Today, the UCI has a biological passport that collates the results of all doping tests over a period of time for each rider. The aim is to improve the fight against doping by detecting abnormal variations of biological markers, rather than by the detection of prohibited substances alone. Unfortunately, it is not infallible.

There is a way to go further, though, a way to monitor the true physical potential of a cyclist and observe irregularities. It’s recording output to create a power profile. Training and racing with power meters has now become the norm, making this data readily available. If we were to make use of it, we could determine the power profile of an athlete, ie a record of the evolution and changes of the physical potential of a cyclist. This is the topic we at the University of Sports of Franche-Comté have been studying for a number of years.

Human physiology imposes an unavoidable law which says that one’s level of performance and the duration it can be sustained are directly inversely related. That is to say, as your speed increases, the time you can sustain it decreases. In cycling, speed depends on other factors such as the terrain and wind, so it’s better to use the power output (in watts) developed by the cyclist as a true measure of performance.

The physiological law states that the higher the exercise intensity, the shorter the duration of exercise, following a curvilinear decrease. For example, a rider can keep going for many hours at 150W but is unable to develop 1000W for more than a few seconds.

So, why is the operation of our body not the same as a car? Because a car always runs on petrol, while the energy that we use comes from more than one supply. These sources have different characteristics according to the quantity of biochemical substrates and the level of energy each can produce.

THE POWER PROFILE of a cyclist corresponds to the relationship between different sequential records of power output and the corresponding time durations during a whole race season.

We are studying this power profile in many categories of cyclists: juniors, elites, international U23, professionals, and even the top 10 from the grand tours. The findings are very interesting. Firstly, it’s possible to assess the specific physical capacities of a rider according to the performance parameters in road cycling. That suggests that the power profile can represent a signature of a rider’s physical potential. By overlaying the curves, one can see immediately which athletes are the most powerful in which situation. This profile could guide the finding and recruitment of young talents and identify more scientifically the champions of tomorrow.

This concept is very interesting for the coach in tracking an athlete’s fitness. It allows us to make a direct comparison between the results of a fresh test and all previous records. The coach will know exactly if the athlete is close to his optimal fitness. Changes to the training routine can be made in response, allowing the coach to optimise the training process.

Moreover, the sequence of performances are a more accurate measurement of a rider than a list of race results that have been affected by team tactics, weather conditions, drafting, etc. Thus, the power profile lets us determine a pattern of performance capacity and can flag any fast progressions that could be suspicious.

So, we believe that the power profile of an athlete should be used in conjunction with the biological passport. Of course, this performance data can’t replace blood values, let alone be the only criteria for targeting a rider. However, the combination of the biological passport and the power profile would improve the targeting of those who appear to be doping as the effects of performance enhancing drugs alter both the blood values and the potential power output.

The power profile appears to be a very interesting tool for the cyclist, the coach and the anti-doping authorities, who could use this concept to refine the selection of the athletes to be tested and so further cleanse our fabulous sport with a forensic science method.

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