

Dynamic Extension Technique

Phase one - Muscles that act on the thigh

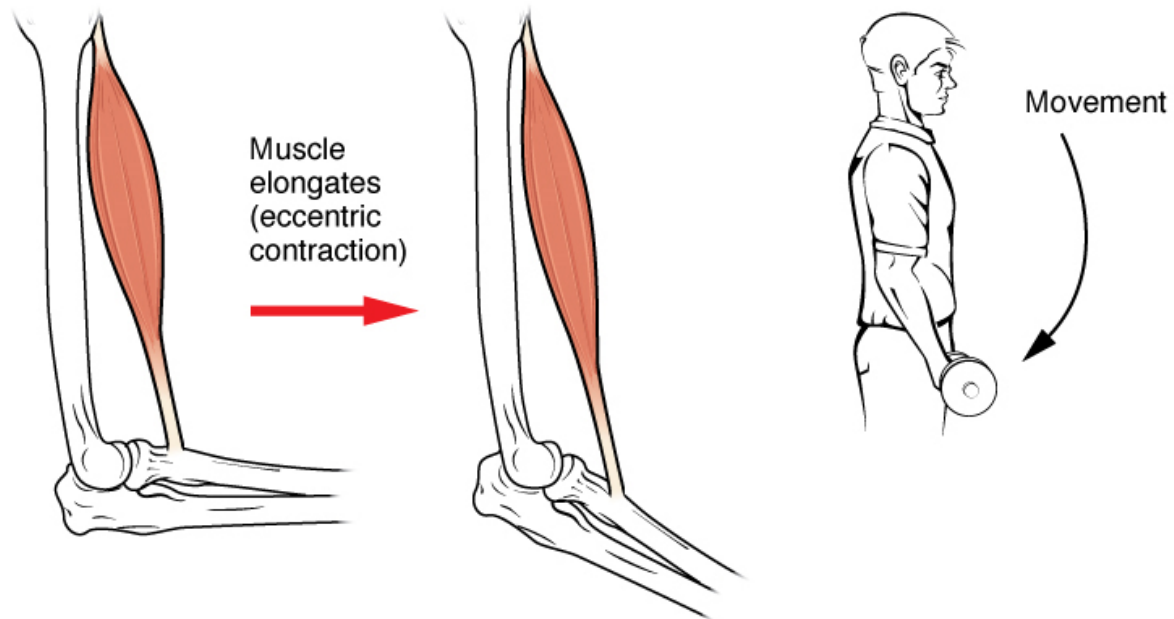


Working deeper into the body with less discomfort for the therapist and client, while bringing awareness back to the body that was forgotten.

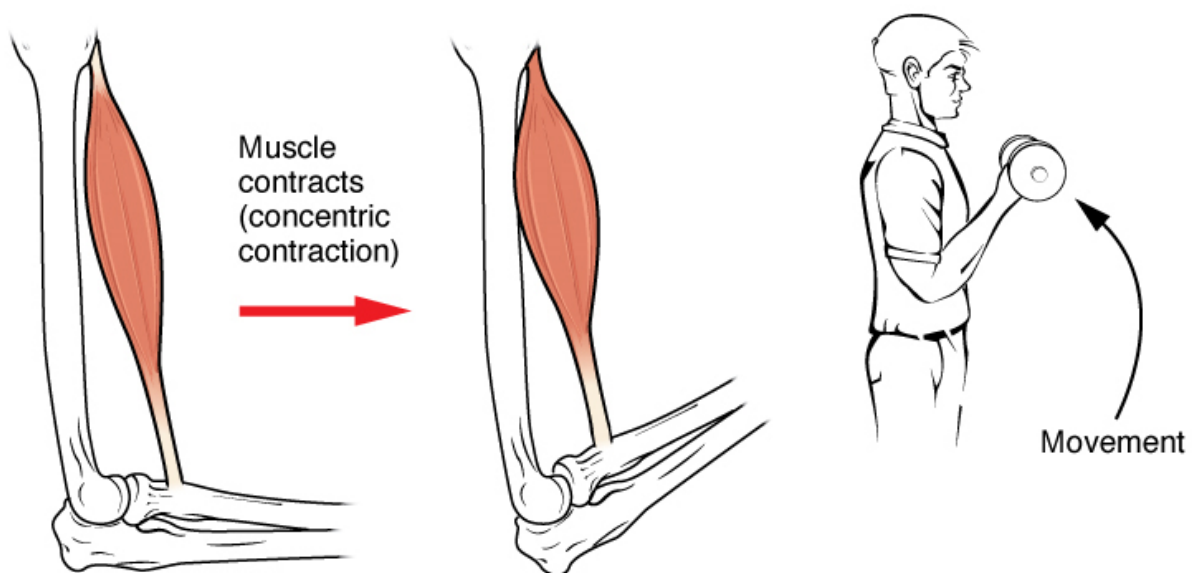
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Dynamic Extension Technique

