

New study could radically improve the way cyclists train

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Reinier Paauwe, a participant in the cycling study at the University of Calgary, races in the Tour De Bowness in Calgary in August 2016. Credit: Masa Higuchi

Eager for the next phase, ready to dedicate himself wholly, the youngster could not wait. Soon he would get his hands on the blueprint for the yellow jersey, those scientifically grounded steps to cycling glory.

Imagine his disappointment. There was no such thing. No hard data to serve as a personal guideline.

"What I discovered in university was that sport science didn't have all the answers I was looking for," recalls Louis Passfield, at the time, a cycling enthusiast in Eastbourne, England. "I thought I'd study sport science, read some textbooks, get a spreadsheet out and start to do all the calculations that were necessary to plot the training.

"But I found that sport science hadn't evolved to that level we could do that."

Passfield took personally the deficiency. An academic career was born.

"My standard opening line to a talk is, 'I went into sport science because I wanted to work out how to win the Tour de France,' " says Passfield, chuckling. "Training works—if people train, they get fitter—but in terms of trying to optimize that process, we know very little indeed.

"Now, 30 years later ... maybe we are in a better position to tackle that. That's what's exciting about this."

Radically improving the way cyclists train

Passfield—on a year-long study leave from the University of Kent—has teamed up with University of Calgary kinesiology professor Juan Murias and master's student Calaine Inglis for a groundbreaking project that could radically improve the way cyclists train.

For the study, 12 local racers provided fitness baselines by undergoing gold-standard testing. At regular intervals during their season, they'll return to the Human Performance Lab at the Faculty of Kinesiology to update their physiological profiles.

"It's really neat that we can get them at these different time points," says Inglis, "and try to understand better how things are changing in relation to their training."

Critically, between visits to the campus, all of their riding is monitored by power meters. These devices—provided by 4iiii Innovations Inc., of Cochrane, and attached to the bikes—provide mountains of information about the riders' work rates.

"The tools now are perfect for that," Victoria Brilz, chief business development officer, says of the 4iiii power meters, which measure crank bend, crank

torque, and axial force. "This technology has the capability to take (scientists) where their studies are going to go in the future."

These instruments will generate, according to Passfield, "literally millions of data points."

Technology provides personalized on-the-spot feedback

Taking into account minute fluctuations, researchers can then determine precisely what influences each individual's performance.

One tantalizing possibility is developing a program that produces personalized on-the-spot feedback. In other words, real-time guidance—specific work-rate adjustments—during rides.

Imagine pedalling and receiving customized input—through ear buds or on helmet visors—to maximize your workout, no matter its duration. "This actually becomes your on-board coach," says Passfield.

Which means amateur [cyclists](#), without the luxury of daily contact with experts, could confidently throw themselves into regimens tailored specifically for them.

Not that these advances make coaches redundant. In fact, for those in charge of the sport's elite—and already burdened with across-the-board issues such as nutrition and motivation and scheduling—this would serve as a worthwhile tool.

"A dashboard of extra information," says Passfield, who, for 30 years, has been associated with British Cycling. "Coaches might have stuff in a spreadsheet, but it's based on their experience and their intuition. It's not based on carefully derived calculations where they're implementing the findings straight out of the lab.

"That's where the computing power and the science really comes in."

Meanwhile, cutting-edge data compilation continues as Reinier Paauwe, captain of Peloton Racing, and the rest of the research subjects keep

pushing their pedals.

"A thing that's rewarding for me," says Paauwe, "is being part of a local program that's doing the kind of testing I'll read about in textbooks in a few years."

Provided by University of Calgary

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