STRETCHING THE NECK

By Joseph E. Muscolino, DC

A SIMPLE BUT IMPORTANT PROCESS

STRETCHING FUNDAMENTALS

Before we begin our exploration of neck stretching, let's examine the fundamental concept of stretching and the various types of stretching protocols we can add to our toolbox of treatment options. (Be sure to check your state regulations for any scope of practice issues related to stretching.) Armed with this knowledge, we can critically reason and creatively apply stretching techniques when working with our clients.

What is stretching? Stretching is a simple mechanical concept of placing a force into the body that creates a line of tension—in other words, a line of pulling that places a lengthening force on the target tissue. Stretching is aimed at making myofascial soft tissue longer and/or better able to lengthen when needed. And, when we consider musculature as part of this myofascial tissue, stretching inhibits baseline muscle tone, which is another way of saying it relaxes musculature. So, in addition to being a physical mechanical process, stretching can also work with the nervous system and, therefore, involves a neuromechanical concept.

TYPES OF STRETCHING

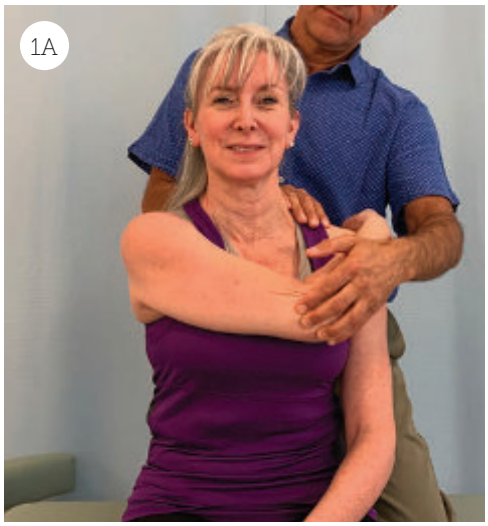
There are many types of stretching protocols. It should be noted that the following terms are not mutually exclusive, so a particular stretch protocol might be described by a number of the following terms.

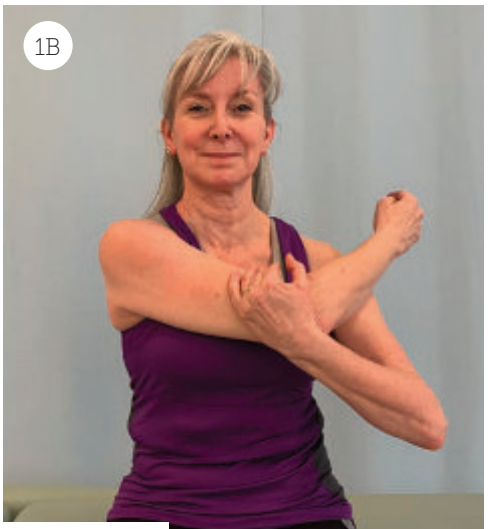
Static Versus Dynamic

Stretching can be performed statically or dynamically. A static stretch is one in which the position of stretch is held statically for a prolonged period of time. Depending on the source, a static stretch can be held anywhere from about five seconds to as long as an hour. The underlying principle behind static stretching is a characteristic of soft tissue known as *creep*. Creep states that a soft tissue will deform when a sustained force is placed on it. The term *deform* literally means to change shape, so stretching involves deforming a shortened taut tissue into a longer, more flexible one. Static stretching is contrasted with dynamic stretching, in which the position of stretch is held for only a short period of time, perhaps one to five seconds, but the number of repetitions performed is greater. Dynamic stretching involves more movement, hence the name.

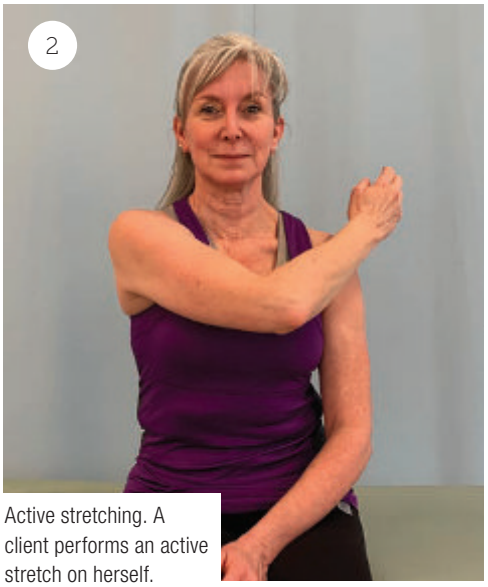
Active Versus Passive

Passive stretching occurs when the musculature of the client's joint being moved and stretched is relaxed and passive, allowing the stretch to occur. Passive stretching can be performed by a therapist with the client fully relaxed, or it can be performed by the client themselves when they use one part of their body to stretch another body part that is relaxed and passive. For example, if the client uses their left upper extremity to stretch their right upper extremity, because the musculature of the right





Passive stretching. 1A: The therapist performs the passive stretch on the client. 1B: The client performs the passive stretch herself.



