

the Kinesiology of Stretching

In their third column, chiropractor and kinesiology educator Dr. Joe Muscolino and his wife, second-generation Pilates teacher Simona Cipriani, explore various stretching techniques.

By Dr. Joe Muscolino and Simona Cipriani



FIGURE 1 COURTESY OF J.E. MUSCOLINO, THE MUSCLE AND BONE PALPATION MANUAL WITH TRIGGER POINTS, REFERRAL PATTERNS AND STRETCHING, 2008, MOSBY

Pilates Style: What are the different types of stretching techniques?

Dr. Joe Muscolino: Stretching techniques can involve many different characteristics: A stretch can be static or dynamic, passive or active, solo or assisted. It can involve a technique called pin and stretch or utilize a neurologic reflex.

PS: What is the difference between static and dynamic stretching?

JM: Classically, stretching is done in a static manner: Once the position of stretch has been reached, it is held for a prolonged period of time, ranging from 10 seconds to a minute or more. Recently, however, more and more people have been advocating what is called dynamic stretching. Dynamic stretches are held for a shorter period of time than static stretches, usually between one and three seconds. Static stretches are performed for three repetitions, while dynamic stretches are performed for approximately ten reps.

Simona Cipriani: Dynamic stretching has been a part of Pilates for a very long time. If you look at most Pilates exercises, you

will see that the stretching position is held only for a second or so, and it is repeated between five and ten times. This is true in both mat and apparatus work and with beginner as well as advanced clients.

Stretching techniques can involve many different characteristics: A stretch can be static or dynamic, passive or active, solo or assisted.

PS: What are the advantages of static versus dynamic stretching?

JM: The advantage of static stretching is based on the property of soft tissues known as "creep." Creep describes how a soft tissue gradually changes its shape when it is subjected to a force that is applied in a slow and sustained manner. Proponents of static stretching often point to creep as evidence for its effectiveness for increasing flexibility. Dynamic stretching has many advantages over static stretching, including increasing local blood

circulation, feeding the tissues with needed nutrients, lubricating and feeding the joints by promoting movement of synovial joint fluid; because this stretching style involves more movement, it better warms the tissues and

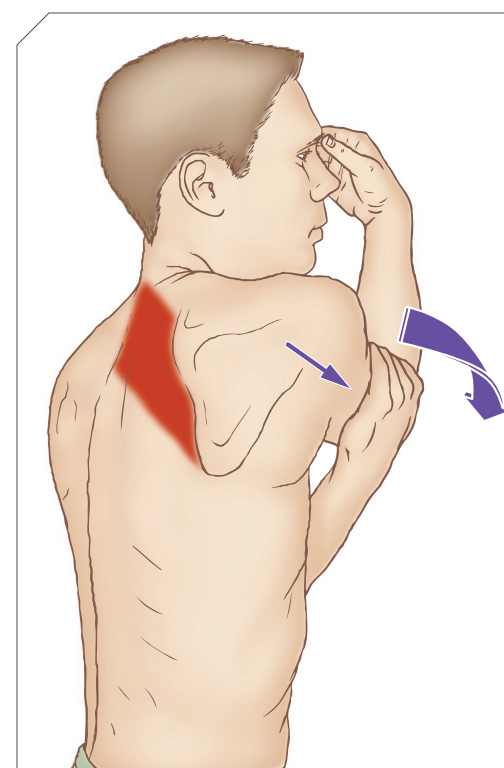


FIGURE 1. In this example of a passive stretch, the client uses his other hand to enhance the stretch.

facilitates healthy neural control by reinforcing nervous system pathways for motion.

SC: Almost every Pilates exercise involves dynamic stretching. For example, with Rollover, the client brings the legs over the head until the feet touch the floor; the position is held for a few seconds, creating a dynamic stretch for the backs of the legs and the entire spine.

PS: What are the differences between active and passive stretching and solo and assisted stretching?

