

## **FUNCTIONAL MOBILITY AND RESISTANCE STRETCHING™ FOR SKIERS**

PMTS™ essentials of skiing:

Tipping

Flexing and extending

Counteracting

Counterbalancing

Combining counteracting and counterbalancing with pole use

Maintaining fore/aft balance

Why can't we make these movements in our skiing? Often it's not for lack of trying, nor lack of proper equipment setup and alignment, but rather our inability to move "functionally" while skiing (or otherwise).

Problems arise when we have chronically tight muscles. Overuse, asymmetrical use, physical trauma, stress, sedentary activities contribute to tightness. Tight muscles stay shortened and pull the body out of alignment. Additionally, tight muscles don't function well and are less strong which makes functional movement difficult and opens the door to injury.

We have to evaluate our "functional range of motion and movement". Traditional passive stretching doesn't really give us a clue here. The focus in passive stretching is often merely on range of motion and achieving an endpoint, regardless of the biomechanical consequences. For example: from a standing position, bend over and try to touch your toes – which picture are you?



Passively trying to stretch can often lead to substitution in order to achieve the desired range of motion (the picture on the right). This isn't functional and is likely to place excess strain on tendons, ligaments, and joints...oh my aching back! True functional range can be determined when we remove the substitution (the picture on the left). Those tight hamstrings are often full of dense fascia, scar tissue, trigger points – we can't passively stretch those out.

## Resistance Stretching™

True flexibility is defined by functional biomechanical alignment and muscle strength. A flexible muscle is generally a stronger muscle.

To stretch tight muscle, remove dense fascia, scar tissue, knots, etc. requires much more force than can be safely applied with traditional passive stretching (about 2x the force is required to stretch the muscle as to strengthen it). Think of a knot in your muscle as similar to a screw placed in wood with an electric drill...try to remove that screw manually. It takes a lot of force...that's us taking those knots out of our muscles. In fact, if you used wood glue on that screw...that means it will take more force, which is what it's like to remove that dense fascia. However, if we contract the muscles while we lengthen them (e.g. use the electric drill in reverse), we will have the added force to pull out those knots and release the dense fascia and tension in our muscles.

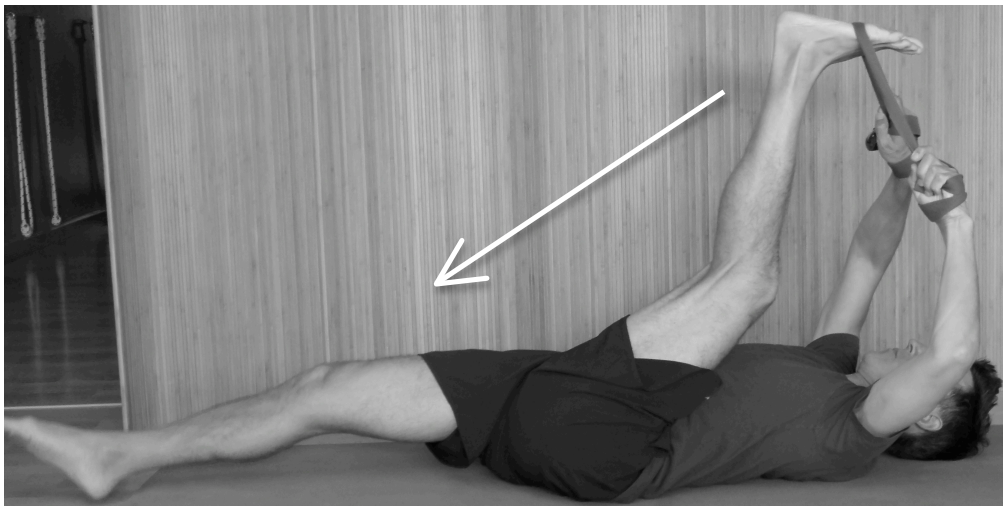
***With Resistance Stretching, we remove tension by contracting the muscle while we lengthen it – called an eccentric contraction.***

Sometimes if the screw is in there tight (aka scar tissue), we have to wiggle it to get it out...so we add strength training (concentric contraction) to the mix of our stretching as a supplement, the “wiggle” factor.

