



# TRAINING GUIDE FOR RUNNING

- NUTRITION + HYDRATION
- CREATING THE PERFECT RUNNING PROGRAM
- 5 TIPS TO PREVENT BURN OUT

**ISOWHEY<sup>®</sup>  
SPORTS**

— OPTIMAL  
— PERFORMANCE —  
NUTRITION

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## + WELCOME

**ALL ATHLETES STRIVE FOR OPTIMAL PERFORMANCE. BUT TO ACHIEVE YOUR ABSOLUTE BEST, YOU MUST FIRST RECOGNISE YOUR STUMBLING BLOCKS AND WORK TO ADDRESS THEM FROM EVERY POSSIBLE ANGLE.**

When you're training to run a long distance, or taking part in an intense physical program, your body has significantly higher demands. These increased needs are met through improved nutrition, technique and performance training as well as supplementation to overcome noted deficits. Complications such as muscle soreness and oxidative stress, that are often experienced by athletes, can also be reduced through the right recovery technique.

The IsoWhey Sports Training Guide for Running provides research, guidance and tips from our team of qualified healthcare practitioners and clinical nutrition specialists who have helped design a cutting edge and holistic training program based on years of scientific research and experience.

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# EATING WELL + KEEPING HYDRATED

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BScNut&Diet(Hon)

Exercise, such as running, is incredibly beneficial to health. Nonetheless, training at high intensities can place greater nutritional demands on the body.

If you wish to achieve the best results from a well-designed training program, fuelling your body to maximise energy metabolism, recovery and overall health is paramount.

A diet rich in a variety of plant foods providing healthy carbohydrates, fibre, vitamins, minerals and phytonutrients is a great place to start. Ensure that this includes foods rich in natural fats such as nuts (e.g. almonds, walnuts), avocado, plus virgin coconut and olive oils.

**Carbohydrates** from fruits and vegetables provide an easily accessible source of energy for the body (e.g. muscle cells). The nutrient-dense nature of a diet rich in these ensures you are taking in the substances required for conversion of carbohydrates to usable energy (i.e. ATP), for the control of inflammation and support for muscle recovery.

Plant foods such as vegetables, fruit, whole grains, nuts and seeds also provide beneficial **fibre** that support digestive health and feed the beneficial bacteria which reside in your gut. These bacteria help to protect the body against training-induced inflammation and immune suppression and thus facilitate healthy recovery. In the 24 hours leading up to a big event, however, it is recommended to minimise fibre intake so as to reduce the risk of intestinal upset during a race.

**Protein** sources are also essential as they provide the building blocks necessary for muscle recovery and growth. The amino acids provided by protein can augment functions including the buffering of hydrogen ions in muscle cells, slowing time to fatigue, and circulation of blood to working muscles.

The essential branched chain amino acids (BCAAs) are particularly useful for not only muscle healing, but also fuelling the muscles (via enhanced energy metabolism). Their consumption before and after training (and on a daily basis) is shown to reduce markers of muscle damage, reduce delayed onset muscle soreness, improve performance, enhance recovery and increase strength exercise capacity.

## ✓ NUTRITION

BCAAs naturally occur in a range of protein-containing foods including red meat, chicken, fish, eggs, certain nuts (e.g. peanuts and almonds), pure whey protein, lentils and specific beans (e.g. soy beans). In order to achieve therapeutic doses, BCAAs can also be taken as a supplement.

Eating before training depends on the length of the training session:

- › **Training session 1 hour or less:** a small snack 1 hour before will help with the energy levels for the session - handful of raw nuts, seeds and dried fruit, banana, piece of toast.
- › **Training session 1.5 hours or more:** 30-60g of carbohydrates need to be consumed per hour.

Throughout long training sessions (i.e. those lasting longer than 1 hour), or endurance events, regular ingestion of carbohydrates, amino acids, water and electrolytes are shown to be beneficial.

During these periods it is important to look for supplement options that are easily digested and absorbed in order to achieve benefit and reduce the risk of intestinal upset which can hinder your performance.

### RACE WEEK NUTRITION

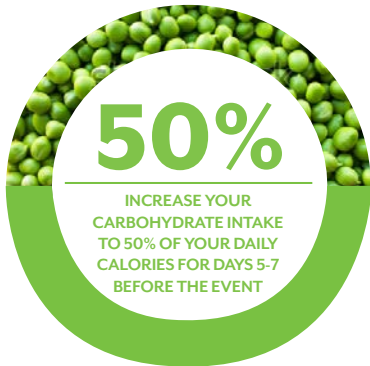
To increase your glycogen (stored carbohydrates) levels, carbohydrate intake should be slowly increased during the week before the event.

Increase your carbohydrate intake to 50% of your daily calories for days 5-7 before the race. For days 1-3 increase carbohydrate intake by 70%.

For every gram of glycogen, the body holds 3g of water so up to 2kg can be gained over this period, with the extra water being beneficial for race day too.



## ✓ NUTRITION



### RACE DAY NUTRITION

The goal is to replenish glycogen stores from the overnight fast with 1-2g of carbohydrates per kg of body weight, 2-3 hours before the start of the race if possible. But don't sacrifice sleep to make this happen; instead have a light carbohydrate meal and compensate with other carbohydrates during the race.

### FLUIDS

General recommendations are to consume 600-800mL of fluid every hour, with 30-60g of glucose as well as electrolytes (10-20 mmol/L sodium (230-460mg), 3 mmol/L potassium (117mg)).

However, it is important to recognise that everyone is different and the best thing you can do is trial different approaches during your training to identify what is best for you.

Recent research suggests that sticking to drinking when you're thirsty is effective in preventing dehydration (so don't feel the need to chug down more water than you feel like simply because the general recommendations say so).

However, in particularly hot environments the evidence does support conscious hydration before and during an event to maximise performance, yet once again the fluid intake required should be calculated on an individual basis. Take into account factors such as how much you sweat, the ambient temperature/humidity of the training/event location, the length of training/event, your body composition goals, gastric tolerance and level of fitness.

Race morning you need around 500mL with the pre-race meal and another 300mL 15-20 minutes before the race.



# BALANCING THE FOOD GROUPS

## ✓ NUTRITION

### TO MAXIMISE MUSCLE PROTEIN SYNTHESIS

20g protein

 20 MINS AFTER OR DURING TRAINING

### CARBOHYDRATES

**The facts:** Carbohydrates are very important for athletes; they provide the most easily accessible form of energy for the body. Carbohydrates, when broken down, provide glucose that is absorbed into the blood. Some glucose remains in circulation to maintain healthy blood glucose levels (BGL), while the remainder is stored as glycogen in the muscles and liver (these storage facilities are limited) and overage is converted to fat for long-term storage.

**Where to find carbohydrates:** The best form of carbohydrates are those with a low GI and that exist naturally within nutrient dense foods, as opposed to “empty” sugars (e.g. refined sugar, cordial, lollies, soda etc.). Nutrient dense carbohydrates include those from vegetables, fruit, whole grains, legumes and low fat dairy. There are, however, special circumstances where rapidly absorbed simple sugars (e.g. those in sports drinks) are required to maintain energy during endurance events.

DAILY CARBOHYDRATE NEEDS FOR FUEL AND RECOVERY		
Exercise	Situation	Carbohydrate targets
Rest day	Minimal activity	2-3g per kg BM
Light	Low-intensity or skill-based activities	3-5g per kg BM
Moderate	Moderate exercise programme (1 hr/day)	5-7g per kg BM
High	Endurance programme (i.e. moderate to high intensity exercise of 1-3 hr/day)	6-10g per kg BM
Very high	Extreme commitment (i.e. moderate to high intensity exercise of >4-5 hr/day)	8-12g per kg BM

BM = Body mass

### PROTEIN

**The facts:** Proteins are made up of long chains of amino acids (the “building blocks” of proteins). Protein is required for multiple functions throughout the body. For an athlete, protein is most important for muscle repair and growth. If you’re aiming to enhance strength, power and muscle size, then you need higher intakes of protein. Elite endurance athletes also have a huge protein demand due to the muscle breakdown that can occur during such events.

**How much protein is enough?** Many athletes tend to unnecessarily overdo their protein intake, consuming large doses of protein in the forms of large shakes and bars. Research, however, has shown that the benefit of protein consumption for recovery may be more in the timing than the quantity. A dose of 20g during and/or immediately after (within 20 minutes) of training tends to maximise protein synthesis rates. Supplementing with additional BCAAs will also greatly enhance muscle protein synthesis for efficient recovery and muscle growth.

