Training zone

# Boost your ride

***Performance Q&A*** *The big cycling questions answered by our team of expert coaches, nutritionists and riders*

## 01 WHY CAN'T I GET ENOUGH DEEP SLEEP?

Wake up feeling lethargic and grumpy? It looks like you're not getting enough sleep – more specifically, deep sleep. Dr Sarah Gilchrist has a doctorate in sleep and athletic performance, and formerly worked with GB Olympic rowers. She now works with recreational athletes.

"All of us have a 90-minute sleep cycle that covers four stages," she says. "The first couple of stages are light sleep, so if you were to nap for 20 to 30 minutes, that's what you'd fall into. Your fourth stage is the rapid eye movement [REM] stage where you tend to dream and is related to emotional control. So, our mental health, positive consolidation of emotions and coping strategies.

"It's the third stage where you enter deep sleep, which is often called 'slow wave sleep' and occurs about 60 minutes in. This is where recuperation and restoration happens. At a physiological level, this is the time when growth hormone is released, glucose metabolism is regulated and protein synthesis cranks up. All are essential to build muscle. It's also the time for memory consolidation, when you take things on cognitively. That means skill acquisition, such as handling your bike better."

**Darken up**
Make sure your room's dark enough

According to a 2021 sleep consensus statement in the *British Journal of Sport Medicine*, "the duration and composition of normal sleep changes across the life cycle. At the ages relevant to aspiring and established athletes, a sleep of eight to 10 hours for an adolescent (aged 15 years) contains approximately 57% light sleep, 22% deep sleep and 21% REM sleep; and a sleep of seven to nine hours for a young adult (aged 30 years) contains around 61% light sleep, 16% deep sleep and 23% REM sleep". This slight age-related reduction in deep sleep is down to the significant growth seen in the teenage years.

**TOP TIP**

**Try afternoon napping, but no more than 30-90mins to fit in with the sleep cycle. Out of this range you could awake groggy.**

**Impact of poor sleep**
That same paper, although aimed at elite athletes, highlighted how 50 to 78% of athletes experience sleep disturbance while 22-26% suffer highly disturbed sleep. That significantly impairs both the deep and REM sleep stages, which has repercussions for both general health and performance.

"Many studies show the determinantal impact of 'sleep restriction' on an athlete," says Gilchrist. "One study put athletes to bed, woke them up at nightly three-hour intervals and sent them back to sleep. They showed that physical prowess and psychomotor skills were both reduced."

"You see a fall in stamina at submaximal levels," adds Gilchrist. "It's the same on the anaerobic side where maximal power output drops, and the same's been seen with a tennis serve. Speed drops through consistent lack of sleep, which is down to a drop in isometric force. Slower reaction time and poor decision making, plus a greater chance of injury and illness... It's all bad. A chronic lack of sleep also leads to certain diseases later in life."

**Know your chronotype**
How do you know if you're lacking deep sleep? As it's clearly a key part of the 90-minute cycle, anyone who sleeps for less than the recommended number of hours is likely to endure insufficient deep sleep. So, what can be done? Playing to your performance and sleep strengths will help. Your chronotype is the natural inclination of your body to sleep at a certain time, or what's more commonly known as being a lark or an owl.

"Again, there have been studies into this. One study found about 50% of elite athletes were morning types, around 9% were evening types and the rest sat somewhere in between. For the general population, you see various numbers bandied about, but it tends to be a third of people morning, a third in the evening and a third in between."

**90**
We all have a 90-minute sleep cycle, which covers four stages

In a perfect world, training to match your chronotype will maximise gains and help you sleep better later on. That's the ideal. Which arguably isn't real. What happens if you're a morning type who has no other option but to squeeze in an evening Zwift section?

"When you exercise, typically your adrenaline levels rise, cortisol increases, your heart rate goes up, as does your core temperature. None of that is conducive to sleep," says Gilchrist. "But you can be strategic to improve your chances of sleeping well.

"I'd advise eating your main meal earlier in the day and a snack after your session as too much food cuts your chances of falling asleep. Hydrate but don't drink too much as you'll spend all night visiting the loo. Shower, stretch and have some downtime before hitting the sack as it's beneficial to lose a little quantity if quality is higher. The next day you should return to your normal routine."

