RUNNING

Author: Peter Ondráš
Co-authors: Miloš Jakubčiak, Erik Hubner, Miloš Pintrava

Editor: Gabika Mihaličková Čepičanová

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Dedicated to the dogs **Amy** (*19.10.2012 – +30.7.2025) and **Labka** (*19.10.2012). Thanks to you, I run.

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Introduction **9**
What running looks like **10**
How to read this guide **11**
What running brings **12**
Running sets you free 12
Running changes your perspective 12
Running as a return to vitality 12
Equipment **14**
Shoes 14
Sole 14
Drop 15
Barefoot 16
Lacing 17
Marathon knot (heel lock lacing / runner's loop) 17
Tongue loop (lace keeper / lace holder) 17
More tips on lacing running shoes 17
Shoe designations – ATR, GTX, W, Trail, Carbon 18
Road shoes 18
ATR 18
GTX 18
W, Wide 18
Trail 19
Carbon 19
Shoe size 19
Complete database of running shoes 19
Laces 19
Shoe lifespan 20
Shoe care 21
Clothing 21
Underwear 21
T-shirt 21
Nipple protection 21
Short or long sleeves as required 22
Running with or without a T-shirt 22
Shorts 22
Waist belt 22
Socks 22
Waterproof socks 23
Cap 23
Sunglasses 23
Jacket 23

Gloves 24
Running crampons 24
Insect repellent 24
Rucksacks and vests 24
Running to work / school 25
Ultra running 25
Watch (sports tracker) 25
HR – heart rate 27
Optical HR bands for the forearm 27
Chest HR belts 27
Indirect HR measurement 28
HR in more detail – running by heart rate 28
HRmax 28
Heart rate zones Z1–Z5 29
Z1 31
Z2 31
How to determine the Z2 range 32
How to increase the Z2 range 32
How my zones have shifted 34
Z3 34
Z4 35
ANP 35
Z4a 35
Z4b 35
Lactate 35
Z5 36
How to run properly 37
The key is Z2 and the 80/20 rule 37
Feelings 38
What affects how you feel whilst running 38
HRV 39
VO_2max 40
Other equipment 40
Soft flasks (instead of a camel bag) 40
Filter bottle 41
Headlamp 42
Bell 42
Poles 43
Vaseline 43
Salt 43
Magnesium 44
Gel 44
Ion 45
Strong Power Cream (Niambo) 45

Headphones 46
Socialising 46
Community runs 46
STRAVA 47
SmashRun 47
Komoot 47
Relive 47
Appka by Appa 48
Data analysis 48
STRAVA (paid version) 48
Runalyze 48
Quantified Self 48
SmashRun 48
Statshunters 49
Route planning 49
Strava Routes 49
Strava heatmaps 49
LocusMap 49
Komoot 50
TrailForks 50
Warm-up 51
Breathing 52
Side stitch 52
Breathing outside of running 52
Gaze – where your eyes are looking 53
Food 54
Running on an empty stomach 54
Running immediately after a meal 54
Notes 54
Losing weight through running 55
Recommended approach to weight loss 55
The most important part of weight loss – a calorie deficit 55
The yo-yo effect vs. adaptation 55
Summary 56
Adjusting your diet – listening to your body 56
FINALLY, RUNNING 57
Consistency, endurance, adaptation 57
Consistency 57
Endurance 57
Adaptation 57
Pace 58
GAP (Grade-adjusted pace) 58
Speed (km/h) 59
Pace Calculator 59

Pausing activity tracking 60
Types of training runs 60
Recovery run 60
Light running 60
Tempo run 60
Interval running 61
How to determine the length and pace of an interval 61
How to determine the length or duration of the recovery period 62
Long slow distance (LSD) 63
Fartlek (playing with pace) 63
Summary 63
Running technique 63
Cadence 64
Run flow 65
Mistakes 65
Long strides = heel strike 65
Pushing off upwards rather than forwards 66
Landing on the balls of the feet 66
Not using the arms 66
Unstable core 67
Failure to use the arms and an unstable torso at the same time 67
Unnecessary attempts to run uphill 67
Fixing mistakes 68
Training 68
Effectively building up your weekly mileage 69
Race training – categories A, B, C 69
Goals for races 70
Etiquette 70
Weather **72**
Running in winter 72
Summer 74
Sweating and its consequences 75
Humidity and sweating 75
Drinks for sweating 75
Rain 76
Thunderstorms 76
Windy.com – weather forecast 77
My Lightning Tracker Pro – lightning alerts 77
TerraTime Pro 77
Treadmill running 78
Strength training **79**
Nutrition for the joints 79
Trail running **80**
Autopilot for choosing where to land your foot 80

The benefits of trail running 80
Disadvantages of trail running 81
Tips for running uphill 81
ITRA methodology for converting elevation to distance 83
Falls 83
Ultra running **85**
Training 85
Training through races 85
Sleep deprivation 86
Hallucinations 86
Endorphins, serotonin, dopamine 87
Specific types of ultra runs 88
Backyard Ultra 88
Barkley Marathons 89
Recovery **90**
Lack of energy 90
Sleep 90
How to improve sleep 90
Sleep duration 91
Winter swimming (cold water swimming) 92
Supercompensation 93
Injuries **95**
Skin abrasions or blisters 95
Tick-borne diseases 95
Books describing running injuries 95
Weight vest 96
Running whilst ill 96
Boosting immunity – zinc 96
Motivation **98**
Quotes 98
Photos from trail runs 101
Films 109
Short films 109
IG Reels 109
Running for a goal **110**

Introduction

As recently as 31 August 2016, I weighed 100 kg and did not engage in any physical activity. From 1 September 2016, I began bodyweight strength training under the supervision of trainers, in a small group, three times a week, for a full hour of intense exercise. This also included personalised dietary advice. Within a year, I had lost 25 kg, whilst also gaining a significant amount of muscle mass.

It was only after losing weight that I added running to my routine, starting on 1 November 2017. I was self-taught when it came to running. I read loads of books, but honestly – I often got lost in them. They contained everything and yet nothing, because they weren't explained in a way that I, as a layman, could understand. Gradually, through regular running, I got the hang of it, but I never went back to the books. They were too long, often hundreds of pages.

I've been a trail runner for a long time, practically from the start, but I have no problem with hard surfaces or tracks either. When you run properly, the surface plays almost no role.

I currently run every day. On days when I don't have strength training, I go for a trail run at 6:00 am with a group of other runners. Apart from that, I run to and from work every day. Proper technique allows me to run relatively long distances without the running wearing me out.

This text was written in an attempt to set down most of the things I struggled with myself or didn't understand at first. I have deliberately included notes that may help fellow runners understand more easily and shorten the journey I had to go through myself

Running is a natural movement for humans; the human body was designed to run perfectly. To run far. To run for a looooooooooooong time.
Look at children. Most of them don't just want to walk; they're almost always running (as part of play, not forced). And how efficiently and beautifully they do it. Don't stop them from running, even in situations where YOU think it might be dangerous. Instead, encourage them to run even more. Instead of saying "don't run around here", say "go for it" or "run faster". And then take inspiration from them.

The running of an adult who hasn't run for years or has spent a lot of time sitting looks different from a child's running. The movement isn't usually as natural or fluid. With regular effort, however, it can be significantly improved.

Movement is life, life is movement.

What running looks like

Running works like a constant fall forwards, which the body controls using gravity. This principle is much easier to understand in motion than in text. The following video also demonstrates it.

https://youtube.com/shorts/qwvlI4J7c_E?si=U6hApSHCm0BQTLIX

And in continuous motion, like this:
https://www.youtube.com/shorts/y9dq8Fk-0g4

Beginners often try to consciously control too many details at once. However, running technique must eventually become automatic. A common mistake is to focus solely on the foot strike, even though the entire contact with the ground – both the strike and the push-off – is important for running.

On the following pages, you will find videos on running technique and practical information that you can refer to at any time.

How to read this guide

I recommend reading absolutely everything, including the sub-sections that may not interest you at all to begin with (probably ultra-running).

Pick out from the text what is essential for you at that moment. After a while – say, two months – come back to it and read it again, this time with the experience of your own running.
There is a lot of information, and it is impossible to absorb and apply it all at once. The experience you gain in the meantime will help you better understand what the text is about when you read it again.

This text is intended primarily for beginner runners.

There is no need to try to consciously control everything you read here. If you run regularly and over the long term, your body will gradually find the right movement pattern on its own. It just takes time and patience.

I've written the book in the masculine form, but the advice and tips apply to women as well. In the book, I address you formally, even though runners usually use informal language with one another.

What running brings

Running sets you free

In most articles and books about running, you'll read that running is liberating. However, I haven't found an explanation anywhere of what that's supposed to mean. Perhaps it's because it can mean something different to everyone. I don't know.

Here is my take on it:
Before I took up running, I perceived the world differently. I was preoccupied with the cycle of day and night, I distinguished distances – mostly travelled by car, not on my own two feet. Bad weather bothered me. And sometimes, actually, any kind of weather: winter, summer, snow, rain, sun, low atmospheric pressure… 🙂
Comfort always took precedence over any discomfort for me.

Running changed everything. The weather no longer plays (almost) any role. I don't care whether the day is short or long.
I don't care where or when I have to go – however I get there, even by car.
The world has shrunk for me. What you have to drive round in a car can be covered almost directly on foot. Suddenly you realise that everything is very close together, separated only by beautiful nature, where you can spend your time.
I no longer care about comfort. I'm truly flexible in everything. This is how I perceive freedom.

Running changes your perspective

Over the last two centuries, humanity has made a huge social leap forward, but biologically, the human body hasn't had time to adapt yet. We live and work in a completely different way to how we did when humans first evolved. This leads to artificial stress and an increase in lifestyle-related illnesses. Running can be an excellent form of prevention, or even a basic treatment.

Whilst running, your mind clears of unnecessary thoughts and trivial problems – for example, stress over things you cannot influence or which, from a biological perspective, from the point of view of early humans, make no sense at all = practically all modern-day work tasks. This frees your mind, and life becomes both more beautiful and simpler. You'll shift from striving to own things to striving to enjoy everything, whilst respecting sustainability. You'll connect with nature and understand what life is all about.

Running as a return to vitality

During any physical activity – running, dancing, cycling or swimming – new synapses are formed in the brain. The exact mechanism isn't important (see the recommended reading for more), what matters is the result.

The brain's cognitive abilities improve. You remember things more easily, can juggle multiple thoughts at once and maintain focus even when multitasking. You are calmer, less irritable; stress affects you only briefly and fades quickly.

Gradually, your zest for life and enjoyment of everyday activities return, much like in your youth. Blood circulation throughout the body improves, as do your vitality and overall physical well-being. This effect is evident in all areas of life – sporting, professional and intimate.

Book recommendation: Anders Hansen – Run Your Brain / Anders Hansen – The Mind-Body Method

Equipment

You don't need any special gear to run. You can even run barefoot – gear just helps you cope with tougher conditions or longer runs.

If you decide to start, don't buy anything for the first few days. Use whatever trainers you have. It only makes sense to invest in gear once you've been running regularly for at least a few weeks.

If you're serious about running, your first investment should definitely be shoes. You can add everything else gradually.
Running may be the cheapest sport, but if you were to buy everything I mention here, it would be quite expensive in nominal terms 🙂.

In the following sections, I'll give examples of specific gear in certain categories. It may not be the gear with the best value for money or the best in other respects. In all cases, it will be gear that **I'm personally happy** with **after trying out several brands and alternatives**. However, this may vary from person to person. Don't get too fixated on these; instead, use them as a starting point for finding similar equipment to suit your own taste and needs.

Always bear in mind that this is consumer goods that you will put under heavy strain. (This applies not only to shoes, but to all types of equipment I will describe here.) And so – despite the price, the lifespan of the equipment is relatively short.

Shoes

I sometimes see people wearing running shoes even on a normal day. I use them for hiking too, but they don't make sense to me for everyday walking. That's because they're designed for running – a movement that's technically different from walking.
When choosing running shoes, consider the surface you'll be running on – road, trail or a combination of both. And try on several models to find a pair that's comfortable for you.

In the long term, it's a good idea to rotate between several pairs of running shoes.

If you run on different surfaces, it's enough to have at least one pair for each (road or track, light terrain, trail). However, if you mainly run on one type of surface, it's worth having at least two pairs of shoes designed specifically for it and alternating them regularly, for example every other run.

Sole

Running shoes often look as though they have a very thick sole. However, this is merely an optical illusion.

Your foot does not sit right at the top of the shoe. It is ‘set’ deeper inside the shoe. That is why the rubber on the sides looks higher than it actually is.

In reality, you are not standing on as high a sole as it may appear from the outside.

A running shoe has cushioning (or generally referred to as stack height), which indicates how much material is between the foot and the ground (from the inside). The height at the back of the foot (**heel**) and the front of the foot (**forefoot**) are specified, and the difference between them is **the drop**.

Note: Track and road races may have maximum sole thickness (stack height) limits specified in the rules, and failure to comply may result in the runner being disqualified. See the rules of the specific race or, generally, the WA (World Athletics) website for more details.

Drop

Drop (denoting the difference between the heel and the toe of the shoe) indicates how much higher the heel is than the toe. It is given in millimetres. You may also come across it referred to as: "heel-to-toe drop", "heel drop", "heel-toe drop", "heel-toe offset" or "heel-toe slope".

The higher the drop value, the more the heel is raised relative to the toe. Values range from approximately 0 to 14 mm.

Running barefoot or in minimalist (barefoot) shoes has **a drop of 0**, meaning the heel and toe are at the same height. Some running shoes, such as trail models, now also offer a zero drop.

It is important to know that **a zero drop does not mean a stiff shoe**. Even shoes with a zero drop can provide sufficient cushioning and comfort, even for long runs.

The right drop is individual to each runner and depends on many factors. Once you get used to a certain drop, rarely (or never) change it, as it affects your running technique.

With a lower drop, the ankles and tendons work harder; with a higher drop, the load shifts more towards the knees and hips. However, if your running technique is natural, your body can handle both options without strain.

A higher drop is more suitable for beginners, at least initially, when you’ll be landing on your heels. It will also help you maintain a forward lean. But it’s also beneficial for experienced runners on long runs (ultra runs).

A higher drop puts less strain on the Achilles tendon, as the raised heel reduces the range of motion in the ankle. At the same time, however, it shifts the load higher – towards the knee, thigh and hip.

There is no single ‘correct’ drop value for everyone. Every runner must find what suits them, or adapt their technique, and stick to a similar drop value even when changing shoes.



Image source:
https://www.fitendo.sk/pomoc-a-rady/co-je-to-drop-pri-bezeckych-teniskach-a-ako-si-vybrat/

Barefoot

A more accurate term might be **minimalist shoes**. These are one option for experienced runners, but they are not suitable for beginners.

If you haven’t walked barefoot for most of your life, starting to run in them doesn’t make sense. Even with good technique, you should expect to tire more quickly, which is why they are less suitable for long runs in particular.

True barefoot running makes sense on safe and comfortable surfaces, such as grass in a park or on a sports field. It can serve as supplementary training that helps the body naturally find the landing point and the way to push off.

Strength training can also be done very effectively barefoot.

TIP: Short barefoot training sessions can be one way to gradually build up the resilience of your feet.

Lacing

Marathon knot (heel lock lacing / runner's loop)

Recommended lacing for running shoes, regardless of the distance you're running. It helps reduce foot movement inside the shoe (prevents blisters) and stabilises the ankle (prevents ankle injuries).

Lacing:
Most running shoes have an extra eyelet at the top on each side. This is designed to help the shoe fit more securely around the ankle.

If you thread the laces through these last eyelets so that small loops form at the ankle, and then cross the laces from the opposite side through them, the shoe will gently 'lock' around the ankle once tightened.

This helps the heel stay in place better and reduces foot movement within the shoe.

An indirect benefit: this shortens the laces, and if they come undone accidentally, it reduces the risk of tripping by the lace of one shoe getting caught on the other foot.

Video tutorial: https://youtube.com/shorts/enZRV8x5hfE?si=yU2EdFBNfS-h5aZh

Tongue loop (lace keeper / lace holder)

Virtually all running shoes have a loop in the middle of the tongue through which the laces pass. This allows the laces to be tightened differently for the front and back of the shoe. It is suitable for those with a wider forefoot or for anyone who suffers from swelling in the forefoot, for example after their feet have become wet.

Video tutorial: https://youtu.be/k0tGmk6dW6c?si=jSb68lX4KVpM28fP

More tips on lacing running shoes

At the following link, you'll find several tips on how to lace up running shoes, including support for a wider forefoot.
https://www.asics.com/nz/en-nz/mk/choosing-the-right-running-shoe/lacing

Shoe designations – ATR, GTX, W, Trail, Carbon

Running shoes are categorised, sometimes even within the same model, by subtle designations in their names.

Road shoes

Running shoes often do not have a specific surface designation. If no designation is given, the shoes are usually designed for hard surfaces, i.e. roads.

You'll gradually learn to recognise the surface by the sole as well. Shoes for firm surfaces have a smoother sole, without any pronounced protrusions or 'claws'.

Example: Hoka Clifton 9

ATR

ATR *(all terrain)* refers to shoes designed for various surfaces. In practice, this mainly involves **light terrain**, such as city parks or meadows, or a combination of these with roads.

The sole is a compromise design: **the forefoot has a slight trail pattern**, whilst the rear is similar to road shoes. ATR shoes are suitable for soft trails or runs where the terrain alternates between soft and hard surfaces – for example, when running from the suburbs into the city.

Example of equipment: Hoka Challenger 7 ATR

GTX

Gore-Tex (GTX) refers to shoes that are only **partially moisture-resistant** – they are not waterproof.

They are of no help in the rain, when wading through water or on wet grass. On the contrary, once water has seeped in, it is harder for it to escape.

They are particularly useful **in snow**, where they help retain heat and prevent snow from getting inside. For running in the rain, dew or on wet terrain, it is better to choose shoes without GTX and wear waterproof socks.

Example of equipment: Hoka Challenger 7 ATR GTX

Note: some models with GTX may have a higher sole (stack height) than the same model without GTX.

W, Wide

Indicates a shoe variant with a wider forefoot.

Trail

Trail shoes are designed for tougher terrain, particularly for running uphill and downhill.

They have a grippier sole with pronounced lugs that help keep the foot stable and prevent slipping. However, they work best when moving **straight up or down**. Their effectiveness is significantly reduced with an angled or sideways foot strike.

Example of footwear: Hoka Speedgoat 5

Carbon

Carbon shoes have a very short lifespan – approximately 160 to 200 km whilst retaining their factory properties. They are therefore mainly used for races or for short training sessions beforehand, to allow the foot to get used to a specific model.

Carbon shoes can slightly increase speed (by up to 4 per cent), but this effect is only significant for very experienced runners. It only works with the correct technique and when performance cannot be significantly improved further through training, diet or conditions on race day.

And above all, the speed boost only works with the correct running technique.

If you are just starting out with running, carbon shoes will not help you. Regular training will have a much greater effect.

Example of equipment: Nike ZoomX Vaporfly NEXT% 2
Note: this is the only piece of kit I haven't tried, and I don't plan to change that.

Shoe size

Running shoes should be **slightly larger** than normal 'everyday' shoes. When running, your foot naturally shifts forward and may even swell slightly.

You'll appreciate the extra room particularly when running downhill and on longer runs. A larger shoe isn't a problem in itself if it's laced properly – the right lacing will help the shoe grip firmly around the heel and ankle. I recommend the marathon knot.

Complete database of running shoes

You'll find most, if not all, running shoes at www.runrepeat.com

Laces

When running, it is important to have your shoes **properly laced**.

If you simply slip them on without securing them, your foot loses stability inside the shoe, particularly around the ankle. This increases the risk of sprains and overloading of the foot and calf muscles. Proper lacing helps keep the foot in place and reduces the risk of injury.

[source: https://dennikn.sk/4682185/expertka-na-chodidla-ked-matkam-ukazeme-ze-problemy-ich-deti-sposobili-barefootove-topanky-rozplacu-sa/]

An experienced runner with strong muscles can run for a short time even with an untied lace if it comes undone whilst running. However, as soon as possible, it is better to tie it again.

Tip: Most running shoes have flat, slightly elastic laces that are less likely to come undone. If your shoes don't have them, you can solve this by replacing the laces.

Practical tip: Dry laces often come undone in wet grass. However, if you tie them again after they've got damp, they tend to stay tied much better.

Shoe lifespan

The lifespan of running shoes is given in kilometres and also depends on the runner's weight – it tends to be slightly shorter for heavier runners. Most manufacturers recommend allowing for a range of approximately **500 to 1,200 km**.

Once this limit has been reached, it is advisable to use the shoes only for lighter runs, not for speed or interval training.

Think of running shoes **as consumables**. Minor damage to the upper isn't a deal-breaker – what matters is the condition of the sole. Check that it's still flexible and, for trail shoes, that the lugs are still functional.

If the sole is in good condition, there's no point worrying about minor cracks in the upper. These can often be easily repaired by a skilled cobbler. In Žilina, I recommend DAPE shoe repairs.

You can easily check the sole's flexibility by trying to press the toe and heel of the shoe together – as if you were trying to bend it into the shape of the letter 'U'.

If this is very easy to do, it means the sole has lost its function and the shoe is now only suitable for light use. For running, it's better to get a new pair.

Source: Hal Koerner's Field Guide to Ultrarunning: Training for an Ultramarathon, from 50K to 100 Miles and Beyond

Shoe care

Running shoes have a relatively short lifespan, so they do not require any special care. Washing them in the washing machine is neither necessary nor advisable.

For minor dirt, rain or morning dew on the grass is often sufficient. If they are very dirty, simply rinse them with clean water and leave them to dry.

You can dry the shoes in the open air, in the sun or using electric ski boot dryers.

Drying is also possible using energy-efficient electric boot dryers, such as the BH TECH comfort PRO.

Alternatively, you can dry the boots using a standard hairdryer.