RECOMMENDATIONS FOR PROTEIN INTAKE	
Group	Protein intake (g/kg/day)
Non-active men and women	0.8-1.0
Elite male endurance athletes	1.6
Moderate-intensity endurance athletes (a)	1.2
Recreational endurance athletes (b)	0.8-1.0
Football, power sports	1.4-1.7
Resistance athletes (early training)	1.5-1.7
Resistance athletes (steady state)	1.0-1.2
Female athletes	~15% lower than male athletes

(a) Exercising approximately four to five times per week for 45-60 min

(b) Exercising four to five times per week for 30 min at <55% VO<sub>2</sub>peak



After a training session, it is important to have a meal or snack within 30-40 minutes in a ratio of 3-4 parts carbohydrate (30-60g) to 1 part protein (20g) to help your body replenish its glycogen stores and repair muscles.

30g carbohydrate sources	20g protein sources
2 slices of bread	100g chicken breast, cooked
3 Weetbix	120g lamb or beef, cooked
4 rice cakes	4 eggs, raw
300g Greek yoghurt	120g cottage cheese
300mL fruit juice	220g ricotta cheese
1 large banana	75g edam cheese
2 medium apples	100g haloumi cheese
1.5 cups blueberries	200g tofu
3 cups strawberries	100g raw nuts and/or sunflower seeds
1 cup grapes	220g baked beans
300g carrots	4 tbsp peanut butter
150g sweet potato	
¾ cup pasta, cooked	
½ cup rice, cooked	
½ cup untoasted muesli	

## FAT

**The facts:** Not all fats are equal. “Good” fats are essential to health and are broadly utilised throughout the body, whereas other “bad” fats tend to end up in storage around the abdomen, hips, thighs, liver, organs and arteries. The key to remember is moderation.

**Where to find good fats:** Try to include “good” fats at every meal. These are generally the oils that are liquid at room temperature, and include olive oil, fish oils (fatty fish such as salmon and sardines are fantastic), avocado, nuts (e.g. almonds, walnuts and pecans). These “good” fats actually help to burn “bad” fat. An insufficiency of “good” fat is linked to slower recovery from physical activity, plus more aches and pains.

## ✓ NUTRITION

The “bad” or saturated fats tend to be those that lead to health problems when consumed excessively. Cholesterol is essential to life, so does not need to be removed completely, but do avoid fatty red meat and poultry and animal skins (e.g. chicken skin, pork crackle).

## FIBRE

**The facts:** Fibres are non-digestible carbohydrates. Rather than being broken down and absorbed, they instead pass through the intestines and bowel, forming the bulk of our stools.

Consumed fibre acts as food for good bacteria in your gut, allowing them to survive and multiply. As they feed, these organisms release health-promoting chemicals, plus maintenance of their numbers keep the bad bacteria at controllable numbers. This prevents stomach upsets such as bloating, wind, diarrhoea/constipation etc.

**Why you need it:** Fibre’s resistance to digestion means it lingers in the GIT, slowing the digestion of other carbohydrates consumed simultaneously, hence reducing the GI. Most meals high in resistant fibres are therefore likely to have a lower GI when compared to a carbohydrate meal deplete of fibre.

## ✓ NUTRITION

### TO PREVENT DEHYDRATION

200mL water



EVERY  
15-20  
MINS

BEFORE, DURING,  
AFTER + FOR 24HRS  
AFTER TRAINING

### WATER

**The facts:** The importance of good hydration cannot be stressed enough. Almost every single cellular function and chemical reaction in the body requires water.

Symptoms of dehydration:

- › Thirst and dry mouth
- › Fatigue
- › Inability to focus
- › Nausea
- › Weakened muscles
- › Hyperthermia (over heating)
- › Muscle spasms/cramps
- › Decreased urine output
- › Impaired vision
- › Racing pulse
- › Headache

The consumption of water is vital before, during, immediately after, and for the following 24 hours after an intense training session or event.

To prevent dehydration, begin training/event well hydrated, and aim to consume approximately 200mL of water every 15-20 minutes.

Plain water is often sufficient during training/events lasting less than 1 hour. Longer sessions (or shorter sessions in high heat) will call for an electrolyte replacement.



# SAMPLE DIET

## FOR A MODERATE TRAINING PROGRAM

## ✓ NUTRITION

### APPROX. 1 HOUR/DAY

*\*This diet is suitable for a 70kg male aiming to build muscle mass and strength or train for endurance event.*

### BREAKFAST

2 pieces of wholegrain toast  
2 eggs, scrambled, poached or boiled  
½ avocado (spread on toast)  
1 large banana  
1 glass fresh squeezed fruit juice  
Coffee

### MORNING SNACK

1 apple  
3 wholegrain crisp bread spread with nut butter

### LUNCH

Chicken and salad wrap made with:  
1 lebanese bread  
½ avocado  
100g chicken  
Lettuce, tomato, cucumber, mushrooms  
Cheese

### AFTERNOON TEA

Protein shake made with whole milk (or milk alternative)  
1 handful raw almonds or small tin of tuna

### DINNER

200g salmon or lean red meat (seasoned with herbs)  
1 small sweet potato  
Broccoli  
1 corn on the cob  
½ cup carrots

### EVENING SNACK/DESSERT

Fruit salad  
200g natural yoghurt

### DRINKS

Aim to consume at least 2L of water/day  
Add an additional litre for every hour of physical activity





# CREATING THE PERFECT RUNNING PROGRAM

**NEIL RUSSELL**

BA(Hons) HMS, AEP, MAAESS



When putting together a tailored running program, it's not as simple as just throwing on your running shoes and hitting the pavement.

Once you have established your fitness level, established your strengths/weaknesses and prescreened/treated any conditions or injuries, it's time to set your performance goals and develop your specific training program. When creating a running program it is crucial to focus on the following areas to maximise race day and training performance:

- › Technique
- › Stability and core
- › Muscular and cardiovascular endurance
- › Race pace and speed development
- › Strength/power
- › Flexibility
- › Rest and recovery (see page 21)

## TECHNIQUE

Technique drills are the cornerstone of any good running program. They should be performed as part of the warm up to reinforce good technique in the ensuing training session or race. Running drills maximise efficiency during running, increase speed or pace and reduce the risk of many common running injuries. The drills should focus on posture/alignment, foot striking, stride recovery as well as muscle activation.



## ✓ TRAINING

### STABILITY AND CORE

When running, we are only ever contacting the ground with one foot at a time. This means that your ankle, knee and hip stability play a significant role in stride efficiency and injury prevention. Poor hip stability or gluteal function results in internal rotation of the femur (thigh bone), causing knees to point inwards and our arches to collapse (over pronation). These two errors in biomechanics result in an increase in stress on the muscles and ligaments around the knee and ankle. In time, this leads to patellofemoral dysfunction (runners knee), plantar fasciitis, shin splints and increased chance of calf strains, to name a few. Additionally it will increase your contact time with the ground, resulting in a reduced running pace.

*Gluteal strengthening, single leg exercises should be completed to stabilise your hips and knees.*

Core strength and endurance is vital in counteracting the rotational force of running and posture maintenance during longer races. Rotational and counter rotational exercises should be performed to enhance running power and protect against injury. Core stability, posture and foundation exercises are the building blocks of any strength and conditioning program from distance running to power lifting.



## ✓ TRAINING

### TO PREPARE FOR DISTANCE EVENTS:

- BUILD ON YOUR RUNNING DISTANCE WITH GOOD TECHNIQUE.
- RUN SHORTER DISTANCES AT A FASTER PACE.

### MUSCULAR AND CARDIOVASCULAR ENDURANCE

The best way to develop your running-specific muscular and cardiovascular endurance is through long, slow distance (LSD) training and tempo training. This is what most people do when training for a running event.

For beginners, distance should be slowly built up with good technique at the foundation of the program and tempo runs kept short, where technique is likely to be compromised during fatigue.

**LSD training** is exactly what it sounds like; it's all about building on your running distance with good technique to prepare you for distance events. The focus is on technique rather than pace.

**Tempo training** involves running at a pace slightly faster than the pace required to achieve your goal time; they are completed over a shorter distance than your race.

