DISCRIMINANT ANALYSIS OF PHYSIOLOGICAL VARIABLES BETWEEN ELITE CYCLISTS AMONG SPECIALTY

Peinado Ana Belén¹, Díaz Víctor², Benito Pedro José², González Coral³, Álvarez María², Calderón Francisco Javier², García Augusto³, Martín Carlos², Morencos Esther²
(Universidad Politécnica de Madrid, Universidad Complutense de Madrid¹, Universidad Politécnica de Madrid², Universidad Complutense de Madrid³, Spain)

INTRODUCTION
The actual road cycling requires cyclists perform in a great variety of terrain (level, uphill, etc.) and competitive situations (1). The differences between professional and amateur cyclists and among flat terrain (FT), time trial (TT), all terrain (AT) and uphill (UP) cyclists have been studied in previous investigations (1-4).

The aim of this study was to compare the physiological characteristics between flat terrain, all terrain and uphill cyclists and develop a multivariate model that would allow to discriminate among cyclists according to their specialty.

MATERIAL AND METHODS
Twenty elite cyclists (amateur category) participated in the study. The experimental protocol consisted of: Anthropometric measurements, spirometry and one incremental tests in cicloergometer until exhaustion. The workload was increased 25 W/min starting from 100 W. Twenty-eight variables were measured. Based on the opinion of the trainer and on the current rider ability, each cyclist was included in one of these three groups: FT, AT or UP cyclists.

Differences in the means among groups (FT, AT and UP) were examined using a one way ANOVA. First, discriminate analysis was applied to 28 variables measured and then, the same analysis was applied to anthropometric parameters (8 variables). The significance level was set at 945;<0,05.

RESULTS
There were significant differences between UP and FT [heighth, body mass (BM), body fat (BF), free fat body mass (FFM), maximum oxygen uptake/Kg (VO2 max/Kg)] and between UP and AT (body mass, FFM). The first discriminate analysis revealed one significant function. This function represented differences between FT and the other two groups (AT and UP). After validation the analysis showed that 100 % of the cyclists were correctly classified in their respective speciality. The second analysis (anthropometric variables) revealed one significant function and 75 % of the cyclists were correctly classified.

DISCUSSION
Uphill cyclists have been reported to be significantly shorter and lighter than other specialists (1, 4) and cyclists’s performance will be determined by their anthropometric characteristics (1). Also, UP have a higher VO2 max/Kg (1, 3, 4). In conclusion, our model confirms that elite cyclists can be classified according to their specialty:

SPECIALTY=9,215+1,457*Age+1,039*BM–0,702*Height+0,572*BF+0,992*FFM–1,667*RBM+0,417*FVC–0,195*HRmax+0,294*HR2–0,013*Wmax+1,134*VO2AT–0,532*VO2ANAT–0,077*VO2max/FFM+0,035*VE+0,515*LH
(first analysis);
SPECIALTY=56,024+0,418*BM–0,445*Height+1,468*BF+0,565*FFM–1,696*BMI (second analysis).

REFERENCES

Keywords: Anthropometric Data, Physiological Differences

12th Annual Congress of the ECSS, 11–14 July 2007, Jyväskylä, Finland