WORK SMARTER, NOT HARDER

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body mechanics for massage therapists

COURSE DESCRIPTION:

The efficiency with which massage therapists use body mechanics in the delivery of massage therapy is crucial both to the quality of the therapeutic care and the longevity of our massage therapy careers. Unfortunately, the study of body mechanics is often given insufficient attention and therapists work harder rather than smarter, sometimes resulting in career-ending injuries.

This course offers a set of 10 guidelines designed to create healthy body mechanics when delivering massage and bodywork. These guidelines show how to maximize the efficiency with which we work by showing how to harness the laws of physics, rather than working against them.

COURSE OBJECTIVE:

This course is divided into three categories and offers 10 guidelines on how to use equipment and supplies, how to position your body and how to perform massage therapy strokes in a manner that maximizes efficient delivery and minimizes stress on your body. While useful for all massage therapists, these techniques are essential when performing deep tissue work. When you finish this course you will be able to:

- Define the role of body mechanics in massage therapy.
- Describe how the delivery of force in massage therapy is affected by gravity, table height and lubricant.
- Compare the advantages and disadvantages of the stoop bend and the squat bend in massage therapy.
- Describe how foot positions and trunk orientation of the massage therapist affect the strength of delivery in massage therapy.
- Describe how delivery in massage therapy is affected by both head-and-neck and upper extremity joint alignment.
- Describe how the therapist's use of larger muscles and a larger contact area improves the delivery of massage therapy.

CONTACT HOURS: 2.0

NOTE: Massage therapists are advised to practice these techniques prior to utilizing them in a clinical setting.

7.8

THE AVERAGE NUMBER OF YEARS MASSAGE THERAPISTS STAY IN THE PROFESSION.[1]

bodywork, body mechanics & physics

BODY MECHANICS AND PHYSICS

Regardless of the technique employed, the essence of all forms of physical bodywork is the delivery of pressure—in other words force—into the tissues of our clients. The efficiency with which we achieve this is crucial, not only to the quality of therapeutic care that we give our clients, but also to our own health and longevity in the field. To examine the efficiency with which our body works, we must study the mechanics of our body; therefore this field is called *body mechanics*.

Understanding and applying the fundamentals of good body mechanics is simple. We need to apply the laws of physics to our body. The same laws of physics that rule all physical matter including the moon and stars governs the forces that our body generates and to which our body is subjected. If we work with these laws of physics, we can generate greater forces with less fatigue, effortlessly working on our clients, and have our body subjected to less force. But if we work against them, it will be more fatiguing to generate the power necessary to do our work and our body will be subjected to greater forces that may injure us.

WHEN WORKING HARD = INJURIES

Unfortunately, the study of body mechanics is often given insufficient attention in the world of massage and bodywork. As a result, many new graduates and established therapists alike are often ill-equipped to do deep tissue work without *muscling* the massage via excessive effort. Instead of working smarter, they work harder, resulting in a high number of injuries. Many of these injuries force otherwise able and successful therapists to prematurely leave the field.

On average, a massage therapist stays in the field for only 7.8 years.[1] While not all individuals leave as a result of injury, certainly a good number of them leave because of injury, or due to the burnout that occurs from the physicality of doing massage. Giving massage and engaging tissue can be hard work, especially when done with poor technique!

GUIDELINES TO HARNESSING PHYSICS AND BODY MECHANICS

The goal of this course is to offer a set of 10 guidelines designed to create healthy body mechanics when delivering massage and bodywork. These guidelines do not constitute a new technique or method; rather they simply show how to maximize the efficiency with which we work by showing how to have the laws of physics work with us instead of against us.

These guidelines are divided into three categories:

Equipment and supplies—the massage table and lubricants;

Positioning of our bodies—how we bend, the alignment of our trunk, head, feet and joints;

Performing the massage stroke—

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the origin of our strength, the direction in which we apply the stroke, and how we support our contact with the client.

Using good body mechanics is important all the time; however, it is crucial when performing deep tissue work, which requires a greater production and delivery of pressure. For this reason, these guidelines are especially recommended to bodyworkers who do deep tissue work on a regular basis. While this course is not meant to be comprehensive of all aspects and facets of body mechanics for bodyworkers, it does provide a number of essential basics.

As much as following rules and guidelines is important, it should be kept in mind that bodywork is not only a science, it is also an art. Therefore, the following guidelines need to be incorporated into your own unique style.[2]

equipment & body mechanics

GUIDELINE NO. 1: TABLE HEIGHT

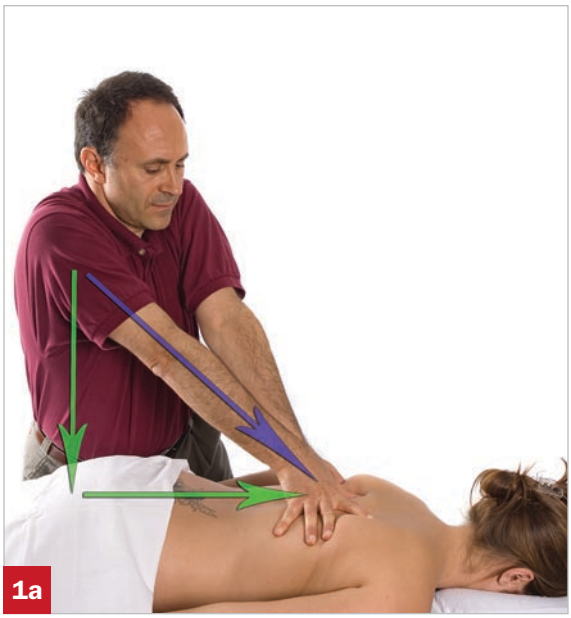
Table height is probably the number one factor determining the efficiency of the therapist's force delivery. The exact proper height of the table is determined by a combination of a number of factors, including:

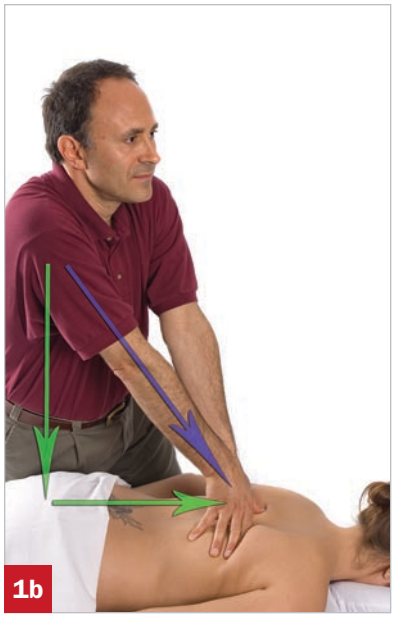
- Height of the therapist;
- Size of the client;
- Positioning of the client on the table (supine, prone, or side lying);
- Technique being employed.

When it comes to the production and delivery of force with less effort, the table needs to be low.[3]

BODY WEIGHT AND GRAVITY

Setting the table low allows the therapist to take advantage of body weight to create force.[2] Weight is





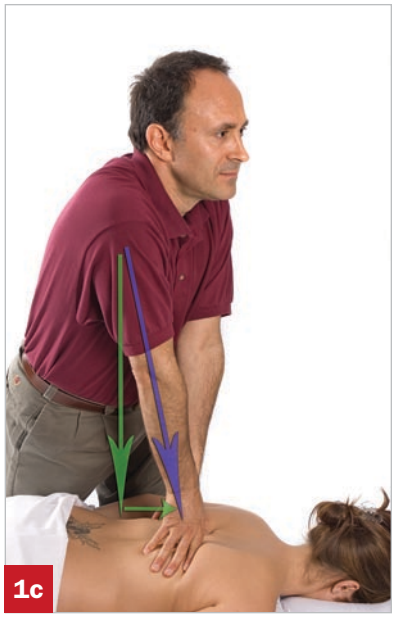


Figure 1 illustrates a therapist working on a client with the table set at three different heights. In each photo, the blue arrow represents the force through the therapist's upper extremity into the client, and the green vertical arrow represents the component of force that is due to gravity. Note that the vertical component vector is least when the table is set high (1a), and is greatest when the table is set low (1c). Ideally, if the line of force of the therapist is almost purely vertical as in 1c, nearly all the force can be delivered via gravity and little effort needs to be expended by the musculature of the therapist. A good guideline to determine proper table height for deep tissue work is to have the top of your table be no higher than the top of the patella (knee joint).

Figure 2 demonstrates an easy method using an ordinary bathroom weight scale to determine how much effort is necessary at different heights to generate force into a client's body. By placing the scale lower and simply leaning into it, the greatest pressure with least effort is obtained.

merely a measure of the force that gravity exerts upon mass;[4] and because gravity is an external force that never tires, why not take advantage of it?

When a therapist generates force to work on a client, that force can be created in two ways—internally within the body by muscles, or externally from gravity. The internal creation of force by musculature requires effort on our part, and can be fatiguing. However, the creation of force by gravity requires no effort. If the goal is to create force with the minimum effort possible, it is desirable to utilize gravity as much as possible.[2]

However, gravity does not work horizontally or diagonally; it only works vertically downward. Therefore, it only works if the therapist's body weight is literally above the client. This requires the client to be placed below the therapist; hence the necessity of low table height.[5]

With the client located below the therapist, the therapist does not need to expend much effort; rather it is only necessary to *lean into* the client letting the therapist's body weight generate forceful deep pressure (Figure 1).[2,6] Given that the greatest weight of the body is located in the core (i.e., the trunk) of the body, it is the trunk that must be positioned above the client when the therapist leans in.

PROVE IT TO YOURSELF

To test the principle of table height at home, place a bathroom weight scale on a chair or massage table at various heights. At each height, simply lean into the scale and read the force that you are generating on the scale (Figure 2). If the scale is low enough so that you are directly above it, note how much pressure you can effortlessly generate by passively leaning into the scale. Try to create the same reading on the scale through muscular effort when the scale is located on a higher surface. The difference in effort required is the difference in work that the therapist must do. Multiply this by how many minutes or hours the therapist works per week/month/year, and the cumulative effect of a table set too high can be appreciated.

THE IMPORTANCE OF SELF-SUPPORT

When generating deep pressure by leaning into the client, it is important for the therapist to maintain a position of self-support; otherwise the therapist's control and balance might be lost, decreasing the effectiveness of the session as well as the client's comfort.[2,7] This self-support can be maintained via a strong and stable stance of the lower extremities (this will be discussed more fully in Guideline No. 5).