These sessions are often combined. For example, completing a 15-20km run with the last 5km at race pace or faster.



### RACE PACE AND SPEED DEVELOPMENT

Developing anaerobic capacity is a commonly overlooked aspect of running training; most people just try to run faster for increasingly longer distances. The most effective way to increase your race pace (running pace) and beat your personal best is to implement interval and repetition training into your program.

**Interval training** involves completing high intensity intervals (>80% of maximal effort) with rest periods between each interval, usually with a work-to-rest ratio of less than 1:1. For example, 6 x 1km intervals with 3 minutes rest in between each interval.

**Repetition training** involves performing near maximal repetitions (>90% of maximal effort) with a work to rest ratio of 1:2 or 1:3, depending on the duration. For example, 15 x 200m sprints with 1 minute rest between each repetition.

You can vary distances and rest durations depending on experience, training load and the event that you are training for. These sessions are the key to getting faster!



ADVANCED RUNNERS PERFORM AN  
ADDITIONAL REPETITION SESSION.

## ✓ TRAINING



### STRENGTH AND POWER

Often completely neglected by runners, strength and power training significantly increases your maximal power output. The higher power you can potentially produce per stride, the lower the percentage of maximal power (effort) required per stride, thus improving running efficiency and speed.

All strength and power programs should begin with general conditioning exercises and then progress to more running specific power based exercises. A general conditioning exercise could be a body weight squat or lunge, while an advanced running specific exercise includes plyometric exercises and power lifting.

### FLEXIBILITY

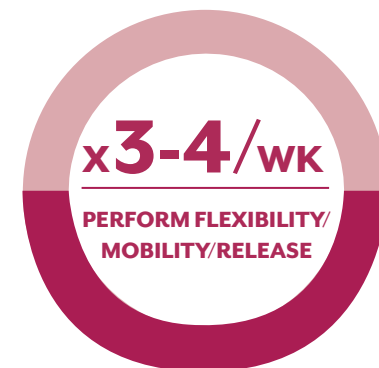
Tight hips flexors, hamstrings and calf complexes (to name a few) are the downfall of many runners. Not only will tightness lead to poor running posture, incorrect neuromuscular patterns and eventually injury, it will also slow you down.



A small amount of flexibility or mobility training should be incorporated into all sessions (in the warm up and cool down). Additionally, you should complete specific flexibility and active release sessions, i.e. stretching, foam rolling and massage ball release.

Use a combination of static and dynamic stretches to maximise flexibility as different muscles respond differently to different stretching techniques.

EXAMPLE OF A WEEKLY RUNNING TRAINING PROGRAM FOR AN EXPERIENCED RUNNER							
	Mon	Tues	Wed	Thurs	Fri	Sat	Sun
am	Tempo run	Strength /Power	Repetition training	Stability + Core	Interval training	LSD run	Recovery session
pm	Flexibility + Release	Stability + Core	Rest	Flexibility + Release	Rest	Flexibility + Release	Rest



# RUNNING TECHNIQUE

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## FLEXIBILITY

Running is just one of those things; if you ask 50 people about running technique the chances are that you would get such a wide variation of answers that you would be more confused than when you had started. Furthermore, many people don't even begin to think of running as a 'skill' per sé, rather as a normal physiological and biomechanical function.

Running is most definitely a skill. It requires proper technique and regular practise. Here we are going to look at the basics of running technique and the modifications that make just those tiny differences. Proper running technique not only improves your running times, but it can prevent injury and ensure you continue running for many years to come.

## POSTURE

Just like any good trainer or strength coach would say, posture should be the starting point and base of skill progression. If there is poor posture present, all technique and development built on top will be of a sub-par standard, exacerbate the poor posture and ultimately leave you worse off than when you initially started out.

To start, for good posture we require a straight back, with the natural curvature of the spine. This straight back keeps your airway open, and makes sure breathing remains an easy and unrestricted practise whilst running. A straight back also requires 'shoulders back', making sure that your shoulder blades are held back in line with the spine and preventing your shoulders 'rolling in', which ultimately restricts breathing.

With a straight back, we now need to 'lean forward' into a position that allows us to start falling as we run. Running is commonly considered 'controlled falling' – that is to say that when running you are continually falling forward, due to gravity's pull, and your legs are catching and propelling yourself with each step.

## ✓ TRAINING

Keeping a straight back, with shoulder blades retracted, lean forward at the hips and allow yourself to start falling. When you reach the point that you start falling and need to catch yourself, you've found the running position that works for you. It may take time to adjust to this technique, but ultimately it will improve running comfort and efficiency.

## FOOT STRIKE

If we've applied our correct running posture effectively, we should be 'falling' with each step and attempting to catch ourselves. This is where the importance of proper foot striking begins.

The worst thing you can do for both your body and your running efficiency is striking with your heel. When landing on your heel, the ground reaction forces applied through the foot resound up through the knee, hips and lower back, and often contribute to long term pain, soreness and running difficulty. On top of this, striking with your heel decelerates you with each step and makes you adopt a more upright position – decreasing running efficiency and contributing to long term injury.

Sprinting requires you to run up on your toes, striking solely with the forefoot. This utilises the natural spring of the achilles tendon for fast propulsion and efficient foot strike. Forefoot striking also makes best use of our correct running posture. However, the pressure on both the achilles and calf muscles make forefoot striking hard to maintain for longer durations of time. Hence, mid-foot strike is the best strike to use for longer distance running.

Mid-foot strike takes the best aspects of forefoot and heel strike, whilst also maintaining correct running posture. Mid-foot strike requires us to strike the ground just behind the forefoot. After the initial contact we can slowly plant the mid-foot and heel into the ground, before propelling off. This eases pressure through the achilles and calf muscles and simultaneously decreases the ground reaction forces associated with heel striking.



## ✓ TRAINING

**FINDING YOUR COMFORTABLE  
BREATHING TIMING COMES  
DOWN TO PRACTISE AND WHAT  
WORKS FOR YOU.**

### HIP DROP

If you watch an assortment of social runners, you will no doubt see at least one running with excessive hip displacement. This means that with each stride their hip (of the striking foot) appears to drop, creating a mild lateral flexion of the spine and placing unwanted pressure on the spine, sacrum and pelvic bone.

To counteract hip drop, we require strong gluteus maximus muscles that can maintain level hips with each running stride. Many single leg stability and strengthening exercises can be used to improve strength and keep the hips level during running.

### HILLS

Hills are often the most horrific and hated aspects of running; but in reality they can be your friend and help you run with better technique and more efficiency.

When running up hills it is important to utilise our proper running posture, with our straight back and forward lean. Running up hills makes it easier to maintain this posture, as we naturally lean forward when running up a hill.

Many find running up hills to be far more tiring than running on the flat – which makes sense. However, when running up hills we can employ the help of our big hip extension muscles gluteus maximus, our glutes.

With our natural lean forward, we can really engage our glutes to get the most out of each stride and power through to the top of the hill. This makes hill running great for toning and strengthening the glutes.

Similar to running up hills, many runners appear to hate running down again on the other side. Downhills are pretty much a free ride, once you know how to run them properly. Ensuring you land with your mid-foot strike when running down a hill, you can capitalise on the downward and forward momentum to increase your running speed while spending the same energy as running on the flat. Landing heel or toe first will either decelerate or cause a loss of control, making hills dangerous with poor technique. Effective hill running requires practise before you can confidently power up hills and enjoy a free ride down the other side.

### BREATHING

Breathing is the most important thing we do on a day-to-day basis. When you exercise, your heart rate increases in response to increased blood oxygen requirements, which in turn leads to an increase in the rate and importance of our breathing. Effective breathing while running is a very individual decision, as everyone finds different breathing techniques or timings to be beneficial to them. Some people breathe in for two strides and out for two, some breathe in for three and out for two, some people breathe completely independently of running stride and the list goes on. Finding your comfortable breathing timing comes down to practise and what works for you. Furthermore, breathing may well need to be different early on in a run as opposed to later in a run, when your body is suffering the effects of fatigue.

When we add all these elements together in our running, we can ensure we are getting the most efficient and biomechanically sound running technique conducive to safe long distance running and a long and prosperous running career.

# USING WEIGHTS TO IMPROVE RUNNING PERFORMANCE

**ALEXA TOWERSEY**  
Trainer and nutrition coach



If you want to improve sports-specific performance, you need to practise that sport above all else.