Rules of Resistance Stretching to keep in mind:

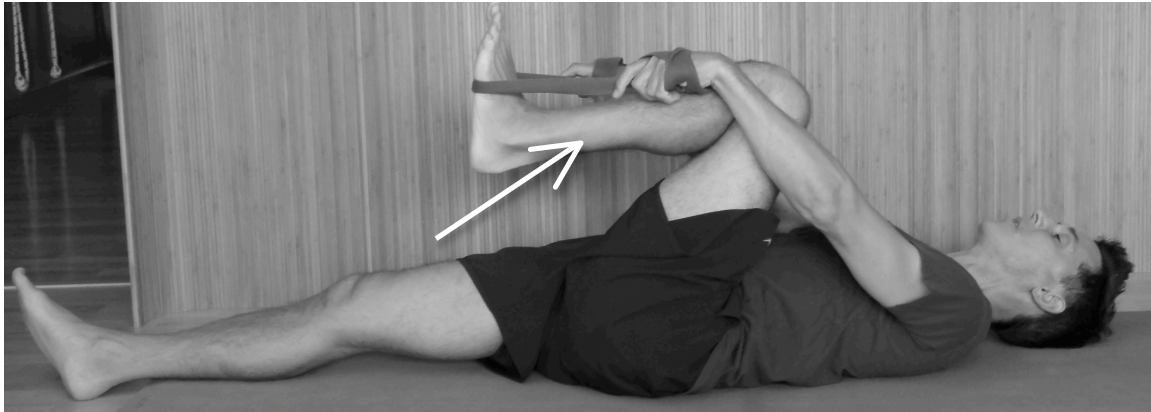
1. To truly improve flexibility, you need to continuously contract the target muscle group while lengthening it (eccentric contraction). You begin with the muscle as short as possible and move to where it is as long as possible.
2. A muscle is only flexible to the point at which it can continue to maximally resist while it is being lengthened. If resistance drops off, then you have reached the limit of lengthening for that muscle – go no further!
3. Stretching without continuing to contract the muscle (passive or static stretching) will risk substitution and a false sense of your true functional range. You may then end up over-stretching tendons and ligaments resulting in injury.

Start with **strength training** to warm the muscle up and to find your functional range of motion. Aim for about 10-20 reps of strength training depending on degree of tightness, scar tissue, etc.





**Resistance flexibility** training a muscle is next and now you will start with the muscle in the shortened position, contract the muscle as you lengthen it. Now you are stretching.



Points to remember when Resistance Stretching or Strengthening:

You contract the target muscle in both strengthening and stretching. One is concentric (strengthen) and one is eccentric (stretch and lengthen).

You *move* your body in both instances. Most of the gain in strength or flexibility occurs thru movement, not at the end point of the movement.

Optimal resistance strength training requires flexible muscles and optimal resistance stretching requires strength in the muscle.

Good breathing is critical. Inhale when strengthening and exhale when stretching. We release the tension in our muscles thru our breathing and exhalation.

For Resistance Stretching, do 1-2 sets of each stretch and about 5-10 repetitions per set. Try to do opposing muscles in sequence – for example hamstrings then quads and vice versa. If you feel like a muscle is difficult to engage or doesn't feel like it is stretching, or you feel the sensation in the opposite muscle, then stretch the opposite muscle first. For a muscle to lengthen, the opposite muscle must shorten simultaneously.

Daily stretching is great, but we are all busy, so if you can aim for at least 3 times a week you will see a benefit. For particularly tight muscles, you might try to do those daily.

Remember, this is a workout, so plan to refuel after stretching and drink plenty of water. When you first begin this type of stretching you may be sore. This is normal, but it's best not to try and do a lifetime of stretching in one session. Moving muscles the day after stretching will help ease any soreness.

OK, here we go....let's do some stretches.

## Hamstrings Stretch – Standing

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### Starting Position

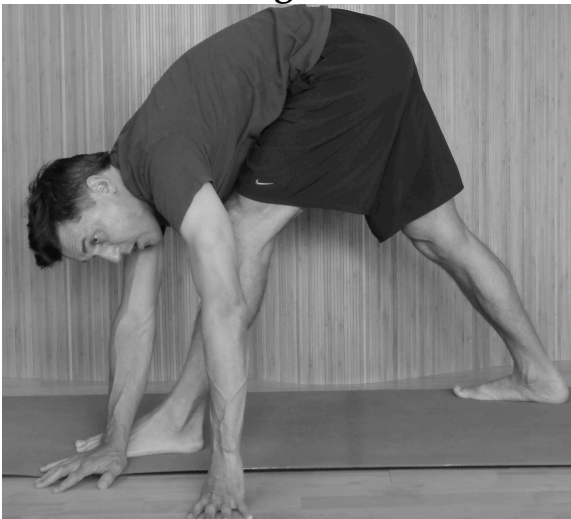


1. Place your body in the Starting Position, one leg in front and knee bent, back leg comfortably wide and with straight knee.
2. Begin powerfully bending your front knee, as if to pull your heel to your butt.
3. As you *continue bending your front knee* (resisting), with your arms pushing and back leg pulling, move yourself backwards such that your front knee straightens. Continue until the knee is as straight as comfortably possible. Hold at the Ending Position.

