The Running Recipe: 5 Critical Skills and Fixes for Efficient and Injury-Free Running Technique

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SKILL 1

Emphasize motion inside of the forward/backward plane of movement.

There are many reasons why some of your motions might leave the forward/backward plane, such as:

1. poor awareness of proper technique;

2. decreased strength of specific muscles;

3. poor ability of the nervous system to control the correct muscles;

4. unique bony alignment and structure;

5. specific muscular shortness.

A portion of these problems can be corrected immediately with technique changes while others cannot be corrected without supplemented and highly targeted work outside of running.

Figure 1 indicates forward flexion and backward extension occur in the pink plane.

Figure 2 indicates rotation in another plane, which you want to minimize.

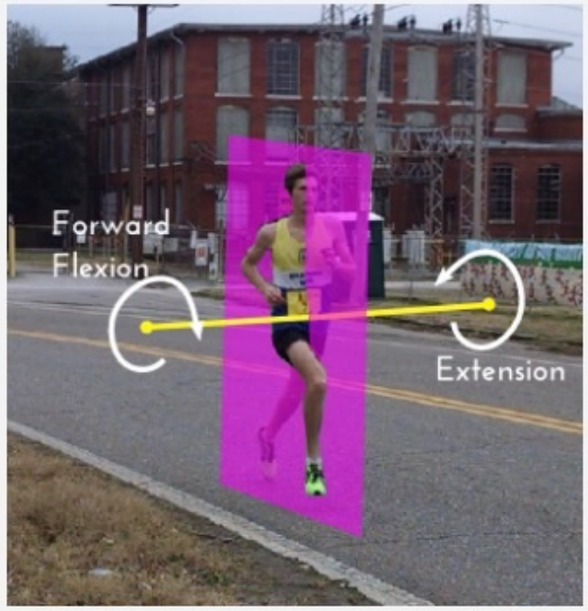


Figure 1: The sagittal plane of a runner. The trunk can flex/bend and extend/straighten about the axis going through this plane.

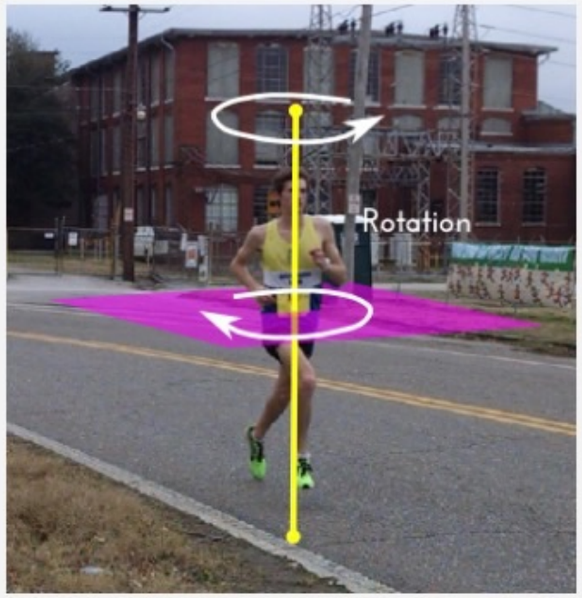


Figure 2: The transverse plane of a runner. The trunk and pelvis will rotate in either direction about the axis going through this plane.

MOUNTAIN RIDGE PHYSICAL THERAPY

Emphasize motion inside of the forward/ backward plane of movement.

These are factors you can focus on changing at any time during your run. You are trying to minimize any motion that doesn't propel you forward. The faster you try to run, the more each of these areas robs you of efficiency.

1. Swing your arms nearly straight forward and backward. They should not be directed toward your midline as each arm comes forward. My left arm in this picture is starting to swing in and up to the midline too much as I tire.

2. Swing the legs directly forward and backward by thinking of each thighs as a pendulum that swings equally forward and backward.