They say that it takes 10,000 hours of practise, and not just any practise but “perfect” practise, to master a skill. If you want to be a good runner, then you need to run.

However this doesn’t mean that you can’t use other training modalities to improve your running performance. When it comes to training for endurance, it’s very easy to get caught up in an endless cycle of “chronic repetitive motion” while neglecting all the other stuff that actually keeps your body road worthy.

Strength training is one of the most under estimated and under utilised aspects of a running program and, whilst it doesn’t need to form the foundation of your training, you shouldn’t avoid using weights to prepare your body adequately for pounding the pavement.

**You can use weight training to:**

## 1. PREVENT INJURY

The most common injuries I see are knee, lower leg and lower back, for the most part caused by structural imbalances, poor posture and incorrect movement patterns performed consistently.

The major imbalances are:

- **anterior versus posterior chain.** If you’ve ever been injured and spent time at physio, you have probably been told you are either “quad dominant” or “your glutes just aren’t firing”.

We spend most of our time in sedentary positions, sitting down hunched over a desk every day. Our hip flexors become really tight, our hamstrings long and weak. If the hip flexors are too tight, it inhibits the glutes, and if the glutes don’t fire, we use our quads for everything.

## ✓ TRAINING

- **single leg imbalances.** Runners are unilaterally dominant, so if you have a weakness on one side, you will compensate on the other side setting yourself up for injury. Single leg movements such as lunges, single leg off-box squats, step-ups, single leg deadlifts and split jumps are all advantageous when correcting side to side imbalances.
- **lateral versus medial imbalance.** The majority of knee injuries are caused by an imbalance between the outside of the leg (iliotibial band) being too tight, and the inside of the leg (vastus medialis oblique or VMO) being too weak. This causes incorrect tracking of the knee, leading to friction, inflammation and pain.

I suggest foam rolling every day if possible for myofascial release and then adding in VMO step ups (with heel elevated) or even wall sits, squeezing a foam roller between the knees, to strengthen the VMO.

## 2. IMPROVE POWER TO WEIGHT RATIO

One of the most common misconceptions when it comes to lifting is that you will get bigger, but muscle mass is not necessarily synonymous with strength.

Having an optimal power to weight ratio just means that you have the right amount of muscle to carry your engine for the duration of your task. It comes down to picking the right exercises in the right rep range.

For maximal strength and power gains, without adding unwanted mass, pick big compound “task-specific” movements like front squats, back squats and dead lifts, and perform them in sets of 2-6 reps at 80% of your 1 rep maximum. These movements are relatively easy to learn, pack a muscular punch on the legs and posterior chain, and emphasise core stability and posture.

## ✓ TRAINING

**FOR MAXIMAL STRENGTH  
+ POWER GAINS, WITHOUT  
ADDING UNWANTED MASS,  
PICK BIG COMPOUND  
“TASK-SPECIFIC” MOVEMENTS.**

**RECOVERY IS JUST AS  
IMPORTANT AS TRAINING.**

### 3. IMPROVE POSTURE AND BREATHING

When you think of running, the last thing you think of is training the upper body. However, your posture dictates the efficiency of your breathing, so if you're hunched over with the typical rounded shoulder posture seen in many desk jockeys, chances are you will be compressing your diaphragm whilst you're running.

This is very inefficient and can cause you to tire much more quickly. Add corrective upper body movements into your program (I like to do them on my recovery days) like: external rotation, lower trap raises, bent over lateral flys, face pulls, Turkish get ups, planks (straight arm and side) and bent over rows, to pull the shoulders back and allow you to remain much more open and upright for the duration.

**In terms of when to include strength training in your program, there are a few options:**

- a. In your off season, completing a strength endurance program with high reps, moderate load and low rest will help you build a solid foundation. The bigger the foundation, the more you have to build on – exactly the same reason you start off with long sustained cardio when building a running base.

Strength endurance sets emulate the energy system and muscular fatigue you would experience in a longer distance race and may be used initially as an alternative to high volume run training, especially if you're prone to getting injured. You can include a lot of eccentric and single leg work in this phase.

You should also note that this type of training is more likely to make you sore, so it's not ideal when you're in-season and need to “perform” in your sports specific sets.

- b. In your on-season, switching to a strength/power protocol will reduce delayed onset muscle soreness (DOMS) and fire up the nervous system. This is very effective for improving your speed

and power, especially on the hills. Your aim during this phase is to complement your run sets. Your progressive resistance (PR) should be coming in your high intensity repeats and tempo runs. Any PRs in the gym are a bonus but not the focus. Learn to listen to your body. Your gym work should NOT deter you from being able to “perform” in your sports specific work.

- c. Your “prehab” work including any specific injury prevention, stability and mobility exercises to even out structural imbalances and help prevent injury can be done in both on and off season, preceding any gym based workouts, on your recovery days or days when you just don't feel like you have the time or energy to give 100%.

Finally, it has to be reinforced that recovery is just as important as training. It is far easier to under recover than it is to over train. I like to think of the body as a bank balance. Every training session is a withdrawal. Every recovery session is a deposit.

If you are always training and making withdrawals, and very rarely doing recovery and making deposits, eventually you will end up overdrawn and injured. My favourite recovery practises include foam rolling, ice baths, contrast showers, sports massage, infra red sauna and acupuncture.

Every training program should have hard performance-based days and easy or recovery days. Learn to go hard on your hard days and easy on your easy days and avoid the junk miles in between, even if you're feeling good.

At the end of the day, quality trumps quantity every time, so learn to train smart and, above all, train for your objective.

# 5 TIPS TO PREVENT BURN OUT

## ANDREW 'PAP' PAPADOPOULOS

IsoWhey® Sports ambassador  
+ endurance athlete

**Running season is around the corner, and with that comes preparation and research to ensure that you not only complete the event, but also prevent a burnout in the lead up to the race.**

**Whether you are looking to participate in a 9km run, marathon or ultra endurance event, it is imperative that you know what your body can handle and what it needs in order to get through the event, particularly if this is new territory for you.**

Listen to your body and train smart. Too often I hear of athletes ending up with chronic fatigue because they burn their adrenal glands from working too hard. Remember, it takes more discipline to recover than it does to push yourself.

Here is my advice on how to prevent a burnout before the big race.

### 1. HAVE YOUR NUTRITION SORTED

In the weeks leading up to the event, make sure that you are consuming enough calories and the right types of food including protein, whole grain carbohydrates, fats and vegetables.

The types of food that you consume are very important, as you don't want to upset your stomach or have too many fluctuations in your energy levels. Knowing what is right for you can come down to experience, trial and error, and perhaps consulting a sports dietitian.

If you want to experiment with different foods and supplements, make sure that you do this a few weeks ahead of the event. The last thing that you want to do is change your diet and supplements the day before, only to find that it has affected you and therefore your performance.

Your nutrition practises on the day of the event will depend on the distance you are completing. If I am competing in an ultra endurance event, for example, I would carry an array of energy gels, sandwiches, fats and salt tablets with me as well as a bladder of water and a second bladder containing a mix of IsoWhey Sports Electrolyte Formula and BioCeuticals Ultra Muscleeze, which has a specialised mineral delivery system that enhances absorption of magnesium.

For a marathon or half marathon, I would most likely just need the water, Electrolyte Formula and Ultra Muscleeze. However, if you are new to these events, you may consider bringing gels and salt tablets with you too.

### 2. GRADUALLY WORK TOWARDS YOUR GOAL

Don't jump straight into the deep end with your training. Your training needs to be gradual, particularly if you are new to this type of event.

## ✓ TRAINING

Pushing yourself too hard, too fast, is a great way to sustain an injury, so I wouldn't advise it.

Engage the help of a coach to create a suitable training program for you, or do your research if you prefer to create a plan yourself.

For an amateur looking to participate in a half marathon, spend your first week running no more than 5km per day; break that up into hill sprints, easy jogs and running on different terrains. From there, gradually work your way up to completing more kilometres each day.

Make sure you change the terrain you are training on. Don't only train on the road - do some work on the sand, grass and on a running track to minimise the impact on your joints.

### 3. IDENTIFY YOUR WEAK AREAS AND WORK ON THEM!

Making sure that you identify your weak areas is important both for your training program as well as for your rest and recovery.