One of my favorite techniques is a movement I call “Dynamic Extension Technique”, I have been practicing for many years. It is a combination of many well know techniques, that once put together will allow working deeper into the tissue with less discomfort for the client and the therapist, while bringing awareness back to the body that was once forgotten.



Every movement of the body is a series of concentric and eccentric contractions.



In its simplest form Dynamic Extension Technique can be broken down into:

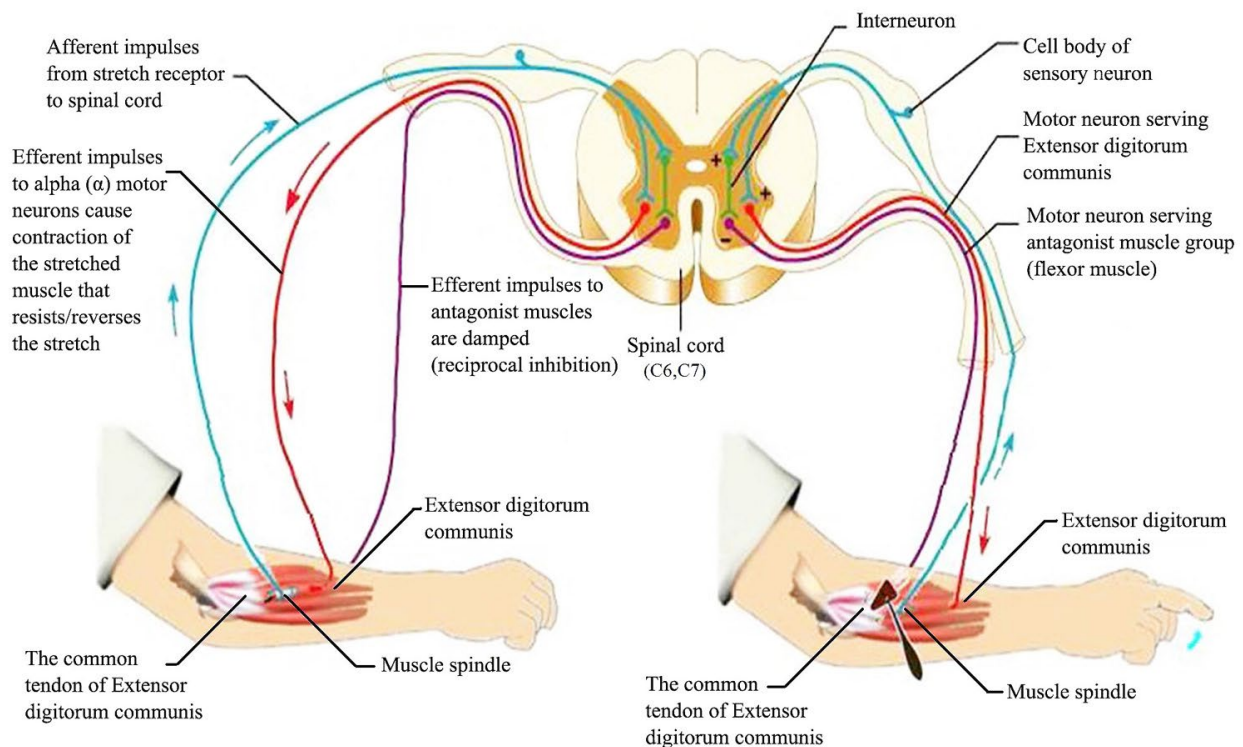
Resist concentric while treating the eccentric

- Have the person contract the opposite of the target muscle (this will elongate the target area).
- During this contraction, using resistance from the therapist (sending the nerve signal to the opposite side) while the therapist treats the target area.