TABLE WIDTH

It addition to the height of the table, the table width must also be considered. The wider the table, the more difficult it is for you to position your body weight over the client; if the client is located at the center of the table, the client is farther away from you. For this reason, a narrow table is more desirable when it comes to utilizing your body weight.[7]

ELECTRIC LIFT TABLE

When working with a table set lower, there is another factor to consider. A low table height is ideal when deep pressure is desired; however, a higher table height is actually easier to work with when light pressure is being applied. It requires less effort for lighter pressure if you stand straighter and apply pressure to the

client with strokes that are more horizontally oriented. If the table is set low in this scenario, you either must bend to reach lower, or must widen the stance of the lower extremities to bring the upper body down to the height of the client.[8]

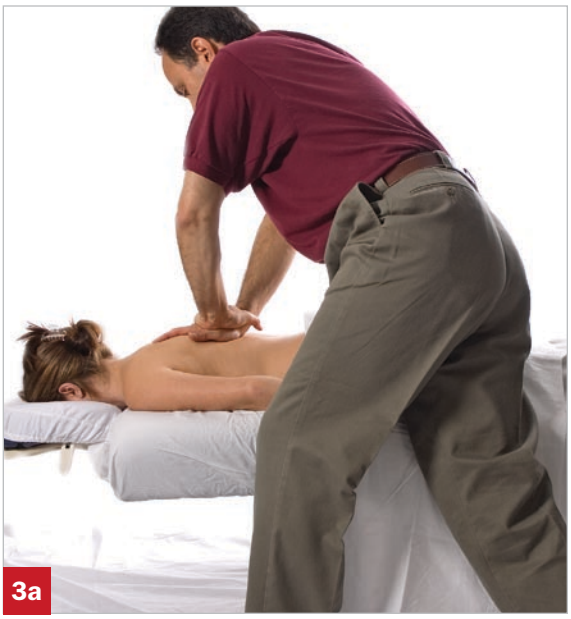
Between these two choices, widening the stance is preferable; however, it requires greater effort than simply standing upright. For this reason, ideal table height will vary during a treatment session based upon the work that is being done.

The solution to this dilemma for anyone who combines deep tissue work and lighter work on a regular basis is to use an electric lift table.[2,7] While electric lift tables are viewed as extravagant by many in the bodywork profession, in my opinion, they are an absolute necessity.

Being able to change the height of the table during a session by merely pressing on a foot pedal enables deeper pressure to be delivered with less effort on a low table, and allows you to stand straighter when doing lighter work with the table set higher. This allows for better sessions therapeutically for the client as well as healthier and less fatiguing sessions for the therapist. In the long run, the benefits of an electric lift table far outweigh the increased cost of the initial purchase.

GUIDELINE NO. 2: LESS LUBRICANT

For beginning bodyworkers, the amount of lubricant used is often part of the problem. The point of using a lubricant is to allow the therapist to glide along the client's skin without excessive friction. However, the more lubricant that is used, the more the therapist's pressure translates into slipping and sliding along the client's skin instead of delivering pressure into the client's tissues.



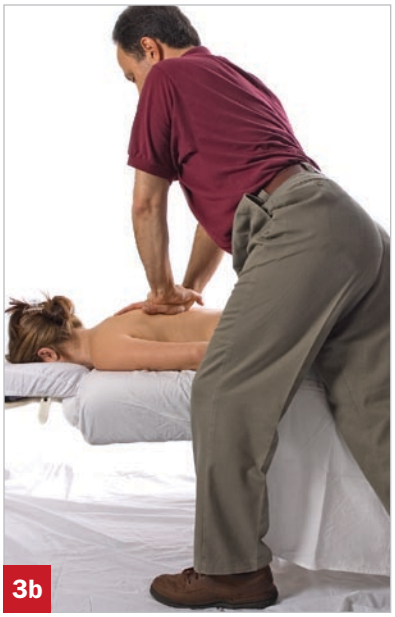


Figure 3a shows the stoop bend, in which the therapist bends by flexing the spinal joints of the trunk. Of the three methods of bending, the stoop bend is least healthy for the therapist. **3b** shows the squat bend with the trunk inclined forward. **3c** shows the squat bend with the trunk vertical. This bending method is biomechanically the least stressful on the therapist's body and should generally be strived for whenever bending over a client is necessary.

The general guideline for lubricant is to use the least amount necessary for the client's comfort. Any amount greater than this decreases the efficiency with which pressure is delivered to the client.

Besides the amount of lubricant, the type of lubricant can also make a difference. Generally, oil-based lubricants tend to create more slide and are not as efficient for deep tissue work as water-based lubricants.

bending & massage delivery

GUIDELINE NO. 3: BENDING

While the ideal body posture for delivering deep pressure with maximal efficiency is for you to be positioned directly above the client and delivering the force directly downward, this body posture is not usually possible to attain without some bending on the part of the therapist. The manner in which the therapist bends is extremely important because bending tends to create postural imbalances that require effort to maintain and places stress upon the therapist's body. Bending postures can be divided into two general categories: the stoop bend and the squat bend.

STOOP BEND

The stoop bend, which involves flexing the trunk at the spinal joints in an effort to bring the body over the client, is less healthy for the therapist. This is because it unbalances the therapist's body by moving the center of weight of the trunk from being balanced directly over the pelvis to being unsupported (Figure 3a). In this position, the only reason that the therapist's trunk does not fall into full flexion is that the spinal extensor musculature must contract isometrically to maintain the partially flexed and imbalanced trunk posture.[9]

Further, a stooped posture of spinal flexion places the spinal joints in their open-packed position. The open-packed position of a joint is its least stable position; therefore muscles must contract to play a greater role in joint stability. The result is greater effort on the part of the spinal extensor musculature to maintain the stooped posture.

SQUAT BEND

A better alternative is the squat bend, which is achieved by flexing the hip and knee joints instead of the spinal joints. In a squat bend, the spine stays erect in its closed-packed stable position, which is healthier for the spine and requires less stabilization contraction effort by the spinal extensor musculature.

There are two squat bend methods:

Squat bend with the trunk inclined forward;

Squat bend with the trunk maintaining its vertical posture.

