10 training secrets of the pros

What are the latest cunning, quirky and experimental training methods being used by pro riders in an attempt to gain a competitive edge? *Jim Cotton* investigates

The world of pro cycling is continually coming up with incremental advances in training, nutrition and technology. Just think, the first power meter appeared around 20 years ago; within a decade, they'd been widely adopted by the pros — and now most riders on your club run are chatting watts and power zones. So what are the cutting-edge methods currently being used by the pros that might 'drip down' to amateurs over the next few years? We did our best to find out...

1 Race simulation

Harry Tanfield of Katusha-Alpecin tells us that his team are prescribing at least one training session a week that is fuelled just like a race day. Coach Stephen Gallagher (digdeepcoaching.com) explains the logic: "It's about teaching the body to take on the maximum carbohydrate possible. You can absorb 80-90g per hour, but you need to train your gut to be able to do that for five or six hours straight."

Similarly, riders will start their training ride at the same time of day as their target race is due to begin. "Races start at very different times, depending where you are in the world, and you need to adapt your digestive system and metabolism to be ready at the correct time," says Tanfield.

Training is now increasingly tailored to target events. Mathew Hayman, who famously won 2016's Paris-Roubaix having spent the weeks prior to the

race solely training on Zwift while he recovered from a broken arm, is now a DS at Mitchelton-Scott. Smart trainers, he believes, are increasingly used to mimic race demands. "It's about training your body to know the efforts and recoveries that are coming — it gives you a psychological boost going into a race," he says. Teams will analyse course profiles and build these into workout files that replicate key sections of upcoming races.

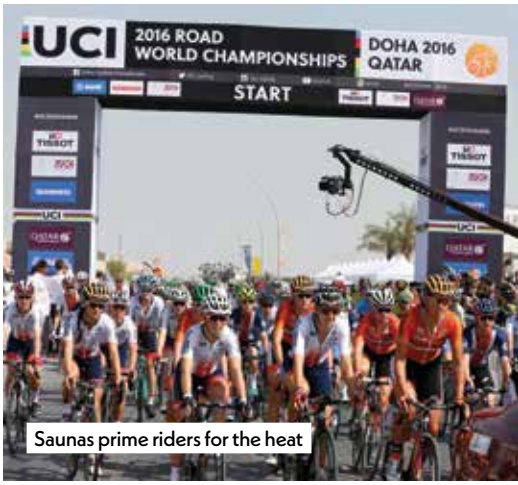
CW says: Race simulation can be relatively easily achieved in your own training, at little or no cost. We'd definitely recommend getting your fuelling, timing and indoor training geared to your target race.

2 Nutritional manipulation

'Training low' — that is, with minimal carbohydrate — is nothing new, but it's becoming more and more common for pros to 'recover low'. Riders will take on the bare minimum fuel during the 'recovery window' immediately after a session, which is believed to boost training adaptations and enhance endurance.

'Double days', where two training sessions are undertaken in one day, are likewise nothing new, but 'training low' is now being weaved into this protocol in increasingly sophisticated ways. Katusha-Alpecin are carefully prescribing either a fasted ride in the morning before refuelling and then doing intervals, or instead fully fuelled intervals in the morning before recovering low and training low in the afternoon. This decision is made based on the rider's physiology and existing power profile, with a view to boosting the efficiency of both the sessions. It's hard to get this process right without professional input — getting it wrong will lead to ineffective training and potentially serious overtraining, so leave it to the pros.

CW says: 'Recover low' is not advised for amateurs. As Dr Jamie Pringle of Boardman Performance Centre explains: "There may be gains to be had, but it's a real double-edged sword — you risk putting yourself in a hole by not recovering properly and compromising the entire training effort."



Saunas prime riders for the heat

3 Sauna and heat training

Heat training was widely used by riders preparing for the Doha World Championships in 2016, and using saunas and environmental chambers is now commonplace among pros.

Dr Jamie Pringle explains: "Training in the heat increases the aerobic capacity of the muscle and boosts your blood plasma volume. An increase in blood plasma allows the heart to work more effectively, as well as giving you a greater reservoir to sweat from, so improving your ability to stay cool." This plasma increase comes as a result of the blood's retention of salts under such conditions, and the resulting increase in extracellular fluid required to maintain stable concentrations in the blood vessels.

Sauna sessions are another way to increase blood plasma. WorldTour pro Mike Woods says: "I go into the sauna for 15-minute sittings, doing 15 minutes on, 15 minutes off, and try to build towards 30 minutes uninterrupted. Most pros do it now."

Sauna is also believed to reduce inflammation and detoxify the body after stage races or long travel days.

4 Altitude (hypoxic) training

Altitude training is no longer the preserve of specialist camps, and is increasingly performed at home using special masks or tents which can mimic the oxygen levels experienced at twice the elevation of Tenerife's Mount Teide. Training at a low oxygen saturation

Photos Getty Images, Yuzuru Sunada, Daniel Gould

increases red blood cell production and the body's ability to carry oxygen to the working muscles.

