

**PRINCIPLES OF APPLIED BIOMECHANICS ON THE RACE
WALKERS: IMPROVEMENT IN
PERFORMANCE WITH A PLANTAR ORTHOSIS**

R. Saggini, A. Calligaris, M. De Angelis, A. Pezzatini

ABSTRACT

Postgraduate School of Sports Medicine, University of Chieti, Italy.

During race walking it is essential to attain and maintain for a period of time the maximal speed with minimal expenditure of energy, in observance of the prescribed standards. To achieve this purpose, it is indispensable optimising the physical carriage. This may be done in two ways: 1) by reducing those force components that are employed along directions of application that do not concur with the sense of progression, since they interfere with and disperse part of energy; 2) increasing the vectorial components that have the same direction as the forward movement.

The aim of our work was to verify the modifications that are induced by use of plantar orthoses, as reflected by parameters of biomechanical performance on the race walker.

Under standard reference conditions, we studied the kinematics and ground reaction of 10 highly-trained athletes. With reference to reports that confirmed previous studies by us and other authors, we verified the modifications induced by the application of special dynamic plantar orthoses. The ground reaction appeared to be optimised by the use of these orthoses through the following mechanisms: 1) a reduction of the sagittal force components that are opposed to the direction of movement; 2) a reduction of the transverse edgewise components that are not useful to the progression, and 3) an increase in the reclamation of useful elastic energy stored by the functional unit, the "musculo - skeletal footwear system".