The first component of Dynamic Extension is commonly known as a massage concept called “pin-and-stretch”, which is applying pressure to a muscle as you elongate it. This is reminiscent of the treatment Active Release Technique (ART).

With the pin and stretch technique, the force of the stretch will be concentrated to the region of the muscle that is between the pinned point and the attachment that is moved.

As a muscle contracts the motor nerve has been activated which is commonly known as a concentric contraction. The opposite or antagonist muscle relaxes known as an eccentric contraction.



If pressure is applied to a muscle while it is in the relaxed or lengthened eccentric state it will encourage the elongation of muscle tissue with less discomfort for the client.

One of the obstacles I face with treating people is lack of awareness of their bodies. With athletes, during their workouts many train past their pain threshold. In fact, the average person may suppress nagging discomfort with their day to day lives.

As this warning signal is suppressed more and more the person may not be aware of a nagging irritation that has grown into a full-blown injury until the therapist addresses it on the treatment table.

Another added benefit of Dynamic Extension Technique is by having the person actively contract the opposite muscle of the one being treated will encourage awareness of this dysfunctional area and help to restore proper function and range of motion.

By contracting the opposite muscle, this will be sending the nerve signal to the concentric side, which allows the target muscle to relax or calm down allowing a deeper treatment of the tissues with less discomfort for the client.

The final component of Dynamic Extension Technique is a form of PNF stretching which is a great tool in gently releasing hypertonic tissue while improving range of motion quickly. ¹

PNF Stretching used in therapy

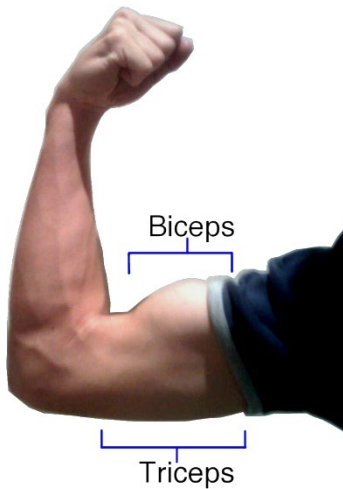
Of the 4 main types of stretching (ballistic, dynamic, PNF and static) PNF appears to be of much benefit. Proprioceptive Neuromuscular Facilitation (PNF) was developed as a treatment system for neurologically impaired patients (stroke, brain injury) and then also applied to orthopedic conditions. ²

The commonly used PNF “Contract-Relax” method performed by people in fitness training and rehabilitation is more of an umbrella term for three different techniques:

1. **Hold Relax** is probably the most familiar technique, consisting of an isometric (non-moving) contraction at the stretched position, followed by a period of relaxation. So, there is an unyielding force applied against the muscle providing force for a period, then a relaxation, followed by an attempt to move further in the range of motion.
2. **Contract Relax** is distinguished from hold relax in that the muscle contraction is concentric (moving). So, it is against a yielding force that starts from the stretched position into a shortened position. Here, the repetitions in and out of the stretched position make this more like a dynamic stretch.
3. **Eccentric Relax** usually begins a bit before the uncomfortable stretch position and then there is an eccentric muscle contraction. So, the stretched muscle is contracting against an overcoming force that moves it into an even further stretched position. This is a particularly good method but has the potential to be overdone if the force is excessive (I have seen this useful method in Hanna Somatic techniques).³



In addition, Sherrington's law of reciprocal inhibition (Sherrington, 1907) ⁴ states that a hypertonic antagonist muscle may be reflexively inhibiting their agonist.



Therefore, in the presence of tight and/or short antagonistic muscles, restoring normal muscle tone and/or length must first be addressed before attempting to strengthen a weakened or inhibited agonist muscle.

As in this example, if a tight bicep muscle is found I would check the triceps muscle to make sure it is not inhibiting the bicep muscle.

Dynamic stretching

There is one form of stretching, however, that has actually been shown to improve strength, power, muscular endurance, anaerobic capacity, speed, and agility: **dynamic or active stretching** (similar to Mobilization which has the movement component as well as the benefits of PNF). It is also called **active isolated assisted stretching**.

Unlike static stretching, active dynamic stretching involves movements that repeatedly put muscles through the expected ranges of motion, such as air squats, leg kicks, side lunges, arm circles, and so forth.