By bending (resisting) with your front leg while your arms push and back leg pulls to move you backwards, you cause your hamstrings to powerfully contract while simultaneously lengthening.

**Note:** Perform the above three different angles for each leg, straight, diagonally to the left, and diagonally to the right. Switch legs and repeat.

### Ending Position



## Hamstrings Stretch – Lying down

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### Starting Position

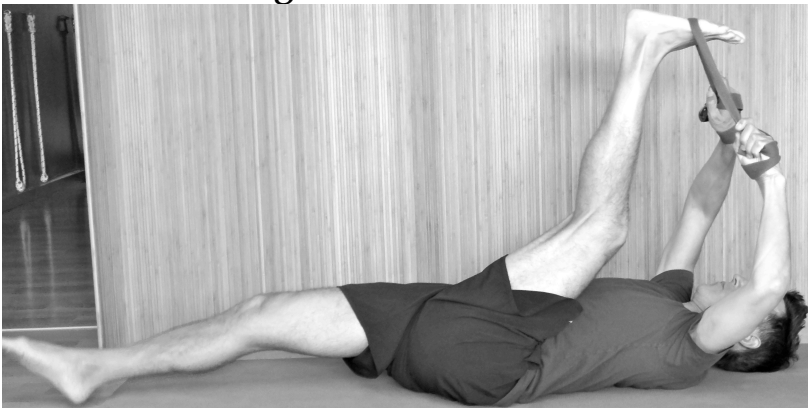


1. Place your body in the Starting Position, bending one knee and holding your foot with your hands or a strap.
2. Begin powerfully kicking the foot that you are holding down towards your butt, bending your knee.
3. As you *continue kicking your foot towards your butt* (resisting), with your arms begin pulling your foot away from your butt, straightening your knee. Continue until the knee is as straight as comfortably possible. Hold at the Ending Position.

By kicking (resisting) with your leg while your arms straighten your knee, you cause your hamstrings to powerfully contract while simultaneously lengthening.

**Note:** Perform the above in three different directions for each leg, pulling your leg straight, diagonally to the left, and diagonally to the right. Switch legs and repeat.

### Ending Position



# Hip Flexor Stretch

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## Starting Position



1. Right leg: Starting position split leg kneeling on floor and leaning back towards right knee.
2. Begin with trying to pull your right knee forward as if flexing at the hip by contracting your hip flexors.
3. As you *continue contracting your right hip flexor* (resisting), with your left leg pull your body forward and continue to move forward, opening up the right hip (while still contracting right hip flexor). Hold at the Ending Position.

By pulling forward (resisting) with your right leg while the left leg pulls you forwards you contract the right hip flexor while lengthening. Lift arms overhead or use hands on butt to tuck pelvis in order to intensify the stretch. Repeat with left leg.