Clothing

Underwear

Underwear is probably the most essential part of running kit.
I recommend seamless, functional underwear designed specifically for running. An alternative is to wear no underwear at all and let the running shorts themselves fulfil this function.

Example of kit: **T8 Commandos**

T-shirt

A seamless, functional running T-shirt is ideal. A functional cycling T-shirt can also serve as an alternative.

A functional T-shirt dries very quickly – often even without the sun, just from the wind or the running itself. It is lightweight, does not restrict movement and does not pinch anywhere. The only exception might be the need to protect your nipples on longer runs.

Example of gear: **T8 Iced Tee**
Alternative trusted brands – Johny Tatrosh, Awoo, Craft, Kilpi

Nipple protection

In adverse conditions, such as rain or high humidity (e.g. fog), even a high-quality T-shirt may start to irritate sensitive areas, particularly the nipples.

In such cases, it is advisable to cover the nipples preventively with paper tape or a adhesive plaster.

Example of equipment: Omnipor hypoallergenic adhesive plaster (2.5 cm x 5 m)

Short or long sleeves as required

Arm sleeves are a simple way to turn short sleeves into long ones.

Example of equipment: running arm cover sleeve

Running with or without a T-shirt

In sunny weather, a functional running T-shirt is more suitable than running without one. It protects the skin from UV radiation and sunburn, reflects sunlight, wicks away sweat and helps the body cool down more effectively.

Running without a T-shirt can make sense in high humidity, provided there is no direct sunlight.

Personally, I always run in a T-shirt. The downside is getting a 'T-shirt tan' 🙂, but in warm weather I use functional T-shirts with a cooling effect, such as the T8 Iced Tee.

Shorts

Like a T-shirt, shorts should also be **functional running shorts** – lightweight, short and quick-drying, even without direct sunlight. Running shorts generally don't have pockets, which is intentional. Some models replace them with **an integrated waistband** for a water bottle, keys or a phone.

In cold weather, especially in winter, it is advisable to wear **running tights** over your shorts.

Example of gear: **T8 Sherpa** or **T8 Ultra Sherpa**

Waist belt

If your shorts do not have a sewn-in waist belt, you can use a separate waist belt.

Example of equipment: **Salomon Pulse unisex Belt**

Socks

Socks are a very essential part of running gear. They can even determine your success in a race.

They must fit well, stay in place and not fray. If they start to fray, the risk of blisters increases. That is why it makes sense to use **functional running socks**, not ordinary 'everyday' ones.

Compression sleeves or knee-highs can help with circulation problems.

If you get blisters between your toes, **toe socks** may be the solution. However, bear in mind that they will wear out more quickly.

Practical tip: On long runs, instead of toe socks, I apply food-grade petroleum jelly to my individual toes. During regular training, however, I don't use anything special.

Example of kit: **T8 socks**

Waterproof socks

These are suitable for damp to rainy weather. Although they are not designed for wading across rivers, they cope very well with rain, snow and generally high humidity.

In practice, they are often a more suitable solution than using GTX boots.

Example of equipment: Sealskinz waterproof socks

Cap

The primary function of a cap is **to protect the head from the sun**. The second is **to catch sweat** so it doesn't run into the eyes.

The peak is adjustable – if the sun is high or out of your field of vision, it can be flipped up. We usually flip it down when the sun is low and sunglasses are no longer sufficient.

TIP: A cap also helps in the rain, directing rainwater away from your eyes.

Example of gear: **Awoo BBU merch**

Sunglasses

During the sunny season (roughly from April to October – Northern Hemisphere), sunglasses are an essential part of your kit. Ideal running sunglasses do not fog up quickly and can adapt to changing light conditions, for example when running into a forest.

Example of gear: I use running sunglasses from Decathlon. I'm not specifying the exact model – I can't find them on the shop's website.

Jacket

A running jacket should be functional and reliable. In challenging conditions, it can make all the difference to your comfort – and in the mountains, to your safety too.

Of course, it depends on where and how you run. For short city runs, a simple windproof jacket will suffice, ideally one that's also waterproof. It's an advantage if it can be used across a wide range of temperatures.

Example of gear: **Montane Minimus Stretch Ultra Jacket**

This is the only piece of kit I'm reviewing in such detail. Despite the higher price, I already own two of these jackets because they've proven themselves over the long term in an extremely wide range of conditions. I wear it with just a T-shirt – from around −20 °C right up to summer temperatures in heavy rain. The wind doesn't stand a chance, and rain only gets through in truly extreme conditions.

It can be folded up in seconds and tucked into the waistband of my shorts, and it doesn't get in the way at all when running.

If I had to choose just one jacket for different types of weather, it would be this one. That's precisely why I'm mentioning it – not as a universal recommendation, but as a personal exception that has worked for me over the long term.

Gloves

When running in cold weather, it's a good idea to wear running gloves. Before using them, however, take a look at the section on running in winter.

Example of equipment: **Salomon Cross Warm Glove U Deep Unisex**

Running crampons

When running on hard-packed snow or ice, always use **hiking or running crampons**. They are compact, can be carried in a jacket pocket or on a waist belt, and can be quickly put on when needed.

Example of equipment: **Ice Run Master**

Insect repellent

In summer, and particularly in damp areas, it is advisable to use insect repellent against mosquitoes and horseflies.

Example of equipment: Predator Forte

Rucksacks and vests

A rucksack or vest only makes sense if you need to carry something. They are usually unnecessary for road running – you can carry water or gels using a simple waist belt.

If you do need a rucksack or vest, make sure it is **waterproof** (to protect against rain and sweat) and **flexible in volume** – i.e. small when empty and able to adapt to its contents.

A simple, large storage compartment is more practical than lots of small pockets, which limit what and how you pack.

Running to work / school

If you use your training run as a way to get to work or school, you'll need to carry a change of clothes, possibly a towel and soap, and often work equipment such as a laptop.

Example of equipment: **Stolt Athlete Backpack**

Ultra running

For ultra running, you need to carry more water, probably a change of clothes, and definitely the mandatory kit.
Example of equipment: **Black Diamond Distance 15 Backpack**

Watch (sports tracker)

Running watches are mainly used to **record your route and distance**. They also offer other features, such as elevation, heart rate, steps, navigation and intervals, but you probably won't use most of them at first.

Brands specialising purely in sports include **Garmin**, **Suunto**, **Coros** and **Polar**. They all offer high-quality models, so your choice will mainly come down to personal preference, price and any future requirements.

Flagship models usually have the longest battery life, which will be particularly appreciated by ultra-runners. For regular running, however, this is not a decisive factor.

Example of a model: **Suunto Vertical**

An alternative to sports watches are devices from electronics manufacturers such as Apple, Samsung, Xiaomi and Huawei. On paper, they offer similar features, but in practice they cannot be fully compared to sports watches – particularly in terms of battery life, accuracy and reliability in various conditions.

To start with, however, any watch will do, and there's no point in investing in sports models straight away. If running becomes a natural part of your life, or if you take up ultra-running, the switch to a watch from a sports brand will come naturally.

The advantage of sports watches is the ability to charge them whilst you're active. It doesn't matter whether it's a charging pad or a clip – it works the same way. It's particularly practical to charge during slower sections or whilst walking, for example on steep climbs.



A tennis headband, with a stick-type power bank underneath, from which a charging cable is wrapped around the wrist and connected to the watch, which remains on your wrist and thus allows for continuous navigation, for example

A last-resort alternative is to use **a mobile app directly on your phone** instead of a watch. This is the solution involving the most compromises – the setup tends to be more complicated and you need to disable battery optimisation to prevent the app from closing whilst running.

Nevertheless, it can be a workable solution to start with. It's not ideal, but it's better than having no record at all.

Example of equipment: the Strava app

Note: After an activity ends, sports watches automatically send data to linked apps, such as Strava and many others. So if you're primarily recording your activity with your watch, you can conveniently use the features of other apps without any further steps – a one-time connection is all it takes.

HR – heart rate

Most sports watches measure your heart rate using **an optical sensor on your wrist**. This works reliably, particularly at rest or during very light and short activities. However, during actual sporting exertion, the measurement is often inaccurate, especially if there is hand movement, sweat or water present.

A simple tip to check this:

- if you run **uphill and then downhill**, your heart rate should drop on the descent. If the watch shows similar readings in both cases, the measurement is likely inaccurate.

Another sign of inaccuracy is if the watch shows high heart rate readings whilst you are able to speak fluently, or if the readings exceed your maximum heart rate.

Monitoring your heart rate **isn't essential**, but it can be useful at least after you've finished your activity – particularly to get a rough idea of which zone you were running in most of the time. This affects the effectiveness of your training and whether you'll achieve the results you expect.

Heart rate monitoring is mainly used to help you run efficiently. However, it is not essential – you can get feedback even without a watch.

A simple rule: **if you can hold a conversation while running, you're probably in the aerobic zone (Z2).**

Optical HR bands for the forearm

Optical heart rate sensors for the forearm are a sensible alternative to optical **heart** rate measurement from the wrist. They use the same technology, but thanks to their secure fit, they do not move whilst running and therefore generally provide more reliable measurements. Although the accuracy is still not entirely perfect, in practice it is sufficient for most runners. At the same time, this solution tends to be more comfortable, particularly for women.

Advantages: usable accuracy, easy to put on, doesn't get in the way
Disadvantages: relatively short battery life (approx. 30 hours of activity on a single charge, and it must be switched on and off).

Example of equipment: **Polar Verity Sense**

Chest HR belts

This type of monitor offers the most accurate results and is suitable for multi-day activities.

Advantages: accuracy, long battery life (suitable for ultra-running)
Disadvantages: may be uncomfortable for women, some models may cause pressure marks, button cell battery

Example of equipment: **Wahoo Tickr X** (or its successor)

Indirect HR measurement

Heart rate monitoring can also be partially replaced **by running in a group**. If you can talk whilst running – and especially if you can say a whole sentence without pausing – it is very likely that you are running **at an effective pace** for yourself.

HR in more detail – running by heart rate

You can run without monitoring your heart rate. However, monitoring it can help improve the quality of your training and indirectly reduce the risk of injury. It makes no sense, however, to make heart rate a mantra and constantly check it whilst running. It is often more useful to listen to your own body – or simply chat with another runner.

The division into heart rate zones (Z1 to Z5) is a tool that allows you to train according to the intensity of the workout. Each zone has a different physiological effect, and using them sensibly leads to improvements in fitness, endurance, energy management and overall performance. It also affects how you feel after your run.

HRmax

Maximum heart rate (HRmax) is a biologically determined value that cannot be increased through training. It naturally decreases with age, but training can slow this decline.

It is an important reference value for **roughly determining heart rate zones Z1 to Z5**.

Methods for estimating HRmax:

- spiroergometry (even with this method, the HRmax value is most likely only an estimate, albeit a relatively accurate one)
- stress test
    - interval hill runs, maximum effort. Repeated several times (to make the results statistically reliable). At least 3 hill runs with an approximate gradient of 10% over a distance of up to 100 metres. These are sprints at maximum effort; the body must feel as though it is about to ‘give out’, and the legs must feel stiff even after such a short distance. HRmax will be the average of the highest measured heart rate values (e.g. 179, 181, 178 = 179.33). Depending on the runner’s subjective feeling, this value can be increased by 5 to 10. Let’s say it is always increased by 5; in the example given, this would be 179.33 + 5 = 184.33 to 185.
      IMPORTANT NOTE: to perform the stress test, you must already be able to run at least a little. That is, you must know that this test is not done from the sofa, but is preceded by **a long** and very thorough warm-up jog. Incorrect

running technique will negatively affect the results (a lower value than could potentially be achieved). The stress test can only be performed if the HRV value is within the normal range.

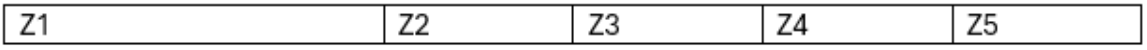
- Fictitious calculation – personally, I consider this nonsense; or, if you turn a blind eye, it might apply to someone who does no sport at all. So, if you're just about to go for your first run, let's say you can get this value in this way. It's a very inaccurate figure that doesn't take gender and many other factors into account.
    - It is calculated as 220 minus your age. So, a 40-year-old prospective runner would have a value of 220-40=180.

Heart rate zones Z1–Z5

HR zones are usually determined as percentages of the maximum heart rate (HRmax). Theoretically, this should be according to the following table, **but in reality it will almost certainly not be the case**.

Zone	% of HRmax	Name	Options
Z1	up to 60%	Recovery	Very light to no load
Z2	60–70%	Aerobic (basic endurance)	Light intensity, able to speak fluently (at least in sentences)
Z3	70–80	Tempo	Moderate intensity, conversation now mostly word by word
Z4	80–90%	Anaerobic	Heavy intensity, no sense of well-being
Z5	90–100%	Maximum	Extreme intensity. The body feels as though the "life" is draining out of it with every step

Graphical representation of the previous table:

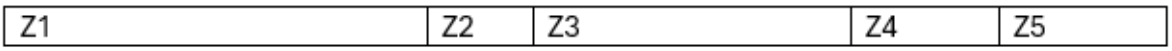


A more likely distribution for a beginner runner (the nominal values are merely an illustrative example; they are not your values, so do not rely on them; you must calculate your own based on your own HRmax):

Zone	% of HRmax	Example of heart rates at an HRmax value of 185
Z1	up to 65%	up to 120
Z2	up to 70%	121–130
Z3	up to 85%	131–157
Z4	up to 92%	158–170

Z5	over 92%	171–185

Graphical representation of the previous table:



Values may vary from person to person – this is merely **an illustration using fictitious figures**. Without further feedback, such as the ability to talk or sustain energy over the long term (for example, during a run lasting longer than 2 hours), it makes no sense to rely solely on percentages.

The aim of this illustration is to show that, at the start, **zone Z2** tends to be **relatively narrow** and **zone Z3, conversely, very wide**.

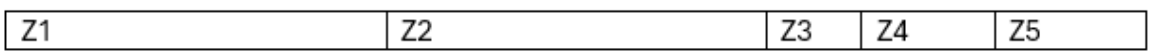
Heart rate zones are always **individual**. Through training – and particularly the way it is carried out – together with lifestyle, they can gradually change and shift.

This is **a more effective division of heart rate zones**, which can be gradually achieved through proper running. Again, these are merely **hypothetical values** for a model HRmax of 185.

Compared to a beginner, the main difference is that **the Z2 zone becomes larger** and **the Z3 zone becomes smaller**. This is a typical sign of improving endurance and running efficiency.

Zone	% of HRmax	Example of heart rates at an HRmax value of 185
Z1	up to 60%	up to 111
Z2	up to 80%	112–148
Z3	up to 85%	149–157
Z4	up to 92%	158–170
Z5	over 92%	171–185

Graphical representation of the table above:



In every heart rate zone, the body utilises both sugars and fats. Only their ratio changes.

In the lower zones, fat burning predominates; in the higher zones, the emphasis gradually shifts to quick energy from sugars.

And now a brief look at the individual zones:

> Z1 – very low intensity, mainly for recovery.
>
> Z2 – fat metabolism predominates. This only gets fully underway after a certain amount of time spent exercising (roughly after ~20 minutes). With better fitness, it activates sooner.
>
> Z3 – sugar burning begins to predominate. Running in this zone often leads to fatigue, hunger and the need to replenish energy quickly.
>
> Z4 – corresponds to race pace on shorter to medium-distance routes (up to approximately a half-marathon).
>
> Z5 – is not relevant for most runners and you can safely ignore it

Z1

A leisurely walk. You feel like you're doing something, but at the same time you feel very good and light. It's as if no energy is being expended at all. Fat metabolism is also only slightly activated. It's effortless movement. It's used for recovery runs.

Z2

Zone Z2 is a magical zone. At the start, its range is usually very small – often just a few heartbeats. However, with training, it can expand relatively quickly. As the maximum heart rate remains unchanged, Z2 expands mainly at the expense of zone Z3, which gradually shrinks.

In Z2, the burning of stored fat predominates. Put simply, running in this zone is the most important factor for weight loss (although it is not the only one).

At the same time, basic endurance is built up in Z2 – that is, the ability to run faster at the same heart rate. If you maintain a certain speed at a heart rate of 120 at the start, over time you will run noticeably faster at the same heart rate.

This shift occurs when the majority of your runs (around 80% of your training volume) take place in Zone 2.

Practical tip:

In Z2, you can talk while running without getting out of breath.

Z2 is therefore the right and appropriate zone not only for beginners, but for most runners for the majority of their training.

How to determine the Z2 range

At the start of your running ‘career’, **you** usually **cannot determine your heart rate zones precisely**, and therefore Z2 either. You can estimate them using a stress test and assuming Z2 to be approximately **60–70% of HRmax**. In practice, however, this is often difficult and of little use to a beginner. Moreover, at the start, these percentages are often even lower.

A simpler and more reliable solution is **not to run alone**, but with at least one other runner and **to chat** throughout the run. If you can do this without any trouble, you are very likely in Z2.

A run that takes place mainly in Zone 2 has a typical effect:

- afterwards, you feel good, you’re not particularly tired, and you don’t have a strong craving for high-calorie food or drinks.
- As this zone primarily burns fat and you don’t consume unnecessary calories after the run, **this type of run genuinely supports weight loss**.

If you want to estimate your heart rate in Zone 2, a simple formula can help:

180 − age

The resulting value usually lies somewhere in the middle of the Z2 zone.

For example, a 40-year-old runner: 180 − 40 = 140.

This is not an upper or lower limit, just a rough guide. This formula does not take gender or previous lifestyle into account, so it should be treated with caution – as a temporary aid – and you should rely more on how you feel whilst running.

How to increase the Z2 range

Improvement comes from **running mainly in the Z2 zone**. If you complete at least **80% of your weekly volume** in Z2, one or more of the following will gradually occur:

- the Z2 range will expand (at the expense of Z3),
- your speed within the original Z2 will increase,
- or both changes will occur at once (which is most common).

At the start, Z2 is very narrow, so this means **a slow pace**. For some people, it may even be just a brisk walk. That’s perfectly fine. The good news is that adaptation happens relatively quickly and is noticeable, which tends to be a strong motivation to continue.

For example, if a beginner’s Z2 is in the **120–130 bpm** range, they should aim to spend most of their run in this zone (after warming up). If they reach this value whilst walking briskly,

there's no need to speed up. The important thing is to stay within the correct heart rate range – not to watch your watch every second.

If a runner resists the temptation to speed up, they will eventually find that:

- at the same speed, their **heart rate** is **lower**,
- they can **increase their pace** and still remain in Z2,
- and gradually they will feel comfortable even at higher heart rates, where they previously felt strained.

This is a sign that **Z2** is **expanding and Z3 is narrowing**. At higher speeds, the runner is able to speak fluently, and the run remains controlled and sustainable.

Practical tip: A simple and enjoyable way to expand your Z2 zone is by **brisk walking**. Not a slow stroll, but a brisk pace with light breathing – without the need for heavy sweating. You can fit in a brisk walk anytime and anywhere: on the way to work or school, whilst heading out for lunch, or during your daily routine. A walk with your dog in the countryside is also ideal, when they walk briskly alongside you and keep up the pace – not just wandering aimlessly, but moving together smoothly.

Example:

The weakness of such examples is that people tend **to take the stated heart rate values literally** and apply them to themselves. That is a mistake. Everyone has **completely individual figures** and must work only with their own values.

To illustrate, I'll use **my spiroergometry data from 2018**:

- **Z2** range**: 130–147 beats per minute**
- most effective fat burning: **142 beats per minute**

If I were to run at least **80% of my training sessions within my Z2 range at that time** (130–147), the following would gradually occur:

- **Z2 would expand upwards** (above 147),
- **Z3 would narrow** (e.g. from the original 148–156 to a smaller range),
- or its upper limit would shift slightly higher.

In practice, this would mean that I could **increase both my speed** and **heart rate** whilst still remaining in Z2. Improvement without the run becoming significantly more demanding.

Note on weight loss:
If I wanted to lose weight, I would **lose more** at a heart rate **of 142 than at 147** during that

period, even though both values fell within Zone 2. However, these are again **specific figures** for **one person at a specific time**.

Don't take these values **as a guide**. Everyone's are different and they change over time – for me, they look different today due to training and age.

How my zones have shifted

The honest answer is that **I don't know**. I haven't had a spiroergometry test since 2018. What I have done, however, is run a great deal in Z2. I stopped worrying about specific numbers and started focusing mainly **on how I felt** – so that I wouldn't be tired after a run and, above all, 'drained' of energy, meaning I wouldn't feel the need to unnecessarily replenish calories.

The result is that today I run **faster, with minimal fatigue,** and I feel energetically balanced over the long term. I can easily handle ultra-runs of great length or duration.

It is therefore not essential to know your exact heart rate. To start with, it is quite enough to be aware of your own body and monitor how you feel.

Z3

Z3 is the strangest zone. It usually has the widest range at the start of a running career. If a runner spends most of their time in it, training expands this zone, **but always at the expense of Z2**. Z3 itself does not shift higher – it can only be pushed higher by the gradual expansion of Z2, and even then only slightly.

It is in Z3 that most beginner runners run. This is natural, but at the same time it is a common reason why many give up running. Running in this zone leads to fatigue, the need for rest and a drop in energy during the day.

If someone has started running to lose weight, they may also experience disappointment – after running in Z3, there is often a significant feeling of hunger, and consequently, more calories are often consumed than were burned during the run.

That is why **Z3 is not a suitable zone for beginners**, even though most of them use it. Performance in this zone usually stagnates, fatigue builds up, and running ceases to be motivating. The solution is simple, though not always easy: **slow down and run in Z2**.

Running in Z3 is sustainable **for** approximately **100 minutes**. If there are also sections in Z2 during the run, the time can be extended slightly, but as a rule it does not exceed 120 minutes.

