

# Body Mechanics



by Joseph E. Muscolino | illustrations by Giovanni Rimasti | photographs by Yanik Chauvin



“A force couple is defined as two forces, equal in magnitude, that are opposite in linear direction but act together to create the same rotational motion (torque).”

## Working the Hands in Concert – The Force Couple Technique

When working on the client's body, the skilled therapist learns how to work both hands in concert for efficient and graceful manual therapy. One technique that the therapist can use to coordinate their hands is to make use of what is known as a force couple. A force couple is defined as two forces, equal in magnitude, that are opposite in linear direction but act together to create the same rotational motion (torque). This might seem like a fancy definition, but a force couple is actually quite simple. The easiest way to visualize a force couple is to think of a revolving door.

If one person is entering a revolving door from inside the building and a second person is entering from outside the building, the two people are pressing on the revolving door in opposite linear directions, one outward and the other inward, yet they are both pushing with the same rotational force to spin the revolving door in the same direction (Figure 1).

*Before practicing any new modalities or techniques, check with your state's massage therapy regulatory authority to ensure that they are within the state's defined scope of practice for massage therapy.*

There are many excellent examples in which a therapist can utilize the force couple technique to work on a client. One is performing deep tissue work to the neck with the client supine. If, for example, the therapist is pressing into the laminar groove musculature on the right side of the client's neck using the thumb of the right hand as the contact, the thumb is directing pressure from right to left. The therapist then creates a force couple by using the left hand to hold and move the client's head by pressing from left to right (Figure 2).

Using the force couple technique is beneficial for a number of reasons. First, if the therapist did not hold the client's head and neck with the left hand with some force generated toward the right side of the client's body, then when pressure is applied from right to left with the right thumb, the client's neck would flop toward the left, making it difficult for the therapist to generate pressure into the tissues. Therefore, the force couple created with the left hand acts to stabilize the client's neck, thereby increasing effective pressure.

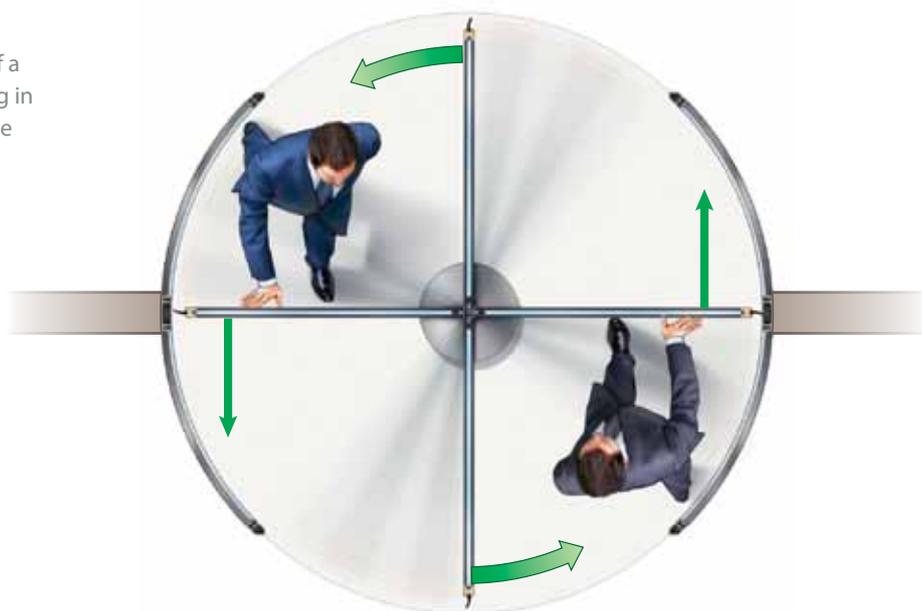
A second benefit of the force couple technique in this scenario is not just to stabilize the client's head and neck from moving to the left, but to actually use the left

hand to move the client's neck to the right, into right lateral flexion. By moving the client's neck into right lateral flexion, the superficial tissues on the right side of the client's neck are slackened, allowing the thumb contact to penetrate into deeper layers of musculature than would otherwise have been possible.