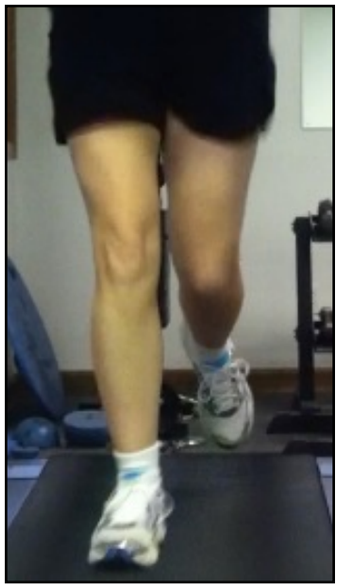
3. Keep the trunk stable. Avoid twisting your trunk excessively. This is a common but rarely addressed problem that drains your power. It is often paired with the arms swinging toward the midline in the middle of your chest.

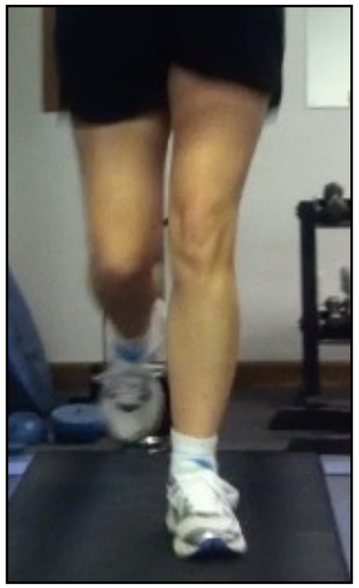
MOUNTAIN RIDGE PHYSICAL THERAPY

Emphasize motion inside of the forward/ backward plane of movement.

1. Collapsing of your foot's inner arch. Tension of the calf muscles as well as overall calf muscle shortness will limit proper ankle joint movement. You need to loosen the calves with frequent massage or rolling for maintenance. Therapy techniques like dry needling or myofascial release can produce large gains of motion quickly.

2. Turning your feet outward. A dominant calf muscle group will restrict your ankle movement. This is a way to cheat the ankle joint into creating mobility. The left foot is turning out more in these pictures. Combining an outward turn of the foot with inner arch collapse can result in deformities like bunions. The same soft tissue work above can be useful to improve motion. The same soft tissue work above can be useful to improve motion.





These are factors that require supplemental work on motion, strength or nervous system retraining to correct. These flaws may occur to make up for a lack of joint motion or stability, such as when the calf muscles shorten, the big toe MTP joint stiffens or the hip flexor muscles become dominant.

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3. Decreased swing of your thigh in a rearward direction. Runners become too good at using their hip flexors, which actually decreases your nervous system input into the important gluteus maximus muscles, in turn decreasing the back half of the pendulum swing. Proper strengthening of the weaker hip muscles would be beneficial along with soft tissue work to the hip flexors.

