Introduction

Proper body mechanics involve:

Good posture

Stability

Balance

Leverage

Use of the strongest and largest muscles to perform the work

In contrast to other workers and health care providers who lift or exert force in an upward direction, most of the efforts exerted by a massage practitioner are sustained, restrained, and static movements with pressure focused downward and forward to deliver compressive massage.)

Research: Efficacy of Body Mechanics in Massage Therapists

Ergonomics – focuses on the design of equipment, the work environment, and the workload with the goal of reducing musculoskeletal stress on the body.

Biomechanics – focuses on the body motions and the muscular forces used to complete tasks.

For massage therapists, the major ergonomic issues are the height and width of the massage table and the amount of space around the table, all of which must support ease of massage application.

The number of massage sessions or hours performed each day or each week also is a factor.

The major biomechanical concerns are improper use of body areas that cannot be sustained in a stable position.

Research Outcomes

Massage practitioners:

- High rate of work-related musculoskeletal disorders
- At risk for soft tissue injury
- Experience spinal loading
- At risk for upper extremity injury
- Experience pain in wrist and thumb, neck, shoulder, and lower back

The main causes of the discomfort are use of the thumb to apply pressure, awkward postures, and a heavy workload.

Avoid Using the Thumb

Provide massage with minimal use of the thumb

Never use the thumb to generate pressure

Current research shows that even with the best biomechanical skills, the thumb cannot withstand constant use to apply pressure.

Ergonomics and Biomechanics

Physical ergonomics that apply to massage therapists:

- Manual materials handling, workstation layout, job demands, and risk factors
- Work activities allowing workers to adopt several different postures
- Human push capability

Ergonomically, the workstation is the primary focus. Improper workstation design, including the width and height of the massage table and the size of the massage room, can lead to poor posture and body mechanics, resulting in an increase in musculoskeletal injuries.

Massage Area

12 x 12 feet ideal (no smaller than 9 x 9)

Avoid clutter and small spaces

Nonslip floor

- Wear nonslip shoes

Other factors:

- Proper airflow, temperature, lighting, and noise levels

The massage area encompasses the open space around the massage table, mat, or chair. This space must be large enough to allow the therapist to move easily around the equipment.

The ideal massage area is quiet and has windows to allow natural light and fresh air, adjustable heat and air conditioning, circulating airflow, and lighting that can be adjusted from bright to dim.

Massage Table

Height = ½ practitioner's height

Adjust 2"-3" more based on therapist's torso, arm, and leg length ratios

Woman needs a taller table than a man of the same height does

24" to 28" wide

Knees and hips are used to lift portable tables

Alternate carrying arms

Measuring Correct Table Height

A, The practitioner's height is measured with a cord and then the cord is folded in half.

B, Starting table's height is set according to ½ of the practitioner's height then adjusted slightly higher or lower if necessary for comfort.

C, Table at correct height.

D, Incorrect height—table too low.

E, Efficient body mechanics with table at appropriate height.

F, Incorrect height – table too high.

Working on a Floor Mat

Body mechanics similar to working with a table, except center of gravity is lower

- Necessitates greater core strength

Movement around client is different

- Weight-bearing balance points on floor are from knees instead of feet

Additional padding on knees may be required

Mat must be large enough to accommodate massage therapist and client

Working with a Massage Chair

Specially designed massage chairs help with positioning the client so that compression can be applied correctly.

Causes of Muscle Injury

Four theories:

- Multivariate interaction theory
- Differential fatigue theory
- Cumulative load theory
- Overexertion theory

Awkward posture is associated with an increased risk for injury, and the more a joint deviates from the neutral position, the greater the risk of injury.

The therapist engages several body parts to deliver a massage treatment, but muscles are not equal in strength and endurance capabilities. Different body parts will fatigue more quickly than others.

Neutral Posture

Neutral posture is the resting position of each joint.

Little or no tension or pressure is exerted on nerves, tendons, muscles, and bones

Also the position in which the muscles are at their resting length

Every joint in the body has a neutral position, in which joint spaces are even and symmetric.

Massage therapists need to consider all these factors to prevent injury and have a long, prosperous massage career.

Biomechanics: Center of Gravity and Leaning

Center of gravity

Average position of an object's weight distribution

Balance

Ability to maintain the body's center of gravity within the base of support

Your center of gravity is closest to the area where most of the weight is located in your body; this usually is somewhere around the navel when you are standing upright with your feet about shoulder width apart.

Center of gravity

Average position of an object's weight distribution

Balance

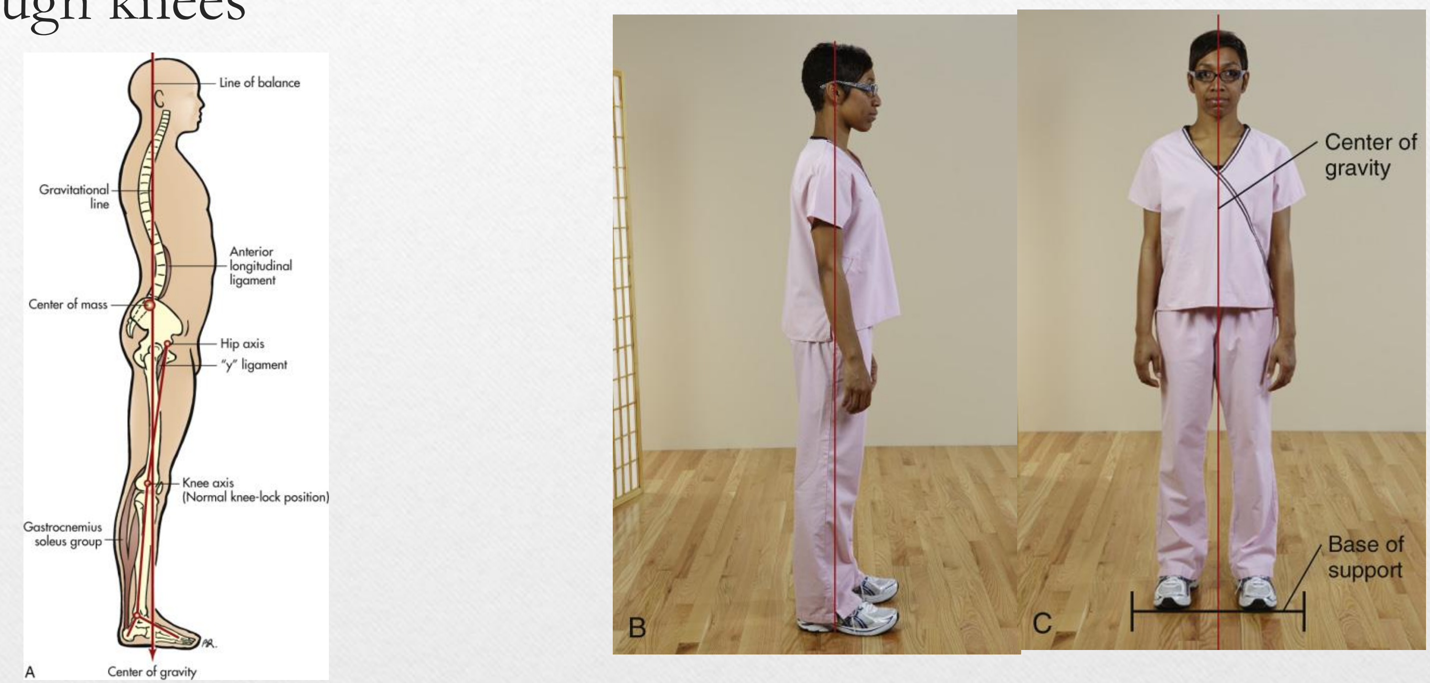
Ability to maintain the body's center of gravity within the base of support