Third and perhaps most important, by using the left hand to move the client's neck into right lateral flexion, pressure is not only generated by pushing into the client's neck with the thumb contact, it is increased by pushing the client's neck into the thumb contact (See Figure 2).

The force couple technique can be used to stabilize, increase tissue penetration, and increase effective pressure for most any muscle of the body. Figure 3 shows another example, this time with pressure into the distal belly/tendon of the iliopsoas musculature. As the therapist's left thumb presses into the femoral belly/tendon of the iliopsoas, the therapist's right forearm/hand flexes the client's thigh, slackening the hip flexor musculature and pressing the client's iliopsoas into the therapist's contact (Figure 3).

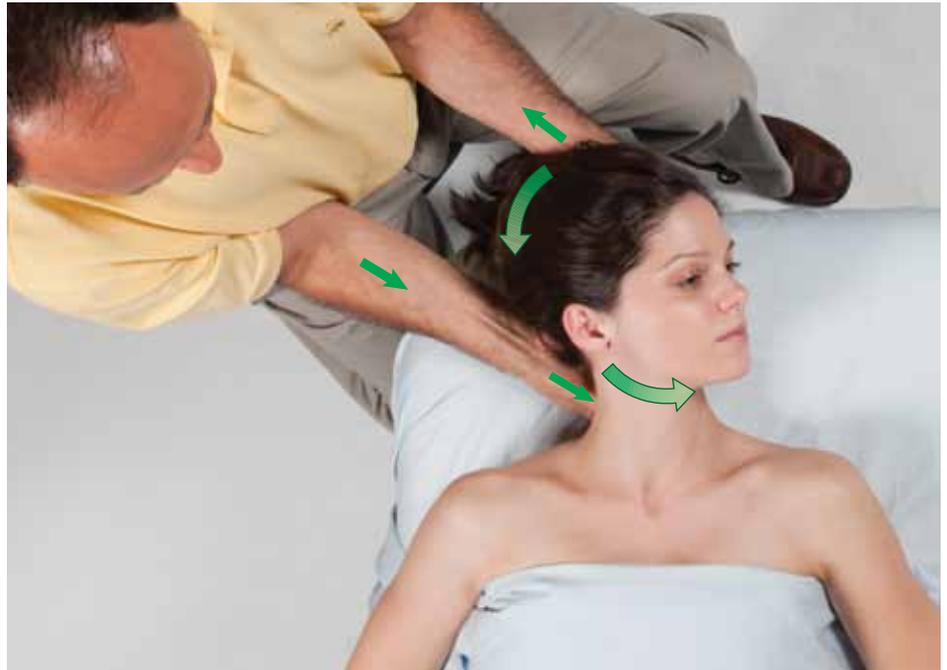
**Figure 1** A revolving door is an excellent example of the concept of a force couple. Each person is pushing in opposite linear directions, but create the same rotation of the revolving door.



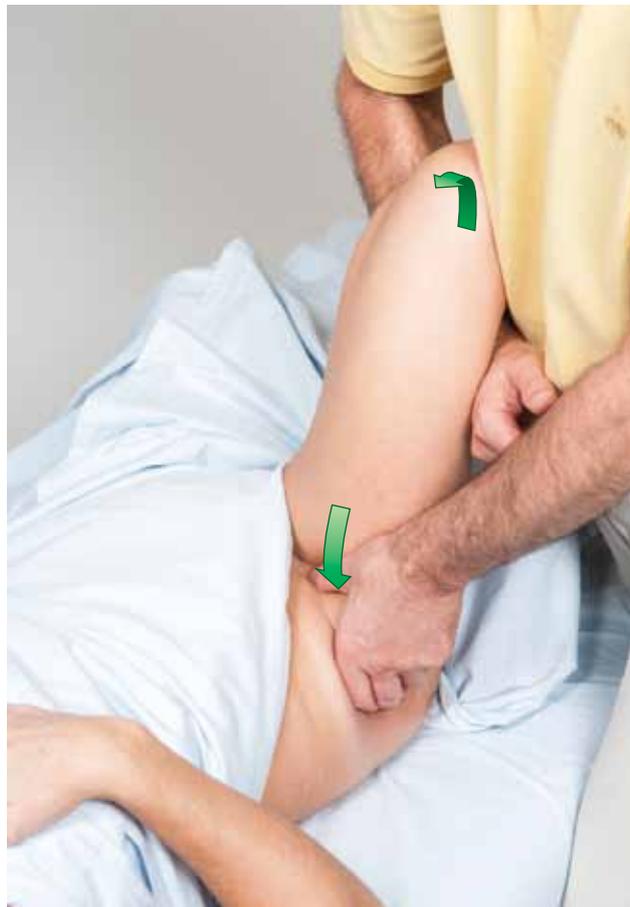
“The force couple technique can be used to stabilize, increase tissue penetration, and increase effective pressure for most any muscle of the body.”