Active stretching accomplishes several things that improve performance: it increases the suppleness of and blood flow to the muscles, raises body temperature, and enhances free, coordinated movement. ⁵

By shortening the opposite of the target muscle, the nerve signal turns off the target muscle allowing it to stretch.

For example, when stretching the hamstrings, the quadriceps muscles on the front of the leg are contracted, releasing the hamstrings, and making them more susceptible to stretching.

A runner would lie on his back, lift his leg by using the muscles on the front of the leg, then stretch the hamstring by lightly pulling the leg back to the point of tightness, holding the stretch and then releasing.

One of the most important pieces of dynamic stretching is to realize that most target muscles of the human body can be stretched by contracting the opposite muscle or group of muscles, along with a little bit extra stretch.

Therefore, it is essential to understand the primary action of a muscle and the opposite.

Adding the movement component and contracting the opposite muscle is key in completing the picture.



Before continuing to regions of the body to treat, we must discuss that:

- Dynamic extension is primarily known as treatment for muscle tissue, but it does so much more! A study has shown that layers of fascia are innervated by nerve endings as well. ^{6,7} The complete answer would be treating all soft tissues of the body not just muscle tissue.
- Sometimes it is not as simple as a target muscle and the opposite. Many movements are performed by combined muscles (synergistic). There may be many target muscles to treat in a region.
- Resisting the concentric muscle may be challenging while providing the stroke to the target muscle. Variations maybe required other than what is outlined in this manual.
- During palpation of a muscle one direction will provide more glide than another direction. By treating the direction with more resistance is best at releasing adhesions. This “against the grain” may be more aggressive and too much for the client, so caution and less pressure may be advised.

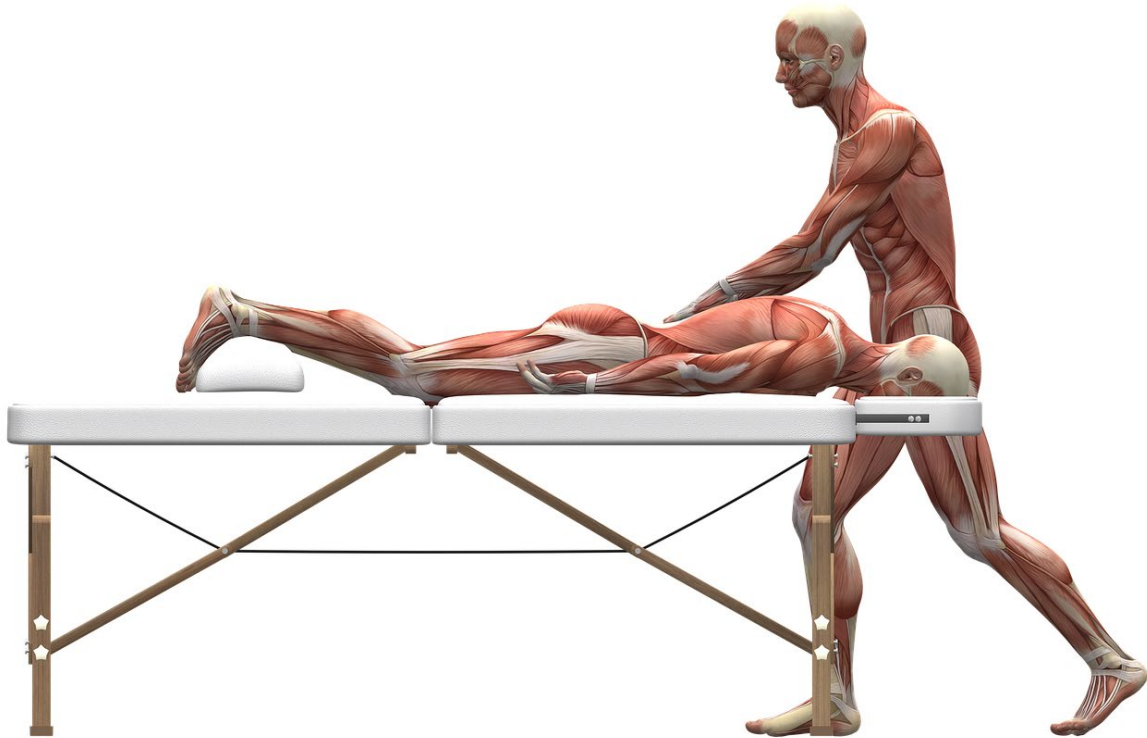
Dynamic Extension Protocol for the Major Areas of the Body

