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Power output and cycle road racing, taken from:

Ebert et al. (2006) **Power Output During a Professional Men's Road Cycling Tour**. International Journal of Sports Physiology and Performance. 1: 324-355.

Cycle racing takes many forms and the most common endurance based cycle events in the UK are cycle road racing, cycle time trials and XC mountain biking. Whilst it may be fair to presume that a talented cyclist would perform equally well across all disciplines, closer examination reveals that the demands of each and the training required for a high level of performance are very different.

Elbert et al carried out collection of power data from elite Australian road cyclists over a period of 6 years, totalling 207 different road cycle racing events. The events were categorised into flat stage races, hilly stage races and 1 day criterium events. All of the riders who took part completed a maximal aerobic power test (MAP) in the laboratory prior to race data being recorded by SRM cranksets.

The key thing identified across the 3 race categories was the fluctuation in power whilst riding, with cyclists performing multiple high intensity efforts of varying duration. This pattern was much higher in the criterium racing due to the nature of such events, cyclists produced very high power outputs as they accelerated out of each corner before braking into the next to once more accelerate away.

Research has clearly identified that fluctuations in power output whilst riding are metabolically inefficient when compared to riding at a constant power output (Palmer et al 1999). Time trial cyclists and triathlon competitors are encouraged to hold a set power output for the duration of their events to encourage economical fuel usage, but during cycle road racing, in particular criterium racing, this is not possible due to constant attempts of riders to break away. The effect is made more significant if corners dictate constant braking and accelerating throughout the race.

Elbert et al showed that during criterium racing lasting on average 89 minutes the Australian subjects produced nearly 70 sprints above MAP per race lasting 3 to 30 seconds, the equivalent to almost 1 sprint every minute. In order to deal with such changes in pace the riders must be conditioned to produce high burst of power and equally important they must be able to recover and repeat the process many times without becoming fatigued. This information dictates that criterium cyclists should mimic such conditions in their training programmes and steady state riding may not be the best preparation for competition.

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