

## C25K Week 4: Injury Prevention

Runners and other athletes are 35% more likely to sustain an injury due to poor training methods; structural abnormalities; weakness in muscles, tendons and ligaments; and unsafe exercising environments. The more runners and athletes know the ways to prevent these injuries from happening, the better we can overall perform and maintain fitness.

### Causes of Injury

- **Poor training**
  - Muscles need 48 hours to recover after a workout.
  - Increasing exercise intensity too quickly and not stopping when pain develops while exercising also causes injury.
- **Structural Abnormality:** Everyone's bone architecture is a little different, and almost all of us have one or two weak points where the arrangement of bone and muscle leaves us prone to injury. Common predisposing factor in injuries to the ankles, legs, knees, and hips include:
  - **Uneven leg length may lead to awkward running and increases the chance of injury**, but many people with equal-length legs suffer the same effects by running on tilted running tracks or along the side of a road that is higher in the center. The hip of the leg that strikes the higher surface will suffer more strain.
  - **Pronation (Flat Feet) is the inward rolling of the foot after the heel strikes the ground**, before the weight is shifted forward to the ball of the foot. By rolling inwards, the foot spreads the shock of impact with the ground. If it rolls too easily, however, it can place uneven stress on muscles and ligaments higher in the leg.
  - **Cavus foot (over-high arches)** cause the ankle to become too rigid. Although the arch of the foot itself may be normal, it appears very high because the foot doesn't flatten inwards when weight is placed on it. Such feet are poor shock absorbers and increase the risk of fractures higher in the legs.
  - **Bowlegs or knock knees add extra stress through knees and ankles over time, and may make ankle sprains more likely.**
  - Other structural conditions that make sports injuries more common include:
    - **lumbar lordosis:** forward curve in the lower spine
    - **patella alta:** a kneecap that's higher than usual
    - **high Q angle:** kneecap displaced to one side, as with knock knees
- **Muscle weakness.** Having some muscles that are very strong and others that are weak can lead to injury. If your *quadriceps* (front thigh muscles) are very strong, it can increase the risk of a stretched or torn hamstring (rear thigh muscle). Tight *iliotibial bands* may be the cause of knee pain for many athletes in running sports.
- **Overuse injuries are caused by repeated, microscopic injuries to a part of the body.** Many long distance runners experience overuse injuries even after years of running. For road runners, the surface is hard and sometimes uneven, and the running movements are repetitive. In addition, there are usually both up- and downhill elements, and these increase the stress on tendons and muscles in the lower leg. You will more likely develop running injuries if you wear the wrong shoes or sneakers. You should use footwear that doesn't allow side-to-side movement of the heel, and that adequately cushions the foot.

## Common Running Injuries & Treatment/Prevention

### 1. **Achilles tendinopathy:**

- Formerly called tendinitis, this is inflammation of the Achilles tendon. That's the large tendon that attaches the calf to the back of the heel.
- Achilles tendinitis causes pain and stiffness in the area of the tendon, especially in the morning and with activity.
- It is usually caused by repetitive stress to the tendon. Adding too much distance to your running routine can cause it. Tight calf muscles can also contribute.
  - **Treatment includes:** Rest, ice, calf stretches, and foam rolling

### 2. **Shin splints:**

- This is pain that happens in the front or inside of the lower leg along the shin bone (tibia). Shin splints are common after changing your workout, such as running longer distances or increasing the number of days you run, too quickly. Pain wise, they can be hard to distinguish from a stress fracture of the shin, but the pain is usually more spread out along the bone.
- People with flat feet are more likely to develop shin splints.
  - **Treatment includes:** rest, stretching exercises, slow return to activity after several weeks of healing

### 3. **Muscle Strain:**

- This is a small tear in your muscle. It's often caused by overstretching a muscle. If you pull a muscle, you may feel a popping sensation when the muscle tears. Common muscles that can be affected are the hamstrings, quadriceps, calf, and groin.
  - **Treatment includes: RICE:** rest, ice, compression, and elevation

### 4. **Ankle Sprain:**

- This is the accidental stretching or tearing of ligaments surrounding the ankle. It often happens when the foot rolls inward or outward.
  - **Treatment Includes: RICE:** rest, ice, compression, and elevating the foot.

### 5. **Plantar fasciitis:**

- An inflammation of the plantar fascia, which is the thick band of tissue in the bottom of the foot that extends from the heel to the toes.
- People with tight calf muscles and a high arch are more prone to plantar fasciitis. Although it may be linked to adding activity, plantar fasciitis can also happen without any obvious reason.
- **Treatment includes:** Calf stretches, rolling out the tissue with a ball, rest, ice, and wearing good shoes at all times

### 6. **Blisters:**

- These are fluid-filled sacks on the surface of the skin. They are caused by friction between your shoes/socks and skin.
  - **Treatment includes:** Start using new shoes gradually; wear socks with a double layer; and apply petroleum jelly on areas prone to blisters