Balance point

Point of contact between the practitioner and the client

Proper Body Mechanics: Standing

Proper relaxed standing posture: center of gravity line through knees

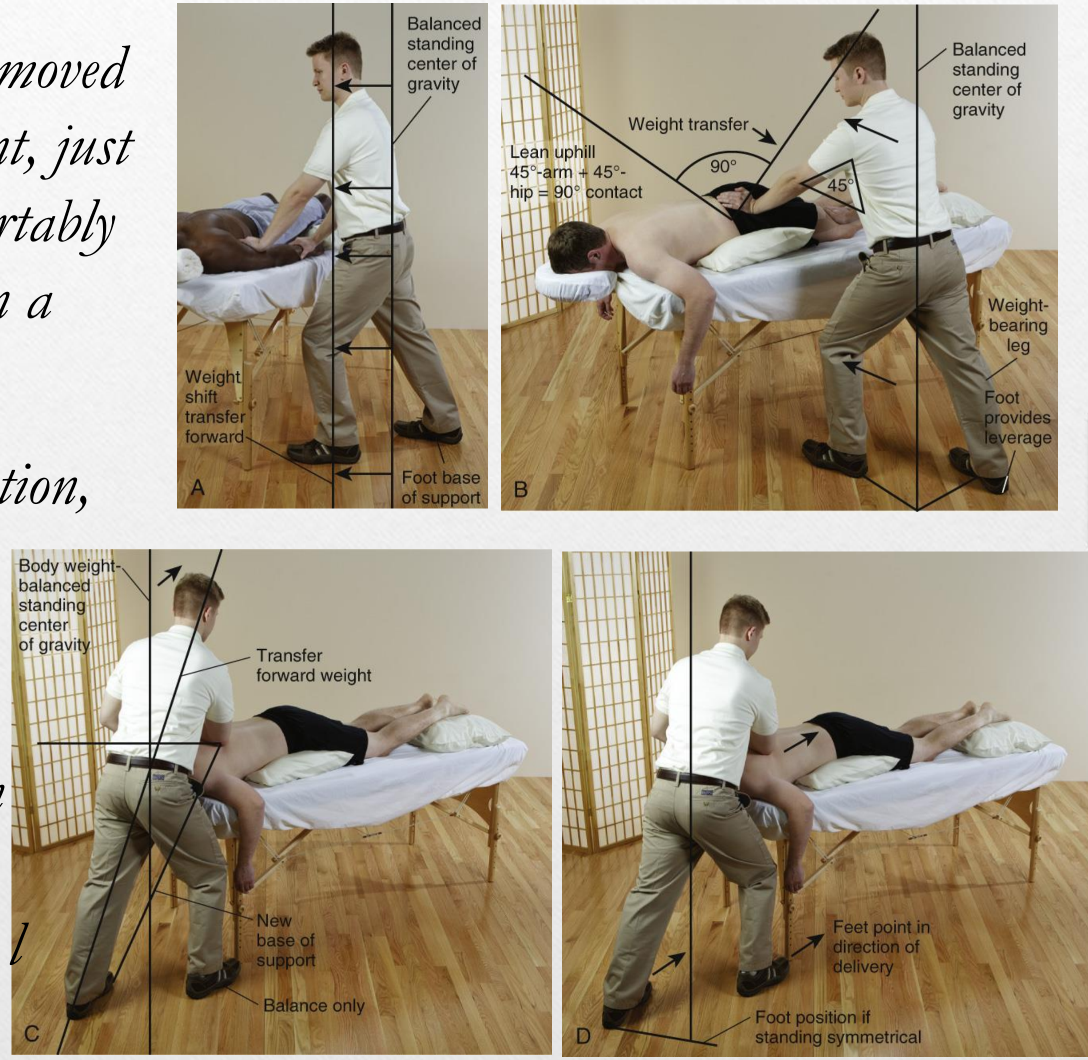


To avoid knee problems, the best standing position utilizes the normal screw-home or knee-lock position in the last 15 degrees of extension on the back weight-bearing leg.)

Proper Body Mechanics: Weight Shift

The center of gravity is moved by "leaning" on the client, just as someone would comfortably lean against a wall or on a table.

During massage application, you lean forward from the ankle as body weight is transferred to the client in the direction in which you will apply pressure, and your back leg is used for leverage.



Force

Box 8-6 Force

Force is a push or pull on an object, which then causes an acceleration, a deceleration, or a change in shape if the object is stable. Massage application applies mechanical forces. The body can move in response to the force (joint movement), or it can change shape, as happens when the soft tissue is massaged.

Forces always occur in pairs. You cannot apply a force to the client's body without the body applying a force back out. This is the reason we can lean on something (a wall, a desk, a client's body) and not fall.

By leaning to transfer weight, the practitioner can substantially reduce muscle tension in the shoulders, neck, wrists, thumbs, elbows, and lower back and efficiently apply mechanical forces during the massage.

Improper Body Mechanics

Improper leg position: center of gravity line behind knees

Low back problems result from inappropriate bending or twisting and improper knee and foot positions. This problem can be avoided by maintaining a stable spinal line while working.

Proper Body Mechanics: Weight Transfer and Asymmetric Standing

The elbow must be in extension (but not hyperextension) to reduce the amount of muscular effort required by the massage therapist.

The knee of the weight bearing leg also must be in full extension to transmit force from the foot pushing into the floor.

Friction and Traction: the Importance of the Feet

Friction – the force that prevents slipping

Traction is required to prevent slipping

Traction – the maximum frictional force that can be produced between surfaces without slipping

During massage, occurs between the foot and the floor, or in the contact with the client's body

Body mechanics for massage begin at the feet. Ground reaction forces at the foot and floor are one of the most important—yet often the most overlooked—aspects of massage application.

Friction and Traction

Ground reaction forces require nonslip surfaces

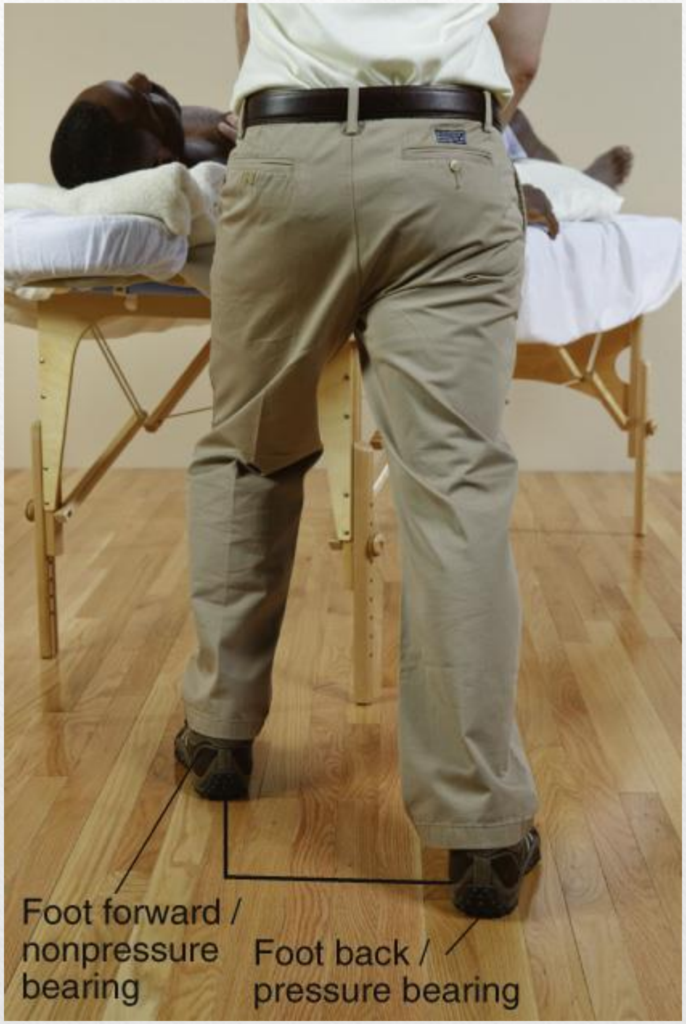
Massage should not be performed in bare or stocking feet, because this hinders the ability to perform massage and also is unsanitary.

The only way to ensure adequate friction (and therefore the ability to generate force) is to wear shoes that have a rubber-type sole and that can be tied or strapped around the arch (e.g., athletic shoes).

Feet stay shoulder width apart as non-weight bearing leg moves forward

The massage therapist can generate the greatest force when the feet are positioned shoulder width apart and with one foot being weight bearing and the other placed approximately halfway between the point of contact with the client and the weight bearing foot in front of the other.

In this posture, the rear foot, and sometimes also the front foot, may be behind the body's center of gravity.



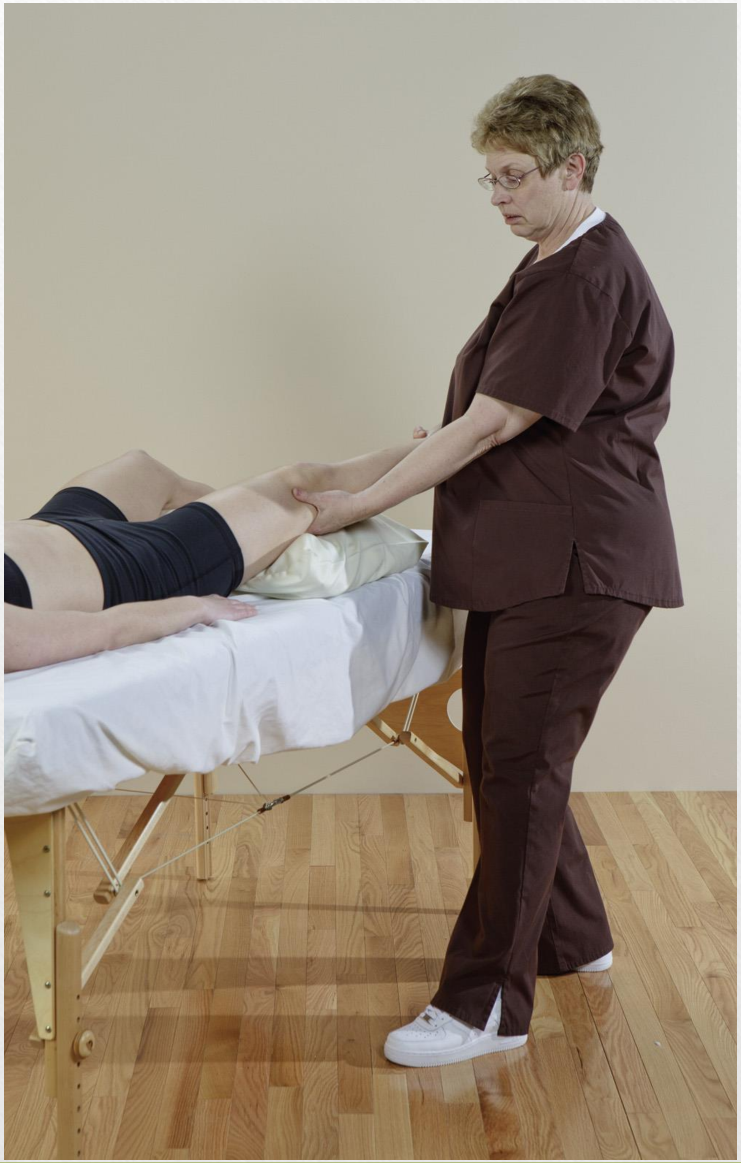
Ground reaction forces are used to create compressive force during massage

If the foot slips easily on the floor or in a sock, or even in ill-fitting shoes, the amount of force you can apply during massage is limited to the amount of friction force or traction at the feet.