**Figure 2** Utilizing the force couple technique to work the neck with the client supine. As the thumb of the right hand directs pressure into the right side of the client's neck, the left hand right laterally flexes and presses the client's neck into the right hand contact.

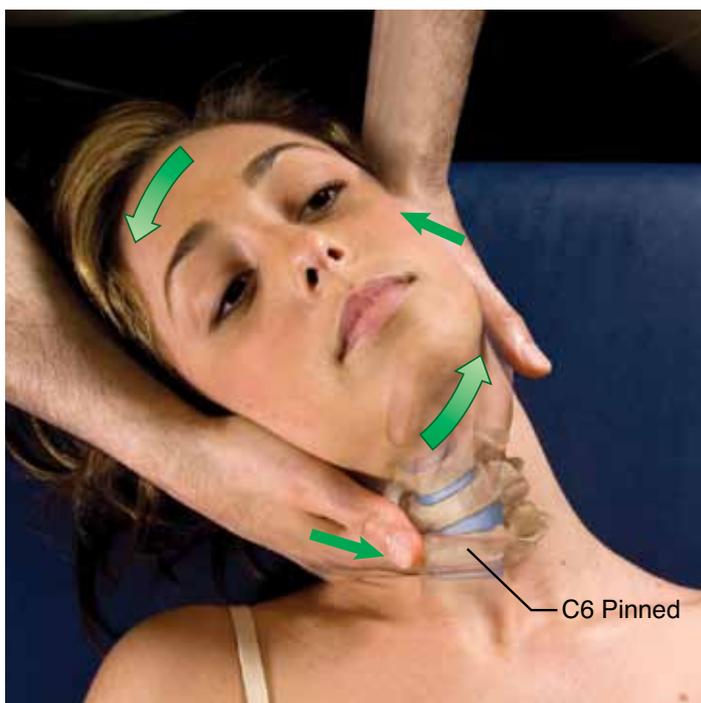
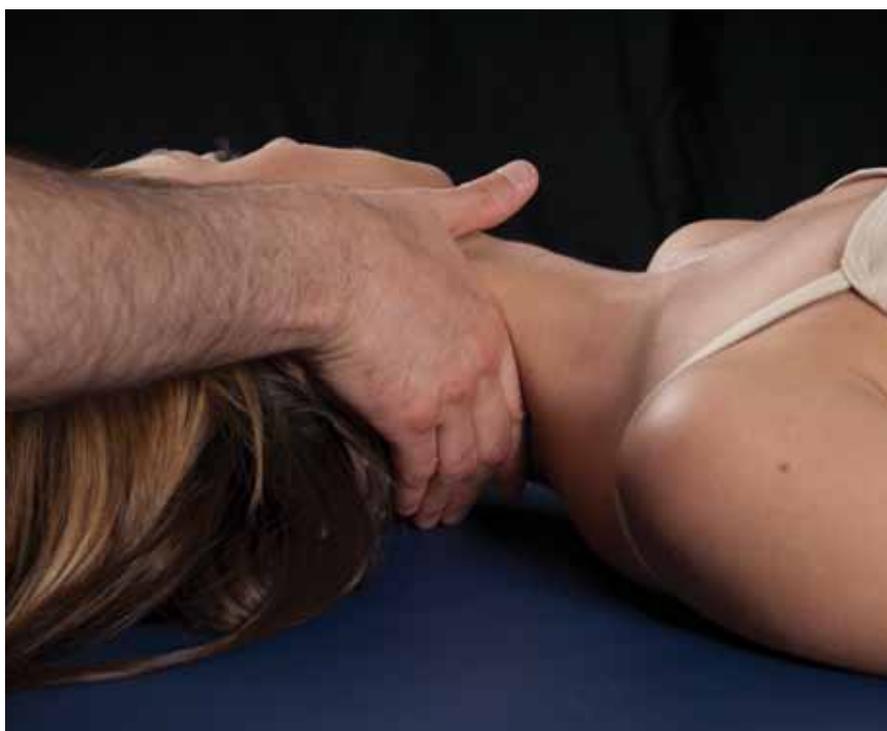


