

Stretching

The science of muscles

A muscle operates over either one or two joints, is attached (via a tendon) to the bone and acts as levers on our bones to give us movement. When a muscle starts from a fully relaxed state, it can only contract up to a maximum of half its length. Maximum force is obtained in the mid-range of the muscle's Range of Motion (RoM). However, when a muscle is already in spasm (in a state of contraction) then it is unable to relax and stretch.

There are functionally two types of muscles: those that stabilise and those that provide movement. People with good "core stability" means their movement muscles are free to provide maximum athletic performance. However those with poor "core stability", where their stabilising muscles are 'switched off', have to use their movement muscles to provide postural stability. This means that they cannot use their movement muscles to their full athletic potential. In general, stabilising muscles are deep and become lax if not used; movement muscles are superficial and become tight if over-used.

Why do cyclists need to stretch?

In a nutshell, to increase performance. If you have poor "core stability", you are prone to muscle imbalance, leading to tight superficial movement muscles, lax deeper stabilising muscles. This can cause poor joint biomechanics and joint misalignment and leave you prone to muscle tear injuries. Finally, tight muscles that become chronically shortened can only produce a fraction of the potential power of the muscle for its size.

Stretching, as part of a postural alignment and core stability programme, can help relax and lengthen tight muscles. By doing this, the muscle will produce far more force because it's acting over a longer length in a biomechanically optimum way for that joint. By also tackling any core stability issues, movement muscles will not be using some of their potential in maintaining posture.

Even though cycling involves a mechanically constrained movement pattern (turning the pedals), increasing the length of your muscles will increase their power for each contraction. Also you will be able to cope better with movements that take your joints to their limits of movement. For example, sprinting out of the saddle, swerving suddenly, mountain biking where your bike and body often go in different directions.

When should I stretch?

The two good times to stretch are as part of your pre-ride or race warm up and as part of your post-ride or race warm down. In all cases, you should only stretch muscles that are already fully warmed up. Also you must remain fully stable as you perform each stretch. However, the type of stretching you do is completely different. Because a "static" stretch "switches off" your muscle it should only be done after your ride. A "dynamic" stretch achieves full range of motion without "switching off" your muscle [3], [4].

Pre-Ride Stretching

The purpose of Pre-Ride Stretching is to make sure each joint is acting over its full range of motion and relaxed so that full power can be generated. The type of stretching you perform is known as “dynamic”. Here, you take the muscle to its full range of motion, so that you just feel a stretch, in a controlled movement. You then immediately release the stretch. Repeat 8-10 times, each time your muscle (and so limb) will go just that little bit further. In practise, it looks like you’re swinging your leg but in fact you are in full control of the movement at all times.

The 3 dynamic stretches I recommend for cyclists are:

- 1) Hamstrings. Start with your left hand holding onto a support and your right hand on your right hip. In a smooth controlled movement, swing your right leg from vertical to out in front of you, keeping it straight. Do not let the pelvis move. Take your leg to the point where you just feel a stretch and return to vertical. Repeat 8-10 times for each leg.
- 2) Quadriceps. Same starting position as for hamstrings but this time swing your leg behind you. When you have reached a slight stretch with your leg straight, then fold your calf towards your bum. If you are particularly flexible then perform a dynamic version of the static Rectus Femoris (standing) stretch. Repeat 8-10 times for each leg.
- 3) Calves. Start with both hands holding onto a support, your left leg forward and slightly bent and right leg behind and straight. Keeping your right leg straight, stretch your right calf by dropping your left knee. When you feel a slight stretch in your calf, drop your right knee until you feel a slight stretch again (usually lower down your calf). Repeat 8-10 times for each leg.

Another one is the dynamic version of the Anterior Chest & Shoulder stretch.

Post-Ride Stretching

“Static” stretching is best done once you’ve showered, changed and had your post-ride recovery meal/drink. Even if you use cold water on your legs there is still enough heat in the belly of your muscles to perform static stretching safely. This type of stretching is done to aid recovery (by flushing out waste products and drawing fresh blood into your muscles) and permanently lengthen the muscles.

With all the stretches, you must maintain good postural alignment and not tilt your pelvis or slump. Exhale when you reach the point of slight stretch. Hold each stretch for 30 seconds, by when you should feel the muscle relax. Take the muscle to the next stretch position and hold for a further 30 seconds. Repeat each stretch sequence 4 times for each muscle. At the end, slowly return to normal standing or sitting.