- The guide I use for treating the body with Dynamic Extension Technique is to determine the action of the target, or eccentric (antagonist) muscle I will be working with. (treating the area as it is being stretched)
- Next is to find the opposite muscle, determine the action of this concentric (agonist) muscle.
- Demonstrate to the person how to shorten or contract the concentric muscle.
- Have the person practice shorten the concentric muscle a few times gently.
- As the person continues to shorten the concentric muscle, resist with 20% pressure, and slowly glide and treat the target muscle (with or against the grain).
- Some areas are best treated with the forearm while others using the hand, in some cases other aids are helpful, like IASTM or Cupping.
- With each stroke as the tissue releases more pressure should be able to be tolerated.



Actions of commonly treated muscles

In this manual, muscle action will be described as the primary function only. Many muscles have multiple functions depending upon gravity and crossing many joints.



Muscles that act on the thigh

Quadriceps-extends leg at knee joint

Hamstrings-flexion of leg at knee joint

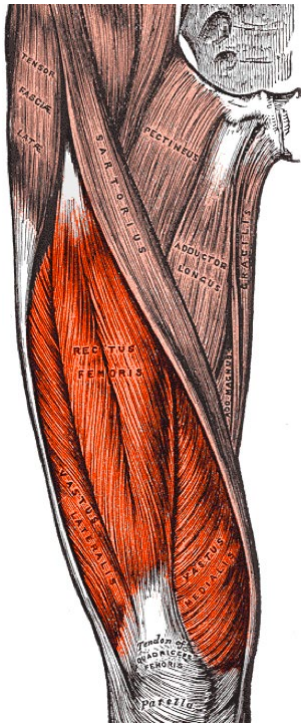
Tensor Fascia Latae-flexes thigh, abducts thigh

Adductor Magnus/Brevis/Longus-adducts thigh

Gluteus Medius/Minimus-abducts thigh-rotates thigh medially

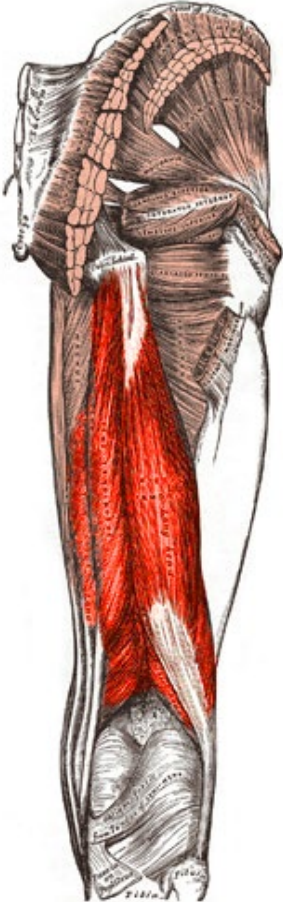
Gluteus Maximus-extends thigh, rotates thigh laterally

Quadriceps (extends leg at knee joint) is a good muscle group to start with. These muscles absorb tremendous stress and shock during walking, let alone running.



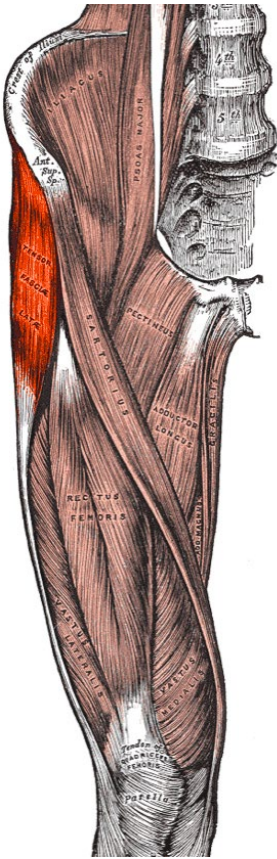
1. Begin supine position, with knee bent and off the edge of the table.
2. A small amount of lubricant is helpful, *if you have not, try shea butter.*
3. Have the person demonstrate a concentric contraction of bending the knee as the person focuses on a gentle activation of the hamstrings. This movement is only approximately 2-4 inches.
4. As the person continues this movement, resist the concentric contraction with 20% pressure. and slowly glide and treat the target muscle (with or against the grain).
5. **Slow and gentle activation of the hamstrings only because they are prone to cramping.**
6. At the end of the stroke, reset and have the person relax the contraction.
7. Repeat, with each stroke as the tissue releases more pressure should be able to be tolerated.
8. A good suggestion to treat “against the grain” of this large muscle group would be to: start at the lateral knee and finish at the top of the medial quadriceps.