For more experienced runners, Z3 has its place:

- **lower Z3** – marathon pace,
- **middle Z3** – half-marathon pace,
- **higher Z3** – 10 km pace

Z4

Zone 4 allows for very fast running, but only for a short time. It is limited by available energy and willpower – before physical resources are exhausted, the mind tends to put an end to this ordeal. It is a safe zone in the sense that no one can run at this pace for long. In training, it mainly appears during tempo and interval runs.

In races, it is typical for distances **up to 10 km**. On longer courses, only elite runners can maintain it.

ANP

Zone Z4 is divided into Z4a (sub-threshold) and Z4b (above-threshold). The boundary between them is **the anaerobic threshold (ANP)**.

ANP refers to the intensity of exercise at which the body begins to produce more lactate than it can break down. Put simply, this is the point at which the body relies almost exclusively on carbohydrate metabolism, leading to relatively rapid exhaustion.

Z4a

Sub-threshold zone (just below ANP).

- You are running on the edge of the anaerobic threshold, but there is not yet a significant build-up of lactate.
- This is a very effective zone for improving endurance at high intensity, such as tempo runs.
- It feels like a hard but sustainable run – you can run for 20–60 minutes, but not comfortably.

Z4b

Above threshold (just above ANP).

- Training in this zone already causes a significant build-up of lactate, which cannot be cleared away quickly enough.
- Performance cannot be sustained for long – typical for interval training or shorter sessions.
- This is a hard workout that improves the ability to withstand and tolerate lactate.

Lactate

Lactate (lactic acid salt, not lactic acid itself) is a substance produced in the muscles during intense physical exertion. It appears when the body cannot supply enough oxygen for **aerobic** energy production and switches to **anaerobic metabolism**.

During exercise, muscles use glucose as an energy source.

- At lower intensities (particularly in Zone 2), the body can also produce it from fats in the presence of oxygen.

- At high intensity, this process is no longer sufficient; the body switches to producing energy without oxygen, and **the by-product is lactate**.

Lactate reduces the efficiency of muscle work. Subjectively, this manifests as **a feeling of fatigue**, which gradually leads to a slowing of pace and a drop in heart rate.

The **anaerobic threshold (ANP)** can be raised slightly through training, particularly by training in **Z4b or Z5**. This is of practical significance primarily for sprinters and runners competing in shorter, high-intensity races.

Once the intensity is reduced, lactate can be reused as an energy source, but **this requires oxygen**. Therefore, after every intense session (Z3 and above), **a cool-down in Z2** is important, as it helps to clear lactate.

A simple rule applies: **the more demanding the exercise, the longer the cool-down should be.**

Note: Sore muscles the next day **are not caused by lactate**, but by tiny micro-tears in the muscle fibres. Regular training significantly reduces their occurrence.

Z5

Zone Z5 is a zone that lasts for a very short time. It involves extreme energy expenditure, and the runner's mind very quickly tries to convince the body to stop the activity immediately 🙂. Training in this zone requires both physical and mental preparation.

Very few people can sustain Z5 for long, as the body very quickly goes into oxygen debt and subsequent exhaustion.

Elite professional runners can maintain Z5 for a matter of minutes. Typically, these are track runners up to a distance of approximately 3,000 metres, and exceptionally, marathon runners in the very final stages of the race (the last few hundred metres to the finish line).

Amateur runners **realistically almost never reach** Z5. If they do, it is usually for a matter of seconds. It is highly unlikely that they would be able to repeatedly reach Z5 even during interval training. If it does happen, it is usually:

- a very short interval,
- a very small number of repetitions (one or two).

During subsequent intervals, the heart rate would drop into a lower zone, or the training would have to be terminated prematurely due to energy depletion.

Note:
If you see in the app or on your watch that you have been in Z5 for a long time, you can automatically dismiss this reading as meaningless. It means that the heart rate measurement method is not working – most often this is due to the optical sensor in the watch.

Solution:

- change the heart rate measurement method (ideally to a heart rate monitor),
- determine your HRmax as accurately as possible (e.g. via a stress test),
- adjust zones Z1–Z5 according to this value (many watch models do this automatically once a new HRmax is entered).

How to run properly

This also affects one's approach to running – whether one tries to understand that everything is interconnected. Younger men are particularly at a disadvantage. Physically, they are often ready to run faster, but at the same time they lack experience and patience. The result is a stubborn approach and running unnecessarily fast, without improving and with low endurance.

Of course, this can also apply to women or older runners, but this pattern is most common among young men.

These runners tend to run predominantly in the Z3 zone. They lose energy whilst running and are tired and drained after finishing. They then consume a lot of calories, which exacerbates the fatigue – some of the blood is diverted to digestion and mental performance declines. The result is a need to lie down and rest. Those around them see this as a paradox: why run if it leads to fatigue, a drop in performance and a lower mood?

The key is Z2 and the 80/20 rule

Proper running is often described by the 80/20 rule. This means that at least 80% of your weekly mileage should be in Zone Z2, with the remaining approximately 20% consisting of fast runs – tempo and interval training.

If you follow this rule over the long term, you can become a very good runner. However, this book is intended primarily for beginners, and this is where an important practical clarification is needed.

A beginner runner **isn't ready for fast runs**. They lack the fitness, technique and mental experience to properly assess how they feel after such a run. They often lack the knowledge too – for example, the ability to read their body's signals, HRV, or to distinguish between healthy fatigue and overexertion. Despite this, many try to stick to the 80/20 rule right from the start, including the 'mandatory' 20% of fast runs. The result is often the same: injury, stagnation, fatigue or giving up running altogether.

At the start of a running career**, huge progress** is made **simply by running regularly**. It's enough to run at least three times a week (ideally more often), without any speed ambitions. An excellent combination is recovery runs, easy runs and long slow runs – all mainly in Zone

2. This approach improves fitness, doesn't overload the musculoskeletal system, and doesn't cause chronic fatigue or excessive hunger.

If you stick to this approach for several months (roughly six months, for example), you'll start to feel right at home when running. Only then does it make sense to gradually introduce faster runs – first tempo runs, then interval runs – and move on to the 80/20 rule in the full sense.

Don't treat the timeframe as a mantra. It may take six months, a year, or even longer. A simple rule applies: as long as you're improving solely through running in Z2, there's no reason to start intervals.

A tempo run should always precede interval training.

And yes – it's worth returning to this book several times. Many things that don't make sense at first will become completely clear over time.

Feelings

Some sports watches ask how you feel after a run. And let's be honest – most people automatically click *'excellent'* there. Regardless of how they actually feel. Yet tracking how you feel is free, simple and accurate, just for you. There's just one condition: an honest answer.

If you feel tired, drained and hungry after a run, but tick 'great', you're not getting anywhere. However, if you honestly admit that it was bad, you'll generate data you can work with. Later, you'll be able to compare what was different on the day you felt good and on the day it was rubbish. Deceiving yourself about how you feel after a run is deceiving yourself. Honesty is the shortest route to better running.

What affects how you feel whilst running

Everything. Every day is different. One day you feel like you could run forever and fast, and the next day you can't manage it even with sheer willpower. That's normal.

Your subjective feelings, as well as objective data (e.g. heart rate), are influenced by factors such as:

- **sleep** – duration, quality, proportion of deep sleep (the better the sleep, the better the performance),
- **recovery** – recovery runs, other sports, compensatory exercises, strength training,
- **air temperature** – the higher the temperature, the higher the heart rate for the same effort,
- **weather** – wind, rain, cold,

- **air humidity** – high humidity impairs sweating and reduces performance due to overheating,
- **recent meals** – whether digestion is still ongoing, or how much fast-acting energy is available,
- **time since the last meal**,
- and a host of other minor factors.

Note: Long-term and regular training has one major advantage – it enables you to perform well even when you're not feeling your best. If you're well-trained, you'll be able to manage the race even when conditions aren't ideal. Muscle memory, experience and willpower will help.

HRV

HRV (Heart Rate Variability) is an indicator of the nervous system's balance and the body's level of recovery. It does not reflect the average heart rate, but rather the variations in the time between individual heartbeats.

The heart does not beat like a metronome. Even at a heart rate of, say, 60 beats per minute, the intervals between beats are not the same – sometimes the interval may be 1 second, other times 1.1 seconds, and so on.
HRV describes precisely this 'irregularity'. The higher the variability, the better adapted and more resilient the body is.

HRV reflects the activity of the autonomic nervous system:

- parasympathetic (rest, digestion, recovery) → HRV increases
- sympathetic nervous system (stress, performance, fight or flight) → HRV decreases

Sports watches only estimate HRV. Accurate measurement is only possible using an ECG. Nevertheless, it is a very useful piece of data – but exclusively within the context of a single individual. HRV values cannot be compared between people and there is no universal 'good' value.

It **only** makes sense to track **your own trend**:

- an increase or decrease in HRV,
- over a period of **2–3 days or more**,
- not short-term fluctuations from a single day.

Even with your own data, the number itself is not the key factor. **Always look at the direction of the trend.**

The watch can use these trends to assess for itself whether the HRV is 'within the norm' for that individual. This can be considered relatively reliable, but **it should not be taken dogmatically** – context is always important (sleep, stress, illness, training).

HRV reflects the activity of the autonomic nervous system, in particular:

- Parasympathetic nervous system = rest, digestion, recovery → increases HRV
- Sympathetic nervous system = stress, performance, fight or flight → decreases HRV

What can be gleaned from HRV
If the value rises, this indicates good recovery (sleep, diet, life balance, low stress) and you can afford to increase the intensity (speed/volume) in training or competition.

If the value decreases, this indicates fatigue / overtraining, poor recovery (primarily poor sleep) or even an impending illness (or an illness is already present in the body but has not yet manifested itself externally; however, it may begin within a few hours). If you see this trend, at the very least, ease off your training (stick to recovery runs).

TIP: if your watch doesn't measure HRV, you can rely on your own feelings again. Check how you feel in the morning after waking up. If you feel tired and lacking in energy at that moment, you definitely have a falling HRV trend. If you feel neutral or very good and refreshed, you have a rising HRV trend.

PRO TIP: Monitoring HRV can be replaced by monitoring the lowest HR value during sleep. Trend monitoring also applies; if the lowest HR value during sleep is falling, this indicates good recovery, and vice versa (i.e. exactly the opposite of the HRV assessment).

VO_2max

VO_2max is the maximum amount of oxygen the body is capable of utilising during intense physical activity. It is expressed in millilitres of oxygen per kilogram of body weight per minute (ml/kg/min).
So much for the formal definition, which won't tell you anything 🙂.

It's true that a higher VO_2max value is better, but in reality, it doesn't matter that much. Proper running technique is more important.

The value isn't comparable between different runners, as it's only an estimate from a watch.

Other equipment

The following gear will be particularly appreciated by trail and ultra runners. Some items are also useful for road running, but more as a supplement.

Soft flasks (instead of a camel bag)

Soft flasks of various sizes, most commonly from 250 to 500 ml. They are inserted into the front shoulder straps of rucksacks and vests (easily accessible whilst running) or into a hip belt – whether integrated into shorts or separate.

Example of equipment:
250 ml T8 bottle for the hip belt
500 ml T8 bottle for backpack straps

Note: Beginners often opt for a camel bag in their rucksack. However, this is a less practical solution. Whilst running, you have no idea how much water you have left; in winter, the water in the tube can freeze, and occasionally the tube comes loose and the water leaks out. Another disadvantage is refilling at refreshment stations – you have to take your rucksack off, remove the CamelBag, fill it and put it back in, which is time-consuming and risks the tube coming loose.

Filter bottle

Outdoors, particularly during ultra-runs or long hikes, you may need to top up your water from natural sources (streams, rivers, puddles). A filter bottle serves this purpose. It removes bacteria and impurities, including sediment, so the resulting water is clear and safe to drink. However, it does not filter out viruses.

Example of equipment: Katadyn BeFree 0.6 L

TIPS for using a filter bottle

Cleaning and handling:

- Do not wash the filter in a horizontal position – always wash it as if it were fitted in the bottle
- Do not put the filter in the dishwasher
- Do not touch the filter with your hands (for hygiene reasons)

Filter function test

Fit the filter onto the bottle and blow into it. If no air passes through, the filter is fine. If air passes through, the filter needs replacing.

If the water flows slowly **–** shake the bottle first. If that doesn't help, remove the filter and rinse it gently in water (river, lake).

Long-term storage and disinfection:

Prepare 0.5 l of clean water and add: 1 Micropur Forte tablet, or 4 drops of Jari (hand washing-up liquid).

- Ideally, prepare the solution outside the bottle and pour it in once ready.
- Press the solution through the filter.
- Allow all parts to dry thoroughly.

Headlamp

In winter, a headlamp is often essential due to the short days. In summer, it is particularly useful for ultra-runs. The basic requirements are simple: the headlamp should not fall off your head or cause pressure marks, and ideally it should last the whole night (depending on the length of the night at that time of year). An alternative is the option of charging from a power bank whilst running or using a replaceable battery. Another advantage is the option to use standard batteries, although you should expect lower performance than with the original battery.

Running with a headlamp takes some getting used to. Visibility is never the same as during the day, and artificial light has its limits – determined by both output and the environment. At first, some details may blur together (such as small stones or roots), as your brain is not yet able to identify them correctly. However, with regular use, you will adapt and your 'judgement of the terrain' will improve significantly. Nevertheless, visibility on a sunny day cannot be achieved.

Example of equipment: **LedLenser MH8** – although not specifically a running headlamp, it fits perfectly on the head, has a long battery life and offers a choice of a wide (short) or narrow (long) beam.
Example of equipment 2: **Petzl NAO RL**

TIP: When I went on my first ultra-run, I was wondering how I'd be able to see the navigation on my watch at night. To avoid having to figure it out during the race, I did a test night run with navigation on a familiar route. It turned out there was no need to worry at all – when I look at my watch, the headlamp automatically follows and illuminates the display.
What's more, most watches these days light up the display even when you turn your wrist towards your face. In practice, however, this is more of a bonus, as the headlamp itself takes care of everything essential.

Bell

Animals usually avoid humans – the problem arises when they are unaware of your presence. A bell solves this problem simply.

Example of equipment: **Coghlans bear bell**

TIP: I always buy several of these, despite their indestructibility. I then use them as small gifts for other trail runners.

Note: I run all year round, most often early in the morning around 6:00, sometimes even earlier, and very occasionally late in the evening. During races, I run all day and all night.
In all the years I've used the bell, I haven't encountered any animals on the trail – at most, I've seen them from a great distance, running away from me.
I've only encountered a bear twice in all that time. And they ran off immediately. Interestingly, it was precisely during the period when I didn't have the bell with me.

Poles

Poles are particularly useful when running on **steep ascents** (from around 15%) and **very steep descents** (from around 20%). On gentler terrain, they tend to slow the runner down, and on flat ground they are downright a hindrance.

Given the strain poles endure whilst running, only one type is suitable: fixed-length folding poles. Telescopic poles are not suitable for running – under dynamic strain, they very often break and can lead to a fall.

How to determine the correct pole length:

Multiply your height by **0.68**. The result is the ideal length, which you should then round to the nearest **5 cm**.

Example: for a height of 175 cm, the ideal length is 119 cm → choose 120 cm.

You can also check this in practice: when you rest the pole on the ground, your elbow should form approximately a right angle.

Running with poles is technically different from running without them and requires separate training. To start with, it is highly recommended to watch a video to learn the correct technique.

https://youtu.be/URLijAcSNL0?si=5KWg6dY8OJ115tLN

Example of equipment: **Leki UltraTrail FX.One**

Vaseline

Cosmetic Vaseline is used to protect areas of the body that are exposed to prolonged friction whilst running. It is commonly used, particularly in ultra-runs.

I don't use it during training. During races, I apply it to the soles of my feet (some people just use their toes), groin, armpits and buttocks – in other words, the areas where the most friction occurs during a long run.

During the training period, it makes sense to use a small amount of Vaseline only locally, for example on cracked skin on the soles of the feet caused by dryness. Most often, this is the skin between the toes or where the toes meet the sole. However, even these minor issues can be easily ignored, and you can run without using Vaseline.

Salt

I don't use salt during training runs. In races, I **only** replenish it **according to my subjective needs**. Salt (and electrolytes in general) is important for the transmission of signals between the brain and the muscles.

Salt on its own doesn't **taste** very **good** to anyone, but fortunately there are **tasteless salt tablets** that can be taken without any problems. When running, when the need for salt is increased, the body often asks for it itself – through **salty food**.

TIP – too much salt: If you overdo it with salt, it puts extra strain on your kidneys. If this happens only occasionally, it's not a big deal. You'll notice it by **very salty, white sweat**.

TIP – lack of salt: When there is a lack of salt, the body cannot retain fluids. You drink water and excrete it within a minute. In that case, **take at least one salt tablet immediately**.

Example of equipment: Nutrend Salt caps

Magnesium

I don't use magnesium during training runs. In races, I only consider it based on my own needs.

Magnesium is not a cure for cramps. Cramps are mainly prevented through training and subsequent adaptation during recovery. **Run regularly – that is the only reliable way.**

However, magnesium can be **of individual importance**, particularly in **ultra-runs**. It helps relax the muscles and keep the legs 'soft'. However, an overdose can lead to relaxation of the sphincter and diarrhoea, which poses a risk of dehydration.

Remember that drinks containing calcium and phosphates (e.g. cola drinks) reduce the absorption of magnesium.

Magnesium exists in various forms with significantly different absorption rates. Therefore, it matters whether you take a random tablet from the race organiser or a specific form and dose that suits you.

The organic form **– magnesium bisglycinate –** is suitable for running. It has high bioavailability, a high content of elemental magnesium and helps to soothe and relax the muscles.

Example of equipment: Magnesium bisglycinate chelate (take 375 mg at a time – 3 tablets)

Gel

Gel provides easily absorbed, fast-acting energy (pure carbohydrates). It usually takes 20–30 minutes from ingestion for the effects to kick in. Always wash it down with plenty of clean water.

I don't use it during training. I do use it during races – as needed. On ultra-runs, I usually take it roughly 30 minutes before a long climb. In a road marathon, I used gels every 8 kilometres from the 20-kilometre mark (20 / 28 / 36).

Gels have a bad reputation because they make some runners feel sick. However, it's very individual. There are plenty of products out there, and there's a good chance one will suit you. The first gels I tried didn't make me feel ill, but I didn't like the taste – I subconsciously avoided them. It was only later that I found a brand that suits me, and since then my attitude towards gels has changed significantly.

That said, **I train without them** – I only try them out before races.

Example of Overstim.s kit

Ion

An isotonic drink is a liquid form of replenishing lost substances – electrolytes, energy and other components (varies by product).

I don't use it during training runs or on short runs. On ultra-runs, I use it at every refreshment station. I recommend bringing your own, tried-and-tested one, because you never know exactly what you'll get from the organisers, or how diluted it will be.

Basic types: **Performance** (contains carbohydrates), **Active** (electrolytes), **Recovery** (often BCAAs for recovery).

For the amateur runner, it makes sense to either ignore the whole thing or use it **only during races**. Alternatively, use **Recovery** occasionally after a more demanding run.

For **ultra-runs**, I've found it works well to drink Active and Recovery a few days before the race. During the race, **I alternate** between the different types and flavours **at random**. It helps keep my legs relaxed and functioning even during very long runs.

Example of Bix Hydration equipment

Strong Power Cream (Niambo)

The cream (red + green) helps keep muscles **relaxed** and promotes recovery. I don't use it during training. During races, I **only use it as needed** and **at the finish line after showering**.

Application procedure

1. Squeeze both creams onto your palm,
2. mix them together,
3. quickly massage into the specific muscle area (thigh, calf, hip)
4. you will probably need to squeeze out a new dose of both creams for each area

If you have hairy legs, you'll need a larger amount.

When used in combination with Active and Recovery drinks, it helps keep your legs 'alive' even after a very long session.

Specific equipment - Strong Power duo 1+1

Headphones

Headphones are **banned** in most races (amateur runners often break this rule). I recommend running **in a group** and **chatting** – it's the best way to run naturally at the right pace (Z2).

If, for some reason, you want to use headphones, the following rules apply:

- no cables that might get in the way
- only small wireless or bone conduction headphones,
- **turn off ambient sound cancellation** – for safety, you need to hear what's going on around you.

Example equipment: Nothing Ear, Suunto Wing 2

Socialising

Community runs

Have a look around your local area – there are regular community runs everywhere. They're open to complete beginners, and even to people going for a run for the first time. The pace is either adjusted to the slowest participant, or the group waits at certain points.

You can search for groups on social media by activity (running) and by city or region.

The main benefit of community runs is socialising. You'll meet runners of all ages and abilities and naturally strike up a conversation with them. Ideally, you should chat whilst running – this will automatically keep you at the right pace, i.e. in Zone 2.

Note: If you're still running slowly, position yourself at the front of the group. You'll be the one setting the pace.

STRAVA

You can also socialise online, most easily via the Strava app. You can follow specific people if you know their names, but it's particularly worth making use of clubs and challenges.

Clubs focus on a specific activity (e.g. running). You'll see other members' public activities there, which is a great way to get inspired and meet people in your area.

TIP: Start by searching for a club using the name of the town where you live. That's the quickest way to find local runners. You'll often find that they also meet up for community runs – and there you can get to know them in person and naturally form smaller groups for joint runs even outside of official events.

PRO TIP: If you meet a runner you want to find on Strava but don't know their name, try searching via **segments**. View the segment you ran that day and check out the other runners from the same day. This only works if you do it on the same day, the other runner uses Strava, has a public activity, and has run the same segment.

SmashRun

An interesting additional service is **SmashRun**. It is an analytical tool that offers detailed statistics, overviews and virtual badges for various running goals. It also shows other runners who have earned the same badges and allows you to connect with them. Smashrun then sends you a weekly report on the activities of the runners you're connected with, which can be a pleasant and gentle source of motivation.