Between these two, maintaining a vertically positioned trunk is preferable, as a squat bend with the trunk inclined forward still places the trunk in an imbalanced posture in which its center of weight is unsupported (Figure 3b). This requires spinal extensor musculature contraction to prevent the trunk from falling into flexion, as well as hip joint extensor musculature contraction to maintain the "flexed" anterior tilt posture of the pelvis at the hip joints.

The squat bend with the trunk vertically positioned maintains the trunk in a balanced posture, such that its center of weight is perfectly aligned and supported over the pelvis (Figure 3c). This eliminates the

tip:

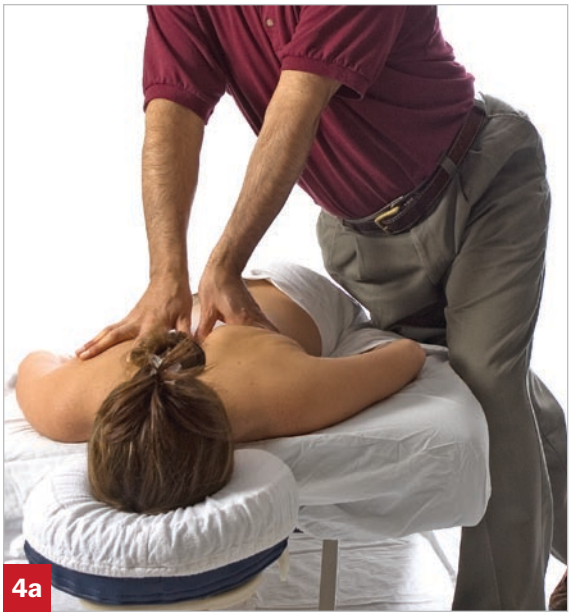
A GOOD GUIDELINE FOR TABLE HEIGHT IS THAT THE TOP OF IT SHOULD BE NO HIGHER THAN THE TOP OF THE KNEE JOINT.

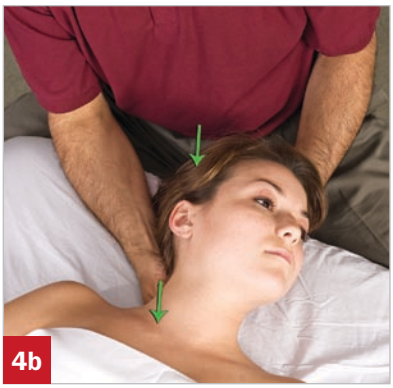
need for spinal extensor musculature contraction to keep the trunk from falling into flexion and hip joint extensor musculature to maintain pelvic posture.[10]

The key to creating a vertical squat bend instead of an inclined squat bend is the degree to which the knee joints are flexed. As the hip joints are flexed to achieve the squat bend position, the pelvis anteriorly tilts, inclining the trunk forward. However, the more the knee joints are flexed as the hip joints are flexed, the easier it is to keep the trunk vertical. This is "bending with the knees" as we often hear.

Hence, a squat bend with the trunk vertically aligned maintains the spine in its most stable closed-packed posture, as well as maintaining the trunk in a balanced and supported posture over the lower body. This translates to the ability of the therapist to work and deliver pressure efficiently while maintaining a healthy spine.

It is interesting that even though most everyone knows that it is healthier for our back if we bend with our knees, so many people do not follow this advice and instead fall into a stoop bend. There must be a reason for this. As it turns out, while the squat bend is healthier for the back, it actually requires more energy expenditure than the stoop bend.[10] Further, even though the squat bend is healthier for the back, it does place a greater stress on the knee joints. All things being equal, it is usually more important to protect the spinal joints. However, when applying these bending guidelines to each particular therapist's needs, the stress upon the knee joints must be factored in. If a therapist has unhealthy knee joints, a stoop bend may be the lesser of two evils.





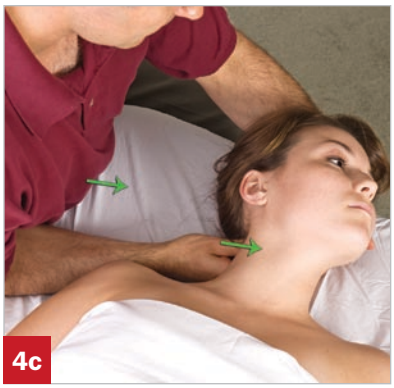


Figure 4 demonstrates the importance of the orientation and alignment of the therapist's trunk. **4a** illustrates a long massage stroke that is being done along the spine on the paraspinal musculature. For the body weight of the trunk to be behind the stroke, the alignment of the trunk must be identical to the line of force of the stroke. **4b** and **4c** illustrate trunk alignment during application of force to a client's neck with the therapist working from a seated position. In **4b** the therapist is working the client's lower neck; in **4c** the therapist is working the client's upper neck. Note the change in orientation and alignment of the therapist's trunk to match the direction in which the force is being delivered.

tip:
USE THE LEAST AMOUNT OF LUBRICANT NECESSARY FOR THE CLIENT'S COMFORT. THIS WILL INCREASE THE EFFICIENCY

Figure 5 shows two positions of the feet when doing bodywork. **5a** is the transverse stance and is optimal when delivering force transversely across the client. **5b** is the longitudinal stance and is optimal when delivering pressure longitudinally up or down the client's body. The importance of the orientation of the feet is that the trunk and, therefore, core body weight is usually oriented in the direction that the feet are pointed.

body alignment & force delivery

GUIDELINE NO. 4: TRUNK ALIGNMENT

It has been stated that the key to delivering a strong force is for the therapist to use the body weight of the trunk as much as possible. The importance of positioning of the trunk was discussed in guideline one. However, the orientation and alignment of the trunk—not just the position—are also critically important when looking to efficiently deliver pressure.