**Figure 3** Utilizing the force couple technique to work the distal iliopsoas. As the therapist's left-hand thumb directs pressure into the client's iliopsoas, the therapist's right forearm/hand flexes the client's thigh, pressing the client's iliopsoas into the left hand contact. (As always, be sure to use proper draping.)



Another technique that benefits from the use of a force couple is joint mobilization\*. Using the neck again as our example, Figure 4 demonstrates right lateral flexion mobilization of C5 on C6. The therapist's contact is the index finger of the right hand (Figure 4A). It stabilizes C6 by pressing against the facet (articular process) with a force that is directed from the client's right side to the left. The force couple is then created by the therapist's left hand, which supports and moves the client's head and neck into right lateral flexion, by pressing from the client's left side to the right (Figure 4B). These two forces are opposite in linear direction, but their synergistic goal is to create the axial torque motion of right lateral flexion. Specifically, the goal is to focus the right lateral flexion motion at the C5-C6 joint level by moving C5 (and the head and neck above it) on the stabilized C6.

Similar to using a force couple for deep tissue work, using the force couple technique for joint mobilization increases the effective force of the mobilization. Once the position of tension of the mobilization technique is reached at the end of passive range of motion, with the therapist's index finger contact against the client's facet and the therapist's other hand moving the client's head and neck into right lateral flexion, the actual mobilization of the joint is most effectively achieved by increasing both the pressure of the index finger contact from right to left and the pressure of the left hand moving the client's head/neck from left to right.



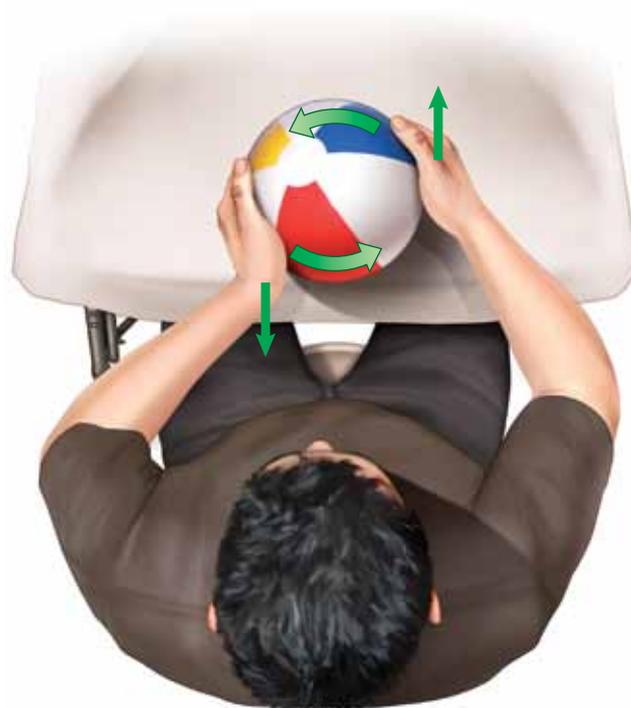
**Figure 4** Utilizing the force couple technique to mobilize C5 into right lateral flexion on C6 (note the gapping of the of C5-6 joint on the client's left side). A, The contact is the radial side of the proximal phalanx of the index finger. B, The force couple is created by the right hand directing pressure from the right to the left to stabilize C6, while the left hand directs pressure from the left to the right.