Pulling requires foot traction

With limited traction at the feet, you cannot safely lean into the client's body or away (as in a pulling stretch), because the feet will begin to slip.

Applying a downward-forward push force during massage with the proper foot traction allows massage therapists to use their body weight to their advantage.



When the practitioner kneels to provide massage, the back knee becomes weight bearing

If therapists kneel during massage application (i.e., work on a floor mat), their knees become the contact instead of the feet.

A folded towel can be used as a cushion.

A cane provides support when the foot is used to apply massage

When using the feet to perform a massage while the client is on a mat, massage therapists must make sure they are standing on a nonslip surface.

A stable, nonskid cane (available at medical supply retailers) can be used to support balance in these cases.

Basic Concepts of Body Mechanics

Keeping the back straight and maintaining core stability

Weight transfer

Perpendicularity

Stacking the joints

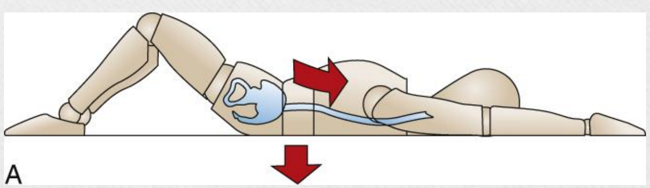
A straight back and a pressure-bearing leg are essential components of body mechanics. If the back is not straight, the practitioner often ends up pushing with the upper body instead of using the more effortless feeling of transferred weight.

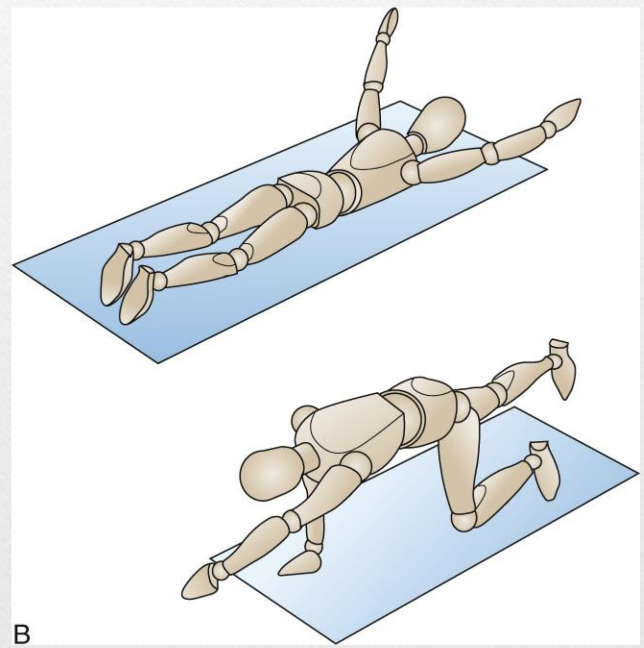
The practitioner's weight should be held on the back leg and flat foot, concentrated toward the heel.

Core Stability = Back Stability

Inadequate use of the body affects:

- Neck and shoulders
- Wrists and hands
- Lower back
- Knees
- Ankles and feet





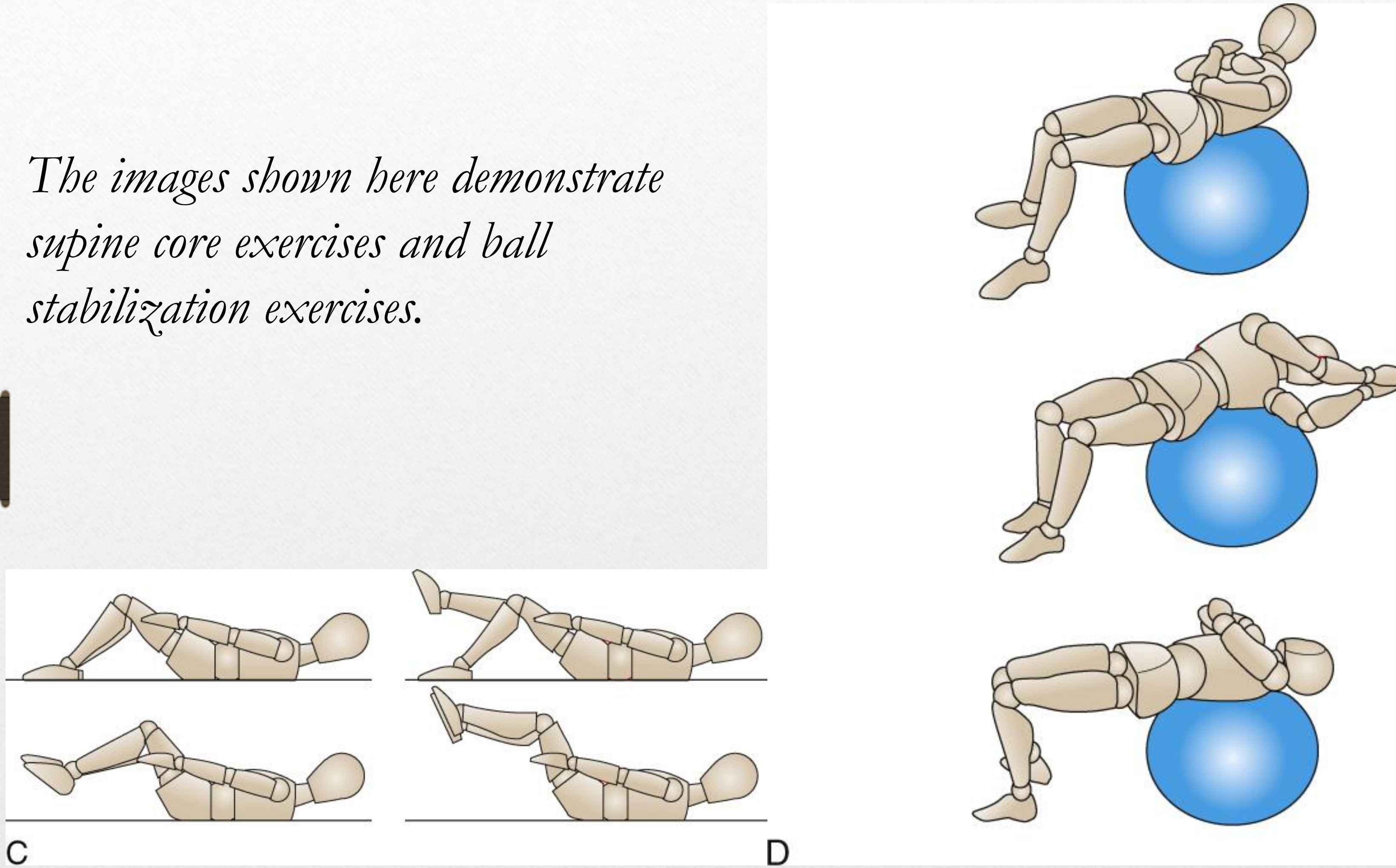
Core stability is a key component of body mechanics.

Many exercise systems target core stability. Some of the most popular are yoga, tai chi, and pilates. Other correct systems are developed by exercise physiologists, athletic trainers, and physical therapists.

Make sure to always do the draw-in maneuver before doing any of the other activities.

Always do the draw-in maneuver when giving a massage.

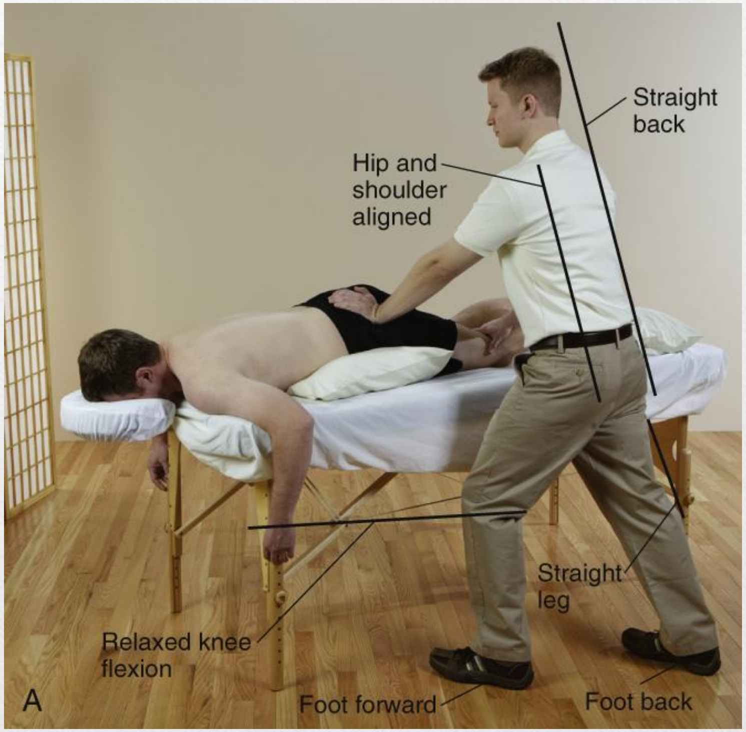
The images shown here demonstrate supine core exercises and ball stabilization exercises.