Komoot

Komoot is an excellent tool for inspiration and route planning, especially in unfamiliar surroundings (such as whilst on holiday). Based on data from other users and their reviews after completing a route, it can suggest the ideal route according to your preferences and performance in a specific location. It also sends weekly tips for activities in your area.

Relive

The Relive app is used to visualise routes. Although Strava and sports watch apps now offer a similar feature, Relive offers a very good balance between output quality and ease of use. The resulting presentation is clear, attractive and fast.

Appka by Appa

This app retrieves data from Google Health Connect or Strava and allows you to donate the calories you've burned whilst exercising.
Sponsors convert these calories into real money, which goes to help those in need. It costs you nothing and is a simple way to combine exercise with helping others.

Data analysis

In most cases, the watch app provides sufficient analysis of training data. It often includes data that is only available in the paid version of other apps. The downside is that you usually only see your own data, and sharing it with a coach or other runners can be complicated.

That is why there are universal tools that work regardless of the device brand (most smartwatches can automatically sync activities with them).

STRAVA (paid version)

The most versatile platform. In addition to basic data, the paid version offers, for example: **GAP (Grade Adjusted Pace)** – pace calculated on flat terrain or comparisons across segments based on age and weight

https://www.strava.com/

Runalyze

The most detailed analytical tool. It contains a huge amount of data and metrics.
If you have or are planning to have **a coach**, it is very likely that this is where you will share your training sessions. https://runalyze.com/

Quantified Self

A simpler alternative to Runalyze. Particularly suitable **for beginners** who don't yet want to deal with a large amount of detail.
https://quantified-self.io/

SmashRun

Allows detailed analysis of any section of a run by simply selecting it with the mouse. An interesting metric is **the percentage pace variation** (the difference between the fastest and slowest pace).

It also includes global statistics (comparisons with the world, road vs. trail runners).

It's also a useful tool for **losing weight through running**. As well as abstract data on calories burned, it converts these into specific foods, divided into 'healthy' and 'unhealthy'. This makes the figures much easier to understand. You'll quickly realise that a short run creates only a small energy allowance for food.

Although energy expenditure increases with longer duration or higher intensity, the reality is still that **it won't be quite enough for a whole roast pork** 😃.

https://sk.smashrun.com/

Statshunters

It creates **a personal heatmap** of your entire running history from Strava and offers a wealth of statistics and virtual badges.

https://www.statshunters.com/

Route planning

Whether you're running off-road or in the city, it makes sense to have a route planned in advance – especially in unfamiliar surroundings. You can upload the route to your watch and use it for navigation whilst running, avoiding unnecessary wandering and stopping.

Strava Routes

The Strava app features a Routes function that suggests routes based on the runner's performance. It also draws on actual routes used by others and usually allows direct synchronisation with your watch. Particularly suitable for road running in the city or in familiar surroundings.

Strava heatmaps

Heatmaps show **where people actually run the most** (including a breakdown of day and night activities). They're not ideal for planning a specific route, but they're excellent for finding your bearings and identifying areas that are 'safe and runner-approved'.

LocusMap

The best app for manually planning routes anywhere. It's a more demanding and manual process, but the result is perfect. In LocusMap, you can display almost any map layer, or even overlay several of them. Routes can be planned on both a computer and a phone, and they can be synchronised with each other (with a Gold membership). The phone version is slightly more sophisticated.

Routes cannot be synchronised with a smartwatch, but exporting them and then importing them into the smartwatch app is very simple and takes just a few seconds.

Komoot

Komoot is ideal for generating routes in new surroundings (e.g. whilst on holiday). Using data from other users, and particularly their reviews after completing an activity, it can create the perfect route based on your preferences and fitness level in a specific geographical location. It usually allows direct synchronisation with a smartwatch.

TrailForks

TrailForks is primarily for cyclists, but is also very useful for trail runners. It contains reports on trail conditions from recent activities, which anyone can view. It helps identify sections that are harder to access and is particularly useful in winter or during temporary restrictions (such as logging).

Warm-up

Before you start running, it's a good idea to warm up your body, get your blood flowing and loosen up. The warm-up before running is called *a warm-up* (WU). In practice, some runners do this through exercises, others through a slow run, or a combination of both – for example, a short exercise session followed by a very light run of approximately 1–2 km.

There are a great many warm-up exercises. I will mention just a few that I consider practical and effective. I should also add that I personally do not do a traditional warm-up – at the start of a run, I choose a slow pace, which gradually warms me up. This is because I am active every day, I regularly do bodyweight strength training, and I also focus on mobility and stability.

However, I highly recommend a warm-up for most readers.

I do some simple exercises (e.g. calf raises) every day, even outside of training – for example, when I'm standing in a queue or waiting.

Warm-up exercises should be short, dynamic and moderately intense. Do not do static stretching before running.

If your warm-up is done correctly, you should be slightly out of breath, even if you're in good shape. Do each exercise for about 15–20 seconds.

Exercise	Description	Video demonstration
Ankle rotations	Circular movements of the ankles	https://youtu.be/AiohKZonPbo?si=3hBnQKwrNqLqvorO&t=15
Lunges	Classic forward and backward lunges	https://youtu.be/3zVrh37QqC8?si=ZiEx2Rp1J6HpR4N2
Low skipping	Simulation of running on the spot without lifting the knees	https://youtu.be/l-NqiUmu-LM?si=DHGodoNddv2eUvz3&t=18
High skipping	Simulation of running on the spot with knee lifts	https://youtu.be/l-NqiUmu-LM?si=_VDS8gHnJ2mroDTo&t=57
Calf raises	Activate the calves by rising onto the toes and release by shifting weight onto the heels	https://youtu.be/l-NqiUmu-LM?si=XhL4iPGp9jpOj7ah&t=487
Kicking	Hands on your bottom and gently kicking your own hands	https://youtu.be/8dIHS_UVfQ4?si=ox0_7MKuHCQupZLz&t=126

Practical demonstrations of the entire pre-run warm-up:

- https://www.instagram.com/reel/DIjaA4nNYiZ
- https://www.instagram.com/reel/DK91pV9NkRK/

Breathing

Breathing is independent of the running itself. It is not directly linked to your strides; its role is simply to ensure the supply of oxygen and the removal of carbon dioxide. The rule is: the higher the exertion, the higher the oxygen consumption → breathing speeds up. When you slow down, consumption drops and your breathing naturally calms down.

It is also true that the more and larger your muscles are, the more oxygen they consume – and the sooner you will have to either breathe faster or slow down.

The basic principle of breathing: inhale through the nose, exhale through the mouth Ideal (when running slowly): inhale and exhale through the nose; if you can only manage to breathe through your mouth, you're running unnecessarily fast

An upright posture is **also** key to breathing**.** Slouching, arching your back or poor torso position reduce lung capacity and impair oxygen intake.

TIP: If you want to run correctly – especially in **Z2** – try breathing **only through your nose**. It is naturally slower and will very reliably keep you at the right intensity.

Note: As a simple aid (only at a very slow pace, up to Zone 2), counting your steps on the inhale and exhale can be useful. There is no correct number – it varies from person to person. It's not a physiologically ideal approach, but for beginners it can act as a guide to keep them in Zone 2. And that's perfectly sufficient at this stage.

Side stitch

If you experience a stitch in your side, you basically have two options:

1. **slow down or switch to walking** and focus on deep breaths – as if you were pushing your diaphragm down into your abdomen with your breath,
2. **continue at the same pace** and try to breathe as deeply as possible.

It's not dangerous. It's just an unpleasant signal from your body that often goes away on its own. In practice, it can teach you to manage your breathing better and tolerate discomfort.

Breathing outside of running

Breathing exercises outside of running can be pleasant, but their direct benefit for running is minimal. During exercise, breathing is always simply a reaction to the oxygen consumption of the muscles involved. If consumption increases, your breathing speeds up. If you want to calm your breathing, the solution is always to reduce the intensity.

The only exception is preparation for **extreme conditions**, e.g. exercise in high-altitude environments with thin air (approx. above 5000 m).

Gaze – where your eyes are looking

There isn't much to consider here. Don't look directly at your feet, as this automatically ruins your upright posture and, consequently, your running technique. **Look ahead** – at a distance that feels natural to you. Your eyes will automatically adjust their focus according to your speed and the surface you are running on.

Video demonstration:
https://youtube.com/shorts/M9U9pk6yOIU?si=549IWrN0H3GUOoci

Note: The 'autopilot' for choosing where to land your feet works not only for trail running, but also for running on paved surfaces.

Food

Food provides the runner with energy for performance. If the body doesn't get it from food, it draws on its own reserves – ideally from fat, which is what happens when running in Zone 2. Food is also converted into energy in the body, just a little faster than fat metabolism.

Running on an empty stomach

Running on an empty stomach relies on the remaining quick energy from your last meal and subsequently, mainly, on fat metabolism. For this to work, **a slow pace** is necessary **– Z2**.

It is often claimed that running on an empty stomach is unsuitable (especially for beginners), but without providing context. However, you already know that when running in Zone 2, you will burn fat and use it to fuel the run itself. Therefore, running on an empty stomach in Zone 2 is safe, sustainable and does not cause fatigue after the run.

Running on an empty stomach **does not improve fat metabolism directly**, but indirectly by forcing you to slow down. And it is precisely running in Zone 2 that improves fat metabolism. At the same time, fats can be utilised sooner, rather than only after ~20 minutes.

Running immediately after a meal

After a meal, some of your energy goes towards digestion, blood is diverted away from the muscles, and running feels harder and slower. Otherwise, however, it is not a problem.

Apart from ultra runs, you can easily plan your run – have your last meal at least 2 hours before running. You'll avoid any discomfort and achieve a higher pace for the same subjective effort (thanks to your stores of fast-acting energy).

Notes

- It doesn't matter what your fitness level is – the principles apply equally to beginners and ultra-runners.
- Running is mainly affected by **the last two meals**, which haven't been digested yet.
- In ultra-runs, it is essential to eat whilst running – ideally so that all the energy goes directly into movement and there is no need to go to the toilet.

Losing weight through running

It is possible. But I don’t recommend it as **the ideal starting point**.

It makes more sense **to lose weight first** and only then start running. But read on.

Recommended approach to weight loss

The recommended approach to weight loss is to put running on hold completely at the start, even for a few months. Instead, it’s better to start with regular brisk walking. Ideally every day, in all weathers, for at least 30 minutes, or even longer. You can use this as a way to get to work or school, or simply as a regular walk. A dog is an excellent companion in this regard, as it will get you out and about regardless of your mood or the weather. Walking is gentle, sustainable and, when done regularly, very effective.

Losing weight through walking works, and the results can be significantly accelerated by adding strength training. But apart from that, **you also need to change your diet**.

The most important part of weight loss – a calorie deficit

Weight loss is never just about exercise. The basis is a calorie deficit, i.e. a state where you consume fewer calories than your body burns. Exercise increases calorie expenditure, but it is only a small part of the equation. A change in diet is essential. Not a diet, not a short-term restriction, but a long-term, sustainable change in the quantity and composition of your food. The ideal order is: diet first, then exercise. More muscle also means higher energy expenditure even at rest, outside of the activity itself.

Changing your diet shouldn’t be drastic. It makes much more sense to consult a professional – not some fly-by-night Instagram advisor, but someone recommended by someone with genuine and positive experience. Talk about what you enjoy eating and what you know you can stick to in the long term. The aim isn’t a perfect meal plan on paper, but combinations of foods that can be followed without stress and work well in everyday life.

The yo-yo effect vs. adaptation

If you change your diet only for a short time and, moreover, drastically, you will lose weight quickly, but once you return to your original routine, the weight will start to come back. The more radical the change, the quicker the rebound. The body ‘remembers’ this experience and reacts more cautiously the next time you try to lose weight – weight loss is slower and the effect is smaller. This is the classic yo-yo effect.

A similar mechanism also applies when combining diet and exercise, though it is much gentler and more sustainable. At first, the weight drops more quickly; over time, the pace slows down. This is a natural adaptation of the body, which always strives to create conditions for long-term survival. Once it experiences a sharp weight loss, it begins to protect its reserves more and use them more cautiously.

The good news is that exercise ‘smooths out’ this process. Thanks to regular exercise, your appetite naturally changes too – you often eat less, more sensibly and more healthily, without the need for strict control. **That is why a combination of a long-term sustainable diet and exercise is the best way to lose weight that has a chance of lasting.**

Summary

If you are overweight, start by taking regular walks and changing your diet (not a diet! But a lifestyle change). Once you have lost at least some weight, you can add running, which will indirectly help you stick to your new eating habits without any trouble.

Adjusting your diet – listening to your body

When it comes to food, you’ll very quickly understand what it means to ‘listen to your own body’. It’s not about voices in your head, but direct feedback. You’ll find that, without much effort, you can do without things you thought you couldn’t live without just a short while ago.

If you eat a heavy meal, running afterwards will be difficult – even if you leave a two-hour gap. Your body will make this very clear to you. And it is precisely because of this that you will start making better decisions very naturally. Especially on running days, you will avoid unhealthy foods completely automatically, without feeling restricted.

FINALLY, RUNNING

We've covered a lot of ground, and so far nothing about running. 🙂 So let's finally get to it.

Consistency, endurance, adaptation

If you run regularly and over the long term, your body will naturally adapt and your running technique will improve on its own. At the start, you'll probably struggle with your technique and consciously try to control it. That's normal.

The good news is that your body is perfectly prepared for running. It just hasn't been used in this way for a long time, which is why it doesn't come easily at first. Patience and consistency will do more than any attempt at 'perfect technique' from your very first run.

Consistency

Run regularly according to any pattern. This could be, for example, three times a week every other day with two days off (Monday–Wednesday–Friday runs and Saturday and Sunday off), or four times a week every other day (e.g. Monday–Wednesday–Friday–Sunday–Tuesday–Thursday–Saturday, then Monday again). The pattern itself isn't that important. What matters is that there isn't a long break between runs. If you only ran at the weekend and then had five days off, your body wouldn't have time to adapt and you'd keep going back to square one.

Run at least three times a week. A lower frequency won't allow your body to adapt, and the result will be stagnation. Each run should last at least 20 minutes, ideally a bit longer, and in the early stages, feel free to go up to 45 minutes. It's essential to run correctly – that is, mainly in zone Z2.

Endurance

Once you've managed to maintain regularity, the second key step follows: **persevere**. Don't stop in autumn, winter or in bad weather. You can run practically anytime (with the exception of, for example, summer thunderstorms with lightning). Your body will warm up on its own whilst running; the feeling of cold usually lasts only for the first 1–2 kilometres.

Adaptation

The body adapts to regular exercise surprisingly quickly. It varies slightly from person to person, but adaptation very often occurs in cycles **of** around **three weeks**. If you do something regularly for three weeks, pain, discomfort or that 'heavy feeling' usually disappear and the activity starts to feel easier. This applies to both fitness and running technique. After three weeks of regular, correct running, your fitness will improve noticeably;

after another three weeks, further progress will be made. Similarly, your technique will improve gradually and imperceptibly.

Pace

Running is assessed using the metric known as pace. This refers to the time taken to run one kilometre (or mile). Average pace is calculated by dividing the total time by the number of kilometres. For example, 30 minutes for 6 km equates to a pace of 5:00 min/km. The lower the pace, the faster the run.

GAP (Grade-adjusted pace)

GAP is a mathematically calculated pace that takes the elevation profile into account – as if you were running on a completely flat surface. On steep climbs, when a runner often switches to walking for efficiency, GAP shows what the pace would be on flat ground. On an ascent, GAP is therefore lower (faster) than the actual pace; on a descent, conversely, the actual pace is lower than GAP.

Note: GAP is displayed by watch apps and, for example, Strava, but only in the paid version. If you have the free version, you will see GAP for activities by runners with a paid account (profile photo with a framed badge).

Illustrative example:
Pace = current pace,
GAP = calculated pace taking into account ascent or descent (*Elev* column).

KM	Pace	GAP	Elev
1	9:14 /km	5:43 /km	110 m
2	12:03 /km	5:47 /km	172 m
3	12:18 /km	5:32 /km	182 m
4	10:36 /km	5:25 /km	124 m
5	11:28 /km	5:30 /km	174 m
6	8:03 /km	5:13 /km	68 m
7	8:17 /km	5:37 /km	85 m
8	6:52 /km	5:48 /km	-2 m
9	5:28 /km	5:21 /km	-11 m
10	5:03 /km	5:08 /km	-106 m
11	5:46 /km	5:03 /km	-89 m
12	5:36 /km	4:45 /km	-201 m

Speed (km/h)

Speed indicates how many kilometres you cover per hour. The higher the value, the faster the movement. However, when running, speed in km/h is rarely used. It is a metric more typical of cycling. Most runners work with pace (min/km) and can safely ignore speed.

Speed can be particularly useful in **ultra-runs** or very long routes when you want to estimate the total race time, including downtime (refreshment stations, short stops). In such cases, you can estimate in rough intervals, approximately 4–12 km/h, depending on the route profile and difficulty.

For example, if you choose an average speed of 7 km/h for a 200 km ultra run, your total time will be approximately 28.5 hours. From this time, you can work backwards to calculate your average pace per kilometre. During the race, you then simply need to check whether your average pace is staying below this figure – if so, you know you're heading for a better finishing time than the original estimate.

The disadvantage of speed in km/h is that we don't usually have it 'in our heads', and most watches don't even display it as the main reading. However, it can be roughly estimated based on experience from similar races or training sessions and used purely as a rough planning tool.

Illustrative table for converting pace and speed:

Pace per 1 km	Speed in km/h
6:00	10
5:00	12
4:30	13.3
4:00	15

Pace Calculator

OmniCalculator offers a range of sports calculators, including several designed for running (search *for 'running'*). The most practical is the Pace Calculator – it allows you to calculate pace, time and distance. You can use it when planning your target time for a race, but also when calculating **the maximum pace** required to meet time limits in individual sections of the race.

Pausing activity tracking

Never use the automatic pause function on your watch. It often activates during steep uphill climbs, even when you're still moving, which distorts the data.

I also do not recommend using the manual pause function. All watch models save activity in Garmin FIT format (including those from other manufacturers), and this always includes total time (elapsed time) and moving time
Which time is used in the analysis depends entirely on the specific app and type of activity.

For example, Strava normally uses *moving time*, meaning it automatically deducts the time you're stationary, and the average pace is calculated without any downtime. However, if you change the activity type to 'race' in Strava, it will start using *elapsed time* and count the entire duration, including stops.

Types of training runs

At first glance, all runs may seem the same, but in reality they **differ significantly in purpose, intensity and effect on the body**. Understanding these differences is key if you want to run long-term, healthily and with progress.

The types of runs described below are based on the experience of Miloš Jakubčiak.
The section on interval running is supplemented by a free paraphrase of ideas from a podcast with Miloš Jakubčiak, compiled by Peter Ondráš.

Recovery run

It usually lasts 20 to 45 minutes at a very low intensity, i.e. in zone Z1. This training method is used after demanding and intense training sessions, when the aim is to support recovery – to allow for better blood flow to the muscles and faster removal of metabolic waste products (including lactate).

Light running

This is a fundamental training method for increasing the body's aerobic capacity. Without it, fitness levels will not improve. It forms the basis for all more intense training sessions and is performed at a moderate intensity, i.e. in zone Z2. The duration should not be less than 20 minutes, and the upper limit depends on the target race distance: approximately up to 60 minutes when preparing for a 10 km race, up to 90 minutes for a half marathon, and up to 180 minutes for a marathon.

Tempo run

Tempo running is a training method performed at an intensity just below the lactate (anaerobic) threshold. For a well-trained runner, this corresponds roughly to the first half **of**

Z4 (Z4a). It serves to develop aerobic capacity and to teach the body to process lactate efficiently. For a less well-trained runner, tempo running begins earlier, in **the upper part of Z3**; as the heart rate increases further, the body enters an oxygen deficit and produces more lactate than it can process. Tempo runs also have a clearly defined duration – usually **from 20 minutes**, and can reach up to **120 minutes** when preparing for a marathon.

Interval running

Interval running has over 1,600 variations and always depends on the distance the runner is preparing for. In principle, it serves to increase speed and train fast-twitch muscle fibres.

The interval phase is usually run in **Zone 4**; with very short intervals and a small number of repetitions, it is possible to go up to **Zone 5**. This is followed by a recovery phase (rest period), the aim of which is to bring the heart rate back down to at least **Zone 2**. Then the next interval begins. This trains speed and, at the same time, the body's ability to adapt quickly – both in terms of heart rate and breathing – to increased energy demands.

Each interval should be run **to the same standard**. For example, if you choose 5 × 1 km at a pace of 4:00/km, all intervals should be very close to this value, with only a minimal deviation. Your heart rate should be similar or slightly increasing during each interval if the pace is also increasing. A drop in pace or heart rate during the intervals means that the training is not being performed correctly.

Each interval is followed by a recovery phase in **Z1**, during which your heart rate should drop as quickly as possible. The length of the recovery can be determined by distance or time, but it should be the same between each interval. Ideally, your heart rate should behave similarly during the recovery phases and not gradually increase.

There are other forms of intervals, such as pyramids, where the lengths and paces vary. However, even in this case, the same phases of the pyramid should have comparable pace and heart rate.

We can probably agree that interval training is very demanding – physically, in terms of fitness and mentally. Beginners need not include it. In the first few months, a runner naturally gets faster simply by running regularly in Z2, without any intervals.

If you do decide to try intervals, a watch is almost essential. A running watch allows you to set up a precise interval plan, including warm-up, intervals, rest and cool-down, and signals each phase with both sound and visuals. During intervals, there's simply no time to look at the display.

How to determine the length and pace of an interval

The length and pace of intervals depend on your goal. Ideally, interval training should cover your target race distance, or slightly exceed it. You should run at your target pace or slightly faster, never at random or at your maximum 'all-out' pace.

Although it looks simple, setting the correct length of the intervals, their number, pace and rest periods is not trivial. It requires a good understanding of your own body, your current

recovery status (sleep, HRV, subjective feelings) and, ideally, experience from previous races. Therefore, intervals should only be run by more experienced runners or those guided by a coach.

