## 5 Tips for Injury-free Running

Conquer your recurrent injuries & enjoy your running

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Easy to implement tips Suitable for all abilities from beginners to elite



### **5 Tips for Injury-free Running**



Health + high performance

# About the author

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After graduating from RMIT in 2003, Luke has worked in private practice for 16 years, and recently founded Health & High Performance in Mont Albert North. His vision is to provide high quality healthcare to help active individuals keep and athletes doing what they love!

Luke's special interest is treating sporting injuries and in particular running injuries (knee pain, ITB, achilles pain, plantar heel pain). His unique approach takes a variety of different assessments and treatment techniques to get to the source of your problems and get you back on track.

In 2016, Luke was awarded the Australian Chiropractors Association's "Sports Chiropractor of the year" for his contributions to the field of Sports Chiropractic. In 2019 Luke was awarded his Fellowship in Sports and Exercise Chiropractor by AICE. A keen fitness enthusiast himself. Luke has competed in a variety of different sports throughout his life, but his current number one love running! is Luke has completed 5 marathons, an ultramarathon & 2 Iron Man triathlons.

Luke loves to learn, with his extensive post graduate qualifications including:

- International Sports
  Chiropractic Practitioner
- Postgraduate Diploma Sports Chiropractic
- Masters of Sports Science
- Australian Strength and Conditioning Association Lv 1

Luke currently serves as:

- President of Sports Chiro Australia
- Vice President of Sports Medicine Australia Victorian Committee





## o4 Injuries amore injuries





#### Unfortunately injuries in running are very common, with the research revealing at least 50% of runners will be injured at a particular point in time.

80% of these injuries are overload injuries. Why overload and not overuse? Overuse implies that a body part is more "used" than another. For example is the left knee really used more than any other body part?

Acute running injuries are rare, consisting mainly of muscle injuries, sprain, or skin lesions (blisters and abrasions). Eighty percent of running disorders are overuse injuries, resulting from a mismatch between the resilience of the connective and supporting tissue and running. Earning the name "Runner's knee". the most common running is injury patellofemoral pain & represents almost half of all running injuries. Other common running injuries include bone stress injuries (medial tibial stress syndrome & tibial stress fracture) and tendon injuries (plantar heel pain & achilles tendinopathy). Lopes, A. D., et al. (2012).

## What causes a running injury?



Firstly, we should preface by saying that running injuries are complex, with each injury having different triggering factors including genetics, structure, mechanics, training loads, psychosocial and tissue qualities.

Basically ANY injury occurs when the demands on the body exceeds its ability to handle those demands. We like to use a seesaw analogy, on one side you have load (which includes training workload, intensity, how good your recovery is, sleep, nutrition and life stresses), and then on the other side we have the load capacity of your body (which includes how strong you are, your mobility, biomechanics, running gait, previous injury and genetics).

So whilst there may be many different contributors to running injuries, here are our top 5 tips to prevent running injuries.



## 1.Training Loads

07





Our first tip to injury-free running is appropriate training loads.

The main mistakes we see runners make with training loads is:

- 1. **"Too much too soon":** Doing too much running too soon and creating loading "peaks"
- 2. **"Too fast too often"**: Too much of their weekly running at a high intensity.

In this first graph on the right, we see a typical graph of an Rapid injured runner. increases in weekly running volume. and а lack of consistency: some weeks a lot, and some weeks very running. The little second graph on the right is what runners should aspire to: gradual increases in weekly running mileage.



## Too much too soon: the 10% rule



Some of you may have heard of the 10% rule. That is gradually increasing your weekly running mileage by 10% each week. Is there research to support this? In a 2014 study by Nielsen, novice runners progressing their running distance >30% over a 2-week period seem to be more vulnerable to distance-related injuries than runners increasing their running distance by <10%. The takeaway from this research is increasing mileage between 10-30% is desirable.

So which is it, should you increase by 10 or 30%?Well if you are just beginning to run, or run less than 10km per week, if you were to increase by 10% it would take you an unnecessarily long time to build up your mileage (eg 10% of 5km is only 500m per week), so increasing by 30% is acceptable.