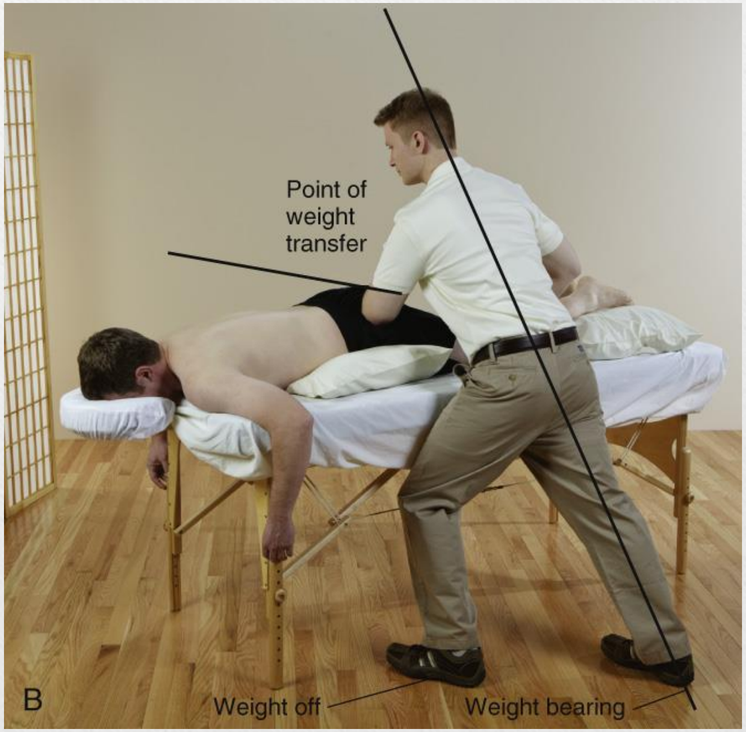


Weight Transfer

A, Maintaining alignment of the shoulder and pelvic girdle is part of stacking of the joints.

B, During a weight transfer, the point of contact on the client and the therapist's back foot are weight bearing. The front foot is used only for balance.





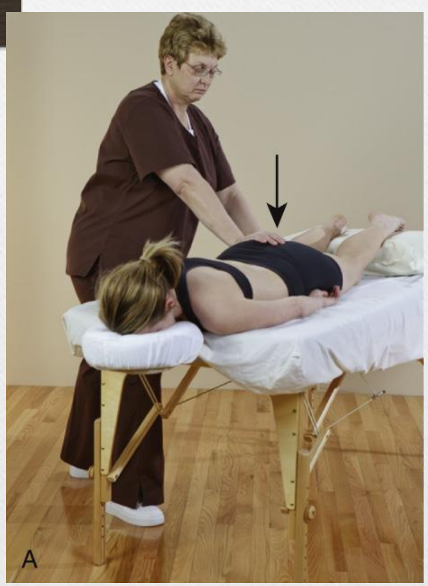
C and D, Weight transfer while kneeling.

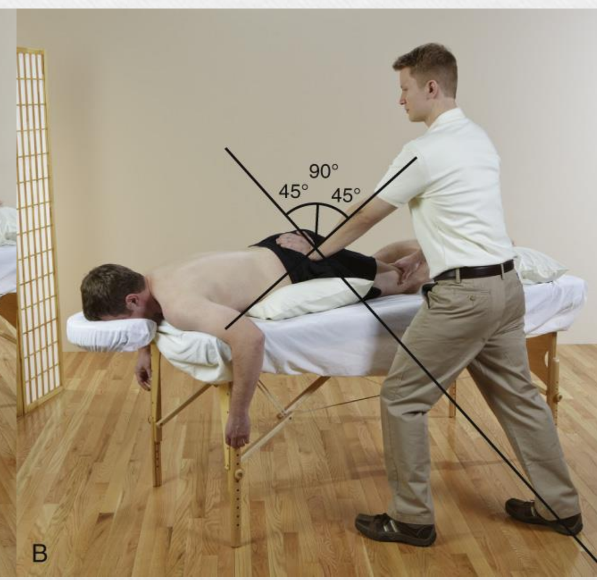
A, Correct stance. The back foot is weight bearing, and the front foot is used only for balance.

B, *Avoid standing on the toes, which shifts weight bearing to the front foot.*

Perpendicularity

Perpendicularity ensures that the pressure exerted by the massage therapist sinks straight into the client's tissues.





Massage primarily uses a force generated forward and downward with a 90-degree contact against the body.

The combination of a 45-degree slant from the contours of the client's body plus the 45-degree angle of force used during appropriate body mechanics results in the 90-degree contact.

Stacking the Joints

Stacking the joints one on top of another is essential to the concepts of perpendicularity and weight transfer.

The practitioner's body must be a straight line from the feet and then through the shoulder to the forearm, or through the elbow acting as an extension of the shoulder, to the heels of the hands.

The ankle, knee, hip of the back leg, and spine are stacked. The shoulder is stacked over the elbow, which in turn is stacked over the wrist. Stacking the joints in this way allows the pressure to move straight into the client's body effortlessly as the center of gravity moves forward.

Stability of the shoulder girdle and elbow also is essential.

Stable vs. Unstable Core

The two common stability problems for massage therapists are the core and the shoulder complex.

A, Stable core, stacked joints, and an efficient weight transfer.

B, *An unstable core results in increased lordosis, pelvic and shoulder girdle rotation and tilt, a forward head position, and shoulder instability.*

Pressure, Drag, and Duration

Affected by number of factors:

- The client's body size, tissue quality, and treatment preferences
- The massage therapist's strength, expertise, and technique preference
- The location of the pressure and the desired outcome for the massage

The perception of the application depends extensively on the client.

Pressure – compressive force exerted downward into the tissue through a 90-degree contact

Drag – resistance to glide

- Glide moves horizontal to the tissues
- Drag applies tension force to tissues to stretch them

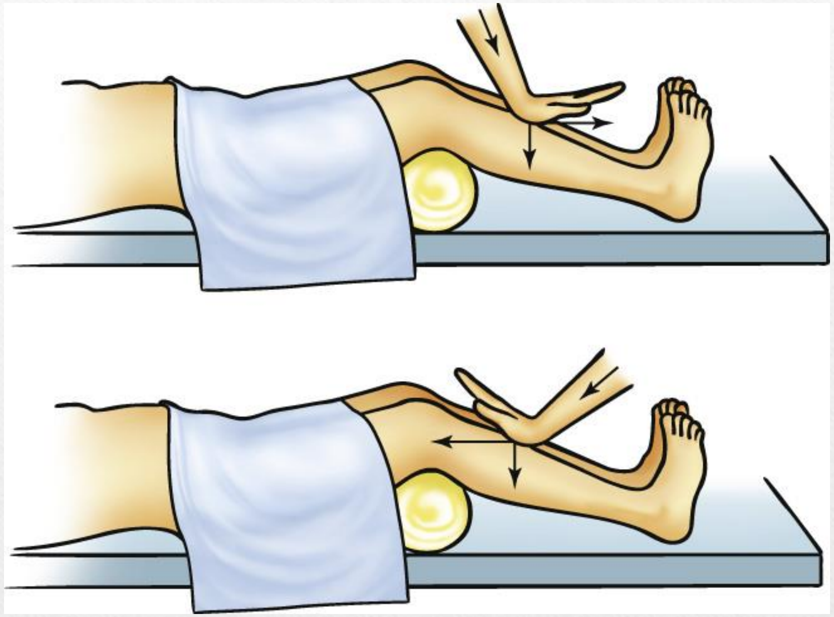
Pressure combined with drag can produce a broad range of intensities.

Duration can modify intensity. In general, long duration is more intense and short duration is less intense.

Application of uphill force is more efficient

To apply pressure to a client, especially during a gliding stroke, moving uphill is always more efficient than moving downhill.

When a force is applied uphill, both the horizontal and vertical components are directed into the client's tissue. However, when a force is applied downhill, only the vertical component is directed into the tissue; the horizontal component is dissipated and thus wasted.



Using compression and the base of contact to determine the pressure level

A, Compression with a broad-based forearm contact. B, Compression applied with a loose fist on a smaller contact base.

Pressure

Level 1 – Skin surface

Light pressure

Therapist's fingertips do not blanch

The tissues in the fleshy areas of the body (i.e., between the joints) can be divided into seven layers, which require seven levels of compressive force.

In Level 1, pressure slides on the skin and cannot produce drag or tension of the skin.

Level 2 – Skin

Pressure slightly dents skin

In Level 2, pressure moves the skin to bind but cannot apply a tension force to stretch the skin past bind. The therapist's fingertips blanch, but the nail bed does not change color.

Level 3 – Superficial fascia

Pressure should penetrate skin, but not reach muscle

In Level 3, palpation of muscle structure indicates that the force is too intense. The therapist's fingertips and nail beds blanch.

Level 4 – First muscle layer

Pressure penetrates skin and superficial fascia

The therapist should be able to palpate muscle tissue in Level 4. Body mechanics require moderate leaning into the tissue.

Level 5 – Second muscle layer

Pressure displaces the surface tissues

In Level 5, compressive force penetrates to the middle muscle layer. Point or narrow-based contact would feel "pokey." Broad-based contact with leaning body mechanics typically is used.