Examples:
– 10 × 200 m is a workout more suited to track runners and distances around 1500 m.
– If the goal is to improve your personal best for the 10 km distance to 40 minutes (pace 4:00/km), the total distance of the intervals should cover at least 10 km. This could be, for example, 10 × 1000 m at a pace of 3:55 – 4:00, 5 × 2000 m at a pace of around 4:00, or 2 × 5000 m slightly below the target pace.

Or you can choose any other combination of intervals that, when added together, covers the target distance of 10 km and is also around your target pace. Examples of typical variations:

Short intervals: 25 × 400 m at a pace faster than race pace, e.g. around 3:45/km.
Medium intervals: 10 × 1000 m at a pace close to your target pace, approximately 3:55–4:00/km.
Medium intervals: 5 × 2000 m at target pace of around 4:00/km.
Longer intervals: 4 × 3000 m at target pace or slightly slower, approximately 4:00–4:10/km.
Long intervals: 2 × 5000 m at target pace or slightly slower, e.g. 4:00–4:15/km.

A simple rule applies: the shorter the interval, the faster the pace compared to your target pace. This builds up a speed reserve, which you can then use during continuous pace running in races.

Note: the more intervals (in terms of total distance) you include in a week, the more easy, relaxed runs you should also have. Intervals should make up only a small part of your training – in line with the **80/20** rule.

How to determine the length or duration of the recovery period

The aim of the recovery period is to calm down as much as possible and prepare the body for the next interval. Ideally, it should be as short as possible, but it always depends on how quickly you manage to get your heart rate back down to a low level. If you are unable to do so within the planned time or distance, it is worth considering whether it makes sense to complete the interval training session at all that day.

The recovery period is entirely individual. Generally, it should not be longer than the interval itself, and around half the length of the interval often works well. However, this is not a hard and fast rule – more important than exact figures is the feeling of calm and the ability to run the next interval at the same pace and quality.

Long slow distance (LSD)

This is run at low intensity, i.e. in Z1–Z2. Its duration should make up approximately 30% of the total weekly mileage. This is a very important training method – not only for developing endurance and helping the body adapt, but also as mental training that teaches patience, energy management and the ability to move over a longer period without the pressure to perform.

Fartlek (playing with pace)

A free combination of recovery, easy and partly tempo running. During fartlek, the runner changes pace intuitively, without precisely defined sections – a burst of speed may last a few seconds or several minutes, for example to the nearest lamppost, bend or hilltop. A faster section is always followed by a recovery at a slower, regenerative pace.

In the countryside, fartlek is used almost automatically. The terrain naturally forces you to change pace – you slow down on the uphill (sometimes to a walk), your pace settles on the flat, and on the downhill you can run faster with relatively little effort. This is precisely why fartlek feels very natural and effortless in the countryside.

You run in any intensity zones, depending on the terrain and how you feel. Typically, this ranges from Z2 to Z4, whilst on downhill sections it is possible to achieve a higher pace with a lower heart rate.

Fartlek is mentally (and often physically) easier than classic interval training. The effects aren't exactly the same, but for most runners they're **more than sufficient**. It improves your sense of pace and your ability to react to changes, whilst not burdening your mind with precise numbers and plans. It is fun, flexible, simulates race conditions well, and can be easily adapted to your current fitness level and mood.

Summary

Proper training is based on low intensity. Approximately **80% of your weekly mileage** should be covered in **Z1 and Z2** – that is, recovery runs, easy runs, long slow runs (LSR) and possibly fartlek. The remaining **20%** consists of speed training, specifically tempo runs and intervals.

Running technique

Proper running technique is based on an upright posture. The foot strikes the ground on the midfoot – not on the toes, nor on the heels. The foot lands beneath the body's centre of gravity, roughly in the arch area, and the push-off is directed forwards, not upwards. The reaction force should support the movement, not hinder it.

From the third step onwards (i.e. the second step on the same leg), some of the energy from the previous landing begins to be utilised. The arch of the foot acts like a spring: it compresses on landing and returns energy on push-off. For this mechanism to work, strides

must be shorter, with a higher cadence, and the landing must always be under the centre of gravity. Long strides in front of the body disrupt this effect and lead to braking.

Efficient running isn't just about the legs. The whole body works in coordination, as a single unit – like an orchestra. When the movement is in sync, running feels light and fluid. Ideally, the head is slightly ahead of the landing foot and the body moves forward without unnecessary tension.

Video demonstrations of correct technique and tips for improving it:
https://youtube.com/shorts/qwvII4J7c_E?si=U6hApSHCm0BQTLIX
https://youtu.be/_kGESn8ArrU
https://youtu.be/v1Bj-0QYnIg?si=mWLS3r7LEboL17VL
https://youtu.be/sScNDZu2MWk?si=QQstcC9ixyB2h4Kf
https://youtu.be/gYajoeR_UF8?si=-aMBTgRVISMfRHDs
https://youtu.be/wCVSv7UxB2E?si=ICVXAmaXSpaAQ5mn
https://www.youtube.com/shorts/y9dq8Fk-0g4

Short IG Reels on individual aspects of running technique on the IG profile:
https://www.instagram.com/findyourstridecoach

Cadence

Cadence refers to the number of steps per minute. It can be expressed as SPM (steps per minute – steps of both feet) or RPM (revolutions per minute – steps of one foot). If your watch measures RPM (e.g. Suunto), you can easily obtain the SPM value by multiplying by 2.

The higher the cadence, the faster the run. Acceleration therefore does not come from lengthening your stride, but from increasing the number of shorter steps. This applies on flat ground, uphill and downhill. Always.

Running typically starts at a cadence of around 160 SPM (80 RPM per leg). Around 180 SPM (90 per leg) is considered the ideal value. When running uphill, cadence tends to be closer to the lower limit (around 160); on the flat, it is typically between 170 and 190; and with a proper downhill run, it can go significantly higher – easily over 200, and in exceptional cases up to around 250.

A higher cadence naturally causes the feet to land beneath the body's centre of gravity, which improves the efficiency of the push-off. At the same time, it is usually associated with landing on the midfoot (arch), which allows for a smoother transition from landing to push-off.

A cadence below 160 is already heading towards a transition to walking; below 140, it is practically always walking – although it may be fast. It is precisely through cadence that you can verify, in the data of other runners, the moment when they switched from running to

walking, typically on a steep incline. Interestingly, even when walking, a runner can still maintain a high ‘pace’ – in which case it makes sense to monitor GAP.

Cadence is very important for running, but when you’re starting out, you’ll be most concerned with basic technique anyway. That’s why I won’t go into it in detail here. It’s enough to know that there are special exercises to improve cadence, and a simple mobile app, such as Running Metronome, can also help.

Note: watches and analytics apps calculate the total number of steps based on cadence. Cadence determines the number of steps per minute, which is then converted into individual time intervals of the recording (usually in seconds). After adding these up and rounding off, the total number of steps for the entire activity is obtained.

Video about cadence
https://youtu.be/6tTcyQiTPXE

Run flow

Even experienced runners spend most of their time running with effort. Technically correct, efficient, without wasting energy unnecessarily, but you can still feel that they are running. It doesn’t happen entirely by itself.

Occasionally, however (and the more experienced you are, the more often), they reach a state where the movement seems to take the initiative of its own accord. This state is called run flow.

It is the moment when you run relaxed, yet very efficiently. Nothing hurts, nothing pulls, nothing holds you back. You stop thinking about running – you simply let yourself be carried by the movement. Body and mind are in harmony; you are fully in the here and now. The run has a rhythm, the cadence is steady, and your breathing is natural. It is often described as a euphoric feeling of lightness, as if running were suddenly effortless – with a wonderful sensation.

Anyone who keeps running long enough will experience run flow. Some sooner, some later, but definitely at some point. And when it happens, there’s a very clear ‘aha’ moment – you’ll know exactly that **this** is it 🙂.

Mistakes

Long strides = heel strike

Beginners tend to take steps that are too long. The foot lands far in front of the centre of gravity and, logically, lands on the heel. Paradoxically, this slows the runner down, because every such landing brakes the whole body and the next push-off has to start ‘from scratch’ again, just like the first step. Constantly starting from scratch. Furthermore, with this type of landing, the impact is not absorbed by the whole foot but is transferred upwards, often as far as the knee. After a few kilometres, pain around the knee will therefore set in.

Running shoes with a higher drop can temporarily alleviate the pain, but **they do not address the root of the problem.** The runner is still braking with every step, and the movement remains inefficient. Running speed is not increased by stride length, but by cadence – the number of steps per minute. More steps mean greater speed, but for this to be possible, the steps must be short and quick.

Pushing off upwards rather than forwards

Another common mistake is the conscious effort to push off more. Instead of moving forward efficiently, the runner starts jumping upwards. The result is the same as with long strides – braking, unnecessary energy waste and the feeling that every step starts all over again. The correct push-off is directed forwards, not upwards.

Landing on the balls of the feet

Many beginners initially land on their heels (a habit from walking), then read that they should land on their “toes”. However, this term is often misunderstood. In practice, it refers to the arch of the **foot,** i.e. **roughly the middle of the foot, slightly closer to the toes, not the toes themselves.**

So never run strictly “on your toes”. Even if you accidentally land on your toes (by consciously trying to change your technique), always let your whole foot land on the ground first and only then push off.

You may read in some places that the way you land doesn’t matter. That isn’t true. Every aspect of running technique matters. You can run even with mistakes; the question is simply how long you can keep it up, how much energy it will cost you, and when these mistakes will result in injury.

Not using the arms

None of the beginner runners, and unfortunately not many experienced ones either, consciously use the shoulder girdle, i.e. the movement originating from the shoulders. Yet this is a key part of running technique. Without it, proper technique simply cannot be achieved.

The problem is that the shoulders are difficult to control consciously. This movement must be automatic, not forced. It acts as a natural counterbalance to the legs:

- when **the left leg** moves **forward**, **the right shoulder** moves forward,
- when **the right leg** moves **forward**, **the left shoulder** moves.

I would emphasise that we are talking about the shoulder, not the arm. The arm moves only as a consequence of the shoulder’s movement. So do not try to wave your arms about. This principle can be practised very effectively whilst **walking**. Once you understand it there, it will gradually transfer to running as well. Once your shoulders start working correctly, the movement of your whole body will suddenly become simpler, lighter and more coordinated.

A short video to illustrate:

https://www.instagram.com/reel/DMIV1gUNIDN

Unstable core

The core is key to running. Of course, it is strengthened by running itself, but you will see significantly better results if you consciously strengthen it outside of running too. A strong core then helps significantly whilst running. It keeps the torso upright, stable and facing forwards, makes it easier to maintain the correct pelvic position and gently assists in lifting the legs with each stride. This mainly involves a slight tilt of the pelvis, not a forceful ‘pulling’ of the legs.

If the torso is weak, the runner often bends over or hunches. Consequently, it is not possible to achieve the correct technique. The foot strike tends to be incorrect, the load is transferred unevenly, and in the long term this leads to injuries. At the same time, breathing is impaired because compressed lungs have a reduced capacity.

The torso should be upright and the whole body slightly leaning forward as a single, solid unit. This is not about bending at the waist or hunching, but a gentle ‘fall’ starting from the ankles. The body thus naturally moves forward without unnecessary bouncing or braking.

Failure to use the arms and an unstable torso at the same time

This is a combination of two mistakes at once, and is therefore more difficult to correct. As with everything in running, however, it is simply a matter of time – consistency and adaptation. This mistake manifests itself as the upper torso, particularly the chest and shoulders, rotating left and right. At first glance, it may look as though the runner is “working with their arms” because the arms are moving. In reality, however, this is an anti-running movement – it is the chest that rotates, not the shoulders. A more experienced runner will spot this mistake immediately.

The torso should always be facing forwards, in the direction of movement. Lateral movement should be minimal, almost imperceptible. If anything does move, it is merely a subtle ‘tugging’ of the upper chest in response to the arm’s movement, and this is only localised (from the collarbone to the oblique abdominal muscles), never a rotation of the entire torso.

So if, instead of moving the shoulder girdle, you rotate your torso sideways, you are unnecessarily complicating your run and making it more energy-intensive.

Unnecessary attempts to run uphill

It is possible to run uphill – even on very steep slopes, provided you are sufficiently fit. However, if you are not yet fit enough or the slope is too steep, it makes more sense to switch to a brisk walk. This is generally faster and more energy-efficient than trying to run at

all costs. If you know an experienced trail runner and have access to their data (e.g. on Strava), check their cadence on the climb. The moment their cadence drops below 140, they are almost certainly walking. Take this as a useful example

Fixing mistakes

The solution is actually simple: consistency, perseverance and adaptation. And, as little effort as possible to consciously control every detail of your movement. Let the run flow. Your body knows very well what to do, and with regular running, it will find a more efficient and correct movement pattern on its own – and relatively quickly.

Small adjustments that can be subtly influenced consciously can also help, such as shortening your stride and increasing your cadence. However, don't expect to see a change in the very first few days. It usually only starts to become apparent after a few weeks of regular running.

TIP: From my own experience, I can recommend running uphill (and downhill). It's more demanding, your body adapts to it more quickly, and the slope of the terrain naturally sets a slight forward lean of the body – into the ideal position, without bending at the waist.

TIP: short video clips focusing on individual aspects of running technique
https://www.instagram.com/findyourstridecoach

Training

Ideally, follow the 80/20 rule and aim for a weekly volume of approximately 2–3 times the target race distance.

Examples:

- **10 km race**
  30–40 km per week
  80/20 = 6–8 km at pace + 24–32 km at an easy pace

- **Half marathon**
  40–80 km per week
  80/20 = 8–16 km at pace + 32–64 km at a relaxed pace

- **Marathon**
  60–150 km per week
  80/20 = 12–30 km speed + 48–120 km easy

The rule is that the shorter the distance, the higher the pace per kilometre and the greater the emphasis on speed training (tempo and interval runs). For short distances, the total

weekly volume can therefore reach 4–5 times the target distance (to maintain the 80/20 ratio), depending on your ambition and target time.

A common mistake made by beginners is signing up for a half-marathon or marathon too soon without adequate preparation. It is not enough simply to ‘run the distance’. Volume, regularity and the correct distribution of intensities are essential.

You also need to bear in mind the time commitment involved in training: speed sessions require a warm-up, the session itself and a cool-down, whilst easy runs take more time due to the slower pace. If you don’t have time for everything, the priority is at least a regular volume of easy-paced running.

If your weekly volume is low or your training is irregular, it’s better not to enter races at all. Running isn’t about heroics at the start line, but about honest preparation beforehand.

Effectively building up your weekly mileage

It is more effective to split the distance into several shorter runs than to cover it all in one long run. For example**, 10.5 + 10.5 km in a single day** is more beneficial for training than a single half-marathon run in one go. Smaller blocks can work just as well, such as **9 + 6 + 6 km**.

When running several times throughout the day, there is partial recovery and a change in external conditions (different time of day, temperature, fatigue), which increases the training’s adaptive effect.

Note: For long target distances (at least a marathon and ultra), however, it is necessary to occasionally include a really long run – approximately once every 1–2 months, covering at least two-thirds of the target distance (approx. 28 km for a marathon, 60+ km for an ultra over 100 km). If you don’t have time for such a training session, it can be replaced by training directly in races.

Race training – categories A, B, C

Runners often divide races into 2 to 3 categories, most commonly A, B and C. This division helps to plan training better and manage performance appropriately throughout the season.

Category A races are the runner’s main races of the season. It is for these that they specifically fine-tune their form, adjusting both training and recovery. On race day, they aim to perform at their best and achieve their main goal, such as improving a personal best or achieving a specific result.

Category B races serve primarily as training under race conditions. Runners use them to test various aspects of their preparation, such as longer runs, pace, nutrition, or running in a specific season or weather conditions. If everything goes well during these races and

conditions are favourable, the result may be close to the performance achieved in Category A races.

Category C races are essentially training runs with a fixed start and route. They serve primarily to gain experience and take advantage of the benefits of an organised event, such as refreshment stations, a marked course and the opportunity to run in a group, without any emphasis on the result.

Goals for races

I recommend taking part in races, but always choose ones of a suitable length and difficulty based on your current fitness level. As well as being a chance to socialise, races are also a powerful incentive to keep running. They often motivate you to achieve a performance you wouldn't reach during a normal training session.

You don't have to view races solely as a competition against other runners. You can see them as a competition against yourself, comparing yourself to your own past times, or simply making the most of the prepared course, organisation and refreshment stations.

To ensure you experience that positive feeling after finishing a race as often as possible, I recommend setting yourself several goals. You can also divide these into categories A, B and C.

Goal **A** represents the ideal race scenario – the performance you'd like to achieve if everything goes to plan (sleep, diet, leg condition, overall well-being).

Goal **B** has more lenient criteria and is what you aim for if some things don't go perfectly.

Goal **C** is even more flexible and takes into account the possibility that the race won't go to plan.

Setting goals in this way helps maintain the motivation to finish the race even if something goes wrong during the run. At the same time, it reduces the risk of disappointment at the finish line, as achieving at least one goal brings a sense of satisfaction.

Etiquette

Runners generally use informal address* and greet one another**. Age and 'civilian' life don't matter. When running, we are equal in a special way. Using informal address quickly dispels the formal atmosphere and naturally replaces it with a friendly vibe.

A nod of the head costs you nothing and may cheer someone up. In any case, you won't hurt anyone by doing so. 😀

* In exceptional cases, it is possible to use the formal 'vy' form with someone if there is a special reason for it. Personally, I used the formal 'vy' form with Štefan Karak, and I would also use it with Peter Polák if I ever met him in person.

Edit 28 Oct 2025: Štefan Karak got in touch and suggested we drop the formal ‘vy’ form, which I gladly accepted. 🙂

** I always greet all runners with a wave. The only exception is in situations where there are a great many of them at once and a greeting would lose its meaning – for example, when running in a park where dozens of people are training at the same time.

Weather

You can run **almost anytime**. The only exceptions are truly extreme conditions, such as thunderstorms with lightning, extremely strong winds or floods. Generally speaking, however, you can run all year round.

Running in winter

Running generates heat in the body, which naturally warms the runner in winter. This effect usually kicks in after about 2 kilometres of running, regardless of pace or the outside air temperature.

TIP: I recommend running in the countryside and up hills. If there is a severe frost in the valley, it can be noticeably warmer on the hill. However, this only applies if there is no strong wind blowing on the ridge.

It is often said that in winter it is best to wear several thin layers of clothing (for example, a long-sleeved T-shirt, a short-sleeved top over it, and an outer jacket). This approach is correct, especially until your body gets used to the cold. Once you've adapted, you'll find that the key is **not to stop** and to keep moving (even if just walking). Then, a single T-shirt and a jacket are often enough.

The general rule is: dress for a run as **if it were 10 °C warmer** than the thermometer shows. More experienced and faster runners can even dress as if **it** were **15 °C warmer**. Warming up your body requires energy, so your pace will naturally be a little slower in winter than in autumn or spring. However, the difference is usually small.

TIP: In winter, avoid covering your mouth and nose with a balaclava or buff. In freezing conditions, the air you breathe out freezes on the fabric. Instead, slow your pace and breathe through your nose, which will naturally warm the air.
If you need to cover anything, cover your neck (with a buff) and head (with a hat), not your mouth and nose. In very bad weather, you can cover your mouth with a jacket that isn't too close to your face and won't freeze as much.

TIP: Your legs are less sensitive to the cold. Focus more on keeping your head and torso warm (a proper running jacket). Your legs can cope with the cold even in shorts, or in running leggings (or a combination of leggings and shorts). In the cold, the body restricts blood flow to the extremities, particularly the fingers. Gloves designed for very bad weather, hand warmers, or waterproof winter gloves instead of running gloves can help.

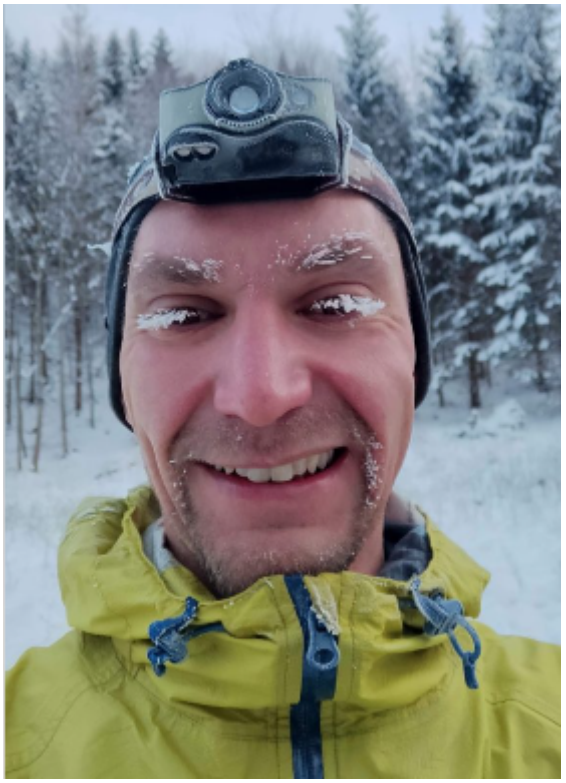
PRO TIP: Coping with severe cold is aided by cold acclimatisation, particularly winter swimming. Actual swimming is ideal, not just brief contact with the water. It has a positive effect on the whole body's thermoregulation and also makes winter running easier. However, it is a demanding activity, both physically and mentally.

The following photograph was taken on 8 February 2023 from Minčol Hill near Žilina. The photo was taken at around 7:00 am, with a temperature of −19 °C. I was wearing a single long-sleeved Johny Tatrosh T-shirt, topped with a Montane Minimus Stretch Ultra running jacket. On my hands, I was wearing only standard Salomon winter running gloves.
Photo by Branislav Blažek.