Total weekly distance	0-10km	10-20km	20-100km	100+
Recommended maximum weekly increase	30%	20%	10%	10km

On the other end of the scale, for those doing a higher weekly mileage, increasing by 30% would be too high an increase (eg. 30% of 30km is a whopping 9km), so, therefore, sticking to 10% increase is more appropriate for these runners.

## Too fast too often

Now we all like to feel like we've got a good workout after our runs, but this doesn't mean you should be running EVERY run hard! The problem with doing most (or all!) of your running hard is that it is quite taxing on your body, and can make you more prone to injury.

In the early 2000s, an American Scientist, Stephen Seiler studied how elite endurance athletes reallv train. He found а remarkably consistent pattern: World-class cyclists, Nordic skiers. rowers. runners. swimmers and triathletes all did approximately 80 percent of their training at low intensity and 20% at high intensity. Following on Seiler performed from this additional studies that compared the 80/20 approach to 65/35 and 50/50, and discovered that the 80/20 balance came out on top.

So you should be running **80%** of your weekly mileage at an easy pace, with only 20% for hard efforts. We see this flipped around in many amateur runners.

What is an easy pace? A simple way to determine what your easy pace is: it's the fastest pace you can do whilst being able to breathe completely through your nose



## Step rate

20% 100% 110%

## 2.Running technique

11

Knee flexion





Running is a skill, and just like many other skills (ie swinging a golf club, swimming) there are better ways to do things.

There is NO single best way to run, but there are a lot of BETTER ways to run.

Certain characteristics of running technique has been shown to be related to **running economy** (Folland 2017, Moore 2016) AND **injury** (Luedke 2016, Chan 2017, Napier 2018).

With a running gait assessment, analysis can be performed of many characteristics including:

- Posture
- Foot landing & Overstride
- Cadence
- Arm swing

One of the first things we assess with running technique is posture. Common faults we see here are bending forwards too much as seen in the image to the right, and the pelvis dropping excessively as seen on the image to the far right.

A cue we often use to correct excessive forward bending is to imagine there is a string attached to your head lifting you up.



The next common fault we see with running technique is overstriding (below). Overstriding has been shown to increase braking forces, which result in greater stress on your body. Keep your running strides nice and short and resist the temptation to stride out in front of you.



Another common technique fault seen in runners is arm swing issues. Here on the left we see a common fault with the arms crossing over the midline: ideally the arms should go slightly inwards when swinging, but should not cross over the midline.



## 3.Strength training



## "Fit to run" NOT "Run to be fit"



#### Why is strength training beneficial for runners?

### Firstly it's role in **injury prevention** and secondly to **improve performance**!

We have a saying that you shouldn't "run to be fit", you should be "fit to run". That is, if you lack some of the required strength and mobility for running, you may be at a higher risk of injury.

Our three favorite self strength tests for runners are:

- 1. Single leg calf raise to fatigue
- 2. Single leg sit to stand
- 3. Single leg bridge to fatigue

### Calf strength

When it comes to running, the most important muscles are not the glutes, it's the calves!

So appropriately the first test to perform at home is the calf raise to fatigue test. This test involves doing as many single calf raises as possible until you can't do it anymore!

Click on the image to the right for tips on how to perform the single leg calf raise test, and the results you should aim for depending on your age..





### Sit to stand test

The next assessment is the sit to stand test, and this one focuses on the quads. Click on the image to the right to see how to perform this test. The aim is to do more than 25 reps with less than 10% difference side to side.

#### Single-leg bridge test

The third test to do at home is the singleleg bridge test. Click on the image to the right on to see how to perform this test. Again the aim is to perform 25 reps on each side, with less than 10% difference between legs.





### "Running will bulk me up"

One of the excuses that runners give for not doing strength training is they are concerned it will bulk them up. This myth has been dispelled, with recent research showing not only an improvement in strength, running economy and VO2 max, but doing it WITHOUT increasing bulk!

"This study demonstrates 40 weeks of strength training can significantly improve maximal & reactive strength qualities, RE, & VO2max, without concomitant hypertrophy, in competitive distance runners." (Beattie 2017, Blagrove et al 2018)



## Tips for implementing strength training

**Don't just perform weighted running**: firstly the exercises you perform don't need to resemble the movements of running and secondly you don't need to be doing the reps you'd be doing on a run. The aim of strength training is to build strength, your endurance will come from your running

Ideally you want to fit **2-3 strength training sessions per week** in your offseason, and decreasing this to once per week when competing. And to achieve optimal results, you should strength train for at least 6 weeks



#### How to schedule your strength training sessions?

Ideally you want to separate your running and weights sessions by 8 hours, and put your weights on the same day as your harder runs. This leaves your easy days as exactly that. Remember that running is your priority, so ensure that your legs are refreshed and ready to go on your harder running days. Here we give an example of what a week might look like incorporating your running and resistance training.