That downtime is key, says Gilchrist, as watching TV is fine but ensure your choice of programming isn't too stimulating. It's the same if scrolling through your smartphone, which taps into a recent development in the world of sleep – that while bedtime smartphone use isn't advised, it's not because of the blue light.

"Professor Michael Gradisar observed that the blue light emanating from our phones isn't strong enough to suppress melatonin, which is the hormone that tells you to sleep," says Gilchrist. "The problem is more the 'scroll hole' you might fall into when looking at platforms like Instagram. It's arousing and can inhibit sleep."

Further raising your chances of a proficient sleep are the use of eye masks, banishing caffeine after lunchtime and changing the tog of your duvet to match the season.

You can also bank sleep, too, if a period of anticipated sleep loss awaits, such as travelling abroad for your goal sportive. One study in collegiate basketball players showed that sleep extension, comprising a 10-hour time in bed each night over a timeframe of five to seven weeks, improved reaction time, sprint times, mood and free-throw shooting accuracy. **James Witts**

**TOP TIP**

**Consuming tryptophan-heavy foods can also help with sleep. "Tryptophan is a precursor to melatonin and is found in milk, almonds, many plant-based foods and turkey," says Gilchrist. "We used to get through so much turkey mince with the rowers to help them sleep."**


**Night owl?**
Try to train when you're most alert

**Images** Getty Images, Unsplash.com

# 02

## HOW DO NUTRITIONAL NEEDS CHANGE AS WE AGE?

As we age and transition through different life stages, we naturally experience changing metabolic, hormonal and growth needs that affect performance. Throw in lifestyle factors such as work and family, plus health risks and stresses that occur naturally as the decades roll by, and chasing personal bests may well dwindle with age. Thankfully, there are things that we can adapt to bolster our longevity.

How, for example, can you postpone or accommodate age-related changes? And what easy wins can you incorporate into your current lifestyle to improve performance and recovery? That's where Pip Taylor, a former pro triathlete and performance dietitian for micronutrient product specialists Pillar Performance, and Emma Wilkins, a sports nutritionist and physiologist at High North Performance, come in. They've worked with many cyclists across the age spectrum and are adept at generating veteran velocity...

**Dietary changes by the decade**

You can see optimum fuelling as one very long model of periodisation. A huge macro-periodisation that stretches well beyond one season and into the decades. "In your 30s, your priority could be maintaining energy levels and supporting muscle recovery," says Taylor. "Your 30s are a good time to focus on building and maintaining muscle mass and strength ahead of hormonal changes that accelerate natural declines after this period. Recovery and adequate energy and nutrition allows for this maintenance of muscle mass but also supports consistent physical activity levels."

"As you move into your 40s and 50s," adds Taylor, "pay more attention to bone and cardiovascular health. Then into your 60s, 70s and beyond, your priorities could well shift towards maintaining cognitive function and supporting overall vitality. Adjusting nutrient intake to match these changing needs will help optimise performance and support recovery at different stages of life."

How does this play out in the real world, though? Well, let's break down each of those decades and see how you can satiate your age-related performance appetite.

> "Your 30s are a good time to build muscle mass. As you move into your 40s and 50s, pay more attention to cardiovascular and bone health"

**Your 30s**

"Quality protein sources (ethically farmed animal proteins, including all meat, poultry, fish and other seafood, eggs plus dairy, nuts, seeds and legumes) for lean muscle mass and muscle repair are vital as they aid recovery," says Taylor. "You also need adequate energy intake overall for hormonal production, cognitive function and performance needs. Healthy fats will also reduce inflammation and support heart health to help promote training."

**Your 40s and 50s**

"Calcium and vitamin D are essential for maintaining bone health, which becomes increasingly important as we age due to the natural process of bone remodelling and the risk of osteoporosis," says Taylor. "Vitamin D is primarily synthesised in the skin upon exposure to sunlight. However, those in colder climates spend less time outdoors in sunlight. As we age, we may also have reduced skin synthesis capacity as older adults have lower conversion rates of Vitamin D.

"Other adults may also use sunscreen more due to increased consciousness of the negative effects of too much sun exposure, or wear more clothing, leading to lower vitamin D levels," adds Taylor. "Active individuals have higher requirements for vitamin D and research suggests our requirements are higher than previously thought. So ensuring sufficient dietary intake or supplementation is crucial for maintaining bone health."