As a rule, for body weight to be behind the pressure that is being delivered to the client, your trunk must face the same direction as that of the pressure being applied. An easy way to determine the direction your trunk is facing is to look at your navel. Whatever direction your navel is facing, your trunk is facing.

For example, if the force of a soft tissue stroke is being applied across the client's body, then your navel should be facing across the client's body in the identical direction. If, on the other hand, the force of the soft tissue stroke is being applied longitudinally along the length of the client's body, then your navel should be similarly oriented. Figure 4 demonstrates a few examples of proper orientation and alignment of the trunk.

Note: Aligning the trunk along the direction of force is largely a matter of proper positioning of the feet. This is discussed in more detail in Guideline No. 5.

GUIDELINE NO. 5: POSITION OF THE FEET

Thus far, much has been said about the importance of the positioning, orientation and alignment of your trunk. However, there is an old adage in tennis that goes "it's all in the footwork." This is no less true when doing bodywork. Your footwork is crucially important, both for aligning and positioning the trunk, and also for pushing off to generate pressure.[11] To achieve all of these things, let's look at the placement of the feet.

Generally, the direction that the feet are facing is the direction that the trunk is facing. Therefore, if it is desired to change the orientation of the trunk, the easiest way to accomplish this is to change the orientation of the feet. Further, if the feet are not positioned correctly, it is not possible to generate force from a lower extremity by plantarflexing a foot against the ground to push the body weight into the client.[12]

Figure 6. In figures **6b** and **6c**, the feet are staggered in position relative to each other, one in front and one in back. In **6a**, both feet are aligned and parallel to each other. This position is least efficient at generating a forward force into the client. In **6b**, they are both facing approximately forward. in **6c** the rear foot is pointed nearly perpendicular to the front foot. The staggered position of **6b** with both feet facing forward is most efficient at generating a forward force into the client.

TRANSVERSE & LONGITUDINAL STANCES

Positioning of the feet can be divided into two general categories—transverse stance and longitudinal stance. Squaring off the feet perpendicular to the length of the table is called the *transverse stance* and orienting the feet parallel to the length of the table is called the *longitudinal stance*. The transverse stance is effective for delivering pressure transversely across the client's body because it orients your trunk in that direction (Figure 5a); however, it's ineffective when working longitudinally up the client's body because the trunk is not facing that direction.

On the other hand, the longitudinal stance is effective for delivering pressure longitudinally along the client's body because it orients your trunk to face that way (Figure 5b); however, it's ineffective when working transversely across the client's body because the trunk is not facing that direction.

ORIENTATION OF THE THERAPIST'S FEET

Further discussion is warranted regarding the precise orientation of your feet relative to each other. There is a great deal of argument over optimal positioning of the feet.

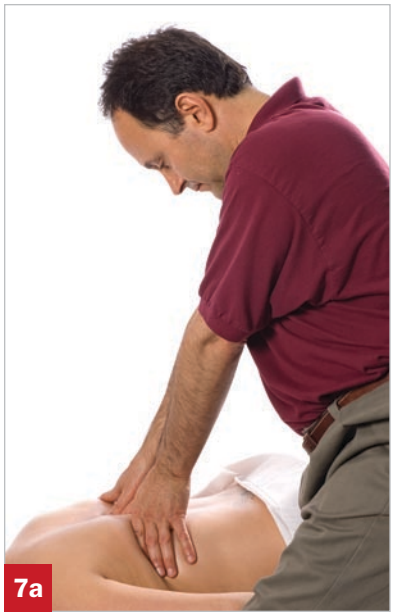
There are three alternate positions of the feet relative to each other:

The feet aligned next to each other and parallel;

The feet staggered in position with both feet facing approximately the same direction (i.e., approximately parallel);

The feet staggered in position with the rear foot oriented ap-

It is a sacred maxim in massage therapy that the therapist's shoulders should never be up. Is this always true? Please go to www.amtaonlinelearning.com for the full online version of this article and read more about this. You can also go to www.



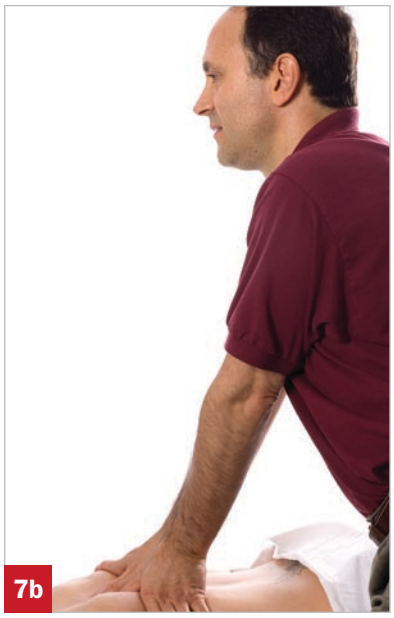


Figure 7 shows two postures of the head during bodywork. In **7a**, the therapist is flexing the neck and head to look at the client. In **7b**, the therapist is holding the head in a more balanced posture over the trunk. This posture is least stressful for the massage therapist's body.

proximately perpendicular to the front foot.

FEET ALIGNED AND PARALLEL

An inherent weakness with the aligned position of the feet (Figure 6a) is that the base of support created by the feet is not very wide in the sagittal plane from anterior to posterior. This makes it difficult to maintain balance of the upper body over the feet with movements of the pelvis and trunk in the sagittal plane as you lean forward into the client.