	Mon	Tues	Wed	Thur	Fri	Sat	Sun
AM	Run easy	Run Speed	Run easy	Run tempo	Rest	Run	Long run
РМ		Weights		Weights			

## What type of exercises should you perform?

You want to be targeting the main muscle groups involved in running: the calves, quads, hips & hamstrings.

Some examples of exercises include:

- weighted calf raises (with knees bent and straight),
- squats (and my favorite variation the rear leg elevated split squat)
- lunges
- hip thrusters & weighted bridges
- deadlifts.

As we mentioned previously, you want to be building strength so **keep the reps ranges below 12**.



19

## 4.Sleep & Recovery





## Sleep, why does it matter?

Sleep deprivation is very common in the general population with **40% of Australians sleeping LESS than 7 hours**, with a total estimated cost to Australians a whopping \$66.3 billion in 2016-17.

For runners, sleep is paramount when considering the training response, which requires a balance between stress, fatigue and recovery. Therefore runners should look to promote recovery which would then decrease their stress/fatigue state. Sleep is surprisingly often overlooked by athletes themselves cause of as a fatigue. Poor sleep quantity and/or poor quality appears to exist in many athletic populations, which can be due to a combination of scheduling sessions of training and competition, travel fatigue, and impaired sleep-onset due to increased arousal postcompetition.

## Sleep & Injury

Sleep can have a profound effect on injury risk. Milewski et al's study on adolescent athletes found those who slept on average less than 8 hours per night had a 1.7 times greater risk of being injured than those who slept more than 8 hours.

In another study on elite adolescent athletes, von Rosen et al found that sleeping more than 8 hours per night reduced risk of injury by 61%



## Sleep & Illness

A range of metabolic and immunologic processes are negatively affected by poor sleep.

Reduced sleep quantity was associated with an increased incidence of illness within the next 7 days in competitive male AFL players

Those who sleep less than 5 hours are 4.5 times more likely to suffer a cold vs those who sleep more than 7 hours



### Sleep & Performance

Reductions in motor and cognitive performance, reaction times, and mood state/emotional stability are often observed in sleep-deprived athletes.

Poor sleep quality, particularly during high training loads and competition periods, has been identified as a marker of underrecovery and an early sign of overreaching. Brandt et al's study on Brazilian athletes revealed a relationship between poor sleep quality and lost matches during a competition.

Silva et al found a correlation between sleep duration and competition performance in elite gymnasts.

To help offset the detriments of poor sleep, napping has been shown to improve running performance in those endurance runners that had less than 7 hours sleep. (Boukhris, O., et al. 2019)

## Sleep: How much?

The National Sleep Foundation's recommendation for young adults (18-25 years) and adults (26-64 years) is between 7-9 hours

Most elite athletes know the performance-enhancing benefits of sleep, and the graph below demonstrates some of the sleep habits of the worlds best. Of note Roger Federer averaging 11-12 hours, LeBron James 12 hours & Usain Bolt 8-10 hours.





#### HOW MUCH SLEEP THE PROS GET

So you really need to be aiming for 7-8 hours of sleep, & increasing this during harder training blocks



### **Sleep:** How to improve?

#### Routine

and Try keep the same sleep/wake the same time: when it comes to sleep, our brains like consistency. Try and go to bed and wake at a similar time throughout the week.

What about sleep-ins?? Unfortunately having a longer sleep on the weekend can throw out your body's normal routine, SO try and keep some consistency on the weekend as well.

Try a shower: having a shower or bath before bedtime can help you sleep by elevating and then core lowerina vour bodv temperature. which prepares your body for sleep.

#### Avoid stimulants

Caffeine is a stimulant, and in one study consuming caffeine 6 hours before bedtime was shown to reduce total sleep time by 1 hour

Also avoid alcohol after 5 pm: Whilst alcohol can help put you sleep, it actually impairs to restorative sleep, hence why you will feel tired the day after a few too many drinks.