Active stretching. A client performs an active stretch on herself.

A stretch may also be both active and passive. For example, the client might actively move into the stretch, but then the client relaxes and the stretch is furthered by an increased stretch force when the client is passive.

Active and passive stretching combined. 3A: The client performs an active stretch. 3B: The client augments the active stretch with a passive stretch. 3C: A therapist augments the client's active stretch with a passive stretch.

Photography by Yanik Chauvin. Artwork by Giovanni Rimasti.

upper extremity is passive, the stretch is described as passive (Images 1A and 1B).

In contrast, active stretching is performed by the client actively engaging the musculature of the joint being stretched (Image 2). A stretch may also be both active and passive. For example, the client might actively move into the stretch, but then the client relaxes and the stretch is furthered by an increased stretch force when the client is passive. This passive stretch that augments the active stretch can be performed either by the client or by the therapist (Images 3A–3C).

Therapist-Assisted Versus Client Self-Care

These terms are fairly self-explanatory. If the stretch is performed by a therapist on the client, it is described as a therapist-assisted stretch (see Images 1A and 3C). If the client performs the stretch themselves, then it is a client self-care stretch (Images 1B, 2, 3A, and 3B).

Pin and Stretch

Pin-and-stretch protocol is performed when the therapist places a pin (stabilization point) somewhere along the target tissue, so that the force of the stretch is focused to a region of that tissue. For example, if a regular stretch without a pin is performed for the right upper trapezius muscle by moving the head/neck attachment away

from the shoulder girdle attachment, then the line of tension of the stretch force is spread out along the entire upper trapezius. However, if we place a pin on the upper trapezius, perhaps halfway along the muscle (Image 4), and the head/neck attachment is now moved away from the shoulder girdle attachment, then the stretch force is focused between that pin point and the head/neck. This results in the stretch force being more powerful for the region of the tissue being stretched. So, the general concept of the pin-and-stretch technique is that it allows the therapist to focus the stretch to the region of the tissue located between the pin point and the attachment that is being moved.

Neural Inhibition

Up until now, the stretching protocols we have described have essentially been simple mechanical lengthening of the target tissue. However, a nervous system component can also be added. *Neural inhibition stretching* is a general term that describes how we can augment the mechanical stretch by adding in a neural component, namely a neural reflex that relaxes/inhibits muscle tone. There are two neural reflexes that may be used: *reciprocal inhibition* (RI) reflex and the Golgi tendon organ (GTO) reflex (Images 5A and 5B).

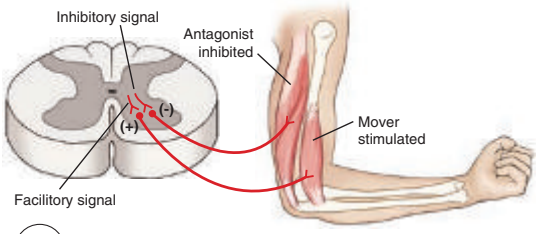
Reciprocal Inhibition Reflex and Agonist Contract Stretching. RI reflex occurs when the client actively contracts mover/agonist musculature and the antagonist musculature to that movement is inhibited so that it can lengthen to allow the motion to occur. It is called reciprocal inhibition because the antagonistic musculature on the other side of the joint is inhibited (the term *reciprocal* refers to a mutual relationship between the mover and antagonist on opposite sides of the joint). This type of stretching technique is described as *agonist contract* (AC) stretching because agonists (movers) of the motion contract so that the antagonist musculature—our target tissue located on the other side of the joint—is inhibited and relaxed, facilitating its stretch. This technique is sometimes described as *antagonist contract* (luckily, still AC) because it is looked at from the perspective of having the client contract the antagonists to the target musculature. It is sometimes described as *proprioceptive neuromuscular facilitation* (PNF) because a proprioceptive neuromuscular reflex, the RI reflex, is used to facilitate the stretch (caution should be used when employing the term PNF because this term is also used for the other type of neural inhibition stretching technique, *contract relax* stretching, that will be described next). And it should be noted that AC stretching technique is the basis for Aaron Mattes's Active Isolated Stretching (AIS) technique. AC stretching technique will be demonstrated later in the article (Images 17A–17C).