INFO: In severe frost (below −10 °C), it is recommended to avoid running near bodies of water and, generally, in areas with high humidity. In such conditions, your eyes, for example, may freeze over. This isn't dangerous, but it is unpleasant and often requires you to rub your eyes with your hands. However, this makes the situation worse, as it introduces further moisture into your eyes, which then freezes over more quickly. 😀

The following photograph was taken on 23 December 2021 in the village of Turie near Žilina, after descending from the Sačné chalet. The time of capture was approximately 7:40 am, with a temperature of −13 °C and high humidity.



Summer

In summer, high temperatures are naturally counterproductive for running. However, there is equipment that can help, such as the T8 Iced Tee functional shirt with a cooling effect. The key is sufficient fluid intake and subsequent cooling of the body through sweating.

However, cooling the body takes a significant toll on your energy levels. When running in the heat, you should expect a significantly higher heart rate and greater energy expenditure. This naturally leads to a slower pace, reduced endurance, or both.

TIP: Wear running caps (baseball caps). They protect your head from the sun and also absorb sweat, preventing it from running into your eyes. In extreme heat, you can place a wet sponge inside the cap to help keep your head cool for longer.

Running in the heat leads to a significant loss of body weight. However, this is not actual weight loss, but a loss of water through sweating. After finishing a run, you will therefore often find yourself drinking more fluids with little or no urination, until the body's balance is restored. After long runs in summer conditions, this can take up to about a day.

For this reason, it is advisable to replenish fluids regularly whenever possible during the summer. If a runner has water with them, they should not pour it away. If they no longer wish to carry it, it is better to drink it, as 1 litre of water represents approximately 1 kg of weight.

Sweating and its consequences

Runners sweat all year round, but sweating is more pronounced in the summer. In addition to fluid loss, which needs to be replenished, there is also a loss of other substances important for the body's functioning and running itself.

Although some runners can manage runs lasting several hours (for example, 3–4 hours) without replenishing fluids for most of the year, in summer conditions such exertion requires replenishment of these losses. Ideally, not just with plain water, but with an isotonic drink, which helps to at least partially replace the lost minerals.

PROBLEM: In very high temperatures (above 35 °C), there may be areas where the heat is significantly worse than elsewhere. Most commonly, these are sections in the forest where the sun is shining but there is no air circulation. The heat 'traps' there and the air is heavy and unpleasant to breathe.

If you find yourself in such a spot, it is better to slow down or switch to walking until you have left it. This does not usually happen in open spaces, even if there is no shade, because the air moves there and the heat does not build up.

Humidity and sweating

Author: Miloš Pintrava

In high humidity, cooling through sweating ceases to work. Sweat does not evaporate from the skin, so the body does not cool down. The body tries to compensate by sweating even more, but to no real effect. Only external cooling will help – for example, cold water, ice, water from a stream, or at least a gentle breeze to allow the sweat to start evaporating.

Drinks for sweating

In summer, most people tend to drink iced drinks, often with ice. However, these mainly cool the mouth and throat. They provide a sense of relief, but they do not actually cool the body. On the contrary, the cold can temporarily suppress sweating because the blood vessels constrict.

Surprisingly, **warm** drinks, such as tea, provide more effective cooling. They promote further sweating and thus the body's actual cooling.

However, when you sweat, you lose not only water but also minerals necessary for the proper transmission of signals between the brain and the muscles. A deficiency of these can lead to cramps or muscle stiffness, particularly in the legs. Therefore, during longer runs or heavy sweating, it is advisable to replenish fluids with an isotonic drink containing electrolytes (such as Bix Hydration Active).

Rain

Rain causes the body's surface to cool down. In summer this can be an advantage, but outside the summer months it is more of a disadvantage. However, the situation is largely resolved by a suitable waterproof running jacket.

Shoes labelled GTX often do not perform as expected in the rain. Waterproof socks are usually a better solution. Although they do not last extremely long, they can significantly help or at least improve comfort for about 1–2 hours.

TIP: Personally, I've found an alternative that works for me – coating the entire sole of the foot with Vaseline. Be warned, however, this method may not work for everyone. Miloš Pintrava, at the very least, had an extremely negative experience with this at the UTMB – he tore off his entire heel on a bend practically at the start. Therefore, try applying Vaseline to your entire foot on your own during a training run.

If you plan to run in the rain for several hours (ultra-running), it is advisable to remove unnecessary accessories such as chains or other metal objects. Prolonged movement and friction can cause painful chafing.

It is also advisable to wear seamless underwear. A damp environment significantly increases the risk of chafing and skin irritation.

When running in the rain or in very damp conditions, it is also advisable to protect your nipples.

Thunderstorms

It is often impossible to predict exactly when a storm will occur. It can develop locally and suddenly, even without clear warning. Sometimes it is accompanied by a sudden change in pressure, which can be detected by a sports watch, but these alerts are not always reliable.

The basic rule is: **avoid storms**. If you know about one in advance, it is better to postpone your run and continue only after it has passed.

If you are caught in a storm unexpectedly, I recommend moving to a lower elevation and not lingering on the ridge. At the same time, slow down as soon as possible, or ideally stop moving. Rapid movement increases so-called step voltage, which can increase the risk of being struck by lightning.

A mobile phone has no effect on the formation or strike of lightning, and there is no reason to switch it off. On the contrary, a switched-on phone allows you to be located and, if necessary, to call for help. Enabled mobile data can improve the accuracy of your location.

Windy.com – weather forecast

Whether you're running in the city or out in the countryside, it's worth checking the weather forecast and adapting your gear accordingly. The paid version of **Windy.com** is a tried-and-tested tool. It isn't cheap, but it offers features that are genuinely useful in practice.

It allows you to view a large number of layers. The **Radar+** layer is particularly useful, combining satellite cloud cover with traditional weather radar. Equally practical is the **Wind** layer, which shows wind strength and direction anywhere on the map. The app can also display a short-term precipitation forecast for approximately the next hour. However, you should bear in mind that in mountainous terrain, the reality may differ slightly, as the models cannot accurately account for the influence of the mountains.

Another advantage is the ability to switch between different forecast models. Both local and global models are available, and it is possible to display several of them at once and compare them. This helps you get a better idea of what might actually happen in the coming hours.

My Lightning Tracker Pro – lightning alerts

This is a simple app that sends real-time alerts about lightning strikes within a set radius. I use 60 km. For running in the city, this is unnecessarily large, but in the countryside it's just enough to allow me to get to safety in time.

For the app to work reliably, you need to turn off battery optimisation, enable notifications and have mobile data switched on. You also need to enable notifications to be forwarded to your smartwatch. Once all this is set up, the app will reliably alert you directly on your smartwatch to the occurrence of lightning, including the direction and distance.

Lightning strikes over 10 km away are generally relatively safe. Below 10 km, particularly in open countryside, the situation is already almost critical. Lightning strikes may occur in the immediate vicinity within a short time.

Google Play
App Store

Note: if you are already near a storm and are not receiving lightning alerts, check that you still have a mobile signal and that mobile data is available.

TerraTime Pro

A simple app for displaying twilight + sunset and dawn + sunrise anywhere on Earth and for any day of the year. It can help you plan whether you'll need to take a head torch or other lighting.
TerraTime

Treadmill running

I’m including this section for the sake of completeness, just to make it clear that I’m aware of the existence of treadmills. However, I don’t use them myself, not even in ‘bad’ weather (because, in principle, such a thing doesn’t exist).

Most commonly available treadmills are active, i.e. self-propelled. The belt moves at a set pace and the runner tries to keep up with it. Personally, I don’t see much point in this type of training. I’ve used this type of treadmill twice – once out of curiosity and the second time as part of a spiroergometric test.

The second type is the passive treadmill, where the belt does not move on its own but is driven by the runner’s movement. This method is closer to real running. It can be compared to running on a hard surface, only without the influence of the weather.

I use this type of treadmill only very rarely and for short periods, mainly as part of circuit training during strength training.

If I were ever to voluntarily go for a run on a treadmill, it would only be for a very specific type of training, such as simulating an extreme incline (over 20%).

TIP: In the event of an injury, a treadmill is a suitable way to maintain fitness. If you can at least walk uphill, a treadmill is ideal, as you don’t have to worry about running back downhill with an injury 🙂.

Strength training

I've already mentioned the importance of a strong core. You can build it up partly through running itself, but I recommend specifically strengthening it. Ideally through strength training without machines – that is, exercises using your own body weight or specific weights, such as kettlebells.

Correct execution of the exercises is key. It affects not only their effectiveness but also the risk of injury. Most people feel they are exercising correctly, but in practice, technical errors are very common. From my own experience, I recommend training with a coach, ideally in a small group. The costs are shared and motivation is higher.

Strength training is a very broad topic, so I won't go into specific exercises here. One thing is important: for runners, it is a crucial area. Anyone who wants to run long-term, at higher volumes and without injury, should commit to strength training.

Strength training has a major impact on long-term running without injury. There are individuals who have run a lot and avoided injury even without it, but these are generally genetically exceptional cases. For most runners, strength training is a necessity if they want to run for years without recurring problems.

Illustrative video:
https://youtu.be/ZorKphOKS94?si=naisTBD09CeL_Kj2

There is, however, one catch. If you have competitive ambitions in races, strength training can be slightly counterproductive in terms of maximum speed. Sprinters have built up mainly the muscles needed directly for running, nothing more. Strength training tends to lead to an athletic, versatile physique, suitable for various physical activities.

Such a physique is practical in everyday life and more resistant to injury, but greater muscle mass also means higher oxygen consumption. When running, this can lead to a slightly lower top speed. You can be fast, even very fast, but probably not quite at the theoretical limit. The reward, however, is running without injuries, without chronic pain, and often with very good endurance, which is particularly advantageous in ultra-running.

Nutrition for the joints

I am deliberately placing this section immediately after strength training. The reason is simple: the best nutrition for joints is proper movement and strong muscles. If you have good movement habits and sufficiently developed muscles, your joints are under less strain and there is no need to worry about various 'joint nutrition' supplements. The muscles take on most of the work, and the joints function in more natural and safer conditions.

Trail running

Trail running takes place in the countryside, usually on hilly terrain. Special shoes with a more pronounced sole (so-called ‘claws’) are used, which improve traction on mud, grass, rocks or forest paths. The pace is usually slower, not only because of the elevation but also due to the specific sole of trail shoes.

It is important to use your feet correctly. Your foot should be pointing straight up the hill or straight down the hill. Any sideways rotation reduces the effectiveness of the sole and increases the risk of slipping. The lugs work best when they are loaded directly in the direction of movement.

Unlike running on tarmac, trail running is generally gentler on the joints and cartilage. Soft and uneven surfaces (meadows, field and forest paths) absorb shocks whilst naturally distributing the load across different parts of the body. There is a constant alternation of ascents, descents and different types of foot strike.

Whilst running on roads repeatedly strains the same muscles, joints and ligaments, off-road running provides varied physical stimuli. It is precisely this variability that is one of the reasons why trail running, when approached sensibly, can be sustainable in the long term and less monotonous.

Autopilot for choosing where to land your foot

Trail running is more demanding than running on a paved surface. In addition to the running itself, you are constantly looking for a place to land your foot and a safe push-off. This happens automatically – the brain ‘prepares’ landing spots at least two steps ahead. However, this also takes its toll on your energy.

Although these steps are programmed automatically, you can consciously influence every single one. It is precisely thanks to this preparation that you can turn around or redirect your attention for a moment without losing your balance or falling.

With regular trail running, the brain adapts to this way of moving. The runner develops a sense that they have more time and that the landing spot is ‘closer’. At that point, you can consciously choose a more suitable spot than the autopilot would have selected on its own. Outwardly, nothing changes – the movement looks fluid and time passes just the same. The change occurs only in the runner’s perception, enabling them to make the right decision at the right moment.

The benefits of trail running

- You spend time in nature and naturally develop a connection with it.
- Trail running means becoming one with nature.
- You won’t be disturbed by cars, and you can even run with your dog off the lead.

- You aren't disturbed by cyclists or large numbers of walkers.
- You don't feel the mental pressure of a set distance. You usually have a set route and always finish your run either at the finish line or by returning to the start.
- The pace is slower, which makes relaxed runs much easier. You don't worry about your pace; you simply keep moving.
- On steep climbs, it is often better to walk briskly than to run. Energy consumption is lower and the time difference negligible. For me personally, the threshold for walking is a gradient of around 10% (100 metres of elevation gain per kilometre).
- Trail running creates a natural fartlek – slower uphill depending on the gradient, normal running on the flat, and significantly faster downhill, often at a tempo run pace but with a lower heart rate.
- It improves the runner's overall stability.
- You'll grow new toenails every season 😃
- Trail running often takes you beyond your current physical and mental limits. It teaches you to tap into energy reserves you didn't know you had.
- With regular, long-term training, your tolerance for discomfort increases significantly, which has a positive effect even outside of running 🙂

Disadvantages of trail running

- The overall running pace is slower. Trail runners are generally slower than pure road runners, although there are exceptions.
- Specific equipment is required as needed (a bell, running poles, a rucksack, water bottles, and the like).
- Trail running is more time-consuming – you need to get to the start and the run itself takes longer due to the lower average pace.
- Interval and tempo runs are harder to train for.
- Shoes generally have a shorter lifespan.
- There is a higher risk of nasty falls.
- Black toenails are common from running downhill and tripping over stones and roots.

Tips for running uphill

It isn't always worth running uphill. In some cases, power hiking is more effective. It depends either on the technical difficulty of the terrain (fallen trees, rocks, water, etc.) or on the gradient of the climb itself. If it's just a matter of gradient, the limit is individual. Personally, I switch to walking at around a 10% gradient. It's a rough estimate; I don't need to know the exact figure in advance.

However, if you decide to run uphill, make use of the following tips from Erik Hubner.
Facebook post with video clips:
https://www.facebook.com/groups/192835454075490/permalink/24770109372588090

Transcribed text of Erik's post:
How do you maintain a low heart rate (Z2) when a runner is surrounded by nothing but hills and therefore has to run up them? Yes, the only option is to adjust your pace and switch to

walking. That's how you can keep it under control. I also run about 1 min/km slower on hilly terrain than when I run the same route at a high intensity.
Nevertheless, there are a few tricks for maintaining a slightly faster pace uphill without your heart rate skyrocketing.

Broadly speaking, this could be called "proper technique" and it means: don't lift your legs unnecessarily high, just follow the terrain closely (but watch out for tripping – you can fall even when running uphill 🤦🤣), don't bounce, lean **your whole body** more towards the hill and make use of gravity (it's a paradox, but this force actually helps us when running uphill; you just need to find the right angle of your body relative to the ground – don't be afraid to experiment; you'll be surprised how much easier it is to run in a certain body position relative to the surface).

However, don't bend at the waist; **your whole body** must be leaning. Your legs MUST go under your centre of gravity; it's not important to push off with the ball of your foot (calf), but mainly with your hamstring (as if on stairs). Your stride mustn't be unnecessarily long; your hamstrings can't handle that much, and you'll soon be in cramps. You need to engage your glutes significantly in the movement.

If the slope allows it even slightly, it is good to place the whole sole of the foot on the ground, not just the toes, even when transitioning to walking.

If the terrain is technical or rocky, it is best to choose spots that most resemble steps; this puts the least strain on the Achilles tendon and calf, allowing the large, powerful muscles in the leg to do the work.

You don't need to look far ahead; it's better to scan the area immediately in front of you and check you're on the right path every now and then by looking up (*at a more distant target or by checking the navigation route on your watch*).

When running uphill, the work of the arms, or rather the movement of the shoulder girdle, is even more important. Try to imagine that there is a rope in front of you and you are dynamically pulling yourself upwards by it. The sharper this movement, the more it will help you whilst running. (*If you can't picture it as pulling on a rope, imagine instead that you have virtual poles in your hands, which you are using to help you run uphill).*

When transitioning to walking, feel free to rest your hands on your thighs to help you with the climb. When walking, it's fine to bend at the waist and lean slightly towards the ground. It's important to keep taking small steps; if you want to increase the intensity, don't lengthen your stride, but increase your cadence.

TIP: use your core when moving uphill too. Place your hands on your hips (around your waist), and tilt your pelvis slightly back (having your hands on your hips helps control and reminds you to tilt your pelvis slightly back). This automatically engages your core and takes some of the strain off your thighs.

ITRA methodology for converting elevation to distance

If training takes place outdoors, it usually involves undulating or hilly terrain. In such cases, it is also worth considering how elevation gain affects the overall training load. For this purpose, you can use the methodology from the International Trail Running Association (ITRA), which converts metres of elevation gain into the equivalent distance on flat ground:

+ 100 metres of elevation gain = 1 km on flat ground
− 300 metres of elevation gain = 1 km on flat ground

Example: A run is 10 km long with an elevation gain of +500 metres. These 500 metres are usually run back down to the starting point.

The virtual distance of such a run is:

10 km + (500 / 100) for the ascent + (500 / 300) for the descent
= 10 + 5 + 1.7
= 16.7 km

Running in the countryside thus indirectly increases the weekly distance covered. The same applies to races if they take place in the countryside and involve significant elevation gain – their actual exertion is greater than the course length alone suggests.

However, if you are training for races on flat terrain, running in the countryside is particularly useful for indirectly increasing your mileage during easy runs. Intervals and tempo runs on natural, hilly terrain are not directly comparable to the same type of training on flat ground.

Falls

Falls do occasionally occur during trail running. This can happen on slippery surfaces after rain, such as mud, wet stones or ice. It can also happen during periods of severe drought, when the dusty top layer shifts beneath your feet. Another common cause is tripping over an obstacle the runner fails to notice, such as rocks or roots.

You need to accept falling as a fact and not dwell on it unnecessarily. If this thought doesn't paralyse the runner, they remain relaxed. This reduces the risk of a fall and, should one occur, the risk of subsequent problems.

Even after years of running, I still have a few minor falls every year. Usually, these are just slight grazes on my knees and palms. Occasionally, I have a more serious fall, leaving me with scrapes over a larger area of my body. However, none of these falls has led to injury or the need to stop running. Nor have they made me afraid of falling again.

TIP: I haven't fallen once on difficult or technical terrain. All my falls have happened on terrain that looked easy at first glance. This is probably when I subconsciously underestimate the situation and my concentration wanes. That is why, in places where I

have fallen in the past, I consciously increase my alertness and lift my legs a little higher to reduce the likelihood of another fall.

Note: Falling is part and parcel of running in general. You can trip even when running on the road, for example in town – over a kerb, a missing paving stone or a drain cover that isn't flush with the ground.

Pro-level falling 😃:
https://www.instagram.com/reel/DMWyGnKvqXc/

Ultra running

Ultra running is running over a distance longer than a marathon, i.e. more than 42.195 km. It can take place on various surfaces – on a track, on the road or off-road. Most often, ultra runs take place in natural surroundings, where they take the form of so-called ultra trails. However, there are also well-known road ultra runs, such as the Spartathlon, or solo versions of relay races.

Training

Preparing for an ultra-run is like putting together a jigsaw puzzle made up of smaller pieces, which, when combined, provide at least part of what is needed to complete an ultra-race.

The foundation lies in building endurance through low-intensity runs (Z2) and maximising weekly mileage. A typical example might be a daily run of 10 to 20 km at Z2, which amounts to approximately 70 to 140 km per week.

As this is already a significant volume of training, it is advisable to split the daily workload into smaller segments. For example, two 10-km runs are generally more effective than a single 20-km run. In this way, the weekly volume can be built up more effectively and sustainably.

Such training is also time-consuming, often amounting to 10 to 15 hours a week. It therefore makes sense to take every opportunity to run – running to and from school or work, running as a way to get to strength training, simply any opportunity that arises during the day.

Unlike training for road races, where the weekly volume often significantly exceeds the target race distance, in ultrarunning it is generally sufficient to cover at least approximately two-thirds of the target race distance each week.

Training through races

Just as with regular races, participating in races is a common training tool in ultrarunning. This is even more true for ultra distances. Finding time on a normal day for a very long run can be challenging, whereas in the case of races, not only the runner but also those around them view such a time commitment differently.

Even in ultra-running, it makes sense to divide races into categories A, B and C.

However, for ultra distances, it makes no sense to plan more than one or two Category A races per season. Most races serve as tests – for example, tackling a long distance, running at night (ideally in races starting in the early evening or at midnight) or other specific situations.

It follows that most ultra runs in the season will be Category C; approximately two to three races may be Category B and one to two races Category A. Category C and B races should serve exclusively as preparation for successfully completing Category A races.

Placings in Category C and B races are not important. It is important not to get carried away by the crowd and to strictly adhere to the plan set for the race from the start.

Sleep deprivation

In ultra-runs, everyone will sooner or later experience sleep deprivation. If you have a time buffer within the time limit, it is possible to take a short nap anywhere on the course. If you do not have this leeway, you either continue without sleep or you must withdraw from the race (DNF – *did not finish*).

Short naps, known as power naps, can be a great help. They usually last 10 to 20 minutes and serve as a quick 'boost'. During these, the body enters light sleep stages (NREM stages 1 and 2), which help refresh the mind and improve alertness.

An alternative is to complete at least one full sleep cycle, which lasts approximately 90 minutes. This cycle includes deep sleep (NREM stage 3) and the REM stage, which are important for more comprehensive regeneration of both the body and the brain.

In the short term, if you need to function for one or two days and nights, micro-sleeps – that is, several short naps during the day or night – tend to be more effective. However, if the need to function whilst sleep-deprived extends beyond two nights, the body will very likely require at least one complete 90-minute sleep cycle.

Hallucinations

Energy consumption is extremely high during an ultramarathon. The organ with the highest energy consumption is the brain. Even whilst running, it works at full capacity – it may not be dealing with 'everyday' matters, but it ensures the choice of foot strike, limb coordination, balance and other processes.

When energy is truly low after a very long time, the brain, in an effort to conserve energy, begins to shut down certain parts of itself in order to maintain movement. This shutdown can manifest as hallucinations. It is nothing extreme, but rather the creation of a non-existent reality from real stimuli.

