the length of your career. If you have your own practice and are in control of the table you use, an electric lift table is essential. If you work for an employer or rent or share space with another therapist, then it is helpful to convince your employer or colleague that an electric lift table is essential.

AN ELECTRIC LIFT TABLE'S MECHANICS WILL NOT ONLY IMPROVE THE THERAPIST'S BODY MECHANICS, INCREASING THE LIKELIHOOD OF A LONG AND INJURY-FREE PRACTICE, IT WILL ALSO INCREASE THE EFFICACY AND SUCCESS OF THE THERAPIST'S WORK.

THERE ARE TIMES WHEN THE OPTIMAL TABLE HEIGHT IS LOW AND THERE ARE OTHER TIMES WHEN THE OPTIMAL HEIGHT IS HIGHER. FOR THIS REASON, IT IS IMPERATIVE THAT THE TABLE HEIGHT BE ADJUSTABLE.

ELECTRIC LIFT TABLE OR ELECTRIC LIFT BASE?

Once the decision has been made to invest in an electric lift table, there are a few choices to make. Its height range should be sufficiently large so that it can go low enough and high enough. It should also fit the rest of the parameters discussed in this article (width, shape, length, etc.). Although it is best to entirely replace your present portable table and choose the optimal electric lift table that considers each and every variable, a compromise can be made. It is possible to buy an electric lift base that allows a portable table to be placed on top of it (Figure 6C). Electric lift bases usually cost far less than a full electric lift table. But you will be constrained by all the rest of the parameters of your present portable table. If this decision is made, I recommend it be made as a short-term solution. In the long run, the lasting choice for your practice is to buy the optimal electric lift table.

Table width

After table height, table width is the most important criterion. The problem is that most massage tables are too wide. Understandably, they are designed this way for client comfort, especially the comfort of larger, wider clients. The problem is that just like a table that is too high, a table that is too wide makes it difficult for the therapist to position their body over the client to take advantage of gravity/body weight.

When considering table width, following are a few of the choices that must be made. The simplest solution would seem to be to have a table that is narrower. Table widths range from approximately 24–36 inches, with 28–32 inches being the widths bought most often. From the point of view of mechanics, the narrower the table, the better. The downside is that client comfort might be compromised, especially for larger clients. Therefore, a better choice would be to use a table that allows for variable width.

SCOOPS AND ARMS

Some tables have a “cut out” or “scoop” in their table-top design so that the table is wide for the client's shoulders and upper trunk, but narrower by their low back and pelvis. This considers client comfort, but



FIGURE 7. A, Table with a scoop design and arms allows greater access to the client. B, Utilizing the scoop design allows the therapist to stretch the pectoralis musculature with the client in a supine position. C, Table arms can be removed or swung out to decrease the width of the table. D, The arm of the table in a swung-out position can be used to better access the medial surface of the client's upper extremity.



also allows for the therapist to stand closer in toward the client for more effective use of body weight near the low back and pelvis where deeper pressure is often needed (Figure 7A). Another advantage of the scoop design is that when a pectoralis stretch is being done with the client supine, it allows the client to be positioned diagonally on the table so that the arm and scapula can be off the table to allow for excursion of the upper extremity down toward the floor to facilitate the stretch, but the client's head remains supported on the table (Figure 7B).

Instead of a scoop design, some tables have arms that increase the width; but the arms can be removed or swung out of the way when a narrower table is desired (Figure 7C). Another advantage to arms that swing outward is that the client's upper extremity can be supported on the table's arm while held in a position of abduction,

allowing for greater access to the medial surface of the client's upper extremity (Figure 7D). Optimally, a table should have both a scoop design and adjustable arms.

COMPENSATING FOR A WIDE TABLE

If a narrower table is not possible, it is important for the therapist to adjust his or her body position to optimize the mechanics. One way in which this can be done is to orient the placement of the feet so that the therapist's core can be positioned over the table. This can be accomplished in two ways.

OUTSIDE FOOT BEHIND The first way is accomplished by beginning with the feet parallel to the table (Figure 8A), then placing the "outside foot" behind the "inside foot." This will naturally allow the core to be over the table and closer to the client, but

LEAN AGAINST THE TABLE

For some reason, it is often stated that the therapist should not lean against the table. However, unless the therapist were to literally press against the client in a manner that is physically uncomfortable for the client or that breaches the client's modesty, there is no reason that a table cannot be used to assist the therapist's mechanics. Most massage tables are well made and sufficiently strong to allow for the added force of the therapist to lean into them. Leaning into the table aids the therapist in creating a stable base from which to work, as seen here with pressure being delivered into the client's low back (see Figure 8).

it will also orient the core somewhat diagonally and away from the client (Figure 8B). To compensate for this, it is necessary to rotate the body in the transverse plane; it is important to not rotate the spine, but rather to rotate the pelvis at the hip joints (Figure 8C). The therapist is now in position to employ a stroke up the client's back with the core behind the stroke so that body weight can be used. A stroke from inferior to superior along the paraspinal musculature of the client's back is seen in Figure 8D. One precaution with these body mechanics is that a valgus force might be placed on the therapist's forward knee (as seen in Figures 8D and E). If this is the case, the lower extremity can be adjusted to straighten and protect the knee joint (Figure 8F).