Areas that you may need to work on include sleep, nutrition, training and recovery practises.

If you find you have been sleeping badly, that is going to affect both your performance and your recovery. This will be something that you will need to work on if you want to prevent burn out.

If you are finding that your iliotibial band (ITB) is tight, invest in a foam roller. If you are really tight in this area, odds are that your feet won't be tracking correctly and your inner thighs may be weak. This can lead to soreness in your knees and hips, which is not something you want to have happen before your race.

As mentioned above, correct nutrition is imperative so make sure you identify what fuel sources your body needs well ahead of time.

If you start the race and find you're feeling exhausted or thirsty, this usually means you have left your supplements, food or hydration practises too late.



## ▼ TRAINING

### 4. RECOVERY RECOVERY RECOVERY

Recovery is so important, not only to help with injury prevention, but to also help you avoid an all over burn out.

Stretch before and after your training sessions and make sure you are using a foam roller if you start to feel tight.

On your recovery days, consider doing activities that are beneficial for recovery, such as yoga or swimming.

In the weeks leading up to your event, you may also opt to see a sports massage therapist to make sure that nothing is tight and muscle pain won't hinder your performance.

### 5. THE ESSENTIALS

Make sure that you prepare the obvious training essentials in advance so you are not scrambling the day before the event.

Your feet are the most important thing to consider when participating in a running event, so make sure you have correctly fitted running shoes.

Get fitted by a trained professional. Most sports stores now have a variety of tests and techniques to ensure that you get the right shoe to suit your needs and foot shape.

Also, make sure you wear your shoes in the weeks leading up to the event to avoid a blister from new shoes that haven't been worn in yet.

Consider whether you want to bring drink bottles or a bladder with you. Most events will have people on the sidelines handing out drinks, but I wouldn't rely on them as there may be 10 runners in your way and you might miss out. I would opt for the bladder, as they are easier to carry.

Also, consider snacks. If you are running a distance that is marathon length or longer you may want to carry some gels, energy bars or salt tablets with you. The salt tablets help with the cramping and the gels provide you with energy to help you complete the distance.



# STEPS TO SUCCESS

**MATTY ABEL**

Strength + conditioning coach

**There is the famous quote “fail to plan, plan to fail”. Endurance events need serious planning which ties the following seven points together. Spending an hour in your taper week on planning your event day will save you a lot of stress and give you loads of confidence.**

## 1. LISTEN...

... to your body and to what it is telling you.

## 2. REST

As you may know, your body grows stronger in a state of rest. Just as important as the hard training is, so is the body's chance to repair itself in order to prepare us to be able to train again. If you're tired, moody or have a loss of appetite, unless you are in peak training session, these might be signs you need to rest.

## 3. FUEL YOUR BODY

Over the recent years, low carb, low fat, low calorie diets have been in vogue. As an athlete, or someone who is training multiple times a week, this could be a recipe for disaster and you are working on borrowed time. Just like we wouldn't drive around with our car constantly on empty, we shouldn't be leaving our bodies running on empty. Another way to combat this is again listening to our bodies, if we're hungry eat quality nutrient dense foods, within reason.

## 4. PERIODISE YOUR TRAINING

With any training goals or preparing for a race, it is extremely important to periodise your training to perform at your absolute best. This must include a general prep phase, a base phase, specific phase, pre-competition phase, competition phase and finally a recovery phase.

## 5. DON'T COMPARE YOURSELF TO OTHERS

Especially on social media. It's extremely easy to get caught up with what someone else is doing, thinking Jane's doing this, Simon's doing that, I need to be out training without considering your own program.

# ✓ TRAINING

## 7 STEPS TO AN ENDURANCE RACE

### 1. TRAINING

Don't cut yourself short. Preparing for an endurance event needs time and the correct training, otherwise race day will be extremely tough. Sourcing a coach might be the best thing you do; they should have you on a periodised program ensuring your race day will be your best day.

### 2. PACING

Endurance events can go for four hours or more and need to be paced accordingly. It's easy to get caught up in your training pace, which may lead to an early burnout in your event, which will make the back end of your race extremely hard.

### 3. EGO

Leave the ego at home. This is a big one for the guys and goes hand in hand with pacing. What we tend to see is the ego coming out in the early stages of an event, forcing you to get caught up in your training pace or the front pack and again resulting in an early burnout.

### 4. NUTRITION

Nutrition is very personal and I highly recommended you test out a number of products in your training. There is nothing worse than getting an upset stomach a few hours into your event or the product not working for you. Test and re-test during your training.

### 5. SUPPORT

Having a good support crew with you can make or break your race. Prepare your support crew for a number of situations; you may experience some highs and lows, cramping, fatigue, low motivation etc. Your support crew will need to know how to deal with these situations, be uplifting and most of all get you to the finish line.

## ✓ TRAINING

### 6. MOTIVATION

Remember why you're doing the event: Is it personal? Is it to inspire others? Is it because you enjoy endurance sports? Draw on this when the going gets tough.

### 7. LOW POINTS

It is very rare that you don't hit a low point at some stage in an endurance event and it's how you deal with the low point that may or may not get you to the finish line. Practise this in your training and ask yourself when the going gets tough, how am I going to get out of this and back on track?

## 5 NUTRITIONAL TIPS/SUPPLEMENTS LEADING INTO AN ENDURANCE EVENT

### 1. GETTING CARBOHYDRATE LOADING RIGHT

Carbohydrate loading has changed over time and, as we do more research, we find it takes roughly 12+ hours to restore or load our glycogen levels. This leaves the night before carb load out of the equation. Nowadays we see a slow increase of carbohydrates over a number of days, generally with your highest carbohydrate day two days out from your endurance event. This gives our bodies sufficient time to absorb the carbohydrates as glycogen. However, we only have a limited source we can hold depending on our muscle mass. This is where fat loading might be required.

### 2. FAT LOADING

At some point in an endurance event we are going to need our fat stores as an energy source. Some of us we may train in a depleted state so come race day our fat conversion to energy happens more efficiently. If you slightly increase your "good" fats whilst you load up on carbohydrates, you will ensure you have sufficient sources of good fats to draw on come race day.

### 3. HYDRATION LOADING

As we increase our carbohydrate intake we increase our ability to retain fluid, with each gram of carbohydrate able to hold 3mL of water. For endurance events, especially in warmer weather, this is essential. Generally we should see a small increase in water, around 1L extra per day, as over hydration can also have a negative impact.

### 4. ELECTROLYTE LOADING

Electrolytes can have a major impact leading into an endurance event, especially in hotter climates. Choosing the right electrolyte product before an event can be very personal so I suggest trying a few to see which flavour suits you. What you want to stay clear of is the electrolyte drinks that are high in sugar, which causes an extra stress on the body. Look for a good quality magnesium powder and sip on it throughout the days leading into your event.

### 5. NUTRIENT-DENSE FOODS

What we tend to see most before a big race is people using it as an excuse to binge out, opting for high sugary foods with no nutritional value. But that's like filling a Ferrari with poor quality fuel. Eating these types of foods not only increases oxidative stress and inflammation in our body but serves no purpose. Good food options are high carbohydrate fruits and veggies with high quality fats such as avocado, salmon, nuts and some oils.

# BENEFITS OF COMPRESSION

## MATILDA RAYNOLDS

SKINS™ ambassador  
+ professional triathlete



Admittedly I first wore SKINS™ to look the part: what doesn't scream elite when only a thin piece of lycra separates your bits to the public.

However, fortunately the benefits of the garments far out way the feeling you're running around naked. It is here if you have a sports science degree that I recommend you head to the <http://www.skins.net/au/skins-science/> and read the various independent medical and research studies that have been have conducted. Wait here, if you don't have the degree.

The biggest benefit of SKINS™ compression garments is the way the garments increase your circulation or, as the SKINS™ marketing think tank call it, dynamic gradient engineered compression – stay with me on this.

Essentially the garment applies the right amount of surface pressure in specific points that pushes blood back towards your heart, whilst your heart pumps it back around. It is this crucial element of SKINS™ that differentiates them from their competitors.

Imagine squeezing a tube of toothpaste. If you squeezed it at the top and the bottom, nothing would come out, but if you squeezed it only from the bottom the toothpaste would be pushed up – SKINS™ do the same. So what are the huge benefits of this?