Adam Hansen of Lotto-Soudal does 45-minute rides at simulated 5,000m altitude. "Riding at a very high altitude for a short period of time gives us the benefits of altitude training, but allows us to also be closer to sea level most of the time, where we can do the best quality high-intensity training," he explains.

PRO RIDERS' VIEW

Keep it simple, stupid!

Although there's a lot to be said for getting that extra edge with newfangled techniques, let's face it, unless you put in the hours in the saddle, it's pointless. Despite being exposed to the early days of marginal gains during his time at Team Sky, **Russ Downing** doesn't over-complicate things now he's an independent pro. "I'm a big believer in just getting out there and getting the kilometres in. If you don't spend time on the bike, you're not going to be good at it," he says.

Simon Clark of EF-Education First agrees: "I just focus on doing the basics correctly: the training, gym, nutrition, and recovery. You should focus on doing the obvious things 100 per cent correctly rather than training 80 per cent correctly and then trying to do all these fancy one-percenters that might only get you to 85 per cent."

For both pros and amateurs, it all comes down to consistency of training, and of course talent. **Dr Jamie Pringle** says: "The main, basic gain to be had in endurance sport is reducing the cost of training, and promoting recovery. And the best ways to do that are sleep, nutrition, and reducing life stresses."

So, perhaps you really are best off keeping it simple, stupid.

5 Recovery metrics

Heart rate variability (HRV) is a key metric for monitoring recovery, but has been a marginal data point for a number of years. HRV is a measure of how regular the heart beat is. Though it may seem counter-intuitive, a non-fatigued, healthy heart will pulse in a non-regular rhythm (lots of tiny differences in beat pattern), whereas a fatigued heart will beat more uniformly; and this can be measured with wearable devices. Now that these wearables are becoming more reliable and sophisticated, the data they can collect is being more widely used by coaches to determine training programmes.

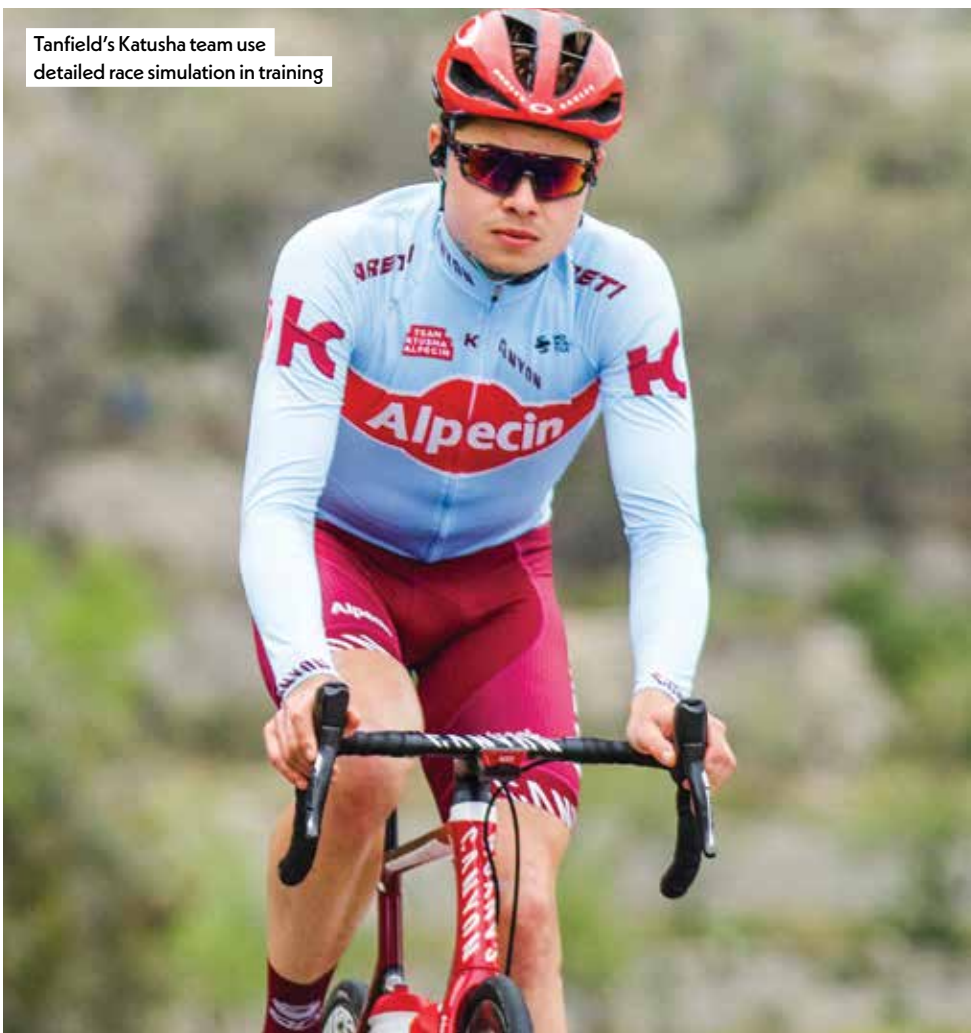
Tim Kennaugh, coach at EF Education First, explains that the team monitor a suite of metrics tied to sleep and HRV. "The information we collect helps us make more informed decisions when riders think they are getting ill or are overly fatigued; it gives us more evidence to back up how a rider says they're feeling and helps us to judge when they need more recovery or are ready for intensity."