OUTSIDE FOOT IN FRONT The second way to orient the position of



FIGURE 8. One method of orienting the feet to optimize placement of the therapist's core over the client. A, The therapist begins with the feet parallel. B, The "outside foot" is placed in back. C, The pelvis is rotated at the hip joints. D, A stroke is performed up the client's back. If the therapist's forward knee has a genu valgus force placed on it as seen in D and E, the therapist should reposition the lower extremity as seen in F.

the feet is to, again, start with the feet parallel to the table (Figure 9A), but then place the “outside foot” in front of the “inside foot” (Figure 9B). The thigh of the (“inside”) foot in back should now be adducted and rested against the table. This naturally brings the core over the table and closer to the client (Figure 9C). However, as in the other method, the core is oriented diagonally, so it must be reoriented to be in line with the stroke. As before, the spine should not be rotated; instead, the pelvis should be rotated at the hip joints (Figure 9D). A stroke can now be performed from inferior to superior along the paraspinal musculature of the client’s back with the core in line with the force of the stroke (Figure 9E). One precaution is to make sure there are no metal or hard plastic protrusions on the side of the table where the adducted thigh is contacting it. Also, if the table does not have much padding on the side, it might also be uncomfortable. In either case, placing a small cushion between the thigh and side of the table can increase therapist comfort (Figure 9F). It is also important to avoid placing too much weight on the foot in back, especially if it is inverted (as seen in 9E). The majority of the therapist’s weight should be placed through the thigh against the table as well as on the forward foot; and the therapist should avoid inverting the foot in back (Figure 9G).

Hopefully one of these positions of the feet (if not both) will be comfortable for the therapist. The objective in each case is to orient the trunk/pelvis of the therapist’s body to be over the client and in line with the stroke so that the force of the stroke can emanate from the core.

USE THE CORNER OF THE TABLE

Another compensation for working with a wider table is to use the corner of the table. When looking to perform longitudinal strokes along the client’s paraspinal musculature, because a wide table makes working from



FIGURE 9. Another method of orienting the feet to optimize placement of the therapist’s core over the client. A, The therapist begins with the feet parallel. B, The “outside foot” is placed in front. C, The thigh in back is adducted. D, The pelvis is rotated at the hip joints. E, A stroke is performed up the client’s back. F, A cushion can be used for comfort. G, The foot/ankle region in back should stay straight (not inverted).

THE OBJECTIVE IN EACH CASE IS TO ORIENT THE TRUNK/PELVIS OF THE THERAPIST'S BODY TO BE OVER THE CLIENT AND IN LINE WITH THE STROKE SO THAT THE FORCE OF THE STROKE CAN EMANATE FROM THE CORE.



FIGURE 10. Working from the head-end of the table. A and B, Standing centered at the head of the table. A, Working the upper back. B, Working the lower back. C, D and E, Working from the corner of the table. D, Working the upper back. E, Working the lower back.



inferior to superior a challenge, the therapist can choose to work instead from superior to inferior. However, when doing this, an error in body mechanics is often made. If the therapist stands centered at the head of the table, the ability to transfer his or her body weight into the client while maintaining a healthy spinal posture might be possible when pressure is applied to the client's upper thoracic region (Figure 10A). However, if the stroke is continued down the back, by the time the therapist reaches the lumbar region, the therapist's body mechanics are usually severely compromised (Figure 10B). An alternative is to instead stand at the corner of the table, between the face cradle and the client's shoulder (Figure 10C). If the table is low enough, the therapist can position his or her core directly over the client's upper thoracic region (Figure 10D). This allows for an efficient vertical transfer of body weight over much of the client's thoracic, and perhaps even lumbar, region (Figure 10E).

Table length

Table length is less often an important criterion of table mechanics and therefore body mechanics, but it does occasionally matter. The length of a table needs to be long enough to allow the feet of a tall client to be supported. However, that same table with a shorter client requires the therapist to bend over the table when working on the client's lower extremities from the center of the foot-end of the table (Figure 11A). One solution is to instead work from the side of the foot-end of the table (Figure 11B). This will work in most scenarios but will not always allow the application of force in the desired direction. If it is important to apply the force from distal to proximal—in other words, directly from the center of the foot-end of the table—then a table that allows for the length to be adjusted should be used. Some tables have an extension piece at the foot end that can be added or removed to