Increasing circulation or blood flow through your vessels increases the amount of oxygenated cells being delivered to help you perform at your peak. Oxygen = energy.

## ✓ RECOVERY

Increasing circulation also flushes out lactic acid, so the impact of the delayed onset of muscle soreness is reduced, as well as delivering new cells to repair damaged muscles.

Another benefit of SKINS™, which is why I always have a garment on either running, cycling or during Christmas shopping, is they reduce muscle vibration. If you've ever watched tennis on TV and seen the drama of a slow motion shot, it shows just how impacting exercise is on your muscles and how much the muscle can move away from your bones. SKINS™ have specific panelling and muscle wrapping that supports and holds your muscles close to your structure that reduces the risk of injury – this is a key reason since starting triathlon I haven't had a single injury that has stopped me from training and racing. I just feel a sense of security when my muscles are supported in this way.

If you're still not convinced, SKINS™ have also been able to incorporate climate control, which again comes back to the increase of circulation, so your body's temperature is more controlled, which keeps you warm when it's cold and cool when it's hot. I've gotten a few looks when I've worn a long sleeve top in 40+ degrees cycling for most of the day. I do this not just because of the benefits mentioned above but because they are also 50+UPF and for me sunscreen does very little in protecting my skin from the sun.

Not all compression is made equally – SKINS™ is the only company to have had independent research conducted and proven and, as mentioned, if you love your science or have a PhD then head on over to [skins.net](http://skins.net) to get to go through successful data.



# REST AND RECOVERY

## NEIL RUSSELL

BA(Hons) HMS, AEP, MAAESS

**When training for a run, there's no room for being a hero and skipping recovery (rest days, recovery sessions and techniques).**

Rest days allow your muscles and endocrine system to bounce back. Additionally every 4-6 weeks you should have a light week to allow your body to adapt/improve, or else you will keep fatiguing and actually start to see a decrement in your performance in training and racing (i.e. overtraining).

Recovery sessions are a great idea on the day following big training sessions or races. This can include pool/ocean swim or light walking and mobilisation (try wearing compression gear) and help increase blood flow to the areas without causing further fatigue, allowing you to get back to training harder sooner.

Post session acute recovery techniques should be completed after every session and include your cool down exercises, nutritional supplementation (protein, simple carbohydrates, hydration and electrolytes) and contrasting temperature showering/ice baths.

Tapering should be factored into your program. Depending on training load and the race distance, usually step back the training volume a week out from the race, performing a few speed sessions and short runs.

## ✓ RECOVERY

Make sure you are getting at least 8 hours sleep a night for maximal physical recovery. When used well these rest days, recovery sessions and techniques, as well as tapering, will mean you recover better from every session and race, allowing you to train harder and avoid injury, thus optimising performance on every race day!



# PROTOCOLS

## ENDURANCE TRAINING

The IsoWhey Sports product range has been designed based on scientific research and incorporates beneficial ingredients like L-glutamine, tart cherry and probiotics into a range of unique products. our brand's key goal is to support the overall health, performance and recovery of elite athletes, and for this reason we also leave out unwanted ingredients such as added fructose, and artificial flavours, colours and sweeteners.


THIS TRAINING  
PROTOCOL IS IDEAL  
TO FOLLOW WHEN  
TRAINING FOR AN  
ENDURANCE EVENT  
LASTING MORE THAN  
2 HOURS.

## ✓ SUPPLEMENTATION


### PRE-WORKOUT ✓



#### ✓ ULTIMATE ENDURANCE

 X1 2 HOURS PRIOR TO EVENT

#### ✓ ELECTROLYTE FORMULA

 X1 LESS THAN 45 MIN PRIOR TO EVENT


### DURING WORKOUT ✓



#### ✓ ON-THE-GO FUELLING COMBINATION

REFER TO REVERSE SIDE FOR OPTIONS

#### ✓ ULTIMATE ENDURANCE

 X1 FOR EVENTS LASTING LONGER THAN 2 HOURS

### POST-WORKOUT ✓



#### ✓ REFUEL & REBUILD

 X1 30 MIN AFTER EVENT

#### ✓ BCAA POWDER

 X1 30 MIN AFTER EVENT


**TIP:** COMBINE REFUEL & REBUILD + BCAA POWDER FOR EASE

#### ✓ ENERGY BAR

 X1 60 MIN AFTER EVENT

+


#### ✓ ELECTROLYTE FORMULA

 X 1-2 CONSUMED OVER THE 2 HOURS FOLLOWING EVENT (UP TO 4 SERVES DAILY)

### DAILY ✓




#### ✓ REFUEL & REBUILD

 X1 30 MIN AFTER TRAINING LASTING 1-2 HOURS

#### ✓ BCAA POWDER

 X 1-4 IN AND AROUND TRAINING SESSIONS

#### ✓ GLUTAMINE POWDER

 X 1-3 HIGHER DOSES DURING INTENSE TRAINING AND APPROACHING COMPETITION/ GAME/RACE DAY

# PROTOCOLS

## FASTER TRAINING

## ✓ SUPPLEMENTATION

TO IMPROVE SPEED AND AGILITY, FOLLOW THE FASTER TRAINING PROTOCOL. BLENDS OF DIFFERENT CARBOHYDRATE SOURCES CAN BE BENEFICIAL TO ALLOW GLYCOGEN REPLENISHMENT WITHOUT INTESTINAL UPSET.

### PRE-WORKOUT ✓



#### ✓ PRE-WORKOUT FORMULA


 30 MIN PRIOR TO TRAINING

#### ✓ ENERGY GEL



+

#### ✓ ELECTROLYTE TAB

 15 MIN PRIOR TO TRAINING

### DURING WORKOUT ✓




#### ✓ ENERGY GEL



+

#### ✓ ELECTROLYTE TAB

 EVERY 20-30 MIN IF SESSION LASTS FOR MORE THAN 1 HOUR

#### ✓ BCAA POWDER



THROUGHOUT SESSION

### POST-WORKOUT ✓



#### ✓ 100% LEAN WPI+

OR

HIGH PROTEIN,  
HIGH CARB

 30 MIN FOLLOWING TRAINING

#### ✓ GLUTAMINE POWDER

 FOLLOWING TRAINING

#### ✓ BCAA POWDER

 FOLLOWING TRAINING

**TIP:** COMBINE GLUTAMINE POWDER + BCAA POWDER WITH YOUR PROTEIN POWDER FOR EASE

### DAILY ✓



#### ✓ 100% LEAN WPI+

OR

HIGH PROTEIN,  
HIGH CARB\*



#### ✓ GLUTAMINE POWDER

 BEFORE BED

\*DEPENDING ON YOUR BODY COMPOSITION GOALS.

# BENEFITS OF BCAAs

## ✓ SUPPLEMENTATION

### BELINDA REYNOLDS

BScNut&Diet(Hon)

**BCAAs are a popular supplement amongst athletes and individuals looking to increase their strength and/or muscle mass. But is it all hype, or is there solid evidence behind their use?**

**A review of the research seems to support their use, with some beneficial results showing that BCAAs can enhance muscle recovery and growth, whilst providing an energy source to the muscle cells.**

BCAA stands for branched chain amino acids, which are comprised of three essential amino acids: L-leucine, L-isoleucine and L-valine. Essential amino acids are considered as such due to the body's inability to synthesise them. They therefore must be consumed in sufficient amounts, on a regular basis in order to maintain health.

BCAAs naturally occur in a range of protein-containing foods including red meat, chicken, fish, eggs, certain nuts (e.g. peanuts and almonds), whey protein, lentils and specific beans (e.g. soy beans). For all individuals, it is very important that foods rich in essential nutrients are consumed at every meal. As an athlete however, when training is frequent, long and intense, your increased nutritional requirements can call for additional supplementation.

BCAAs make up close to one third of the amino acids in muscle tissue and can also be burned there as an energy source. This is why intense and frequent exercise increases the need for BCAAs, as energy production and muscle recovery processes are required to be performed in a capacity that exceeds the diet's ability to support it.

When you look at the research available on BCAAs, some rather impressive results are achieved through their use, particularly in endurance exercise. The timing of dosing does vary from study to study, however it appears the most superior results will be achieved through daily ingestion, plus a dose both before and after training. For long and/or intense sessions, an additional dose every hour may be recommended. Each dose will ideally provide around 6g of BCAAs in total.