Level 6 – Third muscle layer

Pressure displaces surface tissues and penetrates to the third muscle layer


F

In Level 6, applying force compresses the muscle against the bone; however, if bone is felt, the force is too intense. Full leaning body mechanics with simultaneous counterpressure may be required to reach this layer. Counterpressure involves pulling up against the table or the client's body while compressive force is applied. Broad-based contact must be used, or pain and protective guarding will occur in the first and second muscle layers.

Level 7 – Bone

Pressure slightly more intense than at Level 6

In Level 7, the therapist feels bone pressing against the tissue except around the joints where the muscle layers are not prominent and the bone is beneath the skin and superficial fascia.

Drag

Drag pulls on the tissue.

0—Minimal drag

1—Moves tissue but not to bind

2—Moves tissue to bind

3—Maximum drag: Moves tissue past bin

Less lubricant = more drag

More lubricant = less drag

Duration

Specific application

- Short duration = 10 seconds
- Moderate duration = 30 seconds
- Long duration = 60 seconds

Massage session

- Short duration = 5–15 minutes
- Moderate duration = 15–30 minutes
- Long duration = 45–60 minutes

Speed

Speed

Slow: beginning to end of application, 10 seconds

Moderate: beginning to end of application, 5 seconds

Fast: beginning to end of application, 2 seconds

Client Rhythm

Rock and sway with massage movements

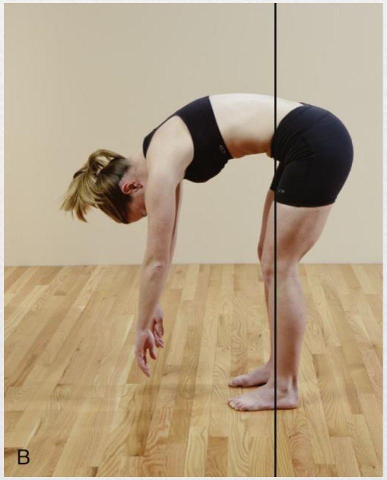
- Slow rocking keeps massage manipulations slow
- Rhythmic movement keeps practitioner's body relaxed
- Comforting to client

Practitioners should remember to work with smooth, even movements, shifting position often.

Gender Differences

Center of gravity

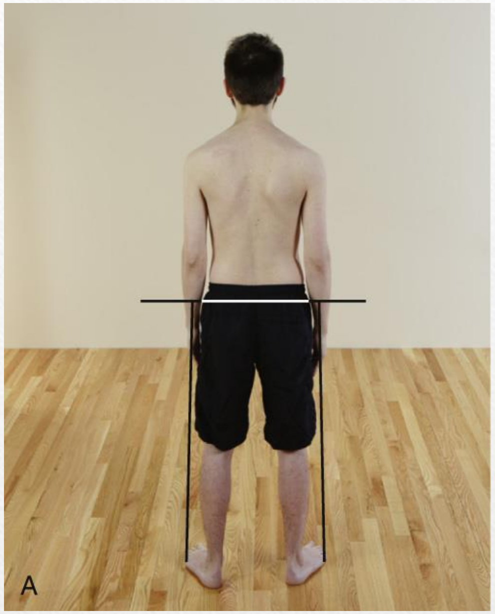
A woman's center of gravity is lower and farther back than that of a man's. Women also carry more weight below the waist. Men are broader in the chest and shoulders and carry their weight above the waist.

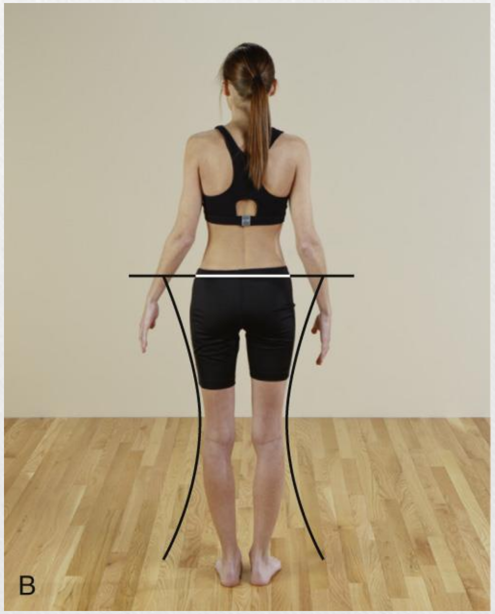


When a man flexes forward, his center of gravity is over his toes. When a woman flexes forward, her center of gravity is over her heels.

Pelvis and knee

A woman's pelvis is wider than a man's pelvis, which means that a woman's femur approaches the knee at a wider angle, called the Q angle. A greater Q angle can result in a knock-kneed stance, which stresses the knee.





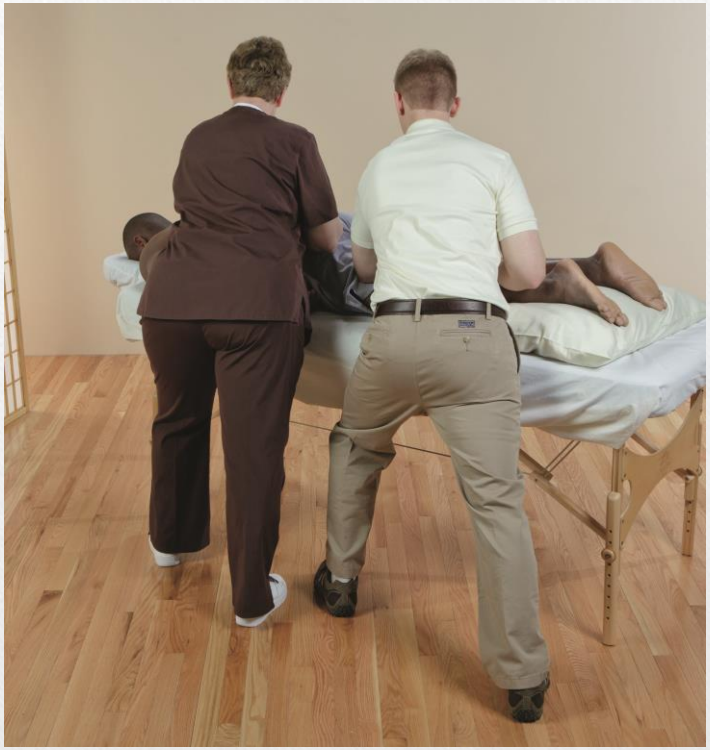
The knee is more mobile in women because of their wider hips and the resulting tendency to knock-knees, coupled with women's greater flexibility.

Gender Differences

Ankles

Women do not bend at the ankles and knees as far forward as men. They also have less total ankle strength.

Because women do not have much movement at the ankle, they require a taller massage table.



Spine

- More backwardly inclined in women than in men
- Women have less rotational stability than men

Physical strength

- Women generally not as powerful as men
- Women have less upper body strength

Summary

- Women should not attempt to perform massage in the exact same way as men

Women must maintain alignment of the shoulder girdle and pelvic girdle during massage to prevent torsion forces (twisting) on the spine while doing massage.

The average woman, because of her smaller size, works at a higher proportion of her maximum strength than does the average man.

Women must leverage by leaning their body weight to apply pressure during massage application.

Self-care and the Effects of Improper Body Mechanics

Warm up pre-massage with aerobic activity and gentle stretching

Dress comfortably

Take breaks

Eat snacks and rehydrate

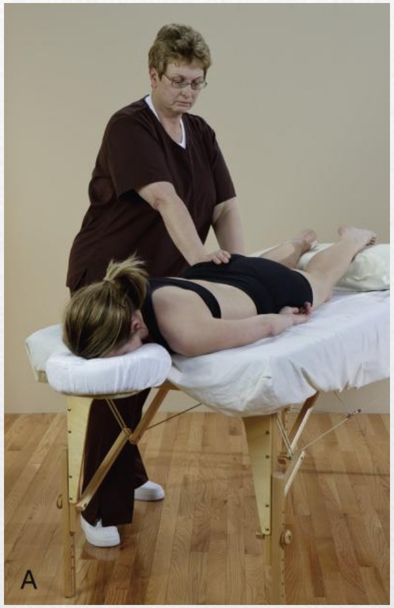
Self-massage frequently

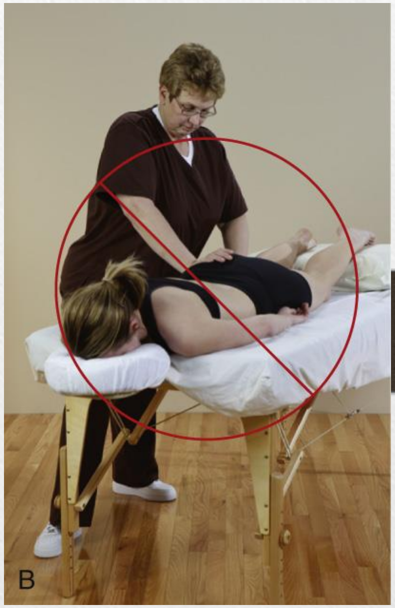
Massage professionals who are not attentive to body mechanics commonly feel the effects in the neck and shoulder, wrist and thumb, lower back, knee, ankle, and foot.

Neck and Shoulder

Neck and shoulder problems most often develop when the massage practitioner uses upper body strength to push and exert pressure for massage.

An unstable core can affect the foot position, causing rotation and tilt at the pelvis and strain on the knee. The bent elbow interferes with weight transfer in the muscular effort to apply pressure. The shoulder becomes displaced and unstable, and the head moves into a forward position.