Hamstrings (flexion of leg at knee joint) is a sensitive group to treat and do not respond well, unless done so with lighter pressure and an extended, slow amount of treatment time.



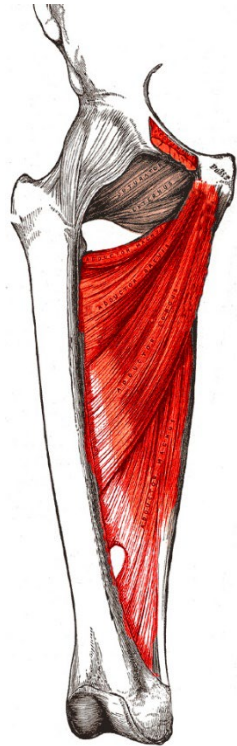
1. Begin prone position, with knee bent and supported by a roll (pillow).
2. A small amount of lubricant is helpful.
3. Have the person demonstrate a concentric contraction of straightening the knee as the person focuses on pushing the ankle into the roll, with a gentle activation of the quadriceps. **At no point should the knee lift off the table.**
4. As the person continues this movement, resistance from the therapist is not needed because the person is pushing into the roll.
5. Slowly glide and treat the target muscle (with or against the grain).
6. At the end of the stroke, reset and have the person relax the contraction.
7. Repeat, with each stroke as the tissue releases more pressure should be able to be tolerated.
8. A good suggestion to treat “against the grain” of this muscle group would be: Medial to Lateral.

Tensor Fascia Latae (flexes thigh, abducts thigh).



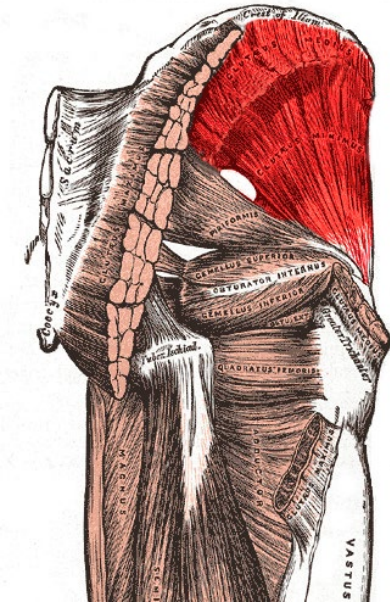
1. Begin side lying position, with upper leg in hip extension, knee straight and off the edge of the table.
2. A small amount of lubricant is helpful.
3. Have the person demonstrate a concentric contraction of hip extension and a small amount of hip adduction. This movement is only approximately 2-4 inches each.
4. As the person continues this movement, resist the concentric contraction with 20% pressure. and slowly glide and treat the target muscle (with or against the grain).
5. At the end of the stroke, reset and have the person relax the contraction.
6. Repeat, with each stroke as the tissue releases more pressure should be able to be tolerated.
7. A good suggestion to treat “against the grain” of this muscle would be to: Medial to Lateral.

Adductor Magnus/Brevis/Longus (adducts thigh)