Golgi Tendon Organ Reflex and Contract Relax Stretching. The GTO reflex occurs when the client actively contracts musculature, causing the same musculature to be neurally inhibited/relaxed. This reflex is named the Golgi tendon organ reflex because it is activated by GTOs located in the tendons of the muscle (these tendon organs were named for Camillo Golgi, an Italian physician and researcher). This reflex is usually described as a protective reflex that prevents the muscle from contracting

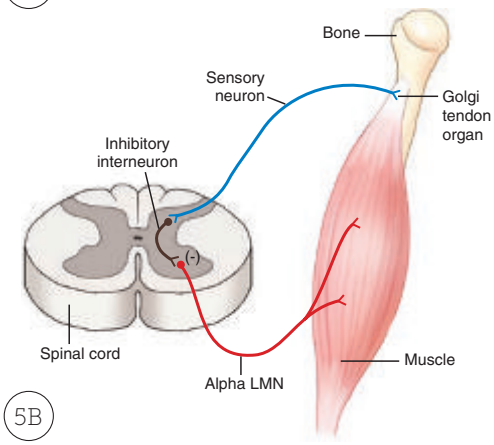
JOINT MOBILIZATION

Grade IV slow oscillation joint mobilization, that can be legally and ethically performed by properly trained and licensed massage therapists in most of the United States, is effectively a form of the pin-and-stretch technique. The difference is that the pin is not placed in the middle of myofascial tissue; instead, it is placed on one bone, and then the adjacent bone at the joint is moved away from the pinned bone. The target of Grade IV pin-and-stretch joint mobilization is to stretch the intrinsic fascial tissues of the joint.

Pin-and-stretch technique for the right upper trapezius. The stretch is focused on the region of the muscle between the pin point and the head/neck attachment.



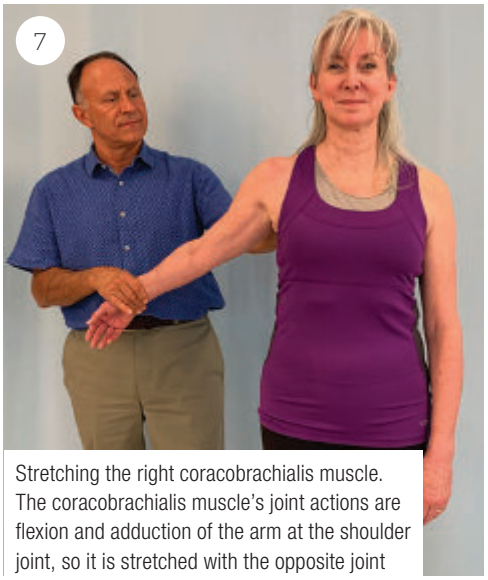
5A



5B

5A: Reciprocal inhibition (RI) reflex. 5B: Golgi tendon organ (GTO) reflex. *Permission Joseph E. Muscolino, DC, Kinesiology: The Skeletal System and Muscle Function, 3rd ed. (Elsevier, 2017).*

Using a rubber band to figure out a stretch. 6A: Placing the rubber band at the attachments of the muscle. 6B: Stretching the rubber band.



Stretching the right coracobrachialis muscle. The coracobrachialis muscle's joint actions are flexion and adduction of the arm at the shoulder joint, so it is stretched with the opposite joint actions—extension and abduction of the arm.

so forcefully that it might tear its own tendons. Stretching that utilizes the GTO reflex is described as contract relax (CR) stretching because the client is asked to contract the musculature and then relax it. CR stretching is also known as *post-isometric relaxation* (PIR) stretching, because the contraction of the target musculature is usually isometric. And, as stated earlier, it is often referred to as *proprioceptive neuromuscular facilitation* (PNF) stretching.

Note that the GTO reflex has classically been described as the sole underlying neural mechanism of CR stretching, but recent research has cast some doubt on this. It is likely that the GTO reflex is part of the underlying neural mechanism of CR stretching technique, but that other aspects of the nervous system are involved. CR stretching technique will be demonstrated later in the article (Images 18A–18C).

PUTTING THE TERMS TOGETHER

Looking at these many terms, we can see that they are not mutually exclusive, and that any one stretching protocol can be described by many of them. For example, if a client actively moves their right arm across the front of their body into horizontal flexion to stretch the horizontal extensors (for example, posterior deltoid, as seen in Image 3A), and then supplements the stretch by using their left arm to pull the right arm farther into horizontal flexion (Image 3B), then it is a client self-care stretch because the client does this themselves; it is an active stretch because they used the musculature of their right arm to initially move into the stretch; it was supplemented with a passive stretch because they completed the protocol by having that joint's musculature passive as their left arm further stretched the target musculature; and it is an AC neural inhibition stretch because the active movement of horizontal flexion reciprocally inhibited the target horizontal extensor musculature!