**\*Joint mobilization is an advanced technique** that should not be performed unless the therapist has had adequate training, preferably in-person continuing education training. Joint mobilization of the cervical spine is generally contraindicated if the client has a pathologic disc or large osteoarthritic bone spurs encroaching on the intervertebral foramina at the level being mobilized. For more on joint mobilization of the spine, see the body mechanics columns: Joint Mobilization of the Neck (Fall, 2007), Joint Mobilization of the Thoracic Region (Winter, 2008), and Joint Mobilization of the Low Back (Winter, 2009).

The force couple technique can be used to mobilize most any joint of the body. For joint mobilization to be successful, both hands must work in concert to create a force couple in which the two hands press in opposite linear directions. Because this might be a bit awkward to learn at first, it can be helpful to think of the client's head as a beach ball; and the goal is to spin or rotate the beach ball (Figure 5).

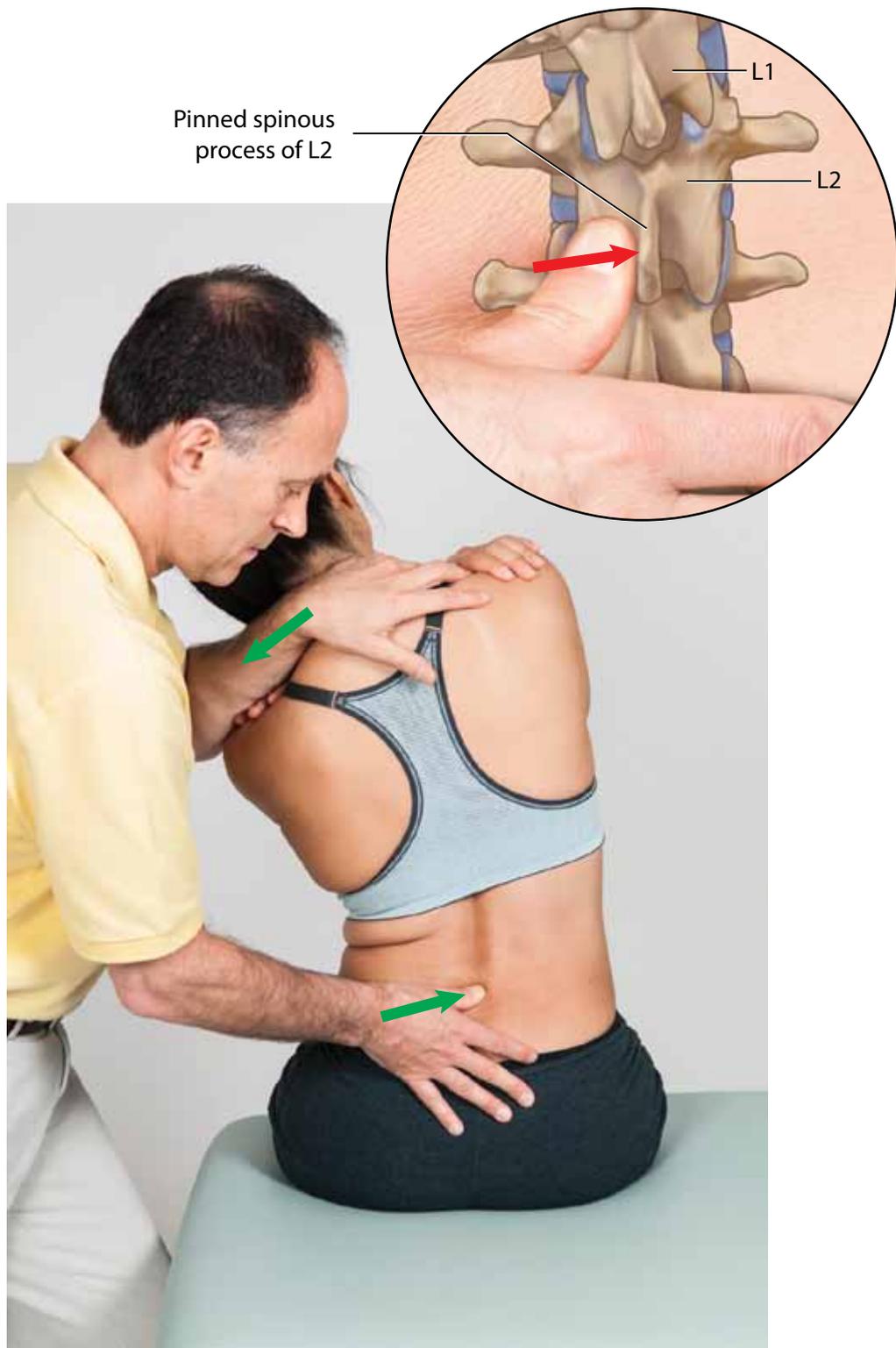
Another example of using the force couple technique to perform joint mobilization of the spine, this time mobilization of the lumbar spine, is shown in Figure 6. As the therapist's right thumb presses from left to right against a spinous process of the client's lumbar spine (L2 in this example), the therapist's left hand presses from right to left against the client's trunk, left laterally flexing the client's thoracic spine and lumbar spine above the therapist's right thumb contact. The result is to focus the force to create left lateral flexion mobilization of the L1-L2 joint.