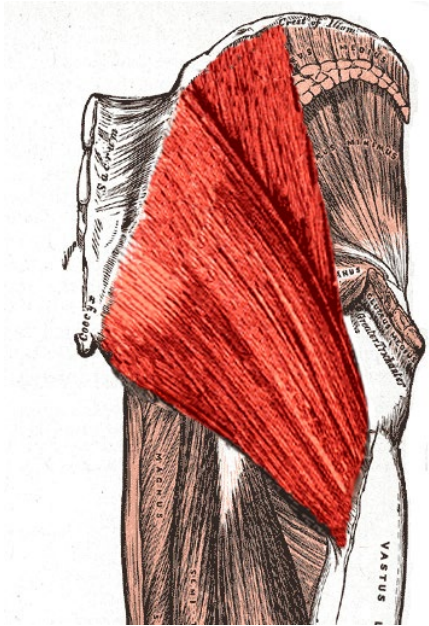
1. Begin supine position, with knee bent and off the edge of the table.
2. A small amount of lubricant is helpful.
3. Have the person demonstrate a concentric contraction of opening the leg in abduction. This movement is only approximately 4-5 inches.
4. As the person continues this movement, resist the concentric contraction with 20% pressure. and slowly glide and treat the target muscle (with or against the grain).
5. At the end of the stroke, reset and have the person relax the contraction.
6. Repeat, with each stroke as the tissue releases more pressure should be able to be tolerated.
7. A good suggestion to treat “against the grain” of this large muscle group would be: Medial to Lateral.

Gluteus Medius/Minimus (abducts thigh, rotates thigh medially).



1. Begin side lying position, with upper leg in hip extension, knee straight and off the edge of the table.
2. A small amount of lubricant is helpful.
3. Have the person demonstrate a concentric contraction of hip adduction and a small amount of lateral rotation. This movement is only approximately 2-4 inches each.
4. As the person continues this movement, resist the concentric contraction with 20% pressure. and slowly glide and treat the target muscle (with or against the grain).
5. At the end of the stroke, reset and have the person relax the contraction.
6. Repeat, with each stroke as the tissue releases more pressure should be able to be tolerated.
7. A good suggestion to treat “against the grain” of this muscle would be to: Lateral to Medial.

Gluteus Maximus (extends thigh, rotates thigh laterally).



1. Begin side lying position, with knee bent.
2. A small amount of lubricant is helpful.
3. Have the person demonstrate a concentric contraction of flexing the hip as the person focuses on a gentle activation of the iliopsoas and a small amount of medial rotation. This movement is only approximately 4-5 inches.
4. As the person continues this movement, resist the concentric contraction with 20% pressure. and slowly glide and treat the target muscle (with or against the grain).
5. At the end of the stroke, reset and have the person relax the contraction.
6. Repeat, with each stroke as the tissue releases more pressure should be able to be tolerated.
7. A good suggestion to treat “against the grain” of this muscle would be: Lateral to Medial.

Bibliography

1. Osternig LR, Robertson RN, Troxel RK, Hansen P. Differential responses to proprioceptive neuromuscular facilitation (PNF) stretch techniques. *Medicine and Science in Sports and Exercise*. 1990 Feb;22(1):106-111.
2. Maicki T, Bilski J, Szczygieł E, Trąbka R. PNF and manual therapy treatment results of patients with cervical spine osteoarthritis. *J Back Musculoskelet Rehabil*. 2017;30(5):1095-1101. doi:10.3233/BMR-169718.
3. Somatic Exercise for Flexible Hamstrings.
<https://www.youtube.com/watch?v=ehr-smlV-Vs>
4. Robert E. Burke, Sir Charles Sherrington's The integrative action of the nervous system: a centenary appreciation, *Brain*, Volume 130, Issue 4, April 2007, Pages 887–894.
5. Herman, Sonja L1,2; Smith, Derek T2,3 Four-Week Dynamic Stretching Warm-up Intervention Elicits Longer-Term Performance Benefits, *Journal of Strength and Conditioning Research*: July 2008 - Volume 22 - Issue 4 - p 1286-1297 doi: 10.1519/JSC.0b013e318173da50
6. J. Tesarz. Sensory innervation of the thoracolumbar fascia in rats and humans *j. neuroscience*.2011.07.066. Epub 2011 Aug 2. doi: 10.1016
7. L'Hocine Yahia, Souad Rhalmi, Nicolas Newman & Marc Isler (1992) Sensory innervation of human thoracolumbar fascia, *Acta Orthopaedica Scandinavica*, 63:2, 195-197, DOI: 10.3109/17453679209154822

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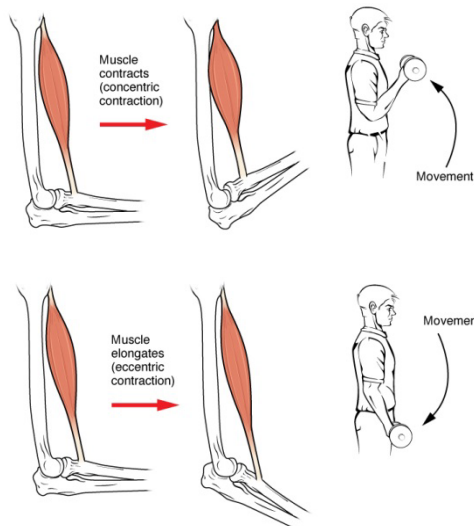