**60s and beyond**

Fatty fish such as salmon, mackerel and sardines are all excellent sources of omega-3 fatty acids, which have anti-inflammatory properties and support heart and brain health. These nutrients are particularly important as we age to maintain cognitive function and cardiovascular health.

**Sleep your way to speed**

"In general, recovery takes longer with age. Sleep is a cornerstone of recovery," says Wilkins. "So it stands to reason that older athletes may need more sleep. The problem is that the ability to sleep for longer durations and/or obtain high-quality sleep can reduce with age. This is true for women in the (peri)menopausal phase, who often have poor sleep."

Studies show that poor sleep can exacerbate age-induced sarcopenia (muscle loss). Vis-à-vis, improving sleep quality can help to postpone this inevitable effect of ageing. Older athletes should aim for at least 7-8 hours of sleep and make steps to improve the quality of this sleep, such as restricting mentally stimulating activities and screen scrolling before bed, using black-out blinds and stopping caffeine intake from lunchtime.

"You should also check your magnesium intake as there are strong links between this mineral and quality of sleep," says Taylor. Magnesium is found in spinach and kale, nuts and seeds, legumes, wholegrains and dark chocolate. You can also take it in supplementary form, but ensure you take a well-researched product such as Pillar Performance. Yes, it costs more, but low-quality products don't contain the form of magnesium needed for promoting sleep and relaxation. They can also increase the chances of gastrointestinal issues. Ultimately, though, whatever your age, good nutrition and quality sleep will ensure you perform stronger and for longer. **Anna Gardiner**

**Fish supper**
Fatty fish helps reduce inflammation

**Go greener**
Spinach can increase sleep quality

**10**
The NHS recommends 10 micrograms of vitamin D daily for adults in winter

**TOP TIP**

**"Ice baths and anti-inflammatory supplements such as tart cherry juice have been shown to enhance recovery," says Wilkins. "These strategies can lead to rapid recovery, but there's also evidence that they dampen inflammation, and suppressing this signal can inhibit growth." It's why Wilkins only recommends these strategies when rapid recovery is needed, such as during a multi-day event.**

**Images** Getty Images

**65%**
Up to this percentage of long-distance riders get OTS

# 03

## HOW DO I AVOID OVERTRAINING?

Overtraining syndrome (OTS) occurs in around 10 to 20% of elite endurance athletes – and affects up to 65% of long-distance cyclists at some point in their careers.

It can be present in a wide variety of forms, ranging from fatigue or a drop in motivation to flu-like symptoms but without having a virus. This diversity of symptoms contributes to the ongoing debate around identification, diagnosis and treatment. For example, there's functional overreaching – a build-up of training and non-training stressors that lead to a short-term crash in performance (lasting a few days). Then there's non-functional overreaching, where the negative effects of the fatigue outweigh the positive gains in fitness and you don't see a performance improvement but instead a longer-term dip (weeks to months).

Finally, there's overtraining syndrome – with consistent, extreme, non-functional overreaching – which can wipe a rider out for a season or more. The job of a coach or self-coached athlete is to find that 'Goldilocks zone': not too much, not too little, just the right amount.

### TOP TIP

**When monitoring training load, be on the lookout for higher levels of fatigue and decreased performance for the same training session type, as this can indicate the beginning of overtraining.**

Train smart
Keep track of your training data


### PLAN AHEAD

The first step to avoid overtraining is proper planning. Look back through your training history to gauge the amount of stress you can tolerate. Stress is seen as a negative, but in order to get adaptation you need to stress your body. It's when the stress is out of balance with the recovery that you get symptoms of overtraining.

Looking back through your training history can give you an idea of your optimal volume and intensity. Keep a diary of your training load; small increases in either volume or intensity can lead to higher levels of fitness, but avoid big leaps or upping both at once. A training plan that works for someone else won't necessarily work for you. Also, keep your training varied to prevent monotony, for mental and physical stimulation.

**"Looking back over your training history can give you an idea of your optimal volume and intensity"**

View training and recovery as yin and yang; the two need to be in balance. Recovery enables the body to adapt, repair and manage the stress it's been put under. You can enhance this with optimal nutrition, proper hydration and good sleep habits. Tracking the data is a useful way to monitor how you're recovering and adapting to your training, not just what your power meter is telling you, but subjective feedback on how you're feeling. Other signs may not seem directly related to performance, but could be a result of overdoing it. These include mood swings, poor sleep, increased resting heart rate and frequent illness.