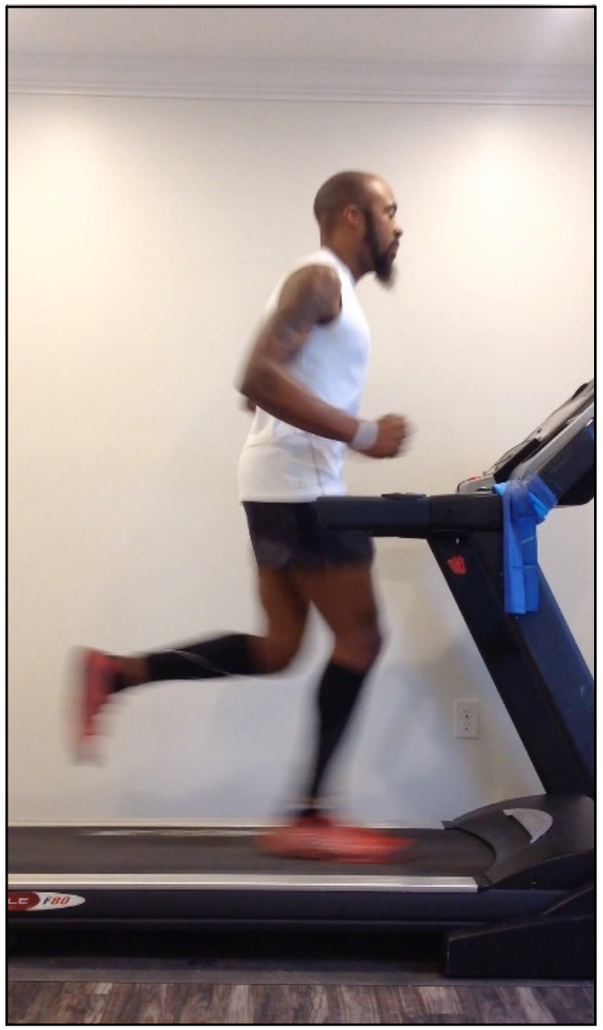
4. Dropping the opposite side of the pelvis. Along with the gluteus maximus muscle, the gluteus medius should keep your hips in a position to allow forward and backward motion. When the gluteus medius shuts down or weakens, the pelvis begins to rock side to side instead of remaining close to level. Notice how much lower the left side of the pelvis is in this picture while the runner is on the right leg. Strengthen those hips as a first step!

MOUNTAIN RIDGE PHYSICAL THERAPY

SKILL 2

Maintain a neutral spine position.

Many runners have a tendency to lean their upper body forward from their low back and hips and round forward at the upper back and neck. Many will have low back pain during longer or faster runs because of the additional strain this causes. There are multiple strategies to maintaining a more neutral spine in running.



MOUNTAIN RIDGE
PHYSICAL THERAPY

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1. For the lower spine, focus on leading with your pelvis and hips. You don't want to relax your stomach, stick out your butt, and arch the low back with forward rocking of the pelvis. You also don't want the opposite, where you would completely flatten the back out. A neutral position is in the middle of those two extremes. Your abdominals are engaged but not to the point that you feel like you are doing a constant crunch or hunching over. It takes a good deal of abdominal strength to run efficiently and quickly. In this video the runner has an excess of forward pelvic tilt which causes abnormal positioning and stress on everything above and below that point.

2. At the upper spine and shoulders, run tall while keeping your shoulder blades squeezing back slightly. Also keep your head centered over your shoulders. Try to avoid shrugging your shoulders upward. Some runners engage their abdominals by rounding their chest downward but that will certainly demand more of the neck, shoulder blade and low back muscles, which is not advantageous.

