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IX International Symposium in Strength Training

Editores/*Editors:* Pedro J. Benito, Ana B. Peinado, Rocío Cupeiro & Francisco J. Calderón

UNIVERSIDAD POLITÉCNICA DE MADRID
Facultad de Ciencias de la Actividad Física y del Deporte-INEF
Departamento de Salud y Rendimiento Humano

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Pedro J. Benito,
Ana B. Peinado,
Rocío Cupeiro,
Francisco J. Calderón
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Comunicaciones orales 3 / *Oral Presentations 3*
Sábado, 17 de diciembre /*Saturday, December 17*
09:00 – 09:30 am

9. Determining physiological and performance variables during a time trial in a first category mountain pass

Nuria Romero-Parra, Ana B. Peinado, Miguel A. Rojo-Tirado, Rocío Cupeiro, Javier Butragueño, Eliane A. Castro, Francisco J. Calderón and Pedro J. Benito

LFE Research Group, Department of Health and Human Performance. Faculty of Physical Activity and Sport Science-INEF. Technical University of Madrid

Background: Physiology and performance of uphill time-trials (TT) in professional road cycling have been previously described (Lucia A et al., 2004; Padilla S, Mujika I, Orbañanos J, & Angulo F, 2000; Padilla S, Mujika I, Santisteban J, Impellizzeri FM, & Goiriena JJ, 2008). Recent field-based uphill trials focused on power output due to its reliability and accuracy to assess aerobic and anaerobic performance (Bossi AH, Lima P, Perrout de Lima J, & Hopker J, 2016; Vogt et al., 2008; Vogt et al., 2007). However few studies have attempted to correlate the different physiological and performances variables in field conditions.

Objective: To assess the relationships among power output, velocity, cadence and oxygen uptake (VO_2) during an uphill time-trial frequently used in cycling competitions.

Methods: Fourteen elite road cyclists (mean±SD: 25±6 years, 174±4.2 cm, 64.4±6.1 kg) completed a field-based uphill TT in a 9.2 km first category mountain pass with a 7.1% slope. Oxygen uptake, power output, velocity and cadence were measured throughout the test.

Results: During the TT mean power output and velocity were: 302±7 W (4.2±0.1 $W \cdot kg^{-1}$) and 18.7±1.6 km/h, respectively. Mean VO_2 was: 3941±110 $ml \cdot min^{-1}$ (61.6±2.0 $ml \cdot kg^{-1} \cdot min^{-1}$). Mean power output, both absolute and relative to body mass, were strongly correlated with mean velocity (r= 0.82, for both correlations) and maximum velocity (r=0.77 and r=0.75, respectively). Strong associations were also observed between

peak power output and both mean and maximum velocity (r=0.78 and r=0.80, respectively). Regarding cadence, a moderate correlation was appreciated with mean power output relative to body mass (r =0.50), whilst non significant associations were found with velocity. Finally, a moderate correlation between oxygen uptake ($ml \cdot min^{-1} \cdot kg^{-1}$) and power output relative to body mass was observed (r=0.42), ($p < 0.001$ for all correlations)

Conclusion: During an uphill TT, velocity rises as a consequence of increasing power output whilst cadence and oxygen uptake do not seem as decisive in order to achieve a competitive advantage.

Practical Application: This data may provide coaches and cyclists, both elite and non professional, with information to adjust training prescription accordingly, allowing them to compare their performance to an elite model.

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Vogt, S., Roecker, K., Schumacher, Y. O., Pottgiesser, T., Dickhuth, H. H., Schmid, A., & Heinrich, L. (2008). Cadence-power-relationship during decisive mountain ascents at the Tour de France. *Int J Sports Med, 29*(3), 244-250.

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Corresponding author:
Nuria Romero-Parra
Facultad de Ciencias de la Actividad Física y del Deporte-INEF Universidad Politécnica de Madrid C/ Martín Fierro nº7.
28040 Madrid - España.
913364070
romero.nuria2010@gmail.com
617150826