For example, if you try to lean into the client by bringing the pelvis and trunk forward (bending at the hip joints), your body will be projected anterior to the base of the feet and will not be supported and balanced. If you compensate for the anterior weight shift of the trunk by shifting the weight of the pelvis posteriorly in an effort to counterbalance the body, then your overall body weight shifts posteriorly and is no longer sufficiently anterior to be over the client's body; this results in an inability to effectively use body weight to generate force.

Similarly, the therapist is unbalanced and unsupported in this position if the core of the body is propelled forward by pushing off from the feet. Either staggered position of the feet is superior in this regard because the back foot can be used to push off the ground and project the therapist's body weight forward, while the therapist's body weight will still be balanced and supported over the front foot. Hence, a staggered position of the feet provides a wide sagittally oriented stance allowing for balance of the body between the rear foot and front foot.[3,5]

FEET STAGGERED

Between the two choices of staggered positioning of the feet, having the rear foot facing approximately the same direction as the front foot (Figure 6b) is the superior position because it places the powerful sagittally oriented ankle joint plantarflexors (soleus and gastrocnemius), knee joint extensors (quadriceps femoris), and hip joint extensors (hamstrings and posterior gluteals) in line with the direction of the stroke.[7, 12]

The position in 6c wherein the rear foot is oriented markedly differently than the front foot (and indeed the entire body) loses the orientation of the powerful sagittally oriented musculature just mentioned and also places the two lower extremities at odds with each other when it comes to generating force because they face in different directions.

MOVING THE FEET

One final note regarding placement of the feet: There is no rule that states that the feet must be planted at the beginning of a stroke and stay in that planted position for the entirety of the stroke; the feet can be moved. With a short stroke, there is little or no need to move the feet. However, with a longer stroke, if the feet are not moved, you will have to reach out horizontally farther away from the initial base of support of the feet. This results in not only a loss of support and balance, but also an inability to keep the trunk vertical, thereby losing the ability to use body weight to generate force vertically downward with gravity.

positioning to reduce injury and maintain force

GUIDELINE NO. 6: HEAD POSITION

An often-overlooked aspect of body mechanics is the position of the therapist's neck and head. The position of the neck and head has little

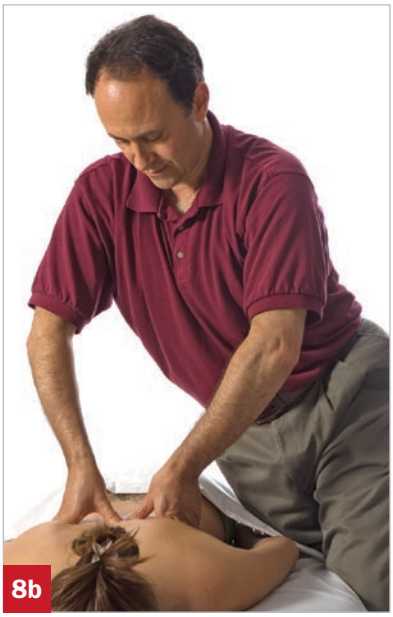
to do with the direct generation and delivery of force while performing a massage. Therefore, it makes sense that the therapist should posturally hold the neck and head in whatever position is least stressful.

The healthiest posture is to hold the head over the trunk so that the center of weight of the head is balanced over the trunk.[7,13] This position requires little or no muscular effort by neck muscles to support it. Unfortunately, many therapists have the habit pattern of flexing the neck and head at the spinal joints to look down at their client. This imbalances the posture of the head and requires isometric contraction of the extensor musculature of the neck to keep the head from falling anteriorly into flexion.[9] Over time, this leads to pain and spasm in the posterior neck.

If it's necessary for you to look at the client as a stroke is being done, then this posture is necessary and correct to assume. However, most of the time, there is little or no need for it; you even can close your eyes and visualize the structure of the client under your hands. So it is a good reminder for you to occasionally focus on the posture of your neck and head to be sure that it is in a posture that is as easy and relaxed as possible (Figure 7).

GUIDELINE NO. 7: STACK JOINTS

Whether the force behind the stroke being delivered to the client is created by muscular effort on your part or is due to using body weight, this force must be transmitted through your upper extremity joints (elbow, wrist, finger, thumb). For this force to travel through the upper extremity joints without loss of strength, it is important that the joints are *stacked*—extended and placed in a



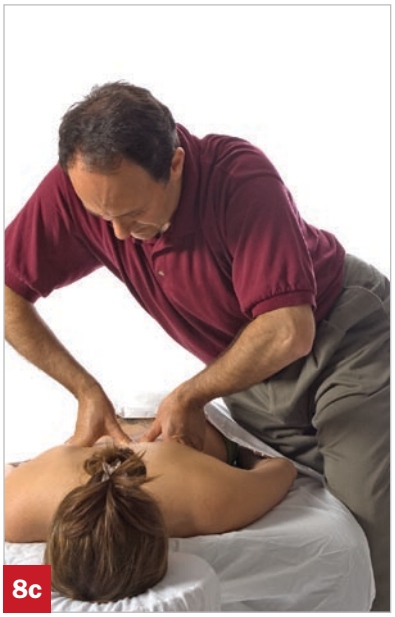


Figure 8 demonstrates force delivery through a therapist's upper extremities that are stacked and not stacked. Figure **8a** shows a therapist who has the elbow, wrist and thumb joints of the upper extremities fully stacked. Figure **8b** shows a therapist with the elbow joints unstacked (i.e., flexed). As the force generated in the therapist's trunk is transmitted through the flexed elbow joints, the upper extremity joints tend to collapse resulting in the therapist's trunk falling toward the client (Figure **8c**).