The BCAAs have been shown to have a protein-sparing effect during the recovery period after exercise, and they actually preserve glutamine levels (BCAAs can be converted to glutamine). This effect is beneficial not only to muscle recovery, but also to maximising immune function, a welcome result when looking to avoid an illness that can interfere with your training schedule.

Anabolic effects are also a noted benefit of BCAAs, meaning their consumption supports the repair and growth of muscles. These essential amino acids also reduce delayed onset muscle soreness, likely due not only to their ability to promote healing, but also through attenuation of the muscle damage that occurs during exercise. This benefit is particularly useful when you need to back up for multiple hard sessions per week, or more than one session in a day.

Enhanced energy metabolism in muscle cells can also be added to the list of BCAA benefits, contributing to their ability to support both performance and recovery. While they have also been demonstrated to enhance the activity of enzymes involved in muscle protein synthesis (e.g. mTOR, p70s6k) which aids in stimulating the growth and recovery processes.

L-leucine in particular has a significant ability to stimulate muscle growth, improving strength and increasing strength exercise capacity. Taking high doses of L-leucine (together with other amino acids and carbohydrate) after a training session has been shown to improve performance at subsequent training sessions.

Further to this, BCAAs down-regulate factors involved in muscle atrophy (e.g. MuRF-1, MAFbx) during the recovery period, ensuring that muscle health isn't compromised by suboptimal repair.

Ensuring sufficient BCAAs are consumed on a daily basis, with additional supplementation before and after training, is likely to reduce your recovery time, support energy metabolism in muscles and potentially even enhance the increases in muscle strength that you're training for.



# THE GLORY OF GLUTAMINE

**Glutamine is the most abundant amino acid in the body and is of paramount importance for overall health. Training at high intensities has been found to deplete available glutamine levels in the body, and low concentrations have been noted in athletes experiencing significant discomfort from over-training.<sup>1,2</sup>**

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Sports people often think of glutamine as a supplement for muscle protein synthesis, repair and growth, and for good reason. Glutamine, along with the BCAAs make up a large component of muscle protein mass. Not only does glutamine assist the formation of other amino acids (e.g. L-arginine), it plays fundamental roles in energy production, the clearance of “fatigue factors” from the blood during training (e.g. ammonia, phosphorous) and regulating acid-base balance to enhance performance.<sup>1,3</sup> It also supports immune function,<sup>4</sup> reduces exercise-induced inflammation,<sup>1,5</sup> and maintains intestinal health in athletes.<sup>5</sup>

When glutamine (3.5g) was given together with maltodextrin (50g) half an hour before exercise, and results compared with maltodextrin alone, the blend was proven to be superior. Subjects on the mixture showed a greater increase in the distance covered during an exercise test. The blend also led to an increase in the length of time for which the intermittent exercise was tolerated and athletes experienced reduced feelings of fatigue, all when compared to maltodextrin alone.<sup>6</sup> These results are believed to be due to glutamine’s role in the Krebs’s cycle (a key energy producing process in the body) and a resultant ability for glutamine to enhance the efficiency of metabolic processes. Glutamine also appears to increase a process known as gluconeogenesis in the liver that maintains glucose and glycogen availability to working muscles.

Further trials support glutamine’s role in enhancing performance, with a carbohydrate plus glutamine combination proving superior in prevention of decreases in anaerobic power, thus improving athletic physical performance. Interestingly, the glutamine and carbohydrate combination was superior in efficacy to both carbohydrate alone and glutamine alone, supporting the importance of incorporating multiple essential components of performance and recovery into a training program.<sup>2</sup>

## ✓ SUPPLEMENTATION

In addition to enhancing performance, glutamine can also reduce undesirable effects that high intensity training can exert on the body which compromise recovery and overall health, if not addressed. It has been found that increases in the permeability of the intestinal lining develop from heavy exercise. The result is gastrointestinal discomfort, an increased passage of unwanted molecules into the body, and thus a worsened internal inflammatory state, slower recovery, compromised future performance and poorer resistance to infection. As glutamine is used as a key energy source for fuelling repair of the intestinal tract, it’s no surprise that glutamine supplementation is shown to prevent this exercise-induced increase in gut permeability and the resultant release of inflammatory mediators in the body.<sup>5</sup> This has significant implications not only for supporting your ongoing training, but health in general.

High intensity training also sees the accumulation of certain compounds in the muscles and blood (e.g. phosphorous, lactate and ammonia). These contribute to pain, diminished ability to perform at your peak and premature exhaustion, therefore approaches which minimise their build up are useful.

A small trial found that at 6g/day for 7 days, glutamine was able to reduce blood phosphorous (which can decrease power), reduce creatine kinase (a marker of tissue damage) and attenuate increases in inflammatory markers during the recovery stage after maximal intensity exercise.<sup>1</sup> An additional preliminary trial found that glutamine supplementation (at 100mg/kg body weight) helped to protect against undesirable exercise-induced increases in ammonia.<sup>3</sup>

Although more research is warranted, glutamine appears to be a useful addition to the training protocol of sports people, not just in the recovery stages but also taken prior to training.

# MAGNESIUM MAGIC

**Athletes can be at a greater risk of a range of specific nutritional deficiencies, especially if dietary intake is inadequate. Magnesium is one such micronutrient which may become depleted in sports people, particularly those whose diets are lacking, and who frequently train at high intensities.**

There are many complications that can stem from a magnesium deficiency, and they are not limited to compromised performance and recovery. Due to the role magnesium plays in regulating excitability of nerves, and relaxation of muscle cells, one of the first signs of a deficiency may be muscular cramps and/or spasms. This can occur in both smooth muscle (e.g. contributing to head aches) and in skeletal muscle (contributing to leg cramps). Magnesium is also involved in normal contractility of the heart muscle, and assists in the maintenance of healthy blood pressure.

In addition to this, magnesium plays a role in our body cells' utilisation of oxygen, increasing oxygen uptake capacity and thus reducing blood lactate levels (which may assist in the maintenance of peak athletic performance). Interestingly, early findings have revealed that magnesium can improve these parameters in athletes, even when a deficiency is not initially present.

Magnesium also plays a role in energy metabolism, maximising energy availability for working muscles (including the heart) during aerobic activity. Preliminary research also suggests magnesium supplementation can assist athletes in achieving desired gains in strength, as part of a strength training program. This benefit may also be attributed to magnesium's role in supporting muscle protein synthesis.

As magnesium acts as an antioxidant and plays a role in metabolism, the higher energy needs and greater oxidation that occurs in athletes will see an increased utilisation of magnesium. This suggests they have a higher requirement when compared to more sedentary individuals.

Magnesium is also an essential cofactor in bone health, with magnesium levels in athletes being positively correlated with healthy bone density. This is particularly pertinent for women who tend to be at a greater risk of bone density loss in later life.

## ✓ SUPPLEMENTATION

Magnesium is also involved in the break-down of inflammatory chemicals associated with pain, meaning that it may assist in minimising post-exercise muscle pain. Via these mechanisms, and others, this broad-acting mineral is also shown to be important in reducing symptoms of anxiety and mild depression.

In addition to greater requirements, athletes are at a heightened risk of magnesium deficiency due to an increased rate of magnesium loss from the body. Like other electrolytes (e.g. sodium), magnesium is lost through sweat (particularly during long, gruelling training sessions carried out in high heat), but also through the urine.

As athletes are often faced with the combination of higher demands for magnesium, plus these accelerated losses, an increased intake will likely need to be considered (at least 400mg/day). This can be supported through a higher intake of magnesium-rich foods such as raw nuts and seeds, unprocessed whole grains (e.g. brown rice), quinoa, spinach, legumes and bananas. A dietary supplement can also be useful in achieving rapid magnesium resuscitation to minimise any present symptoms of deficiency, and potentially enhance performance and recovery.