## Ending Position

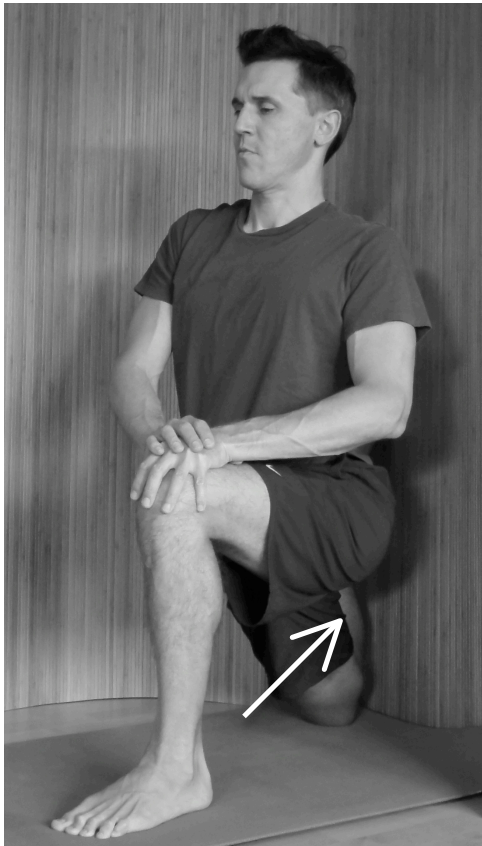


**You have the idea....let's continue with more stretches...**

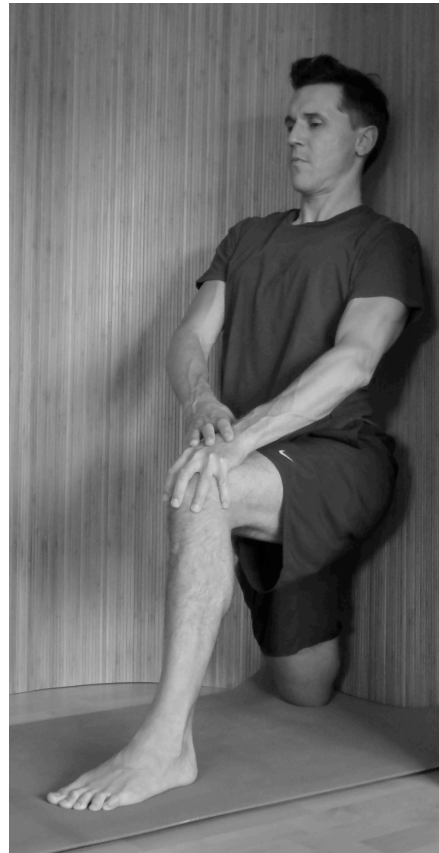
## **Quad Stretch**

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**Starting Position**



**Ending position**



## **Glute Stretch**

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**Starting Position**



**Ending position**





## TFL Stretch

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### Starting Position



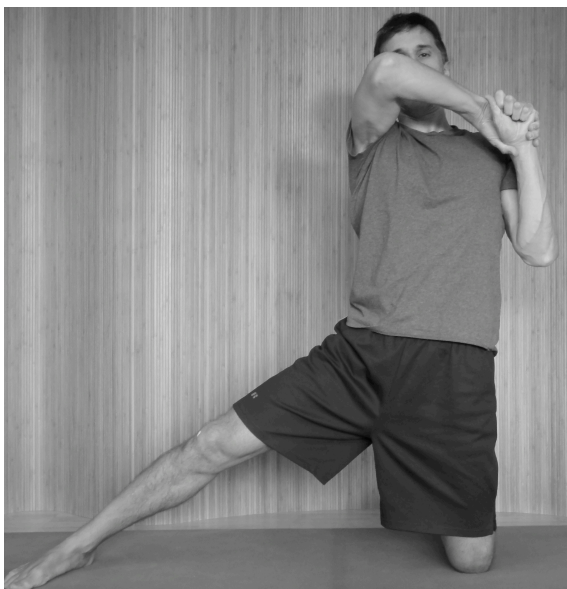
### Ending position



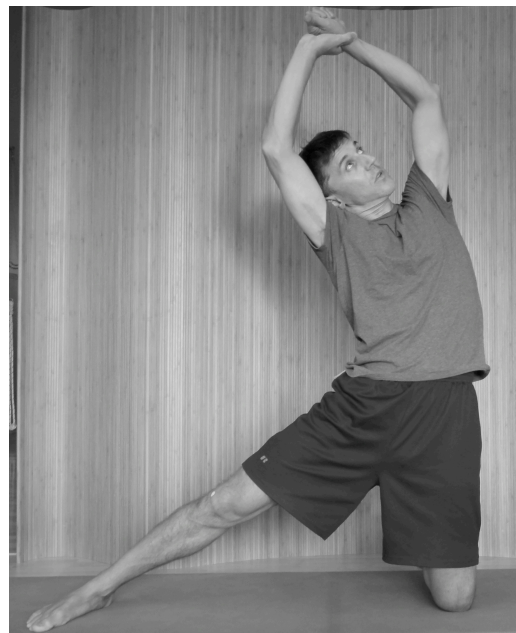
## Side Stretch

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### Starting Position



### Ending position



# Adductor Stretch

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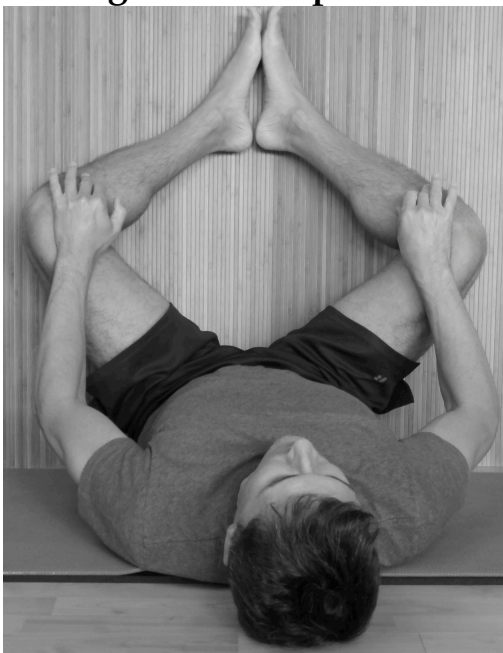
**Starting Position-option 1**



**Starting Position-option 2**



**Ending Position-option 1**



**Ending Position-option 2**