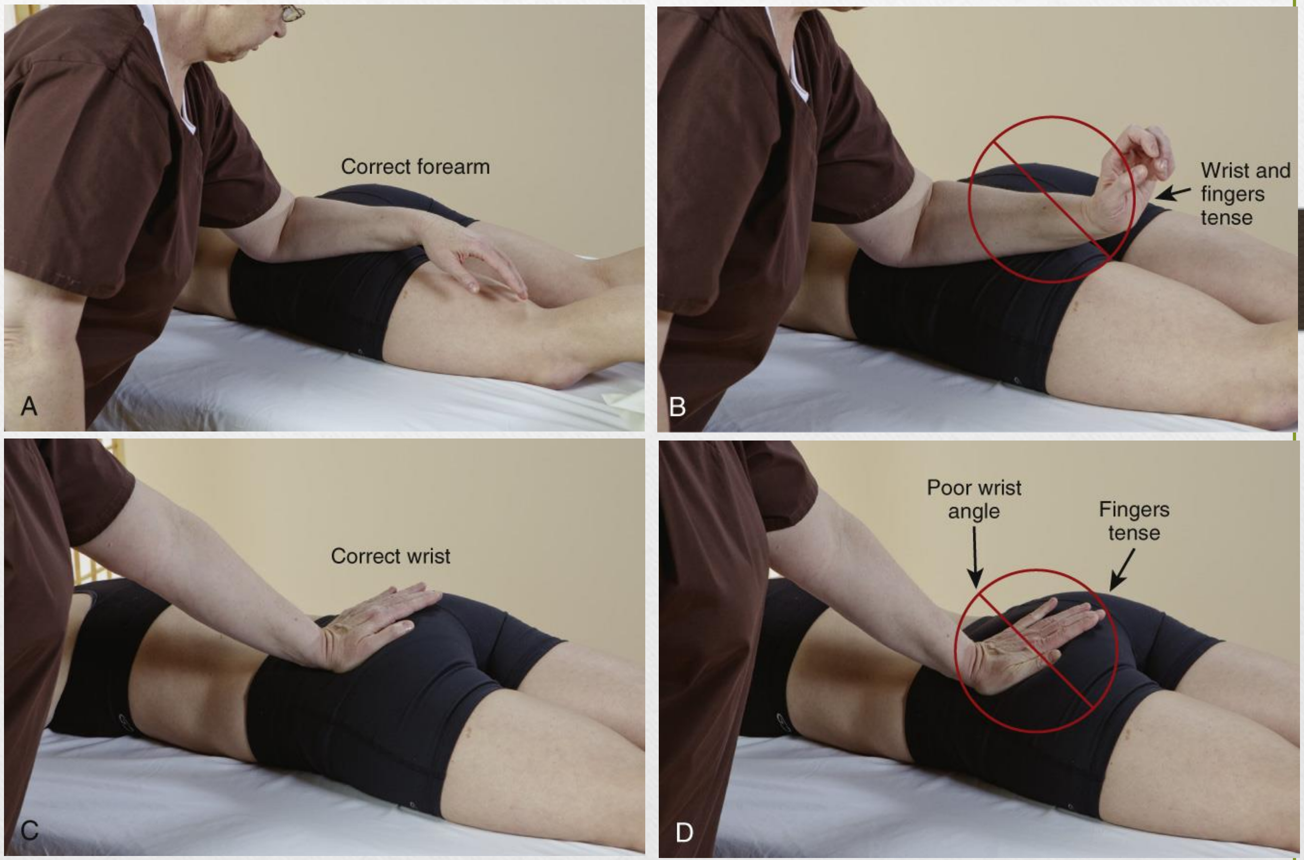




Forearm, Wrist, and Hand

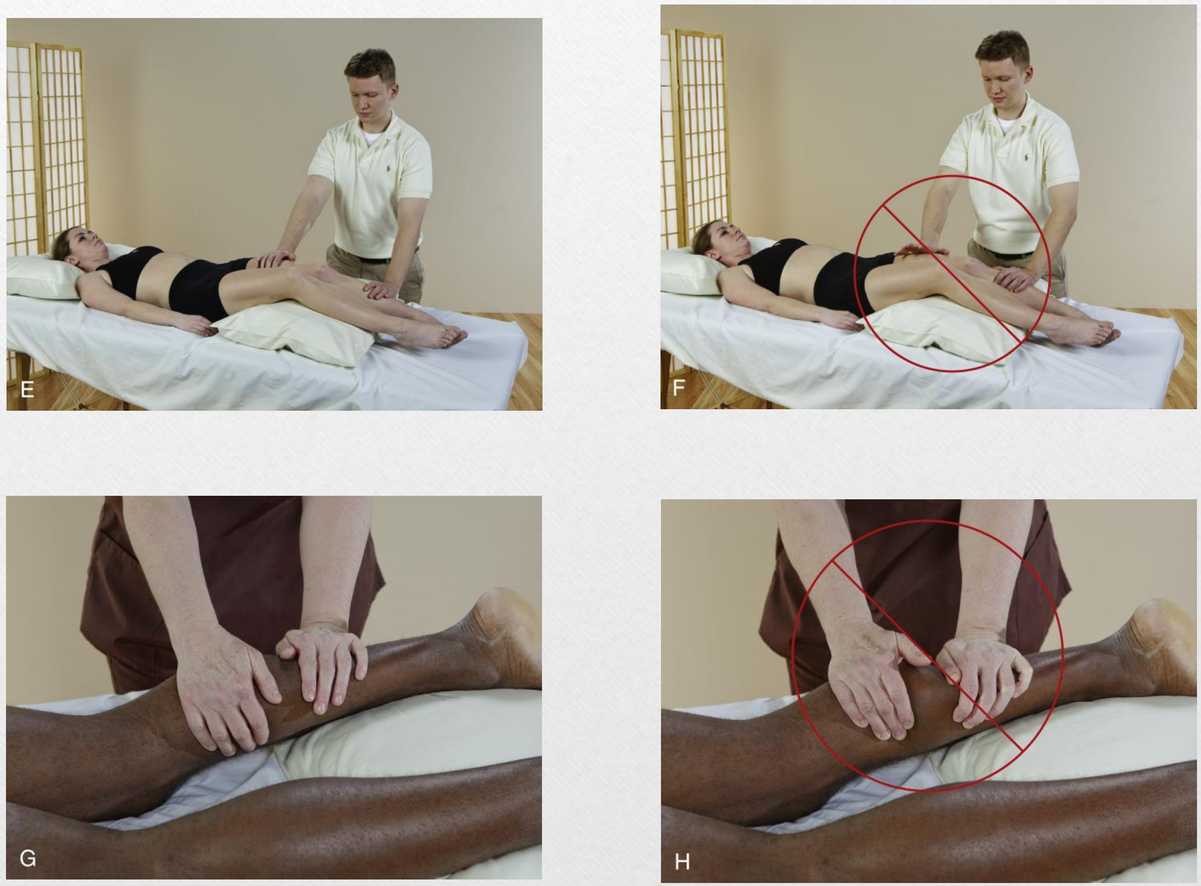
Using a proper wrist angle and staying behind the massage stroke protect the wrist.

Tense wrists and hands also contribute to shoulder problems.



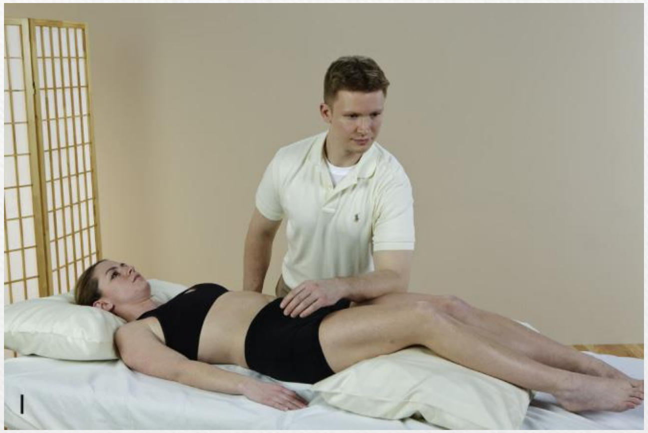
Forearm, Wrist, and Hand

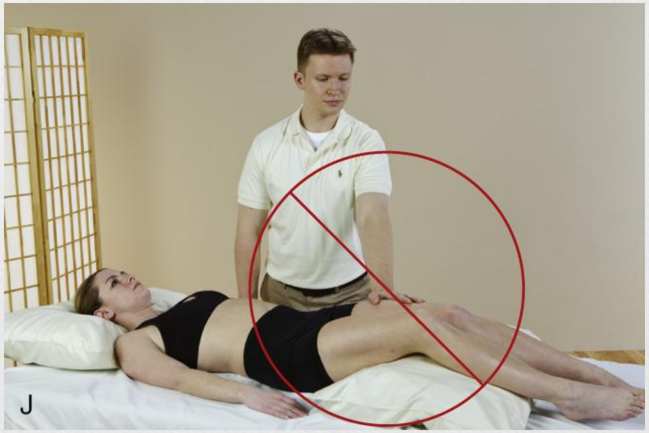
It is important always to maintain a relaxed hand and wrist while giving a massage.

