

EFFECTS OF UPHILL RUNNING ON SPRINTING TECHNIQUE IN FOOTBALL PLAYERS

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INTRODUCTION: The success in many actions in team sports is determined by the player's ability to develop high speed and acceleration. There are many resisted methods for training the strength within the specific running technique, each one with different application according to the characteristics of the overload. Uphill sprinting is one of these methods. A criticism related to the use of resisted methods is that the athletes may use a modified running technique and so subsequently could alter their movement pattern if repeated in time (e.g. Alcaraz *et al.* (2008) showed that some methods modify the body lean). The purpose of this work was to clarify the effects of uphill sprinting on variables related to the running performance and technique in football players.

METHODS: Sixteen male football players of a team competing in the 3rd Spanish Football League participated in the study. They performed 30 m horizontal and uphill (4% slope) sprint running, over artificial grass with their daily training shoes. Interval times were measured with photocells (0-10, 10-20, and 20-30 m). A 2D photogrammetric study was conducted in each condition at the 20-30 m interval. Two trials were recorded and the one with the best time was analysed. A T-test for related samples was applied ($p \leq 0.05$) to compare both running situations.

RESULTS: The measured variables for both conditions are shown in Table 1.

Table 1. Results of the performance and sprinting technique variables.

	S ₀₋₁₀ (m/s)	S ₁₀₋₂₀ (m/s)	S ₂₀₋₃₀ (m/s)	Stride Length (m)	Stride Rate (Hz)	Body Lean (°)	Recovering Thigh (°)
Horizontal	5.45 ± 0.20 *	7.75 ± 0.30 *	8.32 ± 0.39 *	1.85 ± 0.11 *	1.14 ± 0.09	21 ± 4	117 ± 4 *
Uphill	5.19 ± 0.20	7.29 ± 0.25	7.53 ± 0.37	1.81 ± 0.13	1.12 ± 0.08	20 ± 4	120 ± 4

S₀₋₁₀- mean speed in the 0 to 10 m; S₁₀₋₂₀- mean speed in the 10 to 20 m; S₂₀₋₃₀- mean speed in the 20 to 30 m; Body Lean and Recovering Thigh- recorded at the take-off instant.

*statistically significant differences ($p \leq 0.05$) between horizontal and uphill running.

DISCUSSION: Our results support that uphill running reduces the sprint time and stride length while keeps constant the stride frequency as does the sled towing (16% body mass) (Alcaraz *et al.*, 2008). Nevertheless, an interesting effect of the uphill running is that it keeps constant the body lean angle, but increases the elevation of the thigh when recovering the leg, which is assumed to be beneficial for increasing the stride length.

CONCLUSION: Uphill running appears to be an interesting resisted method to overload the athlete to train for increasing stride length while introducing minimal changes in the body lean.

REFERENCES:

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