

# Avoiding Overuse Injury In Running

## Strength Training for Prevention

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### OVERUSE INJURIES 101

- More likely to happen in novice and recreational runners, at a rate of 18 injuries/1000 training hours (Kluitenberg et al, 2015)
- Caused by repetition without variation (think road running vs. trail running) where asymmetries and muscle imbalances are exposed over time.
- Increased transverse (rotational) movement on a single leg drop test is indicative of decreased core and hip strength, and is predictive of several overuse injuries in Runners (Verrelst et al., 2013; Verrelst et al., 2014).
- The knee is the most common site of overuse injury (25%) followed by the lower leg (20%), foot (16%) and ankle (15%) (Fields, 2011; Chang 2012; van Middlekoop, 2008).
- IT Band Syndrome is the most commonly reported injury (McKean, 2006).

### Consider This:

On a 40 minute run you may take 7000 steps, on each step the limb is loaded 2.5-3x your body weight. If you do not have the strength to absorb that force and overuse injury may occur.

However, the fact that you can load the body in a maladaptive manner for weeks or months before an injury sets in shows just how tough your body is!

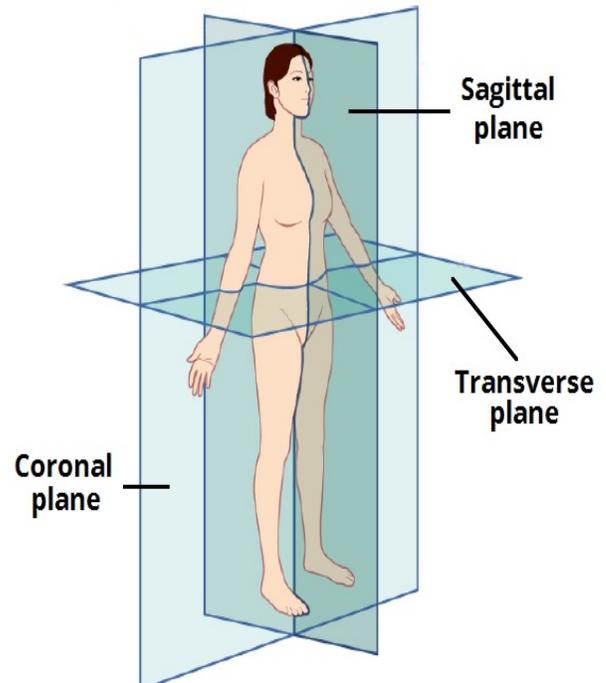
### THE GOOD NEWS

- ✓ Core and hip strengthening is protective against overuse injury
- ✓ When exercises are specific to the activity being trained for they are even more effective
- ✓ Strength training may also make you a more efficient runner



### STRENGTH REQUIREMENTS FOR RUNNING

- **Sagittal Plane**
  - Forward/backward movement – most predominant movement in running
  - Powered by the hip and knee flexors and extensors in the lower extremity
  - Muscles include the quads, hamstrings and glutes
- **Frontal (Coronal) Plane**
  - Side to side movement – controls hip drop when standing on one leg (hip adduction on the stance leg)
  - Powered by the hip abductors
  - Muscles include the glutes (medius, minimus and maximus) and QL
- **Transverse Plane**
  - Rotational movements – most important in generation of power and transmission of force from one stride to another
  - Powered by core muscles
- **Frontal and transverse plane stability** are what protects you from injury!