JM: As a general rule, a stretch done solo by the client is active; when a Pilates teacher assists the client, the stretch is passive. But there are exceptions to these rules. A client can perform a solo stretch passively by using one part of his body to stretch another. For example, if he uses his right hand to stretch his left shoulder joint, it is technically a passive stretch because the muscles of the left shoulder joint are relaxed as the joint is being stretched (see Figure 1).

PS: Is there an advantage to active stretching over passive stretching?

JM: Yes. Because active stretching requires the client to contract muscles, the client also strengthens them during the process of stretching. Another advantage of active stretching is that when the client contracts mover muscles on one side of a joint to move

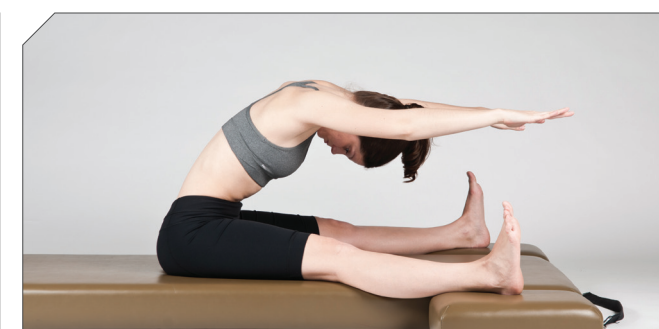


FIGURE 2A. Spine-Stretch Forward is an active stretch as it is performed entirely by the client.



FIGURE 2B. When the client is assisted when doing Spine-Stretch Forward, it can be a much more effective move.

into the stretch, the antagonist muscles on the other side of the joint are neurologically inhibited, in other words relaxed by the reflex known as reciprocal inhibition. This allows for a fuller, deeper stretch than would have otherwise occurred.

PS: Is active or passive stretching more common in Pilates?

SC: Passive stretching is not common in the world of Pilates; it is more likely to be done by a massage therapist, physical therapist or chiropractic physician. Active stretching is more common in Pilates. For example, when performing Spine-Stretch Forward on the mat, we actively contract the anterior abdominal wall to flex the spine. By emphasizing the contraction of the anterior abdominal wall, not only is it strengthened, but also the stretch of the muscles in back is deepened (see Figure 2A).

PS: Is assisted stretching ever a part of Pilates?

SC: Yes. But I believe that many Pilates instructors do not take enough advantage of assisted stretching. After a client has initiated the stretch actively using her own muscles, the Pilates instructor can step in and physically augment the stretch by gently pushing the client further into the position of the stretch. This creates a much more effective stretch than the

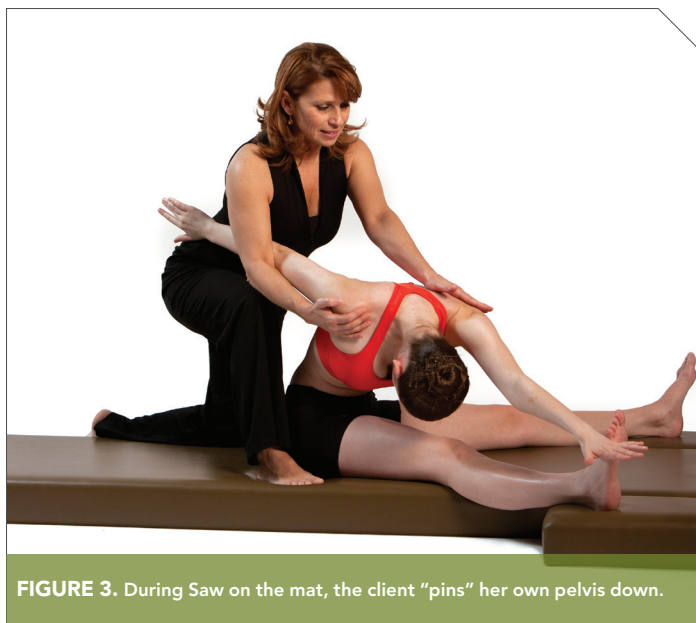


FIGURE 3. During Saw on the mat, the client “pins” her own pelvis down.

Stretch-ossary

A **STATIC STRETCH** is held for a prolonged period of time, ranging from 10 seconds to a minute or more; it’s usually performed three times.