This typically occurs with a random refraction of light, for example at sunrise or in the beam of a headlamp, when the brain 'renders' something that isn't actually there. It might be a tent in a tree, a car in a dense forest, a bed by the path, or sleeping figures all around.

You can snap out of this state for a moment by moving quickly or using cold water. The brain then temporarily switches back to full capacity and begins to perceive reality again. Hallucinations initially occur most frequently in the early hours of the morning after a sleepless night. After a second sleepless night, however, they may also occur at times during the day.

Note: A similar phenomenon can also be observed in artificial intelligence systems, such as ChatGPT. In an effort to conserve resources, these systems may provide answers that do not entirely fit the context or facts. Upon being alerted, the system usually switches to a more accurate mode.

Endorphins, serotonin, dopamine

This is not a mistake; I have deliberately included endorphins only as a sub-section of ultra-running, and I will add serotonin and dopamine as part of their more detailed explanation.

Endorphins are a group of neurotransmitters produced by the brain and nervous system in response to pain, stress or intense physical activity. The name is a combination of the words *'endogenous'* (the body produces them itself) and *'morphine'* (a pain-relieving substance), which already suggests their effect. These are the body's own 'natural opioids', which can:

- reduce the perception of pain
- induce a feeling of euphoria or well-being
- helps manage stress and anxiety

Endorphins are released mainly:

- during intense physical activity
- during pain, as a natural analgesic mechanism
- during intense emotional experiences (laughter, music, falling in love)
- during childbirth, to help the body cope with pain
- during prolonged or extreme exertion, such as an ultra-marathon

Theoretically, they can also be released during a short training run, but this is unlikely. It is more likely to occur during very demanding tempo or interval training sessions. However, these are usually short, and so it is more likely that serotonin and dopamine in particular will be released during them.

Serotonin is associated with feelings of well-being, balance and improved mood. Dopamine is linked to motivation, reward and a sense of satisfaction after exercise. Both of these neurotransmitters, like endorphins, also help with managing stress and anxiety.

Endorphins work in the body in a similar way to morphine:

- they bind to the same receptors as morphine or heroin
- they act as natural painkillers
- during ultra-running or extreme exertion, they can significantly dull pain and fatigue and alter one's perception of reality

This state is often described as:

- ‘second wind’
- “runner’s high”, i.e. euphoria during or after running
- a state of increased pain tolerance, a calm mind and a feeling of happiness or purpose

Neurotransmitter	Trigger	Effect
Endorphin	Long/intense run, pain	Pain relief, euphoria
Dopamine	Reward, success, progress	Motivation, joy
Serotonin	Perseverance, contentment	Mood stability, well-being

Specific types of ultra runs

Standard ultra runs are usually one-day events, exceptionally two-day events, covering distances of approximately 50 km to 120 km. Most of them take place on rough terrain and typically involve an elevation gain of approximately 2,000 to 8,000 metres. In addition, there are solo variants of relay races, which, in terms of their parameters, are essentially the sum of several standard ultra runs.

Backyard Ultra

The Backyard Ultra is a race format that always restarts on the hour. Runners complete laps on the same route, with day and night circuits sometimes alternating. Each participant has exactly 60 minutes per lap, not a second more. The length of one lap is set so that over 24 hours it totals exactly 100 miles, which works out at 6,703 metres per lap.

At first, this distance seems manageable, but after just a few laps it becomes physically and mentally demanding. The hardest part of this race is the need to line up at the start again and again at the top of every hour. Anyone who is not at the start at the appointed time is automatically disqualified – it doesn’t matter whether they’ve overslept or are still on the course from the previous lap.

The biggest problem with this type of race is sleep deprivation. If a runner continues for more than two nights, they have no opportunity to complete a full sleep cycle and are reliant solely on micro-sleeps.

One advantage of the Backyard Ultra is the strong sense of community. All participants are practically together all the time and, at the very least at the start, meet up every hour. Another advantage is the chance to cover an ultra distance without the usual pressure to maintain a certain pace. At first glance, it may seem like a ‘slow’ race, but in reality, the Backyard Ultra is extremely demanding in terms of time and discipline.

Every 15 laps covers a distance of 100 km. Over 24 hours, runners cover 100 miles. As of 8 August 2025, the world record stands at 119 laps, meaning almost five days of continuous movement, which equates to a distance of 797.66 km.

More information is available on Wikipedia:

https://en.wikipedia.org/wiki/Backyard_ultra

Barkley Marathons

This is the race with the lowest number of successful finishers of any race. In some years, not a single runner completes it.

The race consists of five laps, each 20 miles long. Together, they cover a distance of 100 miles. There is a 12-hour time limit for each lap, making the total limit 60 hours.

Runners are not allowed to use watches or navigation devices. Navigation in the terrain is possible only with the aid of analogue navigation tools and their own skills. The runner's task on each of the five laps is to find a book hidden in the terrain, from which they must tear out the page bearing their start number. They must then return to the starting point within the set time limit.

More information:

https://en.wikipedia.org/wiki/Barkley_Marathons

Recovery

Recovery can be active or passive.

Active recovery involves low-intensity movement. This can be a recovery run or another sport that does not place a significant strain on the body and promotes blood flow to the muscles.

Passive recovery, on the other hand, is 'doing nothing' or consciously enjoying some downtime. This includes anything outside of sport that does not strain the body, such as a sauna, a hot tub, reading a book, watching a film or simply relaxing.

Insufficient recovery increases the likelihood of injury. Running then becomes tiring and unpleasant. Such a state can be tolerated in the short term, but poor recovery is unsustainable in the long run.

Lack of energy

If, towards the end of a run or during a run the following day, you are unable to increase your pace – and therefore your heart rate – it means you do not have enough energy.

If you run out of energy during the current run, it means you haven't chosen the right pace or have undertaken a training session for which you didn't have the capacity at that moment.

If this condition only becomes apparent the following day, it means that recovery is not yet complete and your body needs more time. In that case, you can continue with your planned run, but only at a very low intensity, i.e. in zone Z1, in the form of a recovery run.

More on this topic in the chapter on supercompensation.

Sleep

The most important form of recovery is sleep. If you get a good night's sleep, you don't need any special aids or equipment to speed up your recovery.

If you're not sleeping well at the moment, there's no need to worry. Regular running will gradually improve your sleep significantly. As your body adapts to running, your ability to 'clear your head' of unnecessary thoughts improves, and the deep sleep phase in particular becomes more pronounced. Give it time.

As well as sleep, listen to your own feelings. If you feel tired, reduce the volume of your training, the intensity, or both, and allow your body to recover more quickly.

How to improve sleep

This is, of course, individual, but generally speaking, digestion and alcohol consumption have a significant impact on sleep quality. The mental aspect plays a role too. If your mind is

cluttered with unnecessary thoughts, falling asleep is harder and sleep tends to be shallow, with a short deep sleep phase.

Running helps in this regard. Regular running can ‘clear your head’ and improve your ability to switch off. It also helps by inducing mild, natural tiredness. However, this tiredness should not be confused with the fatigue resulting from an incorrectly chosen training regime.

You can actively influence your sleep, particularly by limiting or completely avoiding alcohol, including beer. Even a single beer has a negative impact on sleep, and this effect increases with each additional drink. With wine or spirits, the impact is even more pronounced. This is linked to the body’s processing of alcohol, which is energy-intensive. This process cannot take place whilst the body is in a state of complete ‘shutdown’, and so the body is unable to fully regenerate during the night.

Food has a similar effect. It is advisable to eat your last meal no later than two hours before going to bed, or to go to bed no sooner than two hours after finishing it. If you go to bed earlier, it will take you longer to fall asleep and the deep sleep phase will be short. In that case, it is more effective to wait and go to bed only after these two hours have passed.

There is no need to stick to exact times, such as always having your last meal at 7 pm. It is enough to stick to the approximate two-hour window before bedtime and adapt to the specific day and how you feel.

TIP: Lowering the temperature in the room where you sleep significantly helps improve sleep. Personally, I find a temperature of around 18 °C most comfortable.

PRO TIP: If you practise cold therapy, it is possible to sleep all year round under just a duvet, or on warmer days without any cover at all. Running often reduces the need to be ‘wrapped up’ when sleeping. The best results come from sleeping in just your underwear or completely without any. Anything that helps lower your body and ambient temperature improves the quality of your sleep.

Sleep duration

This is thin ice, which I wouldn’t normally even discuss here. Hence **the warning**: this sub-section applies exclusively to me. It may apply to you too, but it might not. If you decide to try out this information, treat it merely as an experiment and verify it using several relevant sources.

I do not follow the recommended 8 hours of sleep, but rather around 6 hours. This is based on long-term monitoring of my HRV and sleep quality. I have noticed that I feel more tired after 8 hours of sleep than after 6 hours. At the same time, I have noticed that the duration of my deep sleep is the same, approximately 3 hours, regardless of whether I sleep for 6 or 8 hours.

If I assume that one complete sleep cycle lasts approximately 90 minutes, then 6 hours of sleep amounts to 360 minutes, which is exactly 4 complete sleep cycles. With 8 hours of sleep, this amounts to approximately 5.33 cycles, meaning that the last cycle is incomplete. I assume that this is precisely why I don't feel sufficiently rested after 8 hours of sleep.

In theory, I should feel fine after 9 hours of sleep, which would correspond to 6 complete cycles. It is true that I feel better after 9 hours than after 8, but still slightly worse than after 6. I have no explanation for this. I am simply stating a situation I have observed for years.

It is generally recommended to complete at least 5 full sleep cycles per night. For me personally, this recommendation does not apply.

Note: The length of a single sleep cycle is given in the literature as ranging from approximately 90 to 110 minutes. I simply assume that my cycle is closer to the lower end of the range, i.e. approximately 90 minutes.

Winter swimming (cold water swimming)

Swimming in cold to icy water has surprisingly many benefits for runners. However, it is important to do so in moderation and, above all, not immediately after a run. After finishing a run, inflammation may (but need not) develop in the body, which is part of tissue recovery. During cold-water swimming, this inflammation can be suppressed, and that is not desirable.

Exposing the body to cold water and the subsequent natural warming up leads to muscle relaxation and supports the repair of micro-tears caused by exercise.

Note: Ideally, I swim three times a week, always on the days when I also have a morning trail run (Tuesday, Thursday, Sunday). I run at 6:00 am, finishing between approximately 7:00 and 9:00 am. I swim around 2:30 pm. With this schedule, I haven't noticed any negative effects on myself. I've been monitoring this long-term, since 2018.

Cold-water swimming also indirectly trains the mind. If you can handle this, you can handle many other things. At the same time, it very effectively clears the mind of distractions. The moment the body comes into contact with the icy water, the survival mechanism kicks in. Everything unimportant immediately vanishes from your mind and your attention focuses on the blood pooling in your torso to protect your internal organs. Yes, a work problem is exactly that important at that moment – it vanishes instantly 🙂

Cold-water swimming promotes overall adaptation to the cold. As a result, running in winter is less unpleasant. Moreover, on the day of the swim and often for part of the following day, you can feel a distinct warmth in the fingers and toes.

Explanation: By winter swimming, I don't mean a cold shower at 12–16 °C. I'm talking about swimming in open water, or in a river if the still water freezes, i.e. at a water temperature just above 0 °C. Such temperatures are common during the main part of the winter season.

For the body to cope with this, it is necessary to start around September and acclimatise regularly. This allows the body to adapt to the gradual drop in temperature. Under no circumstances is it recommended to start acclimatising right in the middle of winter.

Winter swimming can be a great help, but it is by no means essential. If it's outside your comfort zone (which, to some extent, it is for everyone 😃), it's perfectly fine to manage without it.

Supercompensation

Supercompensation is a fundamental principle of training adaptation that explains why a runner becomes stronger, faster or more enduring after a properly structured training programme.

During a run, the body expends energy, uses up glycogen stores in the muscles, muscle fibres sustain minor damage, and the nervous system also becomes fatigued. Immediately after training, the body is weakened and performance drops. However, during the recovery period, the body initiates repair processes – it replenishes energy stores, regenerates muscle fibres and strengthens them so that they can handle the same or greater load more easily in the future. This process is called supercompensation. The result is a state where the body reaches a higher level than it was before training.

The key is the correct timing of the next training session. If it follows too soon, i.e. whilst you are still fatigued, performance drops and the risk of overtraining increases. If it comes too late, when the effect of supercompensation has already worn off, no improvement occurs. Ideally, you should start a new training session during the peak of supercompensation, thereby gradually pushing performance higher.

The duration of supercompensation depends on the intensity and type of training. After a light run, it may last only a few hours; after a demanding interval session or a long run, it can last 48 to 72 hours. Nutrition also plays a significant role, particularly the replenishment of carbohydrates and proteins, as do sleep quality and overall recovery.

For runners, this means that alternating training load with sufficient rest is essential. Only in this way can the principle of supercompensation be utilised to achieve long-term progress in speed, endurance or overall fitness.

This does not mean you cannot run every day. It is possible, but the intensity of the training must correspond to the degree of recovery from the previous session. If you have had a good night's sleep and feel full of energy, you can run the very next day. After a strenuous training session, however, a light run is usually sufficient.

There is also a rule known as the 1:3 ratio. It states that the effect of training lasts approximately three times longer than the post-workout fatigue itself. For example, if the

fatigue following a strenuous workout disappears after one day, you can still benefit from the supercompensation induced by that workout for a further three days.

Partly because of this principle, taking a completely restful week before a race isn't always the best strategy.

The following link provides a good overview of the topic of supercompensation:
https://effectivecoaching.sk/zakon-superkompenzacie/

Injuries

This is a complex topic. There is one basic rule to follow: do not look for answers in discussions with anonymous people online or on ChatGPT. The same symptom of an injury can have completely different causes in different people, and therefore the solution may also be individual. When it comes to injuries, do not attempt self-treatment or 'online treatment'.

TIP: I run every day, I run quite a lot, I run on every type of surface and in all weathers. I even run the day after really demanding ultra runs (for recovery, of course). Despite this, I haven't been injured. This is no coincidence. First and foremost, it's down to strength training, then proper running technique, and certainly also the fact that most of my runs are at low intensity (Z2).

Skin abrasions or blisters

I recommend Spiridea cream paste for young children; adults can also safely apply it to damaged skin.
https://www.spiridea.sk/spiridea-krempasta/

TIP: if you use a marathon knot, it reduces the likelihood of blisters forming in your shoes.

Tick-borne diseases

I recommend vaccination against tick-borne encephalitis and checking your whole body after a shower following any outdoor activity. If you find a tick, remove it as soon as possible. Prompt removal (ideally within 24 hours) significantly increases the chance that you will not contract Lyme disease.

You can remove a tick using tweezers, for example. Grasp it as close to the skin as possible and rotate it smoothly in either direction, but always in one direction only. After one or two rotations, it will come loose. If the body separates from the head during removal, this is fine – the head, without a source of infection, will not cause the disease, and the body will expel it on its own.

Books describing running injuries

Christian Larsen, Joachim Altmann, Sandra Zürcher – Medical Running

Christopher McDougall, Eric Orton – Born to Run 2

Weight vest

I do not recommend this nonsense to any amateur runner, and for beginners, this hardly needs emphasising. The body is always adapted to its current body weight, and adding artificial weight in the form of a vest is a very quick shortcut to injury.

A weighted vest may have a short-term purpose within strength training. However, it has no place during the run itself.

An exception is the use of practical gear – for example, running to work or school, or running with a rucksack as preparation for an ultra-run. Even in these cases, the load is minimal compared to a weighted vest, and moreover, it is concentrated solely in the rucksack, not evenly distributed across the entire torso.

Even if the vest did lead to the development of certain muscles, they would still atrophy without further use. For most runners, therefore, this approach has minimal or no effect. Theoretically, it might make sense just before a major performance as part of supercompensation, but personally, I wouldn't use it even then.

There are plenty of running-specific changes to your training that will provide sufficient variety and variation in the workload. Artificially increasing weight is unnecessary and inappropriate for the entire musculoskeletal system.

Running whilst ill

Running whilst ill is not ideal, but it is not entirely out of the question either. However, it should always be limited to low-intensity recovery runs.

Deciding whether it is possible to go for a run with your current illness is, in principle, simple. If the illness manifests itself from the neck (inclusive) and upwards, running is safe. This mainly concerns common upper respiratory tract infections, provided the lungs are not affected at the same time.

Boosting immunity – zinc

Running itself in all weathers, especially outdoors, boosts immunity. Regular intake of zinc also helps to support it.

If you are just starting out with running, 10 mg of zinc a day is sufficient.

If you already run a lot – for example, more than 100 km a week, run every day, or do any sport for more than 30 minutes a day – take 25 mg of zinc a day.

Motivation

Motivation is different for every runner. At the start, it's often simple – wanting to get moving, meet your daily step goal, or lose weight.

Anyone who sticks with running and runs properly (i.e. running doesn't wear them out, but energises them) will eventually find that running itself becomes the motivation.

And anyone who adds at least the occasional run in the countryside will find that the grandeur and beauty of nature are a very powerful motivating factor.

Quotes

Mental strength: *it all starts with believing that you can do it. Doubt and fear are your greatest enemies. When you are a victim of fear or doubt, you direct your energy in the wrong direction and waste it. In my case, I've learnt not to worry about things I can't change and to accept things as they come. I can't change the fact that it's raining. So I don't worry about it and I accept it.*

Ivana Molnárová – HR leader, strategic consultant and runner, with a long-standing focus on personal and professional growth:
True growth occurs when we dare to step beyond our comfort zone and face the unknown. It is precisely where safety ends that true strength begins.

Martin M. Šimečka and Modré hory – The almighty run:
Through a long run, I expelled the smoke from yesterday's cigarettes from my lungs, the alcohol from my blood, and the poisonous thoughts from my mind. But above all, it was a state of emptiness and stillness, a hint of death in its gentle form. It was a blissful vacuum, a pause in life.

I am certain that the elegance of movement in an exceptional runner does not depend solely on physique and muscle structure. It is an exceptional feat of the mind, just as the elegance of a brilliant writer's sentence or the elegance of a genius violinist's playing is. I know this because I have been trying in vain to achieve this elegance of movement my whole life.

Melancholy is an existential wistfulness that is far removed from joy, yet it is not unpleasant. I don't feel like setting off, but at the same time, after so many years of running, I know what I'll be experiencing and I don't want to give that up. When I speak of melancholy, I mean a heightened sensitivity to existence itself, which ceases to be taken for granted. When I see a wolf's track in the mud after yesterday's storm, I perceive it more as a message about the mystery of being. I don't know how that wolf lives or what it was doing here. We met in one place, just at a different time. When I step over a fallen tree that was still standing the day before yesterday. When I see the new bed of a stream carved out by a torrent of water, I perceive them more as manifestations of entropy than as individual images of the wilderness. It is a melancholic wonder, heightened by movement.

I don’t know the authors of the following sentences, but I find them beautiful, so I’ll use them here even without attribution:

Running reminds YOU that even in your weakest moment, you are STRONG.

I don’t run to be the best. I run to feel better.

