

INTRODUCTION

Stretching is overrated: it doesn't help with muscle tension or muscle soreness

Several years ago, an article in the New York Times titled *Reasons Not to Stretch* made quite a stir. It listed multiple studies that concluded that static stretching before an activity both decreases muscular performance and is ineffective in preventing injuries. The author compared an overstretched muscle to “lax elastic waistband in old shorts”, and who wants their muscles to become that?! Should we stretch, or shouldn't we?

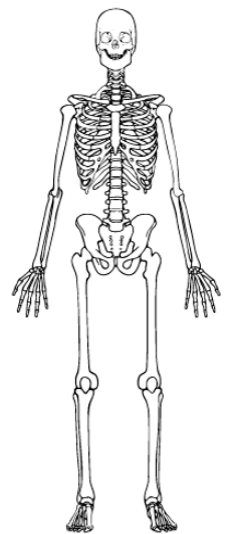
To answer that question let's take a look at the structures that are involved, what their purpose is and what we ultimately want from them.

Bones

The job of your bones is to provide structural support. (They also protect the organs, store minerals and lipids and produce blood cells, but that's beyond our discussion right now.) Bones are also used for leverage when moving the body and stretching.

We want the bones to be strong. How do they get strong?

1. We need to make sure that we have adequate supply of calcium, phosphate and other nutrients.
2. Since the bones adapt to new stresses by becoming thicker and stronger, we need to **strengthen** (not stretch) the muscles that pull on the bones. Weight bearing activities are beneficial here, and yoga is really good in that department, since in the course of the practice you are bearing weight on your feet, knees, hands and sometimes even head. Unless you have some underlying health condition that makes it undesirable, this is good for you.



Ligaments

Ligaments are bands of connective tissue that connect bone to bone. Their job is to support, strengthen and stabilize the joint. Each one of us belongs in a tight-, normal- or loose-ligamented category and we only have mother nature to thank for that.

All gymnasts and super-bendy yoga practitioners have loose ligaments and it's not due to their own accomplishments – they were born that way. Those folks who were born with tighter ligaments might feel like they are lacking, while in fact, they are in a more favorable position, because they have STABILITY. In the flexibility vs stability argument stability always wins. This is because stability is essential in keeping your body balanced and healthy, and in maintaining its structural integrity. Ask those who have loose sacroiliac ligaments and they will tell you how much fun it is for your sacrum to pop out of place all the time. If your ligaments are not stable, you will need to find that stability elsewhere and your muscles will have to carry that burden, even though it is not their job.



What do we want from our ligaments? We want them to support and reinforce our joints. WE DO NOT WANT TO STRETCH THE LIGAMENTS. Stretching the ligaments will destabilize the joint, which will make it prone to injury. Ligaments have very high collagen concentration, which means that they are not elastic. Ligaments can only stretch to the maximum of 6% over their normal length. Past that some collagen fibers will tear. If that happens, it will take forever to heal (ligaments have very little blood supply) and it will compromise the entire area that ligament is supposed to support.

Tendons

Tendons connect muscles to bones. When muscle fibers contract, they pull on the tendons that become stretched and transfer the tension to bones, which are then moved. Tendons behave similarly to ligaments and we don't want to stretch them either.

Muscles

The main job of your skeletal muscles is to move the body by contracting and pulling on the levers of bones. What do we want from the muscles? We want them to maintain their contractile power and resting muscle tone. Contractile power means that the muscle has elasticity and resilience to be able to both contract to generate action and then return to the resting muscle length. Muscle tone means that in any skeletal muscle, some motor units are always active, even when no movement is produced. Resting muscle tone stabilizes the position of bones and joints. We need this to maintain the upright position, to catch ourselves if we trip, to make it easier to begin movement and, of course to show off those nice-looking six-pack abs. Interesting fact: toned muscles use more energy, which means that you continue to burn calories even after exercising and that continues for 24 hours per day. That's one reason why strength training is recommended during a weight loss program.