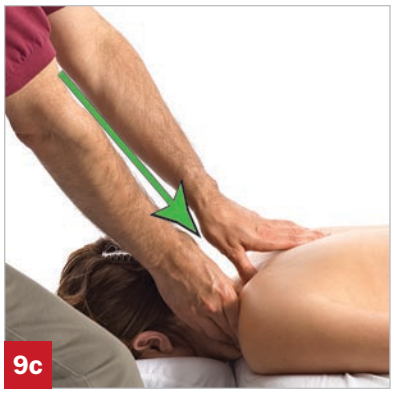


Figure 9 illustrates three applications of force into the back of a client. Note how the direction of the force of the stroke is different in each case so that it is delivered perpendicular to the contour of the body surface that is being worked. Applying pressure perpendicular to the body surface contour is the most efficient delivery of force.

straight line (Figure 8a).[2,3] Then you can deliver pressure for the stroke in a straight line from the trunk of the body through the stacked joints of the upper extremity to the contact with the client.

If you do this as you lean and/or push into the client by pushing off with the back foot, there will be little or no loss of strength, and less muscular effort is necessary. However, when your upper extremity joints are not stacked (i.e., they are flexed), the force generated that must pass through the upper extremities will probably be lost to the client because there will be a tendency for the joints of the upper extremity to collapse. Thus, the force that was supposed to be delivered into the client's tissues is lost in creating movement of the therapist's body at the shoulder, elbow and wrist joints. (Figures 8b and 8c).

It is possible to transmit force through these unstacked, flexed upper extremity joints without loss of strength. However, it requires greater effort because muscles around the unstacked joints must be isometrically contracted to stabilize the joints, preventing them from collapsing. This results in greater effort and is less efficient for the therapist.

Note: Even perfectly stacked joints do not eliminate all effort and stress to the body. While markedly less than with unstacked joints, there will still be some contraction effort on the part of the musculature to stabilize the stacked joints, and stacked joints will be under greater compression forces than when unstacked. However, by keeping the joints straight inline with the line of force being transmitted, all force from your trunk is transmitted without loss of strength to the client.[12]

stroke performance & massage delivery

GUIDELINE NO. 8: PROXIMAL VERSUS DISTAL GENERATION OF FORCE

It has been stated that utilization of body weight via the external force of gravity is recommended whenever possible because it requires little or no effort. However, when it is necessary for you to use internal muscular effort to generate the therapeutic force necessary for the treatment technique, there is a choice of which muscles to use.

When choosing between small and large muscles, it is always advantageous for you to generate the force using larger muscles of the body.[2] A smaller muscle cannot generate the same maximal force that a larger muscle can. Further, to the degree that a smaller muscle does generate the same force as a larger muscle, it requires a much greater effort to achieve this.

Looking at the muscles of the upper extremity from distal to proximal, it is evident that smaller muscles are located more distally and larger muscles are located more proximally. For example, the finger joint muscles located intrinsically within the hand are smaller than the wrist joint muscles located within the forearm, which are smaller than the elbow joint muscles located within the arm, which are smaller than the shoulder joints muscles located in the trunk. For this reason, it is recommended whenever possible to generate force proximally from the trunk.

In addition to the larger proximal core muscles of the trunk, large muscle groups of the lower extremities can also be engaged to create great force with little effort. By placing the feet appropriately, the therapist can push off the ground to generate

strength of force that can be delivered into the client. (See Guideline No. 5 on page 131 for more information about proper positioning of your feet.)

GUIDELINE NO. 9: DIRECTION OF FORCE

When we discussed table height in Guideline No. 1, it was emphasized that the most efficient way to use gravity is for you to direct the force vertically downward. However, the body surface of the client that is being worked is not always horizontally flat. Therefore, while a vertically downward application of force is the most efficient way to utilize gravity, it is not always the most efficient direction to transmit force into the client's body.

For example, when a client is lying prone, the client's back has contours created by the curves of the spinal column. Taking these contours into account, the therapist must change the direction of the line of force so that it is perpendicular to the contour of the location where the client is being contacted. This means that you might be pressing into the client's back at an oblique angle.

There are also times when the therapist is working horizontally into the side of the client's body. For these cases, it is important to realize that the most powerful and efficient delivery of force into the client's body is the force that is applied perpendicular to the body surface that is being worked.[3,11] Any deviation from perpendicular will involve some loss of strength and efficiency because some of the force will be transmitted into sliding along the tissue instead of pressing into the tissue. (Trigonometric formulas for computing the loss of strength are available in Hamill and Knutzen's

30°

IF THE ANGLE OF YOUR FORCE IS 30 DEGREES OFF FROM BEING PERPENDICULAR TO THE CLIENT'S BODY SURFACE, YOU LOSE APPROXIMATELY 15 PERCENT OF YOUR FORCE. IF THE ANGLE OF YOUR FORCE IS 60 DEGREES FROM PERPENDICULAR, YOU LOSE 50 PERCENT OF YOUR FORCE!

Figure 10 shows four examples of a double-supported contact of a therapist's hands upon a client. **10a** is a double-support of the thumb; **10b** is a double-support of the fingers; **10c** is a double-support of the ulnar side of the hand and **10d** is a double-support of the palm of the hand.

tip:
TO PROTECT YOUR HANDS AGAINST INJURY, IT IS ADVISABLE TO USE THE LARGEST CONTACT SURFACE OF THE HAND POSSIBLE.

Biomechanical Basis of Human Movement, page 276.)