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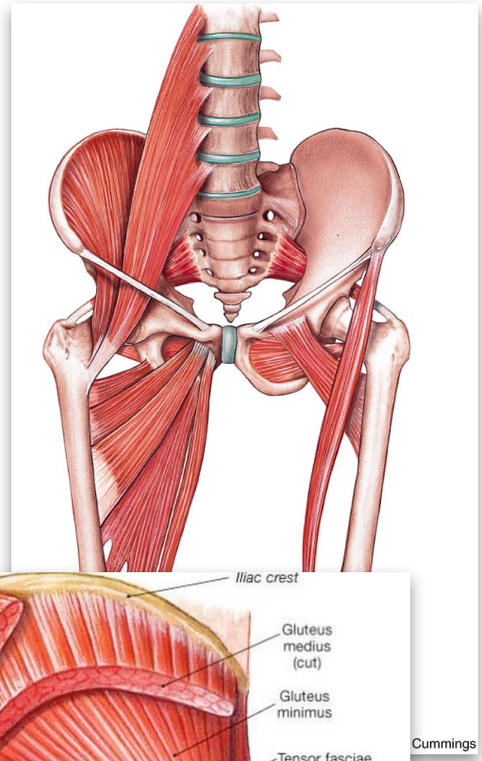
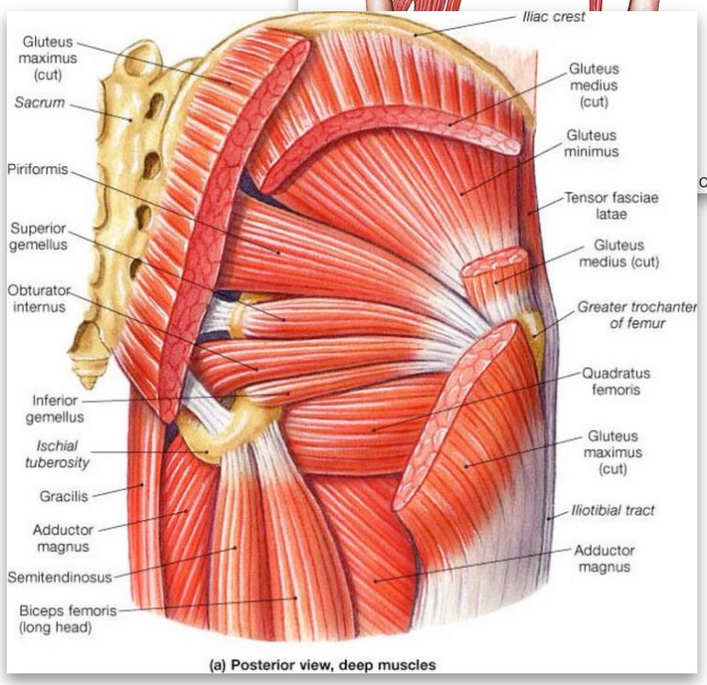
3. Make sure the various muscles and joints of your spine and hips can move through their full range of motion. For instance, the hip flexor muscles at the front of the hips need to be supple and relaxed enough to let your thigh reach backward with each stride. This may require supplemental corrective exercises.

4. Make sure the muscles of your hips, shoulder blades, abdominals and low back are strong and capable. It is common for runners to have the following weak or inactive muscles: gluteus medius, gluteus maximus, middle trapezius, lower trapezius, multifidi, transverse oblique, internal oblique, and external oblique. This may also require supplemental corrective exercises.



Cummings



(a) Posterior view, deep muscles

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SKILL 3

Land softly and quietly.

Research indicates that increased contact force is associated with injury. Run quietly with a smooth, fluid foot contact on the ground. A higher impact force can be related to the initial point of contact, which is typically caused by overstriding too far forward, which is discussed in the next skill point.

MOUNTAIN RIDGE
PHYSICAL THERAPY

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1. You can change how hard you contact the ground simply by using the sound of your feet as feedback. Focus on making that sound as quiet as possible. This can be especially effective on a treadmill because they often make the sound even louder. This will demand a little more muscle control early on in your practice, but by consistently lowering the forces transferred up your legs you will lower your risk for overuse injuries.

MOUNTAIN RIDGE PHYSICAL THERAPY

Land softly and quietly.

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1. Try running striders in your bare feet. I don't know of anyone that can hit the ground hard without a shoe on. You will instinctively land softly. Don't overdo it. Just 1-2 minutes of running is plenty. And do it someplace safe, like an astroturf field.

2. You can practice landing softly with a variety of drills. You will still focus on the sound of your feet striking the surface as feedback. Focus again on making that sound as quiet as possible. In order of difficulty:

   a. hop in place on two legs, progressing to one leg;

   b. hop forward, backward, and sideways on two legs, progressing to one leg;

   c. jump up onto a wooden box on two legs, progressing to one leg.