HOW DO WE FIGURE OUT STRETCHES?

Stretching is extremely simple. We should never have to memorize a stretching protocol. Instead, we can figure out how to stretch any target myofascial tissue in the body. There are two simple ways to approach this:

1. Bring the attachments of the tissue away from each other.
2. For musculature, do the opposite of the muscle's joint action(s).

Bring the Attachments Away from Each Other

If we know the attachment points of the tissue, given that stretching is simply making the tissue longer, then we need to visualize how we would bring the two attachments of the tissue farther away from each other. Picture the tissue as being a rubber band on the client's body. Picture the attachment points of this rubber band, and then ask yourself: How do we bring these two attachments away from each other (Images 6A and 6B)? If we can see this for a rubber band, we can transpose this concept to any myofascial tissue. So, for any myofascial tissue/muscle, if we know its attachments, we can figure out what motion(s) of the body would bring them away from each other.

Do the Opposite of the Joint Actions

The other method for stretching that obviates the need to memorize stretching protocols, at least for a muscle, is to take advantage of the joint actions we have learned for that muscle. A joint action is a concentric shortening function of a muscle; stretching is making the muscle

longer. Therefore, stretching any target muscle is simply an exercise in moving the client's body into the position that would be created by joint actions that are opposite (antagonistic) to the actions of the muscle (Image 7). Of course, for the stretch to be effective, the client needs to be relaxed, so we want the client to be passive as we stretch them. For example, if the muscle is a flexor, we bring the client into extension; if the muscle is a right rotator, we bring the client into left rotation, etc.

STRETCHING AND STABILIZATION

One further fundamental aspect of stretching should be emphasized before we begin exploring how to stretch the neck—the concept of stabilization. As we have said, the underlying idea of stretching a myofascial tissue is to bring the attachments of the tissue away from each other. However, if, for example, we move one attachment of a muscle away from its other attachment, the tension created in the muscle will pull in on the two attachments, and the other attachment will likely be pulled toward the attachment we are moving, causing us to lose the effectiveness of the stretch. For this reason, most every stretching protocol requires the coordination of both of the therapist's hands. One hand creates the stretch by moving one attachment of the target muscle; the other hand acts to stabilize the other attachment of the muscle (Image 8). When a therapist finds that a particular stretching protocol is ineffective, the fault often lies not in how they moved the client's body, but rather in how they failed to stabilize the other attachment of the target musculature.

STRETCHING FUNCTIONAL GROUPS

I realize the title of this article is "Stretching the Neck," and we are halfway in and have not yet addressed neck

Let's begin our exploration of stretching the neck by looking at neck stretches aimed at functional groups. There are six functional groups of neck musculature located within the three cardinal planes: extensors and flexors in the sagittal plane, right lateral flexors and left lateral flexors in the frontal plane, and right rotators and left rotators in the transverse plane. For each functional group stretch shown, we will describe the positions of the hand used to create the stretch as well as the hand used for stabilization, and we will discuss proper body mechanics for the therapist so that the effort on their part is efficient and less stressful on their body.

Stretching Lateral Flexors

All lateral flexion musculature of the neck is located on the side of the neck, whether it is located anteriorly or posteriorly—right lateral flexors are located on the right side, and left lateral flexor muscles are located on the left side. To stretch right lateral flexion musculature, we simply bring the attachments of the muscles away from each other by moving the client's head/neck to the left. In other words, we do the opposite joint action of this functional group—we perform left lateral flexion of the neck. Similarly, we would stretch the left lateral flexion functional group by bringing the client's neck into right lateral flexion (Images 9A and 9B).

Creating the stretch for the right lateral flexion functional group is performed by bringing the client's neck into left lateral flexion. But there are choices for how we accomplish this. In Image 9A, the therapist is using his left hand to press on the right side of the client's head. This is done so the left (upper) arm can be placed against the core of the body, so that the core can be used to create the force of the stretch instead of using shoulder joint musculature. (Note: if the therapist is large-breasted or has a lot of abdominal fat, then placing

Stabilization when stretching. The right lateral flexor musculature of the neck is stretched by moving the neck into left lateral flexion. The therapist's hand is on the superior surface of the client's right shoulder girdle, stabilizing the shoulder girdle to prevent it from elevating.