To illustrate this idea, Figure 9 shows three different applications of force for a therapist working on the back of a client. Note that in each case, the force is being applied perpendicular to the contour of the region of the back that is being worked. If you try this in your practice, I believe that you will intuitively find it to be the easiest way to generate pressure with the least effort.

A necessary addendum to this concept is that if a long stroke is being done—for example, one that covers the entire length of the spine—the contours encountered during that stroke will vary. For maximal efficiency, it is necessary for the therapist to adjust to these contours by changing the direction of the application of pressure; this necessitates changing the orientation of the trunk, and likely also necessitates changing the position of the feet.

contact area

GUIDELINE NO. 10: CHOOSE A LARGER CONTACT AREA

When deep pressure is being delivered, that pressure must be transmitted into the client through whatever body part the therapist uses to contact the client. Apart from the occasional use of elbow, forearms, and feet, bodyworkers usually contact the client with their hands. The danger is that over time, continually transmitting deep pressure through the hands will cause damage to their relatively small joints.

To protect the therapist's hands against injury, it is advisable to use the largest contact surface of the hand possible. For example, working with the palm of the hand compared to the fingers or thumb allows for deeper pressure to be given with less chance of injury to the therapist. The disadvantage to using a larger contact instead of the fingers or thumb is that larger contacts tend to be less sensitive, making it more difficult for the therapist to assess both the quality of the client's tissues and the response of the client tissues to the pressure as the massage is being performed.[7]

The appropriate contact at any point during the massage can only be determined by the therapist. If you do like to use fingers or thumbs a lot, I would recommend that you alternate between these contacts as often as possible. This allows the stress load upon the hands to be spread around, giving each of the muscles and joints of the hand a chance to rest.

In addition to choosing a larger hand contact, it is important to double-support the contact. This means that instead of using the two hands separately to work on the client, the two hands need to work together. One hand should be placed somewhat over the other so that the contact hand on the client is stabilized and reinforced by the other hand (Figure 10).[2,7] Another benefit of double-supporting the contact is that it strengthens the therapist's contact, allowing for a stronger and more efficient delivery of force into the client.

Protecting the contact area of the hand is particularly needed when working with smaller contacts, such as the fingers or thumbs. For a therapist with a hyperextendable interphalangeal joint of the thumb, double-supporting the thumb is critically important to prevent it from collapsing into hyperextension. Figure 10 illustrates four double-supported contacts of the therapist's hands upon the client.

SUMMARY

No matter what technique and style of delivery we have, doing massage is hard work and places physical stresses on our bodies; we cannot avoid that reality.[7] However, if we learn to work more efficiently, we can decrease these stresses.

The proposed guidelines of this course are meant to help increase the efficiency of our work and thereby minimize the stress to our body. As you practice them, keep in mind that any change made in body mechanics will most likely feel awkward at first simply because it is different. However, with time, applying these guidelines should become more comfortable.

While not comprehensive of all aspects of body mechanics for bodyworkers, these 10 guidelines are a solid foundation to build upon. It should be noted that even though these guidelines were presented and discussed separately in this course, it is only by seamlessly weaving them into a cohesive whole that a fluid and efficient style for the delivery of bodywork can be achieved. Further, by increasing the efficiency and decreasing the effort of our work, the quality of our work will likely improve as well.[14] Increasing efficiency is learning to work smarter instead of working harder; and working smarter is the key to having a long and successful career.

REFERENCES

1. American Massage Therapy Association. *2005 Massage Therapy: Industry Fact Sheet*. 23 Jan 2006. AMTA. 25 Sept 2006 [www.amtamassage.org/pdf/2005MTIndustryFactSheet.pdf].
2. Clay J, Pounds D. *Basic Clinical Massage Therapy – Integrating Anatomy and Treatment*. Lippincott Williams & Wilkins: Philadelphia, 2003.
3. Fritz S. *Fundamentals of Therapeutic Massage, 3rd ed*. Mosby of Elsevier Science: St. Louis, 2004.
4. Levangie P, Norkin C. *Joint Structure and Function, 3rd ed*. FA Davis Company: Philadelphia, 2001.
5. Peterson D, Bergmann T. *Chiropractic Technique – Principles and Procedures, 2nd ed*. Mosby of Elsevier Science: St. Louis, 2002.
6. Foster MA. "A Case for the Human Stance." *Massage and Bodywork*. 2005 Apr//May: 72-81.
7. Frye B. Body *Mechanics for Manual Therapists, 2nd ed*. Fryetag Publications: Stanwood, Washington: 2004.
8. Peterson D, Bergmann T. *Chiropractic Technique – Principles and Procedures, 2nd ed.* Mosby of Elsevier Science: St. Louis, 2002.
9. Nordin M, Frankel V. *Basic Biomechanics of the Musculoskeletal System, 3rd ed*. Lippincott Williams & Wilkins: Philadelphia, 2001.
10. Neumann D. *Kinesiology of the Musculoskeletal System*. Mosby of Elsevier Science: St. Louis, 2002.
11. Luttgens K, Deutsch H, Hamilton N. *Kinesiology – Scientific Basis of Human Motion, 8th ed*. William C Brown: Madison, 1992.
12. Hamill J, Knutzen K. *Biomechanical Basis of Human Movement, 2nd ed*. Lippincott Williams & Wilkins: Philadelphia, 2003.
13. Muscolino J. *Kinesiology – The Skeletal System and Muscle Function*. Mosby of Elsevier Science: St. Louis, 2006.
14. Myers T. *Anatomy Trains*. Churchill Livingstone of Elsevier Science: Edinburgh, 2002.

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