### SYMPTOMS THAT MAY SUGGEST A MAGNESIUM INSUFFICIENCY:\*

- MUSCLE CRAMPS, SPASMS AND TWITCHES
- UNUSUAL MUSCULAR ACHES AND PAINS
- PERSISTENT OR EARLY ONSET FATIGUE AND/OR MUSCLE WEAKNESS
- HEADACHES
- PERSISTENT SYMPTOMS OF ANXIETY AND DEPRESSION
- HIGH BLOOD PRESSURE

*\*These are symptoms that may also be a warning sign of other imbalances.*

# STOMACHING THE HEAT

**It takes guts to race and train through intense heat – healthy guts, to be exact.**

**If you're looking to take your whole body health and fitness to a new level, emerging research into the importance of gut health in athletes may hold the key to giving you that extra edge.**

Firstly, it's important to understand that when the body experiences high temperatures, like those associated with intense training, hot ambient temperatures and humidity, this contributes to the release of inflammatory chemicals. This process causes damage to the tightly packed cells of the intestinal tract. A consequence is local inflammation that may (in the short term) go unnoticed in some athletes. There are, however, a number of individuals who may experience this as an upset gut (e.g. intestinal cramps and/or nausea) and diarrhoea.

The problem associated with “heat stress” does not end with a few loose bowel movements, but can be surprisingly significant in compromising your training regimen and recovery. How, you might ask?

Put simply, the intestines are normally very selective in what they grant entry into the intricately regulated internal environment of the body. When something damages this barrier, compounds that would otherwise be denied passage may seep through to the circulation (this can include endotoxins known as lipopolysaccharides, often abbreviated to LPS). The immune system is rapidly alerted to the presence of such unwanted chemicals and there is subsequent initiation of systemic inflammatory responses that may interfere with your recovery, worsen painful muscle and joint symptoms, and even potentially distract the immune defenses from fighting any viruses you encounter. The result is an increased risk of getting sick, slower recovery and possibly worsened performance.

The good news is that emerging research has established that beneficial microbes, known as **probiotics**, have the ability to protect the intestinal lining from this heat-induced damage, restoring integrity to the gastrointestinal tract (GIT) wall and calming the detrimental inflammatory processes. Trials have also shown probiotic ingestion to improve performance in the heat.<sup>1</sup>

## ✓ SUPPLEMENTATION

By improving gut health, probiotics can also support digestion, enhance your immune defenses and reduce gut discomfort and bowel irregularities.

**L-glutamine**, an amino acid frequently used by athletes for its noted benefits in muscle healing and muscle protein synthesis, will also help protect against the widespread complications of heat stress. Evidence shows L-glutamine supplementation can prevent an exercise-induced rise in intestinal permeability (“leaky gut”),<sup>2</sup> thus reducing subsequent whole-body inflammation.

Natural anti-inflammatories are also useful in reducing pain and oxidative stress associated with inflammation that impairs performance. The humble fruit, **tart cherry**, has demonstrated impressive anti-inflammatory and recovery benefits in clinical trials.<sup>3,4</sup>

Other factors to consider when looking to optimise protection against the negative impact of heat stress include good hydration, together with a hypotonic electrolyte and carbohydrate replenishment. **Water, carbs and electrolytes** all assist with prevention of hyperthermia, and can reduce inflammation associated with exercising in the heat. During endurance events in soaring temperatures, large quantities of sweat are lost and an electrolyte drink (containing sodium, potassium, magnesium and calcium) is superior to water alone.

Avoiding known gastric irritants is also important. High doses of fructose added to foods and supplements can pose a concern to certain members of the population due to issues with malabsorption causing IBS-type symptoms.

## ✓ SUPPLEMENTATION



In addition, preliminary evidence suggests that fructose (but not glucose) interferes with the body's normal thermoregulatory processes,<sup>5</sup> possibly increasing your risk of heat shock.

Fructose has also inherited the unfortunate title of “alcohol without the buzz”, due to the oxidative stress it promotes and the potential damage it may cause in the liver when consumed in excess. So, unless it is naturally occurring in a whole fruit, this sugar is best avoided when aiming to optimise health and performance.

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## ✓ WRITER BIOS

**THE ISOWHEY SPORTS TRAINING GUIDE FOR RUNNING FEATURES CONTRIBUTIONS FROM SOME OF AUSTRALIA'S MOST KNOWLEDGEABLE NUTRITION AND TRAINING EXPERTS, AND EXPERIENCED ENDURANCE AND EXTREME SPORTS ATHLETES.**

### BELINDA REYNOLDS

BScNut&Diet(Hon)

Belinda graduated with an Honours Degree in Nutrition and Dietetics in 2003. She has been involved in the complementary medicine industry for nearly 15 years - 10 of these working for BioCeuticals as a Practitioner Sales Consultant, Team Leader, Presenter, Educator and Writer, with an involvement in Marketing and Product Development. Outside of this Belinda has spent time working in hospitals and lectured at the Australasian College of Natural Therapies.

Belinda's greatest passion is assisting practitioners in developing their knowledge by presenting new research in the area of integrative medicine.



### ALEXA TOWERSEY

Trainer and nutrition coach

Alexa has over 15 years experience in the health and fitness industry. She is currently the trainer of top Australian models and personalities Laura Dundovic and Renae Ayris.

Alexa is one of only a handful of female trainers who is a fully certified instructor under the infamous Gym Jones outfit. She is also a nutrition coach and has been a Bio Signature Practitioner since 2009.

At the end of 2014, Alexa launched her 3-day Weight for Women Retreats with fellow PT Sally Matterson Australia wide, teaching women how to best train for their own body, correct technique and how to feel comfortable in the weights room.



### NEIL RUSSELL

BA(Hons) HMS, AEP, MAAESS

Neil has over 10 years experience in personal training, strength and conditioning coaching and exercise rehabilitation. He started working in the fitness industry as a gym instructor in 2001 whilst studying Human Movement Studies. In 2004, he wrote his thesis examining the physiology of team sports performance and received a 1st Class Honours Degree.

Since completing his major work, Neil has had a number of articles published in the internationally recognised *Journal of Science and Medicine in Sport*. He has been a strength and conditioning coach for Australian and NZ representative athletes and a PT for internationally acclaimed paralympians, Hollywood actors, models and media personalities.



## ✓ WRITER BIOS

### JOHANN RUYLS

B.Sp.Ex.Sc, Cert III & IV Fitness, MESSA

Johann is an elite trainer and extreme sports athlete. He finished his Bachelor of Sport and Exercise Science at UTS in 2014 and is currently undertaking Honours by Research in sport and exercise science at UTS, with the Sydney Swans.

Johann is an avid exerciser and loves to play sport and be outdoors. He is a keen surfer and snowboarder, and enjoys to travel to chase the slopes and the waves. He has worked as a surf educator for Surf Lifesaving Northern Beaches Surf School as well as a Surf Lifesaver at Palm Beach. He is a trainer for ATLETA.

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### ANDREW 'PAP' PAPADOPOULOS

IsoWhey® Sports ambassador  
+ endurance athlete

Andrew 'Pap' is an elite endurance athlete, the owner/operator of Battle Fit Australia, a rigorous outdoor group training business which encapsulates the principles and values learnt through his military experience in the Royal Australian Infantry. He is the IsoWhey® Sports Ambassador and the star of ESPN's Search4Hurt, season 2.

With his army background, Andrew's passion to 'fight his limits' has led him to compete in physically gruelling challenges including: The North Face 100km Run, GEO Quest 48hr Adventure Race, 24hr True Grit Obstacle Race and the Big Red Run; Australia's only 250-kilometre multi-day marathon.



### MATTY ABEL

Strength and conditioning coach

Matty is a well-established trail runner and strength and conditioning coach based on Sydney's Northern Beaches. Starting his career in the fitness industry in 2008 at Vision Personal Training, he built his way up to a franchise owner in 2011. In 2012 Matty parted ways following his passion for trail and endurance running. Since then he has combined both passions to launch DBA Runners, specialising in strength and conditioning for runners, running groups, online training and running retreats.

Now focused on Ultra Trail Marathons, Matty has achieved some outstanding results in his running career including The Big Red Run 250km desert race and Northburn100, breaking the 2011 record by 2hrs20second.



### MATILDA RAYNOLDS

Skins™ ambassador  
+ professional triathlete

Matilda made her triathlon debut in January 2009 and loves making a living out of her passion. Previously a marketing and sponsorship manager, Matilda studied a Bachelor of Sports Business, Sports Business and Marketing at the Australian College of Physical Education.

Having transitioned to become a professional triathlete, Matilda has worked through challenges and believes training and performance techniques need to be practiced daily. She also works as a Project Manager at Batyr; a not-for-profit organisation that aims to engage, educate and empower young people to speak out about mental health issues.

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