MUSCLE'S ABILITY TO CONTRACT IS DEPENDENT ON THE RESTING MUSCLE LENGTH

Muscle contraction happens because of the interaction between the thick and thin filaments within a sarcomere (the smallest functional unit of the muscle fiber). For this interaction to occur, there needs to be a generous overlap between the thin and thick filaments. The degree of overlap depends on the resting length of the muscle fiber (which is reflected in the length of the muscle as a whole).

Thin filaments Thick filaments Thin filaments



<p>Normal resting length</p>	<p>Overlap Overlap</p> <p>Optimum muscular contraction is produced when the zone of overlap is large but the thin filaments do not extend across the center.</p>
<p>Shortened resting length (locked short)</p>	<p>Overlap Overlap</p> <p>At short resting lengths, thin filaments extend across the center and collide with the thin filaments of the opposite side. As a result the contraction power of the muscle is greatly reduced.</p>
<p>Stretched out resting length (locked long)</p>	<p>Overlap Overlap</p> <p>At stretched out resting lengths, the zone of overlap is small, which means that interaction between the thick and thin filaments is greatly reduced and the muscle cannot contract properly. If the overlap disappears completely (when the muscle is overstretched), the muscle will not contract at all.</p>

Stretching does not help with either increasing your muscular performance or developing resting muscle tone. This is because muscle's ability to contract is dependent on the resting muscle

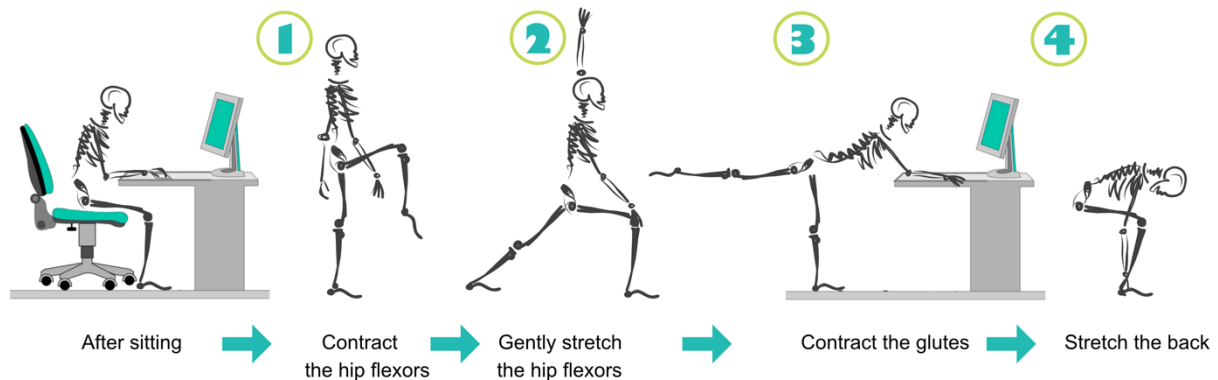
length. If it's either too short or too long the contraction will be weaker. Overstretched muscle loses its contractile power completely and becomes, well, like a "lax elastic waistband in old shorts".

Why do we want to stretch anyway? Usually we do it when the muscles feel tight or sore. Let's look at the mechanisms behind those a bit closer.

You have probably heard the term agonist – antagonist in relation to muscles. It basically means that muscles usually work in pairs – if one is contracting, another one is opposing the movement and becomes stretched. Agonist is the mover; antagonist is the one that resists the movement. Since we rarely use the muscles in a balanced way in our daily lives, often the agonist gets stuck in the shortened (partially contracted) position and the antagonist in the lengthened position. Simple example: when you sit a lot during your day, your hip flexors become chronically contracted (even though you are not moving them, they are just stuck in a shortened state) and your glutes lose their tone and weaken. Adopting Thomas Myers' terminology from *Anatomy trains*, your hip flexors are now locked-short, while your glutes are locked-long. Over time both locked-short and locked-long muscles lose their ability to contract properly and become weak, undernourished and eventually painful. The first instinct is to try and stretch a locked-short muscle, but it is like trying to pry open a clenched fist – it won't give much and then will snap right back into place. A locked-long muscle is already in a stretched-out, weakened state, so stretching it won't get you anywhere.