**Liam Holohan**

**Images** Getty Images **Illustrations** Georgie Sturge

# 04

## HOW DO I TRAIN MY KNEES FOR SMOOTHER CYCLING?

Poor 'knee tracking' – when your knees don't move in a fluid or evenly balanced motion as you pedal – is usually caused by an asymmetry between either your medial (hip and thigh) or lateral (outer lower leg) muscles. "This leads to the knee dropping in and out as you pedal and it can increase the risk of pain around the kneecap area," explains Laurence Plant, specialist chiropractor and clinic manager at Henley Practice, and expert for physio suppliers Meglio (*mymeglio.com*). If your knees wobble in and out of their optimal plane of motion as you pedal, this could cause injury, reduce your muscular efficiency and even mess up your aerodynamic silhouette.

The solution is to train your knees and supporting muscles so that when you bend and flex your knees as you pedal they follow a purer and straighter course. You can achieve this through squat sessions with a resistance loop around your knees. The resistance band will work your stabilising muscles to help keep your knees in sync.

"Wrap a resistance loop around your knees or thighs, spread your feet shoulder-width apart and squat down by pushing your bottom back and keeping your knees perfectly still above your feet," explains Plant. "Aim for three sets of 12 reps and increase the resistance of your loop (switching to a heavier, thicker band) as you develop your strength." Complete these drills two to three times per week. **Mark Bailey**



# Q&A

### What's the difference between a sportive and a gran fondo?

Sportives are more common in the UK, whereas gran fondos rule in continental Europe. A sportive has a non-competitive element, while timed gran fondos (often on closed or traffic-managed roads) are there to be raced from the starting horn. Of course, you can take both as leisurely or as fast as you like, but just be aware of the cut-off times.

### What is Shimano CUES?

Shimano CUES is a relatively new range of 9-, 10- and 11-speed drivetrain components that replace Alivio, Acera and Altus, as well as select Deore components. While it was first introduced on ebikes and MTBs, Shimano has also hinted strongly that drop-bar variants of CUES will come, phasing out Tiagra, Sora and Claris.

### What are mechanical disc brakes?

Mechanical disc brakes are one of the most common types of bike brakes and are actuated by a cable. Compared to rim brakes, mechanical disc brakes provide reliable stopping power in a wide range of weather conditions, including rain and mud. They're generally easier to maintain than hydraulic disc brakes as they don't require bleeding, but they aren't as powerful and require more hand force to operate.

*Need advice or help with any aspect of your cycling and/or lifestyle?*
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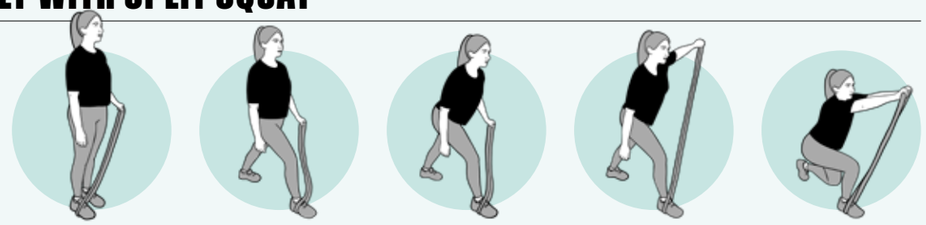
# REVERSE FLY WITH SPLIT SQUAT

This exercise requires a resistance band and targets the primary upper-leg muscle groups that are recruited when pedalling. Aim for 10 reps per leg.



**01** Begin with your right leg. Place the band under your foot while holding onto the other end with your left hand.

**02** Step forward with your right foot, as shown, then put all of your weight through it. Position your left leg behind you so that there's a nice bend in your front knee. Maintain your balance.

**03** Draw your right hip back so that you can feel your glutes and hamstring working. At the same time, tilt your upper body forwards to keep the weight on your right leg.

**04** Pull the band outwards with your left arm until your arm's fully extended. Do this 10 times.

**05** Once that's ticked off, hold the band in front of you with both hands, ensuring you maintain the same posture and leg position. Complete 10 split squats. Move onto your left leg and repeat from 01.