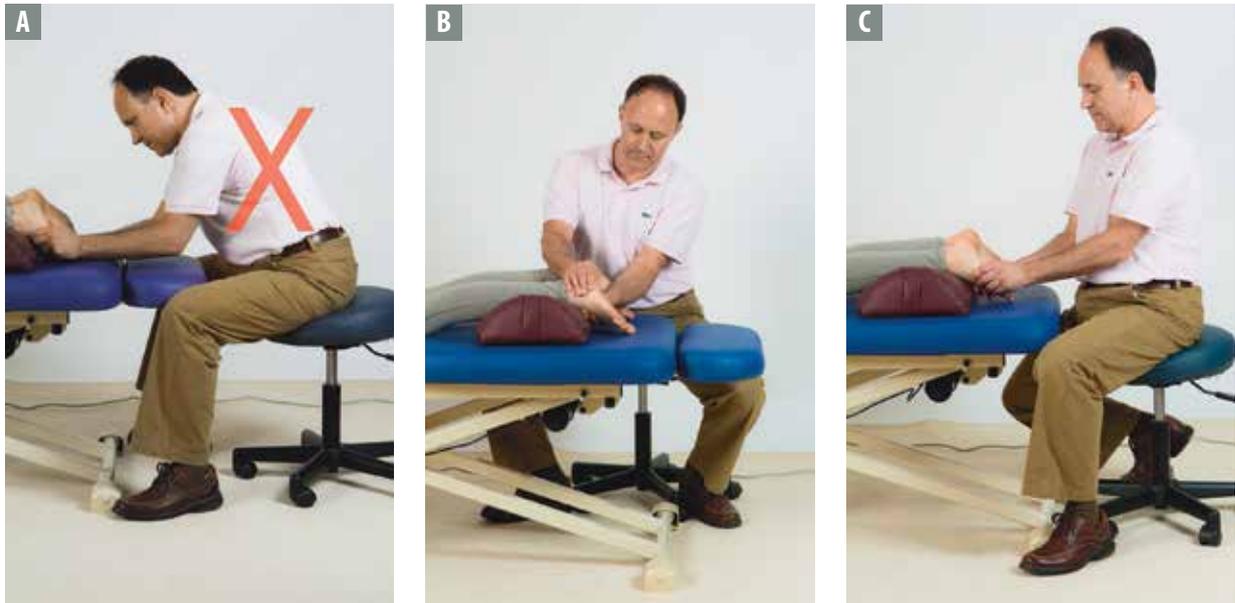


FIGURE 11. Working the client's feet from the foot-end of the table. A, Seated at the center of the foot-end and leaning over to reach the client. B, Working from the side of the foot-end of the table. C, Working from the center of the foot-end with the table's extension piece removed.

adjust its length. Figure 11C shows the same table seen in Figures 11A and 11B, but without the extension piece. A table with this feature allows for support of the taller client as well as optimal mechanics when working on the shorter client from the center of the foot-end of the table.

Table cushioning

The cushioning of a massage table is not often thought of as an important feature, but it can be critically important, especially when employing deep-pressure techniques. Thick, soft cushioning is usually desirable because it adds to client comfort, especially when lying down for long periods of time. However, thick, soft cushioning can detract from deeper orthopedic work because it absorbs the force that the therapist places into the client's body. Instead of the force of the stroke working into the client's tissues, the cushion deflects and absorbs it. This requires the therapist to work harder to create the desired pressure. If deeper pressure is often employed, it is important to select a table with cushioning that is soft enough to be comfortable for the

client, but firm enough to facilitate the therapist's work. If the therapist must work with a softer table and wants to work with deeper pressure, it is possible to place a padded board under the client in the region being worked. These boards, often referred to as *SOT boards* in the world of chiropractic care, are fairly inexpensive and easy to use.

Conclusion

Optimal body mechanics are crucially important to both the quality of the work of a massage therapist as well as a long and injury-free career. There are many guidelines to learn and follow for optimal body mechanics, but even the best body mechanics can be compromised if the table mechanics are poor. This is especially true if the therapist employs deeper pressure techniques for clinical orthopedic work. When all things are considered, a quality table that allows for optimal clinical orthopedic massage therapy is not a luxury. It is a wise investment in the quality and success of the therapist's practice. ■



Joseph E. Muscolino, DC, is a chiropractor in private practice in Stamford, Connecticut, who employs extensive soft-tissue manipulation in his practice. He has been a massage educator for more than 25 years and currently teaches anatomy and physiology at Purchase College, SUNY. He is the author of multiple textbooks including The Muscle and Bone Palpation Manual, The Muscular System Manual, and Kinesiology (Elsevier) and Advanced Treatment Techniques for the Manual Therapist: Neck and Manual Therapy for the Low Back and Pelvis—A Clinical Orthopedic Approach (LWW), and the author of multiple DVDs on Manual Therapy. Joseph teaches Continuing Education Clinical Orthopedic Manual Therapy (COMT) Certification workshops around the country and overseas. Visit Joseph's website at www.learnmuscles.com or his professional facebook page: The Art and Science of Kinesiology.