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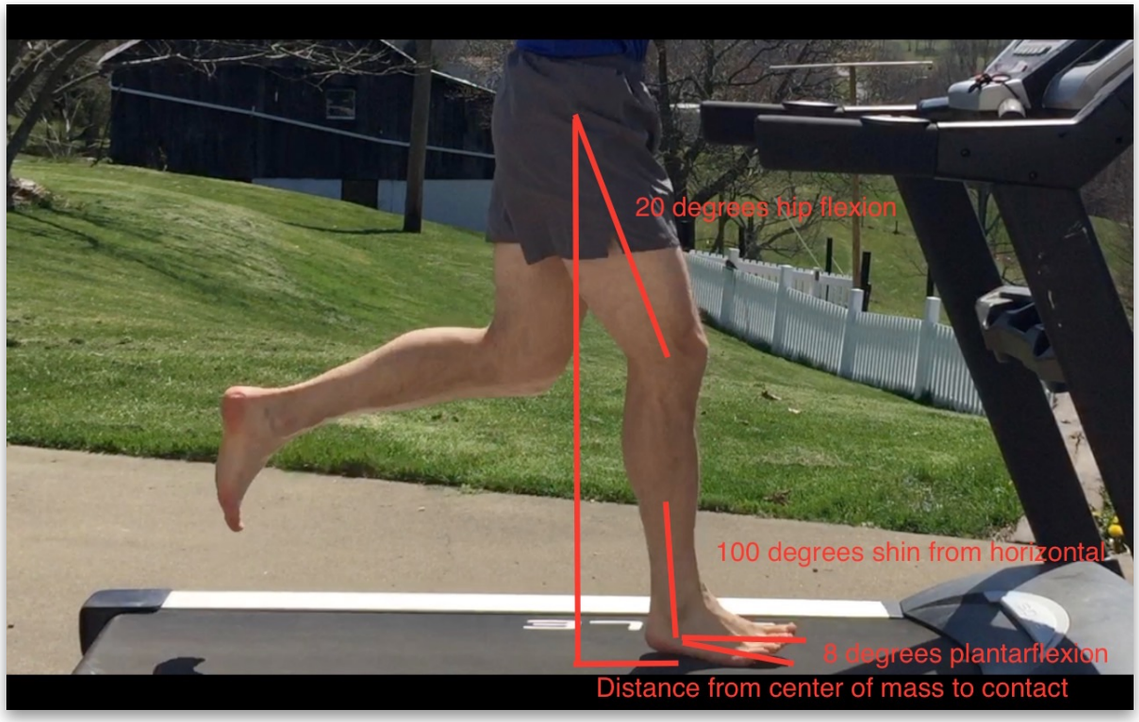
SKILL 4

Avoid overstriding in the forward direction.

Initial foot contact should be close to your body. As a youngster, I remember a high school coach always yelling at me to lengthen out my stride in cross country meets. I'm not sure what I was doing back then as far as technique is concerned, but I know now that it is rarely advantageous to elongate your stride too far forward from the body.

The further forward from your center of mass that you make initial contact with your foot, the greater the stress will be up your leg and at joints like the knee. With excessive forward stride length, runners often develop shin splints and kneecap pain. Imagine your center of mass being a line drawn straight down from the center of your hips, as in the following picture. If the foot contacts the ground 12 inches in front of the line instead of 10 inches, the demands are much different.



