THE FOOT-GROUND REACTION IN THE MALE AND FEMALE SOCCER PLAYERS

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Soccer is a sport of movement and contact where the basic aim is to gain possession of the ball. During the game, the soccer players performs various technical actions and all of these is carried out with or without the ball. The composition of these actions is very complex, both so far as the neuromotor content is concerned, and relative to the metabolic energetic involvement.

The development possibility of a motor action at any frequency is strictly correlated to the balance between internal and external forces.

The contact force between the ground and the soccer's foot is called the ground-reaction force; this force exerted against the soccer's shoe sole contains a wealth of information on gait or running mechanics. An appreciation of factors affecting specific kinematic or kinetic parameters of the lower extremity segments derived from information reflected in the magnitude and impulse of the groun-reaction force. In this ontext, the nature of the ground-reaction force exerted on a soccer player is affected by the physical properties of the surface across the soccer player moves.

The purpose of this work is to verify if exists difference in the dynamic of the female and male soccer players between the analysis of the ground-reaction force's characteristics.

METHODS AND MATERIAL

The study was performed during a normal strike at defined velocity and during the running of the soccer player at 10 km/h over a Bertec plateform covered with a natural grass. Usually, 5 recordings were used for each trial condition, so as pin point of the most recurrent and representative characteristics of the dynamics of the lower limb and the relatrive foot-ground reaction.

Forty elite male soccer players and 15 elite female soccer players were examined and the results were correlated with a control group of normal subjects.

RESULTS

The analysis of the ground-reaction about the development of the vertical force (Fz) has revealed that during the normal strike the first peak is significantly (p 0.001) characterised by high value in males (148% b.w.) and in females (133% b.w.). The second peak is lower than normal but not significantly (p 0.5) instead the third peak is significantly (p 0.001) lower than normal.

The progressional antero-posterior forces (Fy) isn't different from the normal people. The shear forces medio-lateral (Fx) demonstrates a greater and significant (p 0.01) second and third peak.

The progression of the application point show compared with the control group high velocity during the impact phase and a reduced velocity during the propulsive phase (p 0.01).

The morphology of the vectograms is the same in the female and male soccer players. The tests during the running hasn't demonstrated significant modifications about the development of the ground reaction compared with the data of the normal strike at defined velocity.

CONCLUSIONS

From literature and the our data is clear as regards the anthropometric characteristics a different relationship between the lenght of the trunk and of the lowel limb in the female and in the male people; moreover in the female subjects is evident a reduced muscular mass because of a greater amount of the body's fat.

As regards the flexibility, identified with the range of movement possible at a specific point or series of articulations and the general absence of stiffness. in the female people is greater this property.

The parameters of the ground reaction in both groups demonstrate a significant identity concerning the development of the Fz, Fx, Fy and the sagittal vectograms. Its to observe that only the first peak of the vertical force in the female soccer players is reduced of 15% b.w. compared to male soccer players.

This data is probably influenced by the greater flexibility of the female group that allows the reduction of the first peak between a bigger dorsiflexion of the ankle joint.

In conclusion, the development of a motor action appears to be conditioned in this case bigger from the motor learning lated to the soccer compared to the different morpho-structural characteristics of the female and male soccer players.

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FIGURES

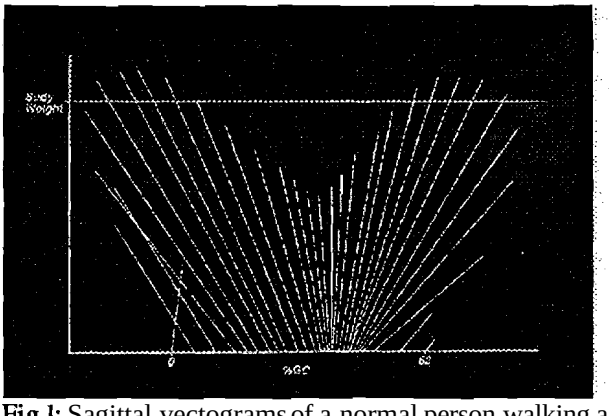

Fig.1: Sagittal vectograms of a normal person walking a defined pace.

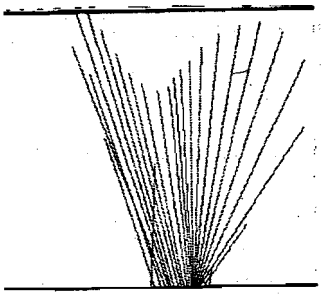

Fig.2: Sagittal **vectograms** of a male soccer player walking a defined pace.

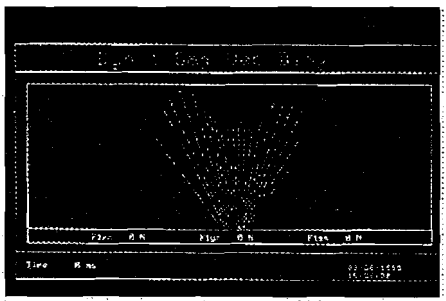

Fig.3: Sagittal vectograms of a female soccer player walking a defined pace.

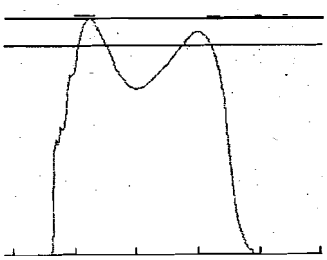

Fig.4: Vertical force patterns in the male soccer player. The first peak is related to the loading response, the second peak to the midstance, the third peak to the terminal stance. The high horizontal line is body weight.

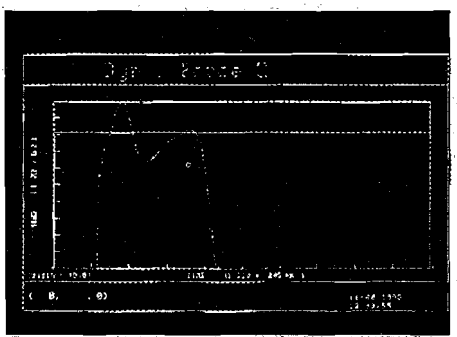

Fig.5: Vertical force patterns in the female soccer player. The high horizontal line is body weight.