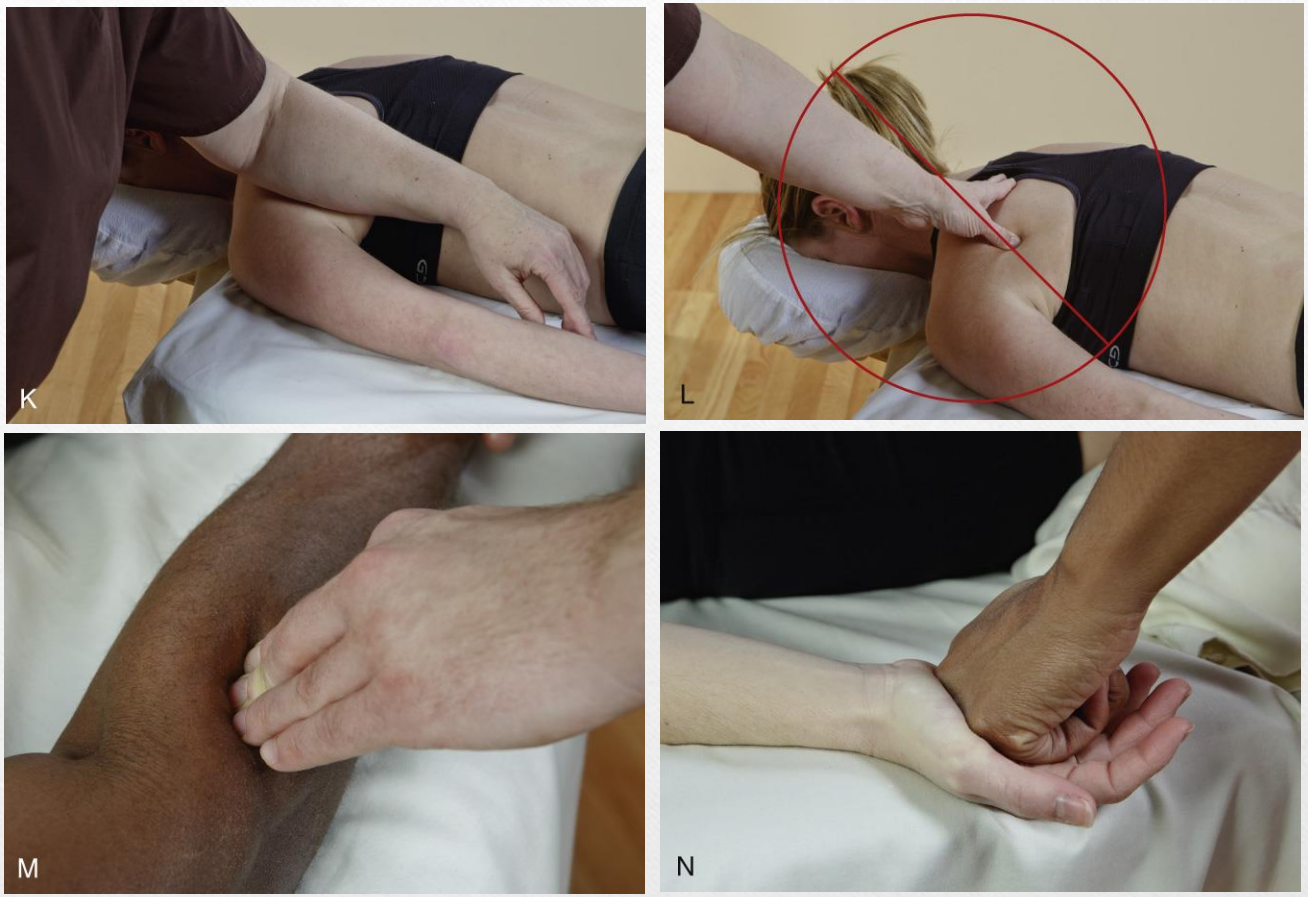


Forearm, Wrist, and Hand

Incorrect arm position, as shown on the right, strains the elbow and shoulder. The body is not lined up with the direction of the weight transfer.







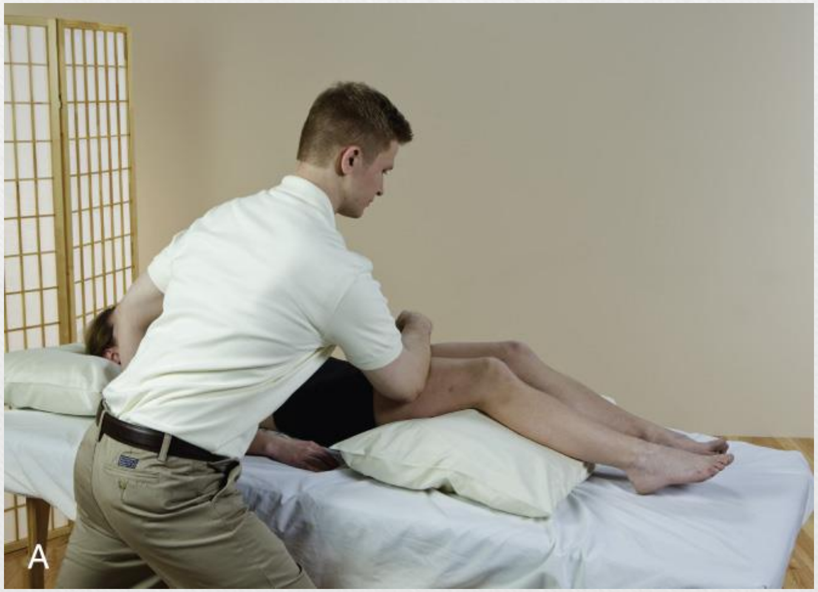
Avoid using the thumb when applying pressure. The design of the joints in the thumb does not allow adequate stability to protect the joint.

Use the forearm to apply massage to spare the hands and wrists.

Low Back

Some reasons for low back problems include core instability, inappropriate bending, bent static positions, twisting, improper knee position, improper foot position, bending of the elbows, and reaching for an area with the arm while giving a massage instead of moving the feet to the area.

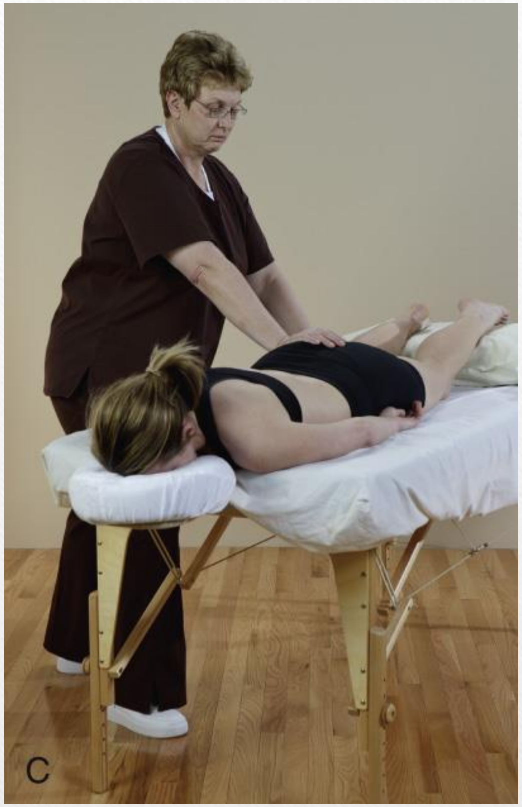
A, A stable low back

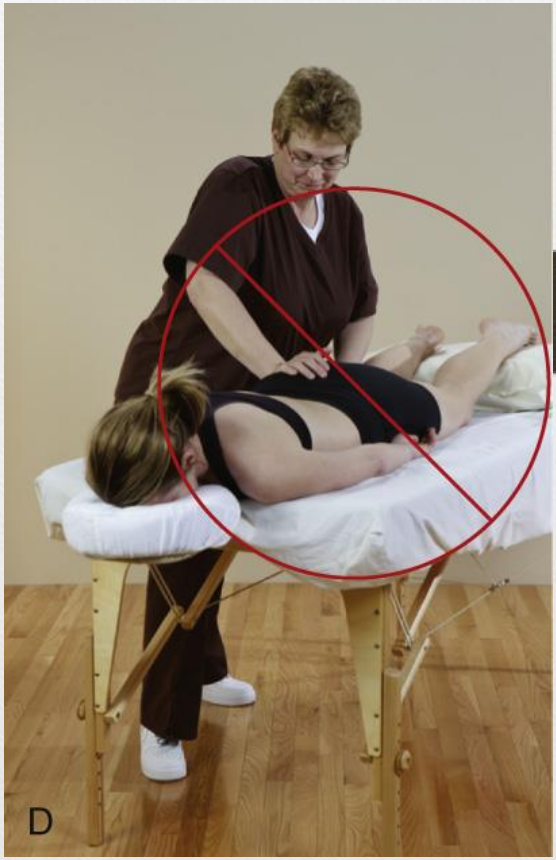


B, Incorrect. The table is too short, and the therapist's core is unstable, as is the scapula. The arm is medially across the body, which is not lined up with the direction of the weight transfer. All of this contributes to low back strain while giving a massage.