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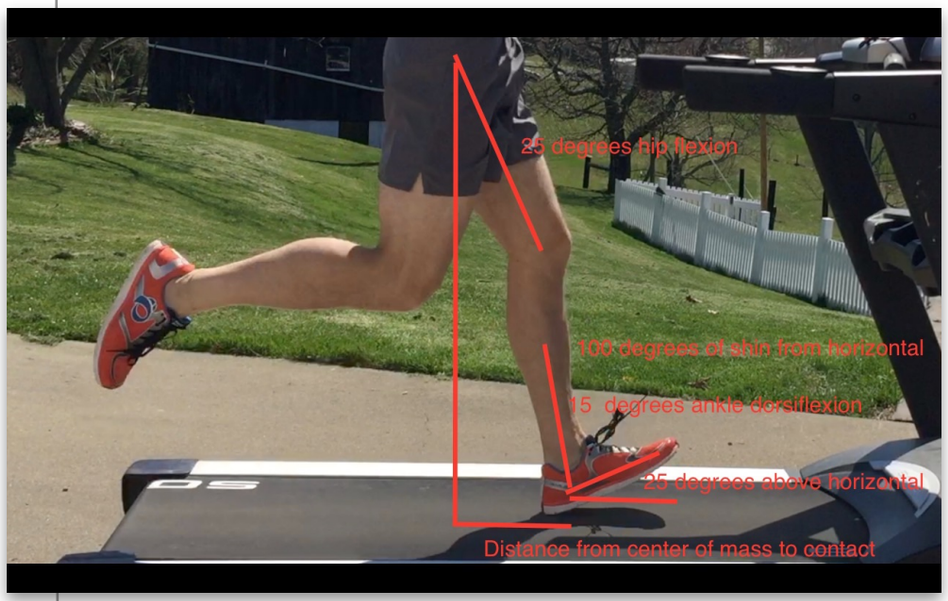
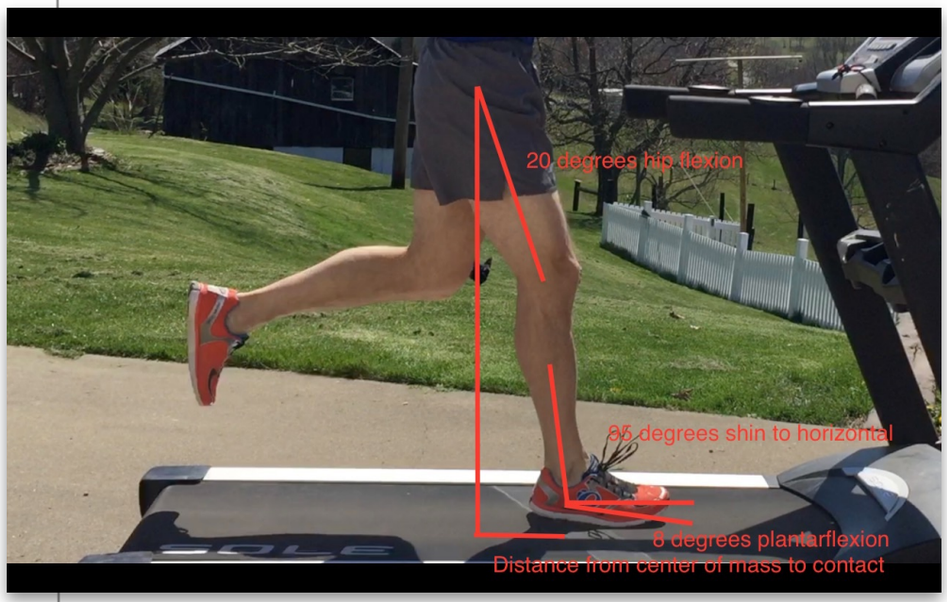
Avoid overstriding in the forward direction.

1. Contacting far forward of your center of mass is likely to require a heel strike pattern, which isn't necessarily bad, but a hard heel strike is not a good thing. Good runners have a long total stride length. This takes into account total hip motion both forwards and backwards. They do not have all of the thigh motion in front of that vertical center of mass line.

2. Imagine your thigh being a pendulum swinging front to back with a similar swing forward and backward. Compare the midfoot and heel strike pictures here. Using the midfoot strike pattern causes the stride to be slightly shorter in the forward direction. That's evident with the lower hip flexion degree value but also the distance line at the bottom of each picture is clearly shorter with midfoot or forefoot striking than heel striking.