The solution here is to **CONTRACT** your tight muscles first and then stretch them later. That's what your muscles are designed to do – to contract and relax in succession, and doing so will increase circulation to the area, "awaken the muscle", so to speak. After sitting for a while, you can walk around a bit (preferably raising your knees up high as you do it), and then do some mild hip flexor stretching (like in modified Warrior 1). This will be more effective than stretching alone. You can take it even further by intentionally contracting the antagonist muscle (glutes in our example) to begin restoring balance to the agonist-antagonist relationship.

HOW TO REMEDY TIGHT HIP FLEXORS AFTER PROLONGED SITTING

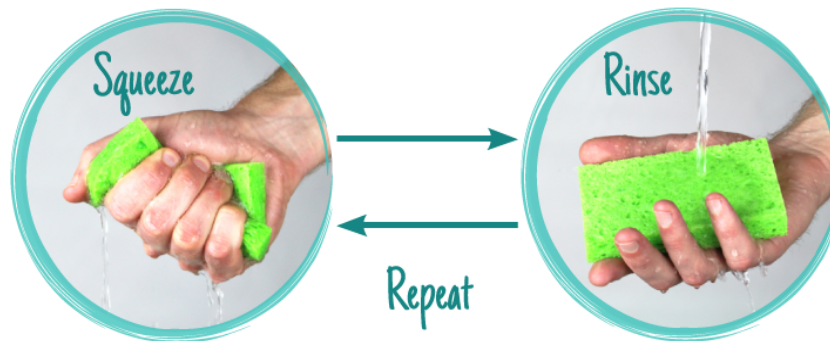


This principle applies to any tight muscle – contract-relax, contract-relax, contract-relax it first. It is much more effective to do that before an activity (running, hiking, gardening, skiing – whatever) than static stretching. You can call it *dynamic warm-up* – it prepares the body for the challenge by warming up the muscles. Unlike static stretching, dynamic warm-up **WILL** help minimize the risk of injury and **WILL** help increase muscular performance. You can do static stretching after the activity.

The same concept applies to dealing with muscle soreness. Muscle soreness is usually attributed to build up of lactic acid in the muscle and/or microscopic tears in the muscle tissue. The process of releasing muscle soreness is similar to cleaning a household sponge: first you want to get rid of the wastes by squeezing them out, just like you would squeeze dirty water out of the sponge; then you would want to bring in freshly oxygenated blood, just like you would soak the sponge in clean water, then you would squeeze it out again and repeat until your sponge is clean and your muscle

is saturated with fresh blood. Blood brings healing. Would pulling on two ends of the sponge accomplish the same effect (like you do in stretching)? Not likely.

Releasing muscle soreness is similar to cleaning a household sponge: squeeze, rinse, repeat.



Then where does stretching fit in? Stretching is useful primarily to locked – short (chronically contracted) muscles and fascia (another important player in the connective tissue category).

To release chronic muscular contraction, you would contract-relax, contract-relax, contract-relax the muscle first to increase the blood flow. After the muscle becomes more pliable, you can begin to stretch so that it could return to its normal resting length. It is not our intention to make our muscles longer, that doesn't serve any purpose at all. Our purpose is to free them from the chronic state of contraction so that they could move the body properly, maintain a healthy muscle tone and improve range of motion at the joint level.

In the viniyoga tradition, we manifest this idea by moving in and out of the pose first (called repetition), and then holding the pose statically. It serves the same purpose of dynamically warming up the muscles before exerting maximum force.