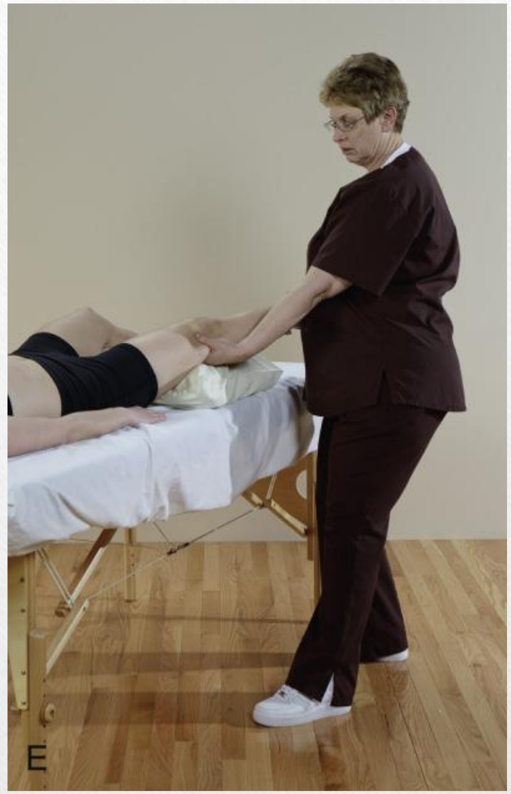
C, Using an asymmetric stance and normal knee-lock position in the weight-bearing leg protect the back.

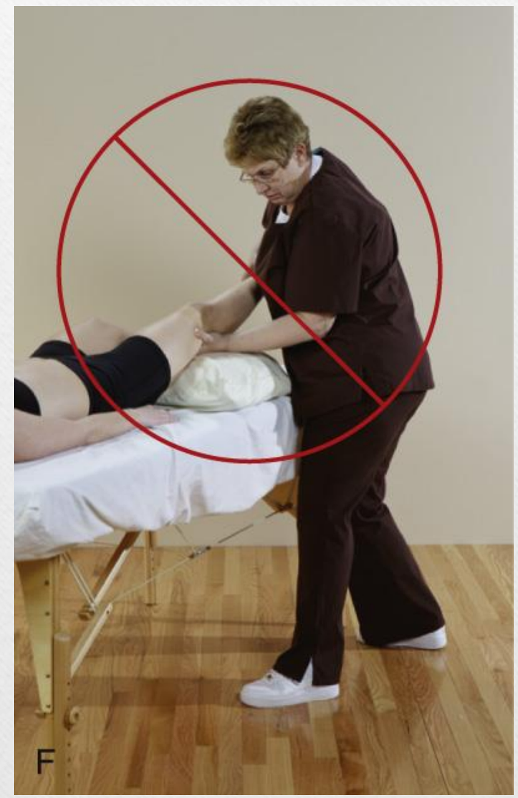
D, Incorrect. The therapist has the weight on the front foot and is standing on the toes. The elbow is bent, and the table too high. Muscle is used to apply pressure.





- *E, Stack the joints and lean back when applying a pull to stretch an area.*
- *F, Incorrect: pulling using muscle strength instead of leaning back to stretch or traction the area.*





G, Correct foot position.

H, Incorrect: foot position is on the toes, too close to the table.

Knee

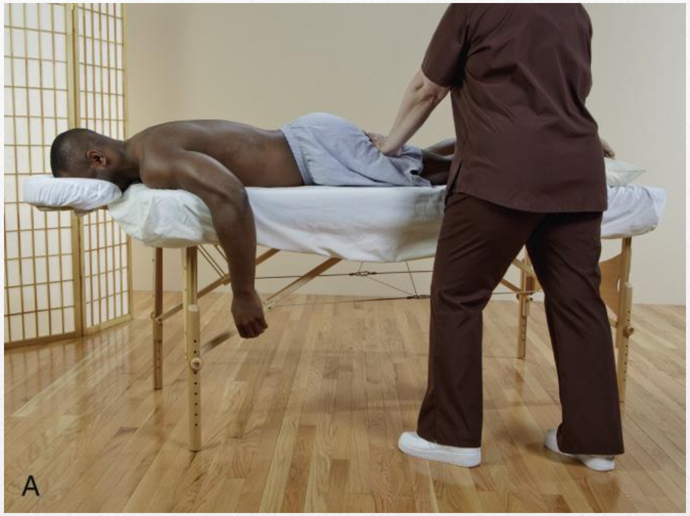
A, Proper knee position: The weight-bearing leg and knee are in extension and stable. The knee of the front balance leg is flexed to allow forward movement during weight transfer.

B, Incorrect: The weight is on the front leg, which is straight, and the back leg is on the toes; this increases the strain on the knees.

C, Correct knee and foot position.

D, Incorrect: The feet are too far apart, in a symmetric stance, with both knees extended.

Knee: Moving Around the Table



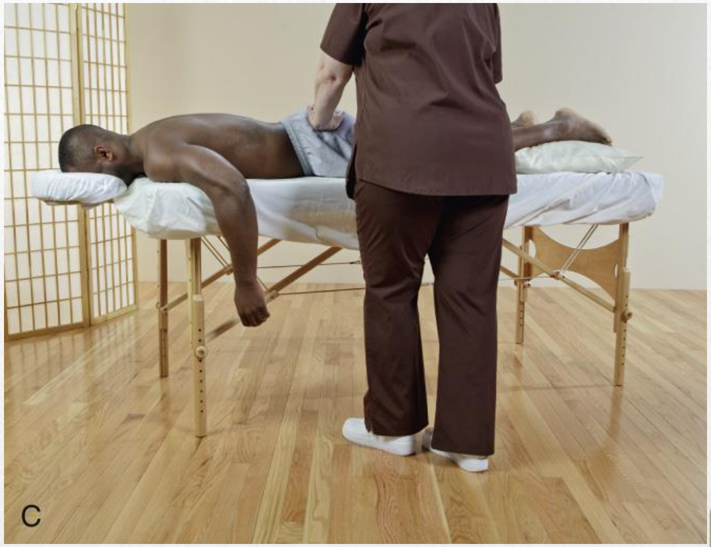
A, Start with the correct knee position (normal knee-lock position) for stability. The moving process remains parallel to the massage table. Avoid moving closer to or farther from the table.

B, Begin the move. Both knees are flexed; the weight is on the front foot; and the back leg is on the toes, ready to transfer the full weight to the front as the back leg is lifted off the floor.

C, The back foot moves close to but is still behind the front foot.

D, The weight is again shifted to the back foot, and the front foot moves to the asymmetric stance; the feet are shoulder width apart.

E, Correct body mechanics is resumed.



Ankle and Foot

Asymmetric standing is the most efficient standing position.

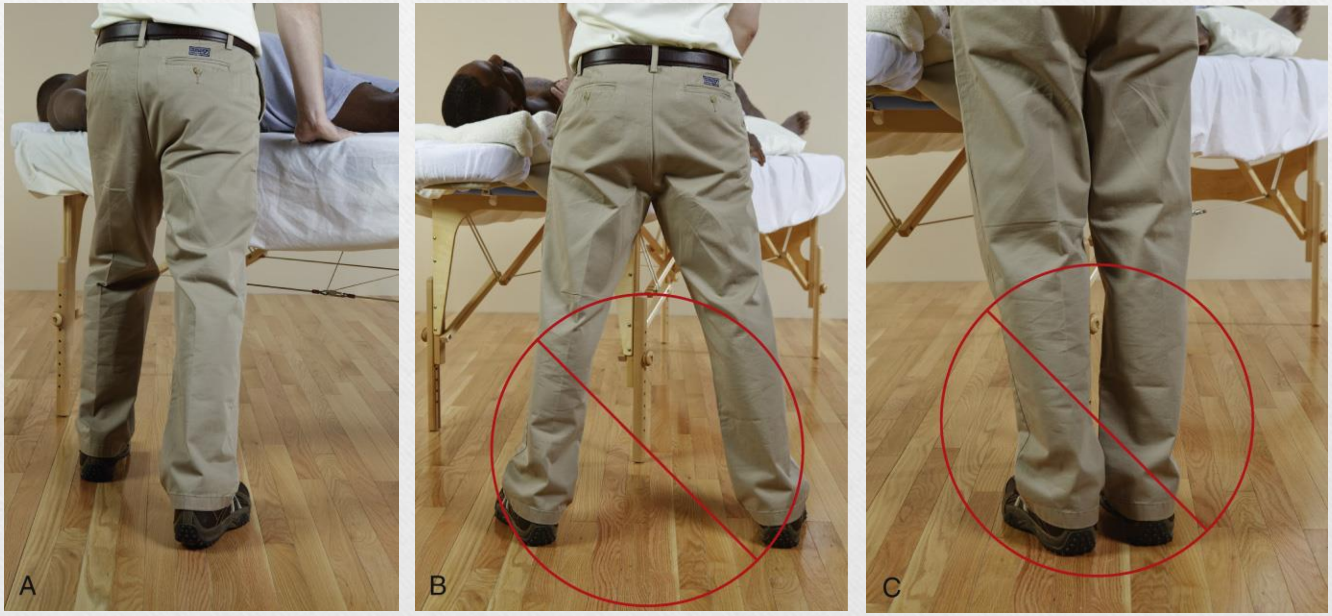
In asymmetric standing, the weight is shifted from one foot to the other in an energy conservation mechanism.

Symmetric standing is fatiguing, interferes with circulation, and should be avoided.

A, Correct asymmetric stance with the feet shoulder width apart.

B, Incorrect: The feet are too far apart, the stance is symmetric, and both knees are flexed.

C, Incorrect: The feet are too close together, the stance is symmetric, and both knees are flexed.



To Test

Access Code: 7FGL

Please write down code. You will be asked for it

Once you have successfully passed the test (70% correct), please email Kim Jackson at kim_hotschool@yahoo.com. We will email you your CE certificate within 7 business days.