You started exercising to change your body, but in the end it changed:

- your diet
- your goals
- your mindset
- discipline
- your energy
- self-confidence
- sleep
- priorities
- friends
- your life

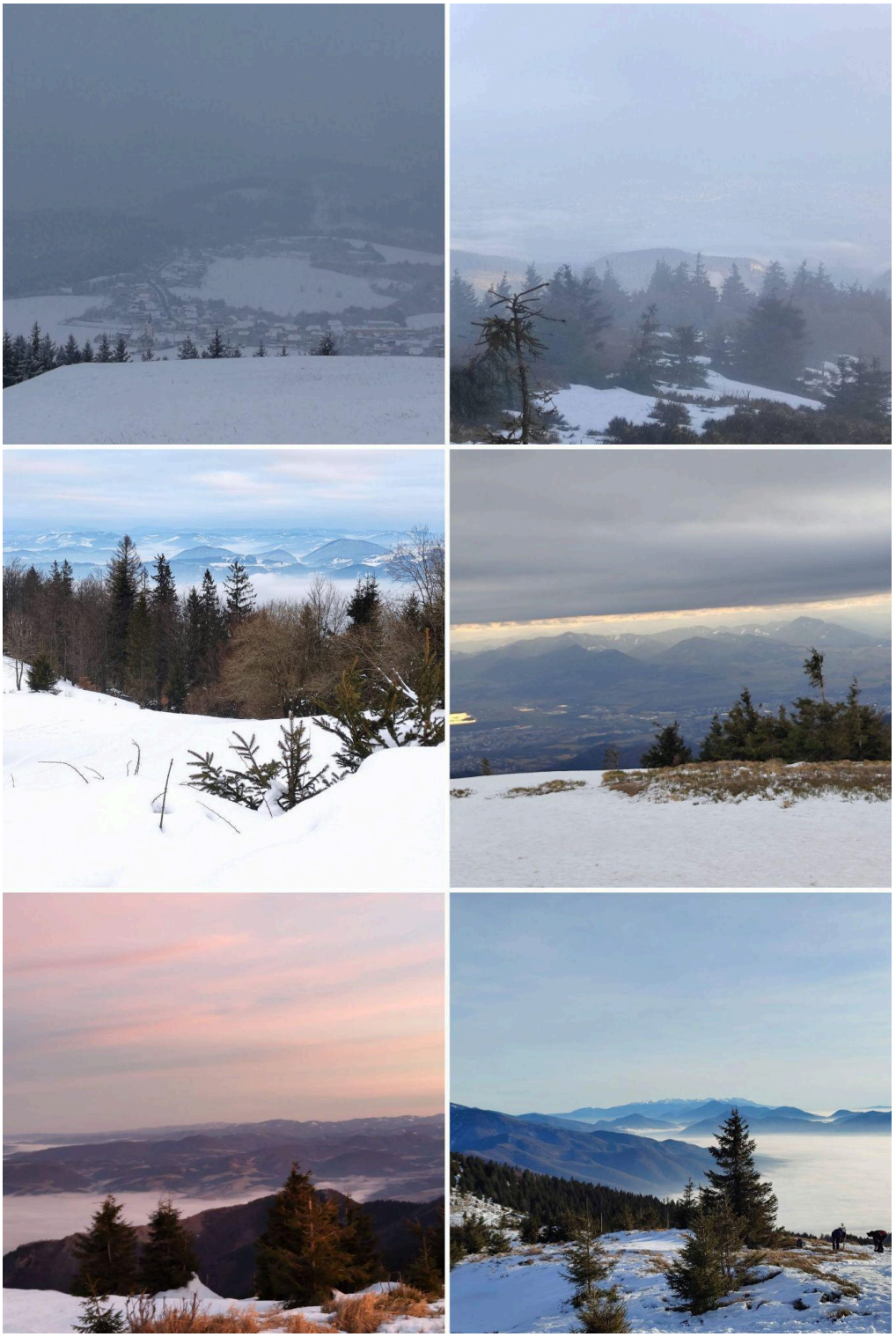
Some lovely motivational quotes from the following source:
https://www.instagram.com/share/p/BAQKXRxRH7

- A runner’s mindset
  - Running isn’t just about kilometres and pace – it teaches resilience, discipline and mental strength in a way that many non-runners will never fully understand.
- Discomfort is temporary
  - Running teaches you to push through discomfort, knowing that pain and fatigue are fleeting. Many may avoid discomfort, but runners embrace it as part of growth
- Consistency beats motivation
  - You won’t always feel like running, but showing up anyway is what makes progress happen. In life, discipline wins over waiting for the “perfect moment”.
- Failure is a stepping stone
  - Bad runs, missed PRs, and tough races aren’t setbacks – they’re lessons. Many may fear failure, but runners use it to come back stronger.
- Your mind gives up before your body
  - Running proves that mental barriers are often bigger than physical ones. Once you learn to silence doubt, you realise you’re capable of more than you imagined.
- Small gains mean big wins
  - 1% improvements add up – better form, stronger glutes, faster splits. In life, small daily habits create long-term success.
- The world is different on foot
  - Running lets you see places in ways many never will – feeling the road, hearing your breath, absorbing the moment. It teaches presence in a world obsessed with speed.
- The running community is unparalleled

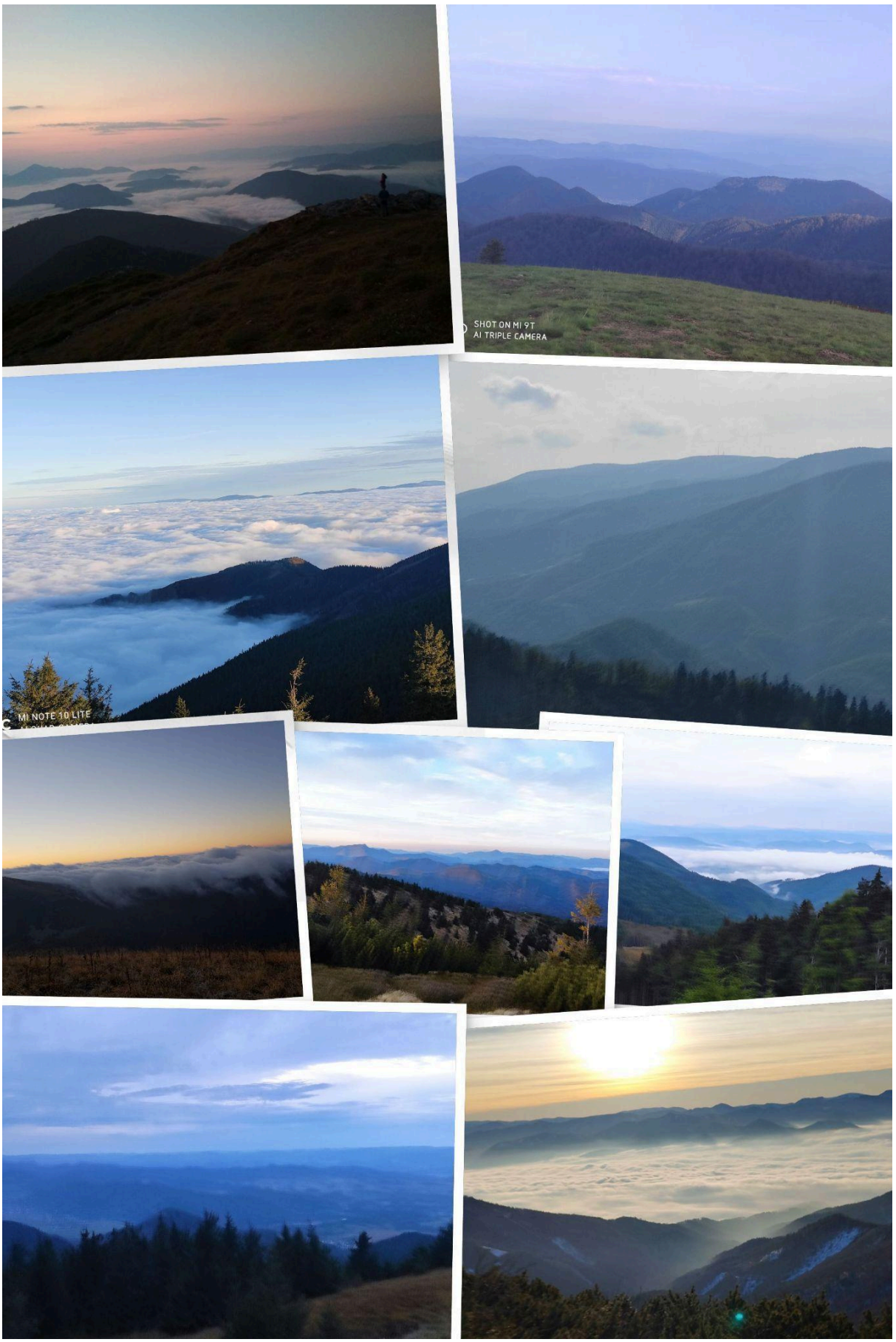
- Runners understand the unspoken bond – nodding to a stranger mid-run, helping someone finish, celebrating each other's wins. It's a community built on shared struggle and mutual respect.

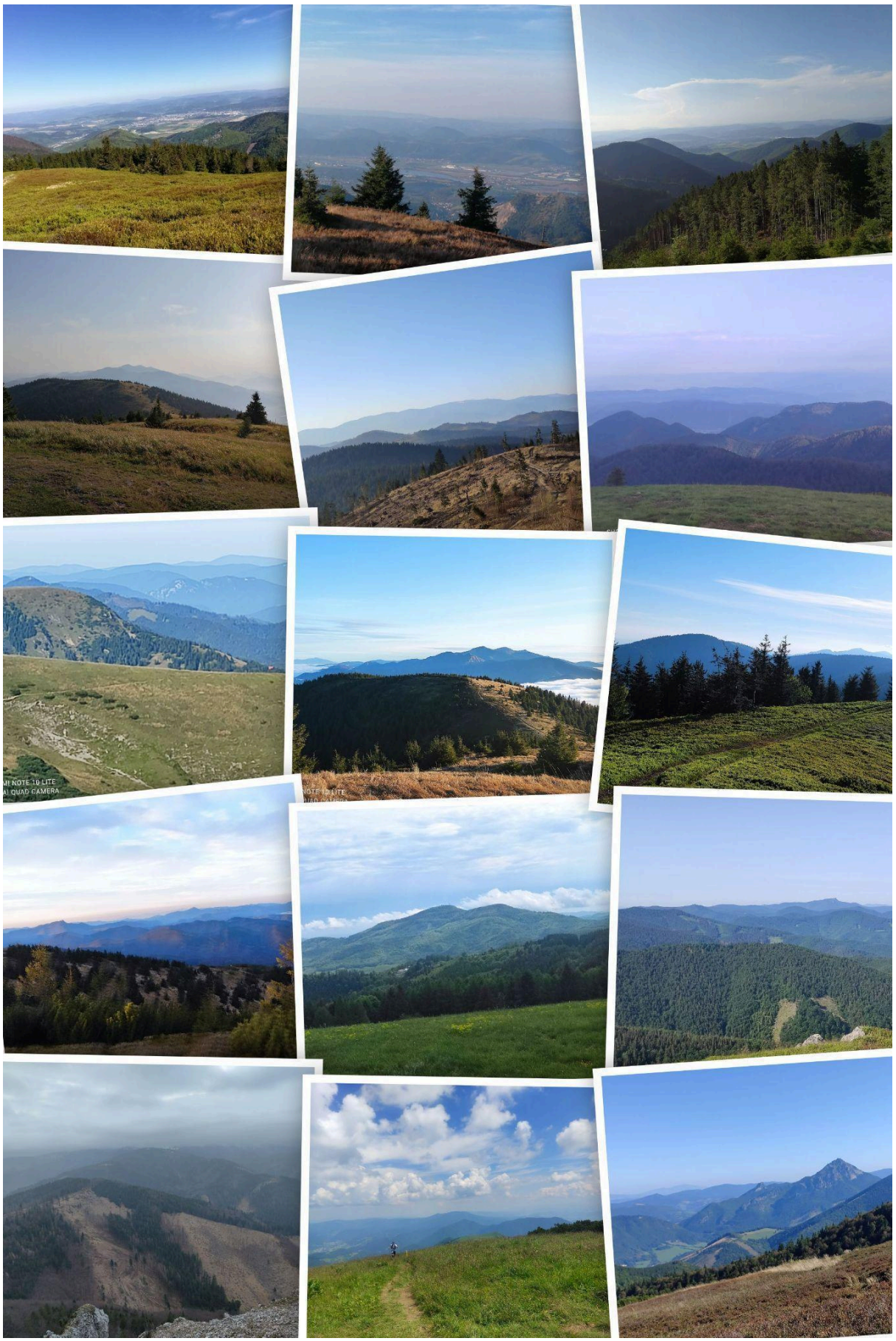
Photos from trail runs

An illustration of what you can see when running in nature:

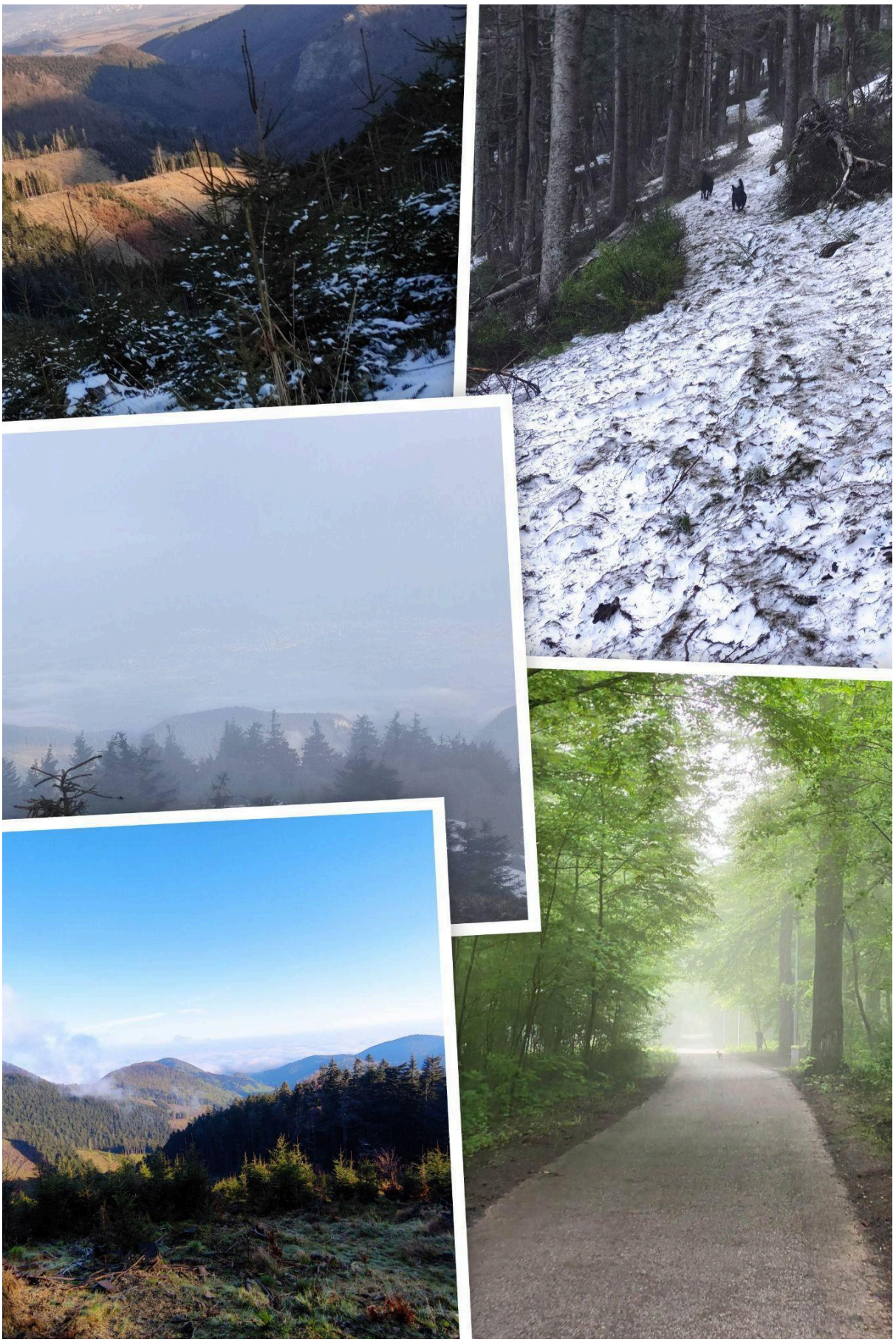




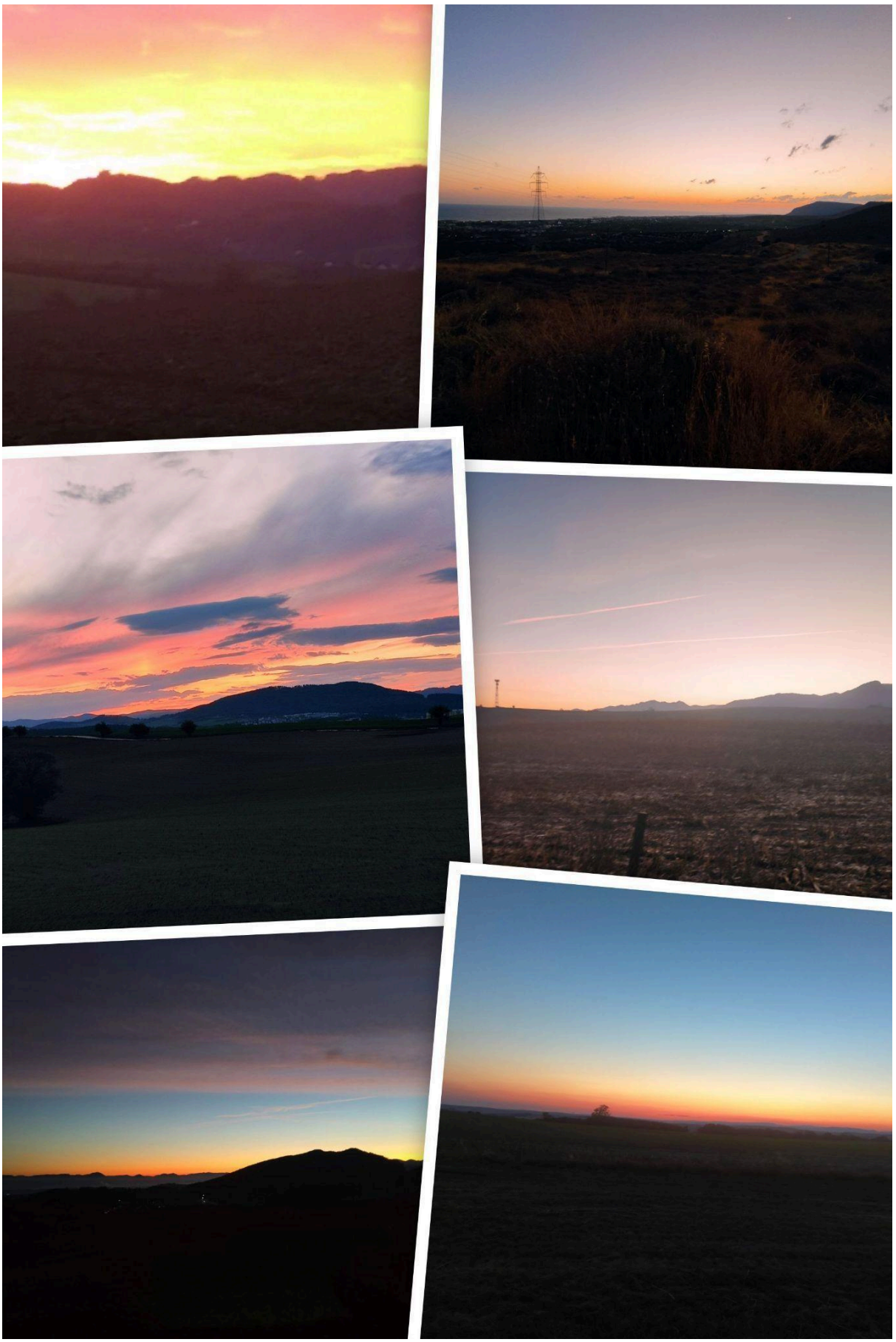

SHOT ON MI 9T
AI TRIPLE CAMERA
MI NOTE 10 LITE











Films

For me, the most beautiful film about life:
The Mirage: Timothy Olson's Race Against Time
https://youtu.be/JOhQGe-tRPA?si=Iy1H2XQWICMpVAAV

A documentary about the first woman to successfully complete the Barkley Marathons:
The Finisher: Jasmin Paris and the Barkley Marathons
https://youtu.be/PgTEsybXw-4?si=2lu-HhwCulEtL3hK

Jim Walmsley and his move to Chamonix to boost his chances of winning the UTMB:
https://youtu.be/MbXwKTZoLQ4?si=oA9aALlv4f17haPB

Majo Priadka – My Ultra Journey
https://youtu.be/PJzIbDJuhDk?si=bwrLMHlcsjkuNixz

Short films

"Enjoy The Silence" Trail Running Motivation
https://youtu.be/1MWgsF64JGI?si=JyUeRXDwsX9ZsUNH
https://youtu.be/vr_iBZ6K4bI?si=hnetouF3Q7MqG_cD

Malofatranská stovka 2024 by Ján Vírostko (Trailmood)
https://youtu.be/2QcirJ2z6V8?si=LoW4tJAN0Kq8-d6E

It's just running
https://youtu.be/B8XGy-lWN9M?si=_2Q5c8jl0gLyUppN

IG Reels

- https://www.instagram.com/share/reel/_-tgGfaeH
- https://www.instagram.com/reel/DMF9CaBNs0k
- https://www.instagram.com/reel/DKXywN3vSEe
- https://www.threads.com/@thefashionjogger/post/DJxBlfaKv9m

Running for a goal

On the previous pages, I've tried to describe everything you need to enjoy running and stick with it long-term. Despite the relatively short length, it's still a lot of information to take in at once, so here's a brief summary:

- It's just running – you don't need to worry about any complicated details, just run.

- Focus mainly on easy runs (Zone Z2), ideally in a group, and have a chat.

- Run regularly (at least 3 times a week) and consistently, all year round.

- Don't compete during training – don't compare yourself to others. Just keep moving, build up your endurance, clear your head and enjoy the exercise.

- Learn from others. Instead of competing from a distance, monitor and analyse the data of more experienced runners and try to apply it to yourself. For example, walk when they walk.

- Come back to this text after a while. With practical experience, you'll read it with much greater understanding than at the start.

- Only start doing interval training when you can no longer improve in any other way.

It's just running. Run whenever you can. The desire will come naturally.

Happy running through life.
Live your STORY.

About the authors

Peter Ondráš

STRAVA: Peter Ondras
Personal blog: https://www.ondras.sk

Train with a coach – A chat with ultra-runner Peter Ondráš
https://www.youtube.com/live/L6gA1ZG2Pls?si=XYJCPNH1cDRji4Q3

Updated 28 October 2025 – Peter Ondráš – 365 days a year of running training
https://www.youtube.com/live/7rsMUG1g6YY?si=C5xWQcJCbN7CmHib

Miloš Jakubčiak

STRAVA: Miloš Jakubčiak

Interviews in 'Train with a Coach' with Miloš:
Train with a Coach – Interview with Miloš Jakubčiak, a successful athlete
https://youtu.be/AD-F3C_HSOw?si=4EO2oYnrB_cV7APf

Train with a Coach – slow and long runs
https://www.youtube.com/live/QUkSwMYeF9U?si=YN2020vCzS4Wb-mh

Train with a coach – high-quality interval training
https://www.youtube.com/live/0YFcHNavuRE?si=akSHg6GPDPOhuaFn

Train with a coach – pace vs. heart rate
https://www.youtube.com/live/VOt6Bso6-OI?si=SS3K6n0RVAZkCuTk

Erik Hubner

STRAVA: Erik Hubner

Train with a coach – Interview with Erik Hübner, ultra-runner
https://www.youtube.com/live/jqBaAsjhD1w?si=gBrd4ZfX1v8VCa6C

Train with a coach – NTS 2025
https://www.youtube.com/live/eyv3gzYGs0E?si=0wlzML8xiWc5AD8J

Miloš Pintrava

STRAVA: Milos SK

Podcast 'Starting Line' episode with Miloš:

https://startovaciaciara.sk/episode/53-milos-pintrava-priekopnik-backyard-ultra-na-slovensku/

Train with a coach – How Miloš Pintrava used to run, not just in Hong Kong
https://youtu.be/8mxl3UckTk0?si=9tWDmYXzIzZwGDDj