***CW* says:** HRV and sleep monitors are widely available now. Whoop bands and Oura rings are currently regarded as top of the tech pack.

6 Live motion sensing

While motion sensors are widely used in bike-fitting to track a rider's position on the bike while on a turbo trainer, similar technology is now being used to provide live feedback of riders' hip positions and pelvic stability on the bike while out on the road.

Adam Hansen uses such devices to track dead spots or imbalances in the pedal stroke, or detect the telltale rocking of the hips when working under too high a load. This helps his training by working on both pedalling efficiency and improving gearing selection, as he explains: "It helps me to understand what cadence is most effective at certain outputs or gradients. I can see where I get the most power without losing form —



Tanfield's Katusha team use detailed race simulation in training

and I can then use that knowledge in a race."

7 Occlusion training

The application of blood-restriction principles, developed in the world of bodybuilding, to cyclists is now being researched and tested.

"Occlusion — restriction of blood flow — boosts the signalling for the muscle to grow at a lower mechanical stimulus," explains Dr Jamie Pringle. The technique was initially used in injury rehabilitation in weightlifters, but it's now being trialled around intense efforts on the bike.

A study team at Loughborough University are currently testing the effect of occluding muscles at the very top of the thigh directly after a 30-second full-gas sprint, before recovering and repeating. By reducing the flow of blood both in and out of the leg, muscles are trapped in a fatigued state, and capillary pressure is increased — both of which boost the signals that stimulate the growth of blood vessels.

Richard Ferguson from the team at Loughborough explains: "Elite athletes have a dampened response to training adaptations, as they're so highly trained. Initial results from our trial are showing a five per cent increase in V02 max in well-trained riders, which is hugely difficult to achieve through other methods."

It's also believed that Trek-Segafredo are trialling occlusion training, though using a slightly different protocol to that being researched at Loughborough.

***CW* says:** Do not try this at home. Never. Just don't.

8 Sweet and sour swilling

For those elites looking to gain a fuelling boost without gaining any calories, swilling a carb drink around the mouth then spitting it out is a common tactic.

"There are sensors in your mouth that detect that sugar is on its way, and they shut down the systems which say you're low on fuel and should slow down," says Dr Jamie Pringle.

Similarly, the old wives' tale about drinking pickle juice for cramp may well be true, as swilling with acidic liquids has been shown to reduce cramping.

"Swilling a liquid like vinegar sends signals that relax muscles that may be cramping," says Pringle. Indeed, it's rumoured that rinsing pickle juice has been used prior to track sprint events where high force can bring on cramp. Brands in the USA are developing acid-based drinks for this reason.

***CW* says:** There's solid science behind swilling theories — but for now it's far better to focus on fuelling properly.

9 3D body-mapped skinsuits

Tech companies have developed ways to precisely 3D-scan your body and model the way in which air flows over it, using this data to build a skinsuit perfectly matched to your shape, with seams, panels and materials placed in the most aerodynamically efficient places possible.

Such technology has been used in the past by Team GB and Huub-Wattbike on the track, and Team Sky (before they became Team Ineos) on the road. As such, it's more than likely that such technology is in use in the WorldTour now.

***CW* says:** New custom skinsuit brand Vorteq has made this technology available to the mass market, so if you're looking to gain a few extra watts, check them out — but be prepared to shell out a few thousand pounds in the process!


Custom skinsuits minimise drag

10 Custom orthotics

If you train for months to increase your power, there's no point letting it all seep away through poorly fitted shoes. And that's why custom orthotics are now a mainstay in the peloton.

"You need to minimise the time of the power transfer," says Phil Burt. "If you have raised arches and an insole that doesn't cater for it, your arch won't immediately make contact with the shoe's footbed. Getting a custom orthotic effectively makes an off-the-shelf shoe something totally bespoke."

WHAT COMES NEXT?

Gene mapping, nanotechnology, and glycogen screening

The future of training is in development in, among other places, **Yannis Pitsiladis**'s labs at the University of Brighton. "We're looking to study athletes' gene profiles, and how they impact their metabolic and hormonal systems," he says. "No single person responds to training in the same way as another, and studying an athlete's individual makeup will help us understand that response. This will enable training to be tailored exactly to the individual rather than the current trial-and-error approach."

Glycogen screening — measuring the flows of sugars through the body — is currently being used to gain a greater understanding of exactly what is occurring in the body as an athlete exercises. Pitsiladis and his team are going a step further to track exactly what is occurring in the body, developing nanotechnology that can be worn as an individual competes. These tiny wearables will integrate into clothing and monitor specific biomarkers in real time, something that could hugely influence race strategies in the future. It would be similar to how Formula 1 teams make their tactical decisions based on live data coming from the cars as the race unfolds.