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ANALYSIS OF THE BEHAVIOR OF ACCELERATION TIBIAL ASSOCIATED WITH PLANT IN CENTRAL PRESSURE KICK PLAYERS SOCCER FIELD

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ABSTRACT

The aim of the study was to develop na effective system of measures biomechanical able to relate the behavior of tibial acceleration with the center of plantar pressure (COP) in soccer players field. This study allowed us to find variations of the displacement of the plantar pressure of the supporting leg and the acceleration and deceleration of the kicking leg in the diferente phases, seeking possible improvement in motor performance by balancing and motor control during the kick.

INTRODUCTION

In recent years interest in the study of the art of the kick increased. Quantitative analysis of technical movements can identify changes in motor behavior that can be decisive for the player, making it an excellent tool in the technical monitoring or rehabilitation and prevention of sports injuries

MATERIALS AND METHODS

For the practical application of the research were selected four athletes, aged between 16 and 19, mean age, body weight and height, respectively, 17.5 ± 1.29 years, 69.0 ± 4.02 kg and 178 75 ± 5.85 cm. As inclusion criteria, the dominant leg for righties and practical experience in football field at least five years. The exclusion criteria, the volunteers could not be in the process of recovery from any type of injury. After being informed about the procedures and objectives of the study, each volunteer or guardian, signed a consent form and clarified; approved by the Ethics Committee CEP / UNITAU nº 523/08.

Participants were instructed to try to hit a target with dimensions (2.0 mx 2.0 m), 9 yards distant. Possible slopes or rotations of the pelvis were minimized through education to the volunteers who kept the body parallel to the camera in two-dimensional plane, as shown in figure 1.

Figure 1: Voluntary running approaching the kicking foot to the ball.

In this research, we used a camera Casio Exilim EX FH-20, with sampling frequency of 210 Hz image acquisition to data from the COP was used a force platform, developed and properly calibrated in the laboratory of Biomechanics (UNESP / Faculty Guaratinguetá Engineering / Department of Mechanical Engineering); manufactured to international standards measured with load capacity of 3600 N, with dimensions of 15 x 500 x 500 mm, width-height-depth. An accelerometer capacitive type, brand SILICON DESIGNS, model: 2210-025, range 0 to 25 g, (g 1 g = 9.8 m / s ^ 2), 0-1000 Hz frequency.

RESULTS AND DISCUSSION

Figures 2-5 show the behavior of tibial acceleration (in g) and historic COP (directions X, Y and medial-lateral, anteroposterior, in mm) with respect to normalized time. The data of the 3rd kick Volunteer B were discarded due to problems in the data collection phase.

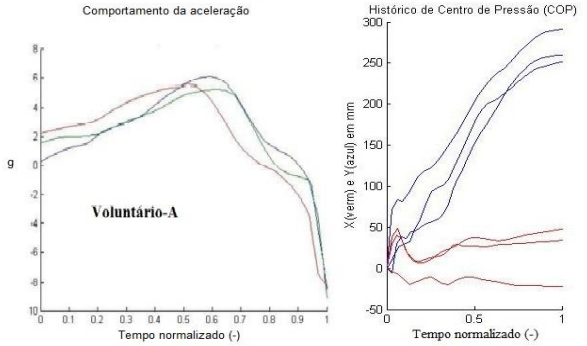

Figure 2: Behavior of tibial acceleration and COP volunteer A.

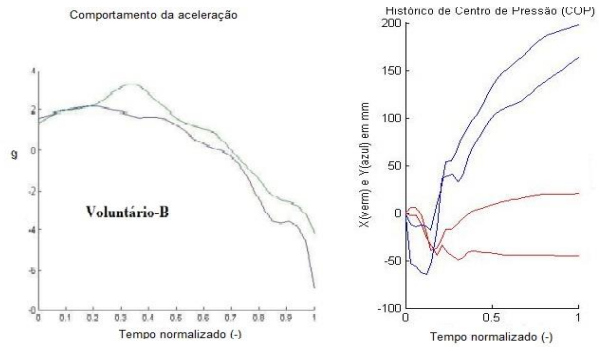

Figure 3: Behavior of tibial acceleration and COP volunteer B.

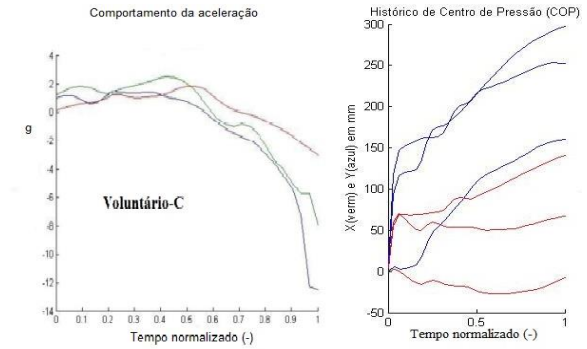

Figure 4: Behavior of tibial acceleration and COP volunteer C.

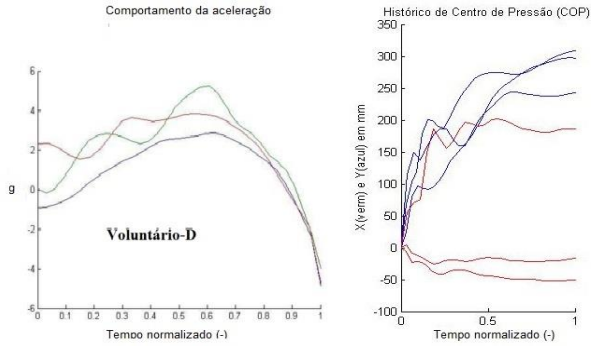

Figure 5: Behavior of tibial acceleration and COP volunteer D.

The volunteer presented the displacement of COP similar for all three kicks, the differences were due to the stabilization excessive support in the region outside of the foot, the second biggest kick had stabilized, the first and third shots showed only setting body at the instant of tibial deceleration. Volunteer B, the first shot showed little shift in Y, the support leg was centralized, but the results showed oscillation in X, with this acceleration was lower and peak tibial found in 0.5 to 0.6, the second shot presented in support excessive metatarsal region. The volunteer C held the second kick with little change, with higher values for acceleration, featuring kick with power. The first and third kicks indicated increased anteroposterior displacement, influencing the slowdown that occurred very close to the ball, with metatarsal overload. The volunteer D presented the first and second shots centralized with good load distribution, the behavior of acceleration for these shots was within expectations, the slowdown occurred in the approach of the foot to the ball coinciding with the support centralized platform, the third kick had greater oscillation in X, with support on the inside of the foot, characterizing the impact of the foot on the ball with less power for Y values were similar, and the values for acceleration. In analyzing inter-voluntary acceleration behavior was similar tibial as well as in the intra-volunteers, the differences found in COP results were related to the anthropometric characteristics and the gesture of each volunteer motor; identified an instability phase kick due to the pre-adjustment body and stability required body during the approach leg of the ball, similar to the results of [1], so the analysis of the COP is more effective when performed intraocular volunteers. The behaviors graphics acceleration curves were found close to that expected for a kick accurately, according to [2.3].

CONCLUSION

The proposed methodology has proven to be effective in recording the performance and also the possible use of the gesture engine to fix soccer players in the field, despite being a small group, individuals sampled were representative. The analysis results intraocular volunteers showed the same trends in behavior graph of curves for acceleration and deceleration tibial associated COP, but analysis of the COP is more effective when performed intraocular volunteers. The methods adopted in this study can serve to improve the behavior of the kick players in training or rehabilitation phase compared with the standards of professional players.

THANKS

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