A **DYNAMIC STRETCH** is held between one and three seconds and is performed for approximately ten reps.

An **ACTIVE STRETCH** is done by contracting the muscles of a joint to stretch that joint.

A **PASSIVE STRETCH** is when the muscles of a joint relax as the joint is stretched. Passive stretches are usually done by the teacher assisting the client.

A **PIN AND STRETCH** is performed by pinning and stabilizing one point on the client’s body and then stretching the client from that pinned point.

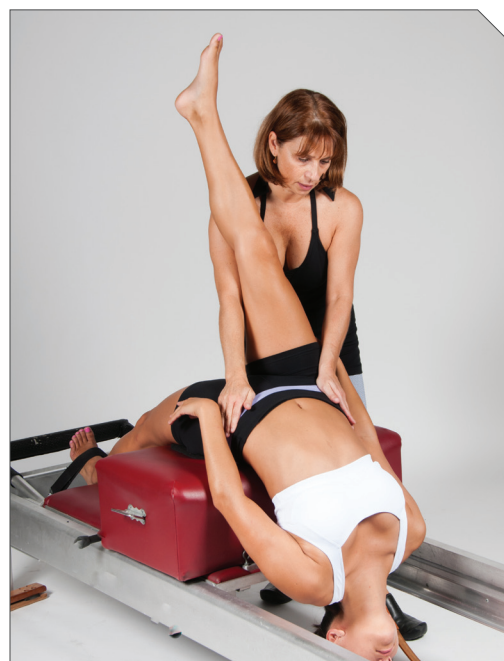


FIGURE 4. The Pilates instructor assists the client by pinning the pelvis during Tree on the Short Box Series.

client’s solo stretch by itself. This can be done with almost any Pilates exercise (see Figure 2B).

Of course, it is very important for Pilates instructors to be sensitive to the response of clients’ tissues to their touch. If the instructor pushes too far, the client might become overstretched and injury can occur (see box on opposite page).

PS: You mentioned an assisted stretching technique called “pin and stretch.” Can you describe it?

JM: A stretch is felt along a line of tension created in the body. Pin and stretch allows the force of the stretch to be focused on



FIGURE 5. Placing the feet in the straps during the Short Box Series helps to pin and stabilize the pelvis.

one area within that line. It is performed by pinning and stabilizing one point on the client’s body, and then stretching the client from that pinned point. In the world of manual therapies, the pin is usually created by the therapist’s hand.

SC: Pin and stretch is used in Pilates in a number of ways. One way is for the client to create the pin herself by actively contracting her own musculature to stabilize a body part. For example, when performing Saw on the mat, the client is cued to contract the hamstrings and glutes to hold the pelvis down as she stretches her trunk forward. Keeping the pelvis “pinned” down focuses

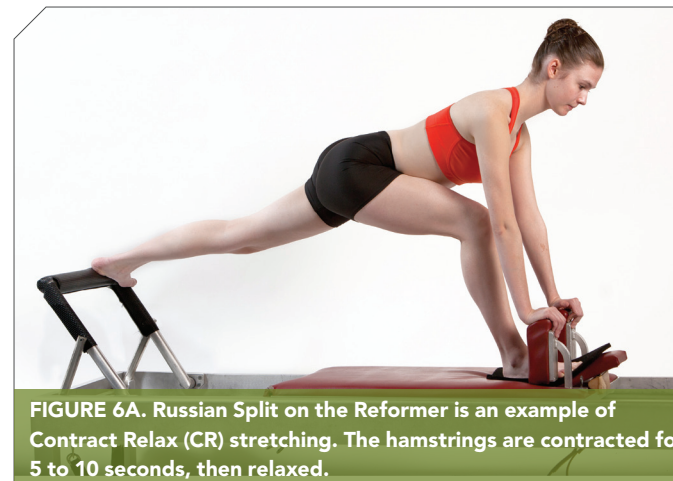


FIGURE 6A. Russian Split on the Reformer is an example of Contract Relax (CR) stretching. The hamstrings are contracted for 5 to 10 seconds, then relaxed.