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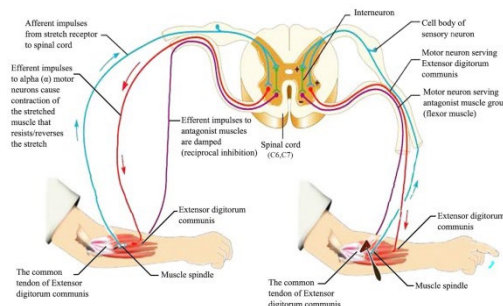


Types of Contraction

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Zhang MJ, Zhu CZ, Duan ZM, Niu
X.

Department of Cardiology,
Second Affiliated Hospital, School
of Medicine, Xi'an Jiao Tong
University, China.

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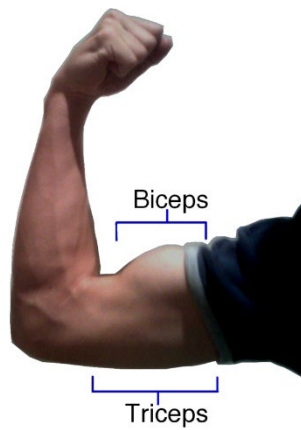


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Dynamic Stretching 11a

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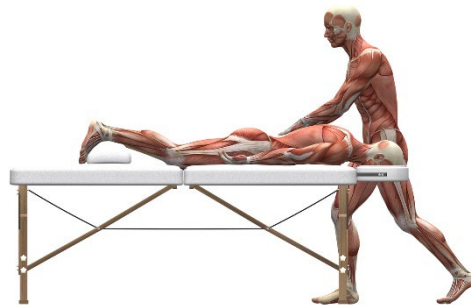


IASTM utilizing Dynamic
Extension Technique

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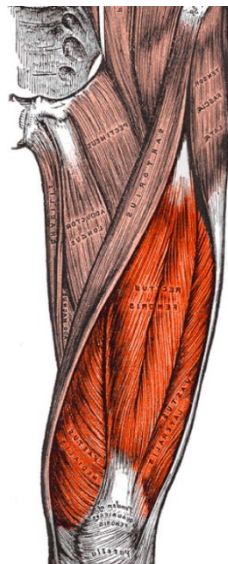


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Quadriceps.jpg

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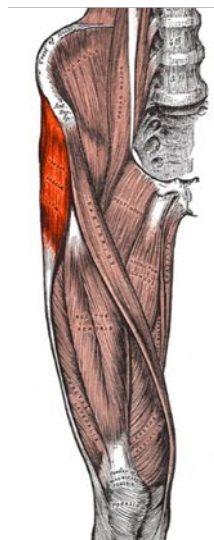
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Hamstrings.jpg

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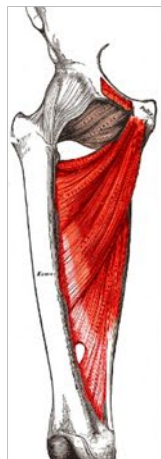
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Tensor-Fascia-Latae.jpg

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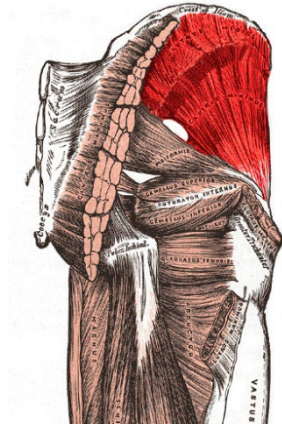
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Adduct.jpg

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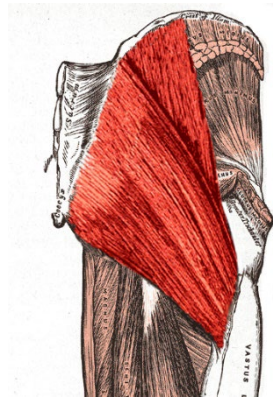
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