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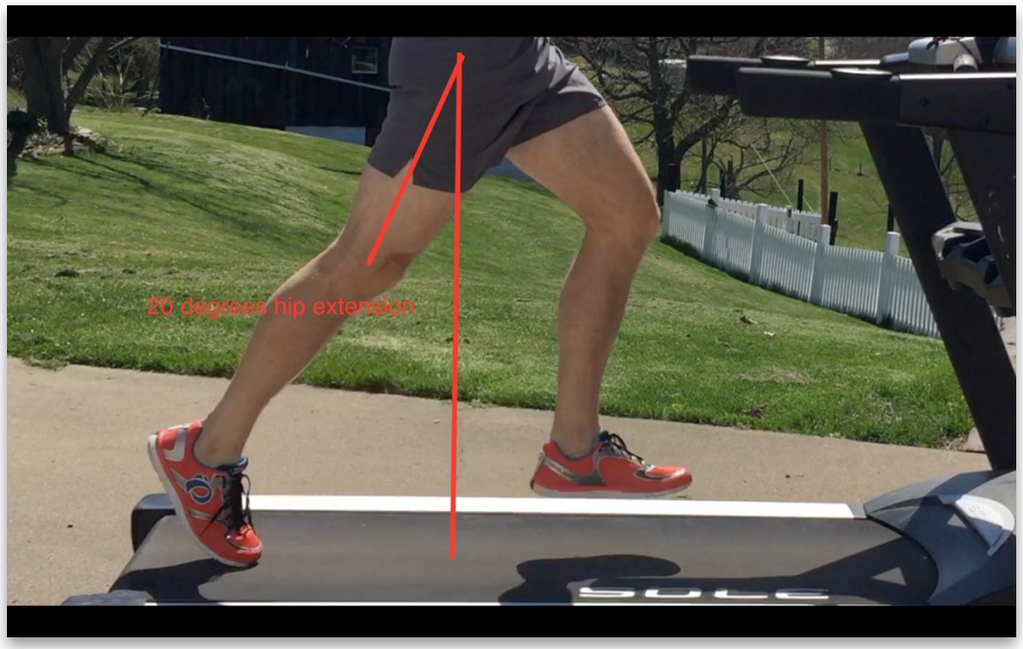
SKILL 5

Emphasize strong hip extension drive as you toe off.

Focus on pushing backward with your legs; don't just worry about swinging forward to take the next step. You've got to use your butt and hamstrings. Your butt's gluteus maximus muscles are big for a reason. They should be helping you push your leg backward to propel your body forward. This is where imagining the backward swing of the thigh as a pendulum comes into play.

Many runners have learned to rely on their calf muscles for the push-off. Many other runners don't the legs swing backwards at all and rely only on the frontmost hip flexor muscles.



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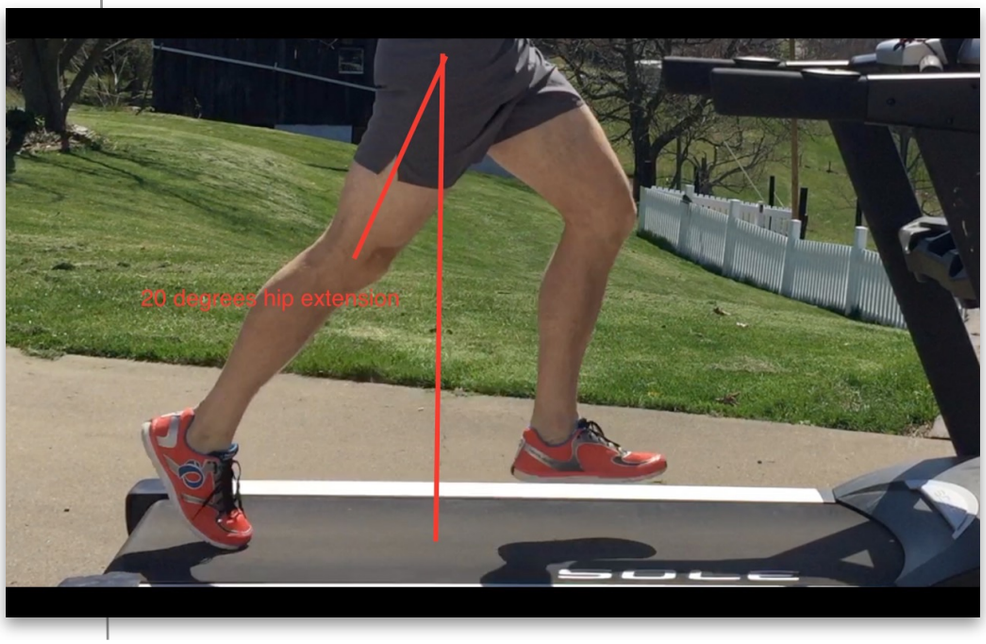
1. Envision squeezing your buttock muscle as the leg pushes back.
2. If you are not aware of the feeling of your glutes squeezing, then try placing a hand on top of one side of the buttock in order to feel for a contraction. If the muscle stays loose at all times throughout the stride then it's clearly not contracting well.