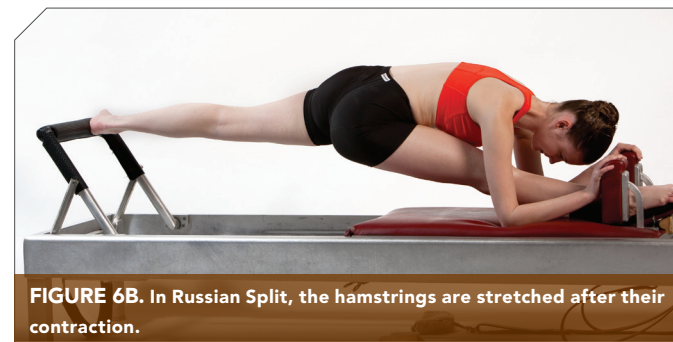


FIGURE 6B. In Russian Split, the hamstrings are stretched after their contraction.

the stretch on the spine (see Figure 3).

If the client needs assistance to pin and stabilize, the Pilates instructor—similar to a manual therapist—can use her hand or other body part to assist (see Figure 4). And the equipment can also help with pin and stretch. When performing the Short Box Series on the Reformer, placing the feet into the straps can assist the client in pinning down their pelvis so that the stretch is then focused in the back (see Figure 5).

PS: Finally, you mentioned using neurologic reflexes to do stretching. How is that done?

JM: First, it is worth noting that a stretch is essentially a mechanical process during which soft tissues are physically lengthened. Most everything we have discussed about stretching so far falls into the realm of the mechanical. But because muscle tone is mediated by the nervous system, if we can make an impact on the nervous system’s control of muscle tone, we can get a better stretch. This can be done via two major neurologic reflexes: reciprocal inhibition (which we previously discussed) and the Golgi tendon organ reflex. The Golgi tendon organ reflex is thought to be the basis of a type of stretching

that goes by many names/acronyms: CR (contract relax) stretching, PIR (post-isometric relaxation) stretching and PNF (proprioceptive neuromuscular facilitation) stretching. CR stretching is usually done by contracting a muscle group for a number of seconds, usually 5 to 10, and then relaxing. This triggers the nervous system to further relax that muscle group. We can then take advantage of that relaxation to stretch the muscle more than we otherwise would have been able to.

SC: Many Pilates exercises take advantage of CR stretching, usually as a dynamic shortening and/or lengthening contraction. For example, during Russian Split on the Reformer, the hamstrings on the right side contract (to stabilize and to move the pelvis) as the carriage is pushed out against the spring tension and as the carriage is returned with control (see Figure 6A). The spring tension increases the hamstring contraction. Immediately after their contraction, the client leans forward and achieves a deeper stretch of the hamstrings (see Figure 6B). The spring tension increases the hamstring contraction. Hopefully, understanding these stretching techniques will help teachers work even more effectively with their clients and enhance their own practice. **PS**

Dr. Joe Muscolino has been an author and educator in the world of manual and movement therapies for more than 25 years. For more information, visit www.learnmuscles.com, or follow him on Facebook at The Art and Science of Kinesiology. Simona Cipriani is a former dancer and has been a Pilates instructor for 18 years. She owns and runs The Art of Control at Purchase College, SUNY in Purchase, New York. For more information, visit www.artofcontrol.com.

Overstretching Injury

Stretching is important and healthy. Like anything else, though, if it is performed incorrectly, it can cause injury. Soft tissues are limited in their ability to lengthen and stretch. Our goal when stretching is to increase that ability, but if we push too far or too fast, we can tear the tissue. If muscle tissue is torn, it is called a strain; if ligament or joint capsule tissue is torn, it is called a sprain. Even if a tissue is not torn, overstretching can still trigger what is known as a muscle spindle reflex (also known as a stretch reflex). This happens when, in anticipation of possibly being overstretched and torn, the nervous system steps in and orders the musculature of the region to contract, which effectively “splints” the region, preventing the stretch from going too far. This spasming often persists and becomes a permanent problem for the client. For these reasons, stretching should always be done slowly and carefully!