## Injury Prevention

### **4 Tips for Improving Running Form:**

1. Ground contact
  - While jogging (slower form of running), it is important to be efficient with each foot strike.
  - Think about contacting the ground with their mid-foot, rather than your heels. This way the foot will contact the ground under the hip and propel the body forward (when heel striking, the leg tends to act as a break and will slow the body down and put more stress on the knees).
2. Arm swing
  - While running, the arms should be swinging from the shoulders, with the elbows bent at about 90 degrees and the hands relaxed.
  - Pretend you are holding two swords, one in each hand. If these swords cross over each other at any time during the arm swing, then the arms are crossing the body, which is a sign that energy is being wasted due to inefficient arm movements.
3. Body lean
  - The trunk should be tall, as if being pulled up from a string attached to the top of the head. Leading with the chest, the body should lean slightly forward (about 5 degrees) to propel the body in a forward direction.
  - Think of the trunk as a gas pedal in a car. Pressing it forward (not leaning forward) gently allows for an increase in speed.
4. Cadence
  - It may make sense to take long strides so as to cover as much ground as possible with each step. However, this can result in high ground-impact forces, which can lead to injury, early fatigue and inefficient running.
  - Advise your clients to adjust their stride frequency to higher than 150 bpm (180 is ideal)—this would be the equivalent of running to Bruce Springsteen’s “Born to Run” or Kenny Loggins’ “Danger Zone” from Top Gun.

### **Benefits of Stretching Post-Run**

- The benefits of stretching for runners are great. These activities enhance physical performance and keep you safe. It also reduces muscle tension, improves coordination, and reduces the risk of lower back pain. Other key benefits include:
  - Improved balance, neuromuscular coordination, and movement efficiency
  - Increased circulation and blood supply to the muscle.
  - Lower risk of injury and assists in correct posture
  - Improved athletic performance
  - Increased range of motion and flexibility
  - Reduces muscle pain and relaxes tense muscles

### **Post-Run Static Stretching:**

- Static stretches are stretches that help to elongate and loosen the muscle that are achieved by holding a certain stretch for an extended period (usually anywhere from 15 seconds to a minute).
- The best time to use static stretching is post-workout. Using static stretches as part of your cool down will help relieve any muscle tension caused by exercise and provide better blood flow to aid in recovery.
- This type of stretching will alleviate any tightness that you may have, decreasing the chance of delayed onset muscle soreness and injury
- Ex: Toe Reach, hip flexor, figure 4, calf, and quad stretch are all great examples of static stretches, especially for runners
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## Injury Prevention for the IT Band

### • IT Band Foam Rolling

- The IT band is one of the most uncomfortable areas of the body to foam roll. If you are new to foam rolling, start by rolling out the calves, quadriceps, hamstrings and glutes prior to targeting the IT band. If you're experienced with foam rolling, it may be time to "loosen" up the IT band by targeting that region. Start with a soft-surface foam roller before proceeding to a more dense foam roll.



- **How to Perform:** Lie on your side with the bottom elbow on the ground to support your body weight. Start at the bottom of the IT band and slowly move up the leg 2 inches, and then down 1 inch. Continue this motion until you reach the top and proceed back down the leg, down 2 inches, up 1 inch. Repeat on the other leg.

### • Extended Leg Twist w/ a Strap



- This is a deeper stretch and opens the glutes and external rotators of the hip.
- **How to Perform:** Lie on your back and place your right foot into a strap or towel. Hold the strap with the left hand and cross the leg over the body, or until a point where you feel a stretch. Think about pushing your foot into the strap to lengthen the lateral shin and deepen the stretch. Hold for 20 to 30 seconds and repeat on the left leg.

### • Seated Figure-4 Stretch

- This stretch lengthens the lateral hip and external rotators of the hip, especially the piriformis. The pose is deeper when the torso is folded forward.
- **How to Perform:** Sit on the edge of a chair and cross the right leg over the left thigh. Place your hands on the shin or inner thigh and apply slight pressure to feel the hip stretch. For a deeper stretch, lean forward with the torso and maintain neutral posture in the upper back. Hold for 20 to 30 seconds and repeat on the left leg.



### • Lateral Band Walks



- This exercise strengthens the hips and gluteal muscles. When deepened into a squat, the hamstring and quadriceps muscles strengthen as well.
- **How to Perform:** Place a band of appropriate resistance around the shins, above the ankles. Start to walk laterally toward the left for 10 steps and then walk laterally to the right for 10 steps. Lower the legs into a squat for a better challenge. Complete two sets.



### Side Leg Lift with Downward Pointed Toe

- This exercise strengthens the lateral hip and targets the gluteus medius, which is a key stabilizing muscle that is often neglected.
- **How to Perform:** Lie on your side, extend the bottom arm and rest your head into the biceps. Lift your top leg to hip height and rotate the foot inward, pointing the toe downward. Lift your top leg to a point where you feel a contraction and return to center. Repeat for 30 seconds and switch to the opposite leg.



### Exercises Every Runner Should Be Doing

Including exercises that strengthen and stabilize the muscles of the body is important to improve running alignment and efficiency, while also stabilizing your joints that may take a beating. Some exercises that are necessary for runners to incorporate in their program are:

1. Squats
2. Low/ High Rows
3. Lateral Lunges
4. Single Leg Deadlifts
5. Planks

### Post-Run Yoga Routine

The following yoga sequence was created to counterbalance the areas most fatigued or tightened by running: hips, hamstrings and calves, with some core work thrown in for good measure. Give yourself 10 to 15 minutes to work through this routine, holding each pose for five to 10 long breaths, or 30 seconds on each side.

#### Downward Facing Dog with Calf Stretch



#### Low Lunge with a Twist





**Hamstring Extension/Half Splits**



**Boat**



**Pigeon Pose**



**Incline Plank**



**Seated Twist**



**Happy Baby**



**Butterfly**

