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Cycling power output produced during flat and mountain stages in the Giro d'Italia: a case study.

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Until recently, the physiological demands of cycling competitions were mostly reflected by the measurement of heart rate and the indirect estimation of exercise intensity. The purpose of this case study was to illustrate the varying power output of a professional cyclist during flat and mountain stages of a Grand Tour (Giro d'Italia). Nine stage recordings of a cyclist of the 2005 Giro d'Italia were monitored using a mobile power measurement device (SRM Trainingsssystem, Julich, Germany), which recorded direct power output and heart rate. Stages were categorized into flat (n = 5) and mountain stages (n = 4). Data were processed electronically, and the overall mean power in flat and mountain stages and maximal mean power for various durations were calculated. Mean power output was 132 W +/- 26 (2.0 W x kg(-1) +/- 0.4) for the flat and 235 W +/- 10 (3.5 W x kg(-1) +/- 0.1) for the mountain stages. Mountain stages showed higher maximal mean power (367 W) for longer durations (1800 s) than flat stages (239 W). Flat stages are characterized by a large variability of power output with short bursts of high power and long periods with reduced intensity of exercise, whereas mountain stages mostly require submaximal, constant power output over longer periods.