Manual therapy is usually performed by working with both hands. The force couple technique is one method of working the hands in concert in which the forces applied are in opposite linear directions. This is not the only manner in which the hands can be coordinated; there are many times when the pressure from our hands is oriented in the same direction. However, when our



**Figure 5** To learn how to use a force couple to perform joint mobilization of the client's neck, it can be helpful to imagine that the client's head is a beach ball that we spin.

goal is to create an axial rotational torque of the client's body with deep pressure or joint mobilization, the force couple technique is ideal. It may require a little practice, but once you are comfortable with this technique, the effectiveness and grace of your manual therapy will be dramatically improved. ■



**Figure 6** Utilizing the force couple technique to mobilize the L1-L2 joint. As the therapist's right-hand thumb directs pressure against the spinous process of L2, the therapist's left forearm/hand left laterally flexes the client's trunk, focusing the mobilization to the L1-L2 joint.

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## Muscular System Force Couples

The concept of a force couple is not only applicable to the performance of manual therapy. Indeed, the engineering of the muscular system often takes advantage of force couples. For example, the upper and lower fibers of the trapezius work as a force couple to upwardly rotate the scapula. The upper fibers pull upward while the lower fibers pull downward; therefore they pull in opposite directions linearly. By so doing, they are antagonistic to each other and cancel out each other's linear forces so that no scapular elevation or depression occurs (assuming that the magnitudes of their contraction forces are equal).

However, they work synergistically with regard to axial rotation to upwardly rotate the scapula as is seen in Figure A. There are many other examples of the utilization of force couples in the muscular system. Figure B shows low back extensor musculature that pulls upward on the pelvis and hip flexor musculature that pulls downward; together, their resultant effect is to anteriorly tilt (anteriorly rotate) the pelvis.

**Figure A** The upper trapezius and lower trapezius create a force couple for scapular upward rotation. **Figure B** The low back extensor and hip flexor musculature create a force couple for pelvic anterior tilt.