The 10 static stretches I recommend for cyclists are:

- 1) Thoracic Spine – Kneeling [1, p91]
Kneeling on all fours, sit back on your ankles, keeping your hands fixed. You should feel a stretch up your lower and mid-spine and back of the shoulders. This stretch may be held for up to 2 minutes to gain the full benefit on the spine.
 - a. Place one knee slightly in front of the other to introduce some lateral flexion.

- 2) Gluteals [1, p87]

Lie on your back with your left leg straight. Bend your right knee, hold with your left hand and pull upwards and across your body towards your left shoulder. Vary the angle of the stretch to hit the tight areas of your gluteals.
- 3) Calves [1, p90]

This is made up of two main muscles: Gastrocnemius (2 joint over both knee and ankle), Soleus (1 joint over ankle).

 - a. Gastrocnemius: Hold onto a stable support with both hands. Place your left foot forward and right foot behind, just before feeling the stretch. Keeping both heels on the floor and right leg straight throughout, gently drop the left knee into the stretch.
 - b. Soleus: as above but slightly bend the right knee.
- 4) Hamstrings – long sitting [1, p88]

Start with your right leg straight and your left leg comfortably bent. Grip the sole of your right foot (or ankle if you cannot reach) with your right hand and press your left hand onto your thigh. Lean forward, maintaining a gentle curve throughout the whole spine.
- 5) Rectus Femoris – standing [1, p89]

Standing, hold a support with your left hand. Bend your right knee and grab your ankle with your right hand. Pull your leg back and your foot up towards your right buttock. Use a towel looped around your right ankle if you cannot flex your knee that far.

 - a. Rectus Femoris – lying with towel [1, p96]

If you are very flexible then this is more effective. Lying on your front, bend your right knee. Loop a towel around your right ankle and draw your heel towards your right buttock. To emphasise the stretch on your upper thigh, put another folded towel under your knee.
- 6) Hip Adductors – long sitting [1, p87]

Sit on the floor with both legs straight. Bend your right leg and place your right foot on your left thigh, above the knee. Support the foot with your left hand and press down on the knee with your right hand. Keep your spine long and maintain correct posture. To help, you can sit against a wall with a rolled towel in the small of your back.
- 7) Upper Trapezius [1, p104]

Sit on a chair and grip the seat with your right hand. Tilt your head to your left allowing your right shoulder to rise. Place your left hand on your right ear to fix your head in position and actively depress your right shoulder.
- 8) Anterior Chest & Shoulders [1, p118]

stand side onto a wall, place your right hand on the wall at shoulder height. Keeping your right arm straight, turn your feet to the left and rotate your body to the left, feeling the stretch across the front of your shoulder. Alter the height of your hand on the wall to vary the stretch.
- 9) Wrist Extensors [1, p107]

Straighten your right arm out in front drop your wrist down (so your fingers are pointing to the ground). Grip your right hand with your left, placing your left thumb into the wrist crease. Using your left thumb as a pivot, gently stretch your wrist further.
- 10) Lower Back Extension [1, p97]

Lie on your front, placing your hands on the floor in the “press up” position. Pushing only with your arms to arch your spine. Keeping your hips firmly on

the floor. Pause in the upper position then lower. Vary the position of your hands to alter the range of motion. It's very difficult at first but avoid using any other muscles, e.g. back, gluteals, hamstrings.

Contra-Indications

As with any exercise programme, you should ensure that you are in full health before you start anything new. If you are over 40 then you should get a medical check up, especially if you are new to stretching or returning after a long absence.

The Gluteal stretch is contra-indicated after pregnancy.

References:

[1] Norris, Christopher M.; *The Complete Guide to Stretching*; A&C Black, 1999

[2] The Sivanda Yoga Vedanta Centre; *Learn Yoga in a Weekend*; Dorling Kindersley, 1996

[3] Karl B. Field, MD; Craig M. Burnwoth, MD; Martha Delaney, MA; *Should Athletes Stretch Before Exercise?*; Gatorade Sports Science Institute
<http://www.coaches.bc.ca/newsroom/enews/2007/Oct07/Stretching.pdf>

[4] Iain M. Fletcher & Bethan Jones; *The Effect of Different Warm up Stretch Protocols on 20m-Sprint Performance in Trained Rugby Union Players*; Exercise Physiology Laboratory, University of Luton.
www.rfu.com/pdfs/technical_journal/sprintperformance.pdf

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