#### **Bedroom environment**

Having a room that is too hot or too cold will affect your ability to sleep. It has been found that around 16 to 18 degrees Celsius is the ideal room temperature (also depends on what bed covering you use).

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#### **Bedroom environment**

Try and remove or cover ANY light in your room, darkness triggers the brain to slow down and stimulates the production of melatonin.No watching TV, using laptops or eating in bed. Keep the bedroom for sleep!!

## Ditch the electronic distractions

Avoid the use of electronic devices for at least 1 hour before bedtime: these produce blue light and have been shown to inhibit the secretion of melatonin, leading to disturbed circadian regulation of sleep.

To help reduce blue light exposure on your mobile device, the latest iPhone has a night shift function under settings/display & brightness.

For your laptop and desktop computers, you can use a free program f.lux which calculates sunrise and sunset and automatically adjusts your screen brightness. The other alternative is blue light blocking sunglasses

A recent study on adolescents found that frequent use of technology at bedtime was associated with: 15-60mins less sleep per night, greater difficulty in "switching off" at bedtime and frequent users of social media at bedtime averaged 60mins less sleep per night. (Arora et al 2014)

Try and avoid any mentally demanding tasks in the lead up to bedtime: reading a book is a good way to wind down.

#### Scheduling of training

Athletes often report worse and disrupted sleep the night before an early morning training session.

Try not to sacrifice sleep in order to train. If you need to train early, ensure you get to bed early, and try and keep the same sleep/wake times throughout the week (as mentioned above).

![](_page_25_Picture_0.jpeg)

A 2014 study on swimmers found that on training days, swimmers averaged almost 2 hours less sleep per night. (Sargent et al 2014)

#### Napping

Sleeping during the day for short bursts under 40mins can help your body catch up on missed sleep.

Ensure however that you don't nap after 5 pm, as it can impair your ability to sleep at night.

In a recent study, endurance runners who slept less than 7 hours sleep per night and took an afternoon nap, showed an improved running performance. (Boukhris, O., et al. 2019)

Try a "nappachino": if you tend to feel groggy after a nap, try having a coffee just before you nap. Then when you wake up, the caffeine will kick in and help reduce sleepiness. To learn more about the "nappachino" click on the video link below.

![](_page_25_Picture_8.jpeg)

#### Supplementation

There are many supplements that can assist with sleep, including magnesium, 5 HTP, melatonin, theanine, GABA, tryptophan. It is important to speak to your health practitioner before taking these to find out if they are suitable for you

Further reading on sleep For learn more about how sleep can affect your health & performance, and to learn how to improve your sleep, head to our blogs (click on the links below)

![](_page_25_Picture_12.jpeg)

27

## 5.Listen to your body

![](_page_26_Picture_2.jpeg)

![](_page_27_Picture_0.jpeg)

The fifth and final tip for runners to avoid injury is to listen to your body!

Most running injuries have warning signs that are often ignored.

## What are abnormal and normal pains?

As runners we all have niggles every now and then. Things that may indicate needing some assistance include:

- pain that gets worse with running,
- consistent pain in an area for longer than a week,
- pain when resting or at night

Whilst it's usually okay to continue to run during recovery of most running injuries, it is important to get a DIAGNOSIS and PLAN to ensure that you are on the right track and not continuing to aggravate your condition.

## You may not have to stop running!

With an accurate diagnosis and plan, you may not need to stop doing what you love! With most running injuries, you can usually continue running with a safe level of pain whilst correcting the things that contributed to it in the first place!

For further reading on this topic, head to our blog "Can you exercise with pain?" link below

![](_page_27_Picture_12.jpeg)

Lastly, some of you may be thinking, what about other things like shoes, stretching or running surfaces? Don't they reduce injury? Whilst they can make a difference for some people. these are the one-percenters. The 5 items we covered in this presentation what are vou should focus on nailina to reduce your chances of injury!

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### To summarize, to reduce your risk of sustaining a running injury

Ensure correct training loads
 Good running technique
 Strength train
 Get enough sleep
 Listen to your body

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For further assistance with your running needs, please don't hesitate to contact us at info@healthhp.com.au

To learn more about running injuries & performance, follow us below

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