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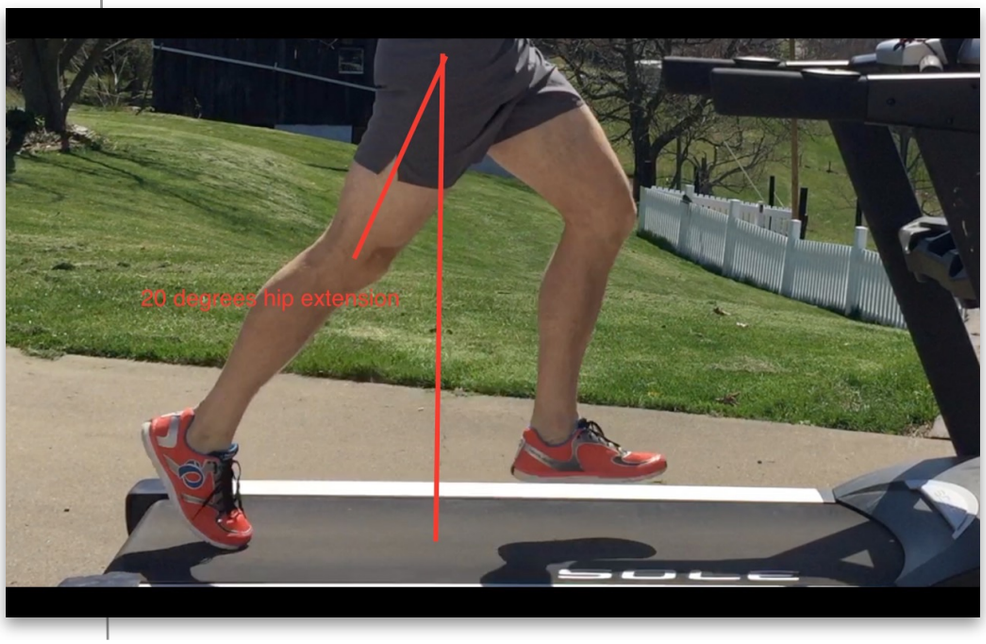
1. Perform maximal sprinting intervals on the track. You can't get anymore specific than that! Sprinting can heavily engage the gluteals.
2. Try strengthening your gluteus maximus muscles with:
   a. single leg bridges;
   b. single leg squats;
   c. forward lunges;
   d. single leg step-ups;
   e. single leg balance while tightening your buttock;
   f. jumping or bounding;
   g. box jumps.



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Summary.

You are not expected to work on every one of these skills at once. Pick one that you know is a problem for you and work only on that component during one of your easy runs.

Start out with one minute of focusing on the change and progress that focus by one minute with every run. In less than a month you will find yourself successfully changing your technique flaws for the better.

This material is not meant to be a substitute for common sense. If you have any doubt, don't do it. Consult a medical professional regarding your prior injuries and overall health status before beginning any exercise routine. Know your limitations. I cannot take responsibility for any injuries caused by following this material and a lack of preparation on your part.

If you have any questions or need any help in your healthy running journey, please email me at derek@mountainridgept.com.

Happy running!

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