## TEST YOURSELF

Here are two quick tests you can do to assess your sagittal, frontal and transverse stability:

### 1. Single Leg Stork Test

- Barefoot, stand on one leg with your arms crossed over your chest and your eyes closed
- Pass = 45s without opening eyes, using arms to balance, or touching other foot down

### 2. Single Leg Squat

- Barefoot, stand on one leg with your arms out in front of you, perform a squat keeping your heel on the ground
- Pass = knee tracks over second toe (does not collapse inward), movement is controlled (no balance fails), able to squat 70-90dg



### 2. Modified Pallof Press

- ✓ **Targets:** Transverse plane strength, frontal plane stability
- ✓ **HOW:** Stand on one leg with the other leg up as if in stride. Secure a resistance band beside you, grasp it between your hands and, with some tension applied, hold your hands out in front of you.
- ✓ **Variations:** Bring your hands in and out, resisting the rotation, spell letters, alternate the leg you are standing on and the direction you face
  - ✓ Start with 3 sets of 10 reps per side, per leg, progress to 25-30 reps
  - ✓ Video: [www.instagram.com/p/BKFI0o6B\\_sq](https://www.instagram.com/p/BKFI0o6B_sq)



## EXERCISES FOR PREVENTION

### 1. Single Leg Deadlift

- ✓ **Targets:** Sagittal plane strength, frontal and transverse plane stability
- ✓ **HOW:** Start standing on one leg, with a weight in the opposite hand, reach your other leg back, and chest forwards until your torso is parallel to the ground, allow your knee to bend slightly. Stand back up to your starting position, do not touch your foot to the ground.
- ✓ Start with 3 sets of 5 reps per side
- ✓ Progress to 3 sets of 20 reps per side
  - ✓ Video: [www.instagram.com/p/BKCPLwLhqj/](https://www.instagram.com/p/BKCPLwLhqj/)



### 3. Side Steps

- ✓ **Targets:** Frontal plane strength
- ✓ **HOW:** Tie theraband around your knees, just above the level of your kneecap. Get into a comfortable semi-squat position, bring legs apart until there is tension on the band (more tension = harder). Take small steps to one side- keeping high tension on the band throughout
- ✓ Start with 3 sets of 20 mini steps per direction
- ✓ Progress to 5+ sets of 20 mini steps per direction
- ✓ Video: [www.instagram.com/p/BSKUTyUgc\\_Y/](https://www.instagram.com/p/BSKUTyUgc_Y/)



#### 4. Standing Fire Hydrants

- ✓ **Targets:** Frontal plane strength, sagittal plane stability
- ✓ **HOW:** Tie theraband around your knees, just above the level of the kneecap. Stand on one leg in a slight squat. Lift your other leg backwards and outwards - squeezing the glute to do so. On your stance leg, do not allow your knee to collapse inward.
- ✓ Start with 3 sets of 10 reps
- ✓ Progress to 5 sets of 20 reps
- ✓ Video: [www.instagram.com/p/BTC7JaygMI4/](https://www.instagram.com/p/BTC7JaygMI4/)



#### I'M INJURED – NOW WHAT?

If you do have an injury, or even the beginning of one, get it assessed and treated by a Registered Physiotherapist to minimize time lost to injury!

Remember, injuries rarely start at the site of pain, often they are due to compensation by that joint or muscle for something that isn't being done elsewhere, a physiotherapist can find that imbalance and correct it to get you back on the road.

#### SUMMARY

- Overuse injuries are common – with the knee being the most commonly affected joint
- Adding in strength training three times per week can help decrease risk of injury
- Strength training should focus on single leg stability – because running is a single leg exercise
- Test yourself!
  - Single leg balance, eyes closed – can you hold for 60 seconds?
  - Single leg squat – can you keep your knee in line with your 2<sup>nd</sup> toe and get to at least 70 degrees
- Exercises
  - Single leg deadlift
    - 3 sets of 5 per side
  - Modified Pallof Press
    - 3 sets of 10 per side
  - Side Steps
    - 3 sets of 20 per direction
  - Standing Fire Hydrants
    - 3 sets of 10 reps

Thanks for listening!

If you liked what you heard today and you're interested in finding out more tips and tricks you can do on your own to stay injury free, like us on Facebook (Physiotherapy III) or follow us on Instagram (@physiotherapyiii) where I post new content regularly!

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