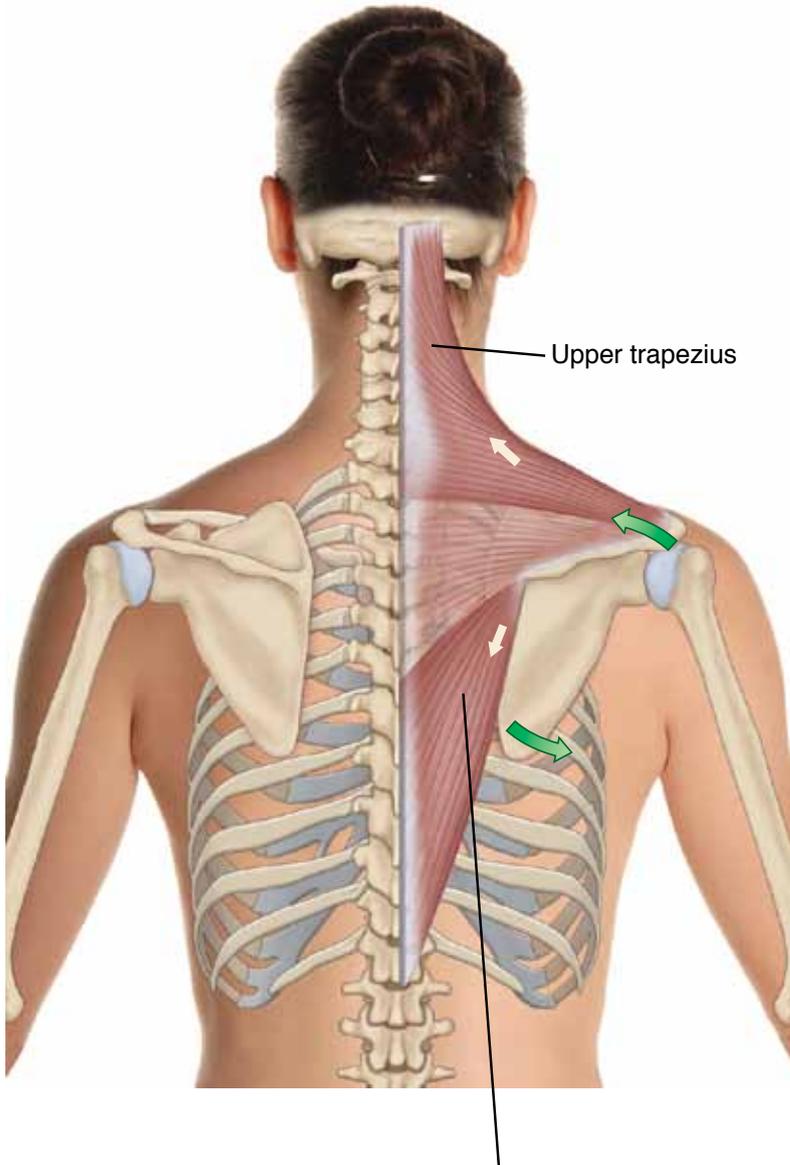
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Figures 2, 3, 6, and Figure B : Lippincott, Williams & Wilkins

Figure 2 : Muscolino, JE. *Advanced Treatment Techniques for the Manual Therapist: Neck*. Lippincott, Williams & Wilkins, 2013

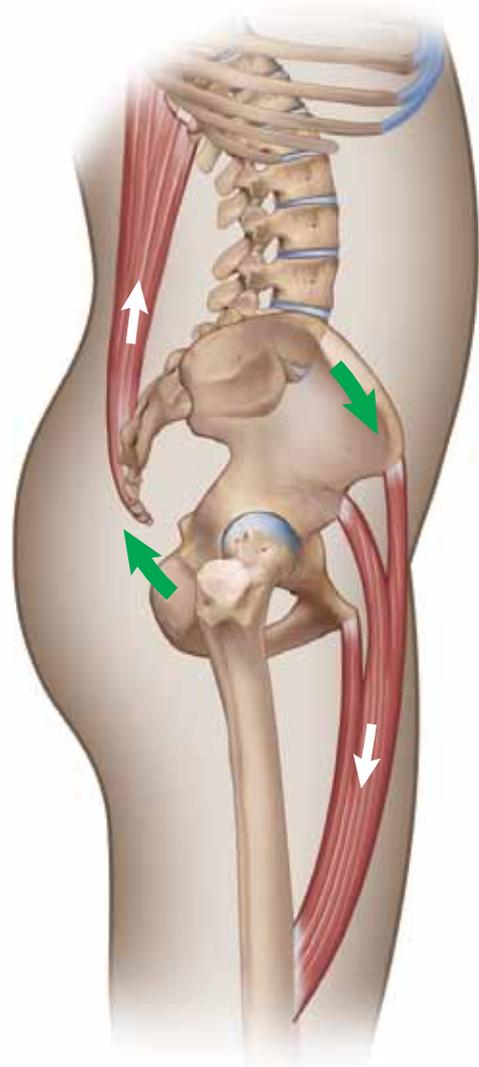
Figures 3, 6 and Figure B : Muscolino, JE. *Advanced Treatment Techniques for the Manual Therapist: Low Back and Pelvis*. Lippincott, Williams & Wilkins, 2014

Figure A : Modeled from Muscolino, JE. *The Muscular System Manual: The Skeletal Muscles of the Human Body*, 3rd ed. Elsevier, 2010



Upper trapezius

Lower trapezius



## Anterior tilt of pelvis



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