EVALUATION OF POSTURAL BALANCE IN SKEET SHOOTING

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INTRODUCTION

Charles Davis, Hunter in Andover (Massachusetts), can be regarded as the father of skeet shooting that throughout the years underwent various technical modifications. The skeet shooting becomes an Olympic sport in 1900 at the second edition Olympic Games in Paris[1,2].

This sport includes shooting a moving target, said skeet, that comes out of trap machines put under the level of the field, and should be struck by the shooter. The position of the shooter is erected with slightly apart legs. The shooter, when took his rifle, order the start of the skeet, with the aim of hit it. The number of targets to hit during a single shooting session is of 25 skeet[3].

The sessions of training of the shooter demands constant improvement, mostly of anaerobic capacity for reducing the well known negative impact of lactic acid in the attentional processes[4-7]. Moreover, the training also needs to improve the of the cerebellar-dependent motor control capabilities[8-10].

The aim of this research was to assess, during a simulation of skeet shooting, whether there is a correlation between postural balance and the different skill's level of the shooters[11].

MATERIALS AND METHODS

The subjects that participated in the research were 14 athletes, subdivided into two groups: Group 1 was composed by seven athletes with capabilities of medium level (less good shooters) whereas Group 2 was composed of seven athletes with excellent capabilities (elite shooters).

All the shooters participating in the research signed the informed consent.

The postural evaluation was made by analyzing six postural measures, i.e. the Centre of Pressure COP): medio-lateral (ML) standard deviation del COP, anterio-posterior (AP) standard deviation del COP, COP path length, average sway velocity of COP.

The platform had a metal force plate surface and all tests were conducted with subjects being barefoot. The AMTI force platform simultaneously measures three force components along the x (medio–lateral, ML); y (antero–posterior, AP); z (vertical, V) axes and three moment components about the x-, y-, z-axes. Signals from the force platform were amplified through an AMTI MiniAmp MSA-6 strain gauge amplifier system before being digitized into an IBM-compatible Pentium computer at a sampling rate of 100 Hz through a Cambridge Electronic Design (CED, Cambridge,

England) 1401 acquisition unit. Routines were developed with MATLAB software (The MathWorks Inc., Natick, MA) to calculate the area corresponding to 95% of the area described by the CoP trajectory (A95), since previous studies showed that this is a more sensitive measure of postural stability[12].

During the recording sessions only two positions were evaluated, those considered critical to achieve of success (goal) that should be maintained for 34 seconds. The choired positions were: preparation for shooting (start) and shooting (shoot).

In order to prevent possible influences on postural stability caused by timetable[12], the acquisitions were performed exclusively between 15.00 and 18.00.

RESULTS

The size of the area of the ellipse of confidence in groups 1 and 2 is different.

In figure 1 is observed that the area of the ellipse in the group 1 is much larger than of the members of the group 2.

Figure 2 shows the trend of the COP of two subjects, one of the group 1 and one of the group 2 into its two positions taken into account.

DISCUSSION

The questions that we set at the beginning of this study were: is there a correlation between balance and skill of shooting[13]? Is there a differences in posture between elite shooters and less good shooters?

The results emphasize the essential role of from equilibrium critical component for the shooter that can be trained[14]. It was observed a significant difference between elite shooters and less good shooters in the sense that the former assumes a posture with a lesser area of the ellipse of confidence (95%) with respect to the latters. This allow us to point out that a good balance is a real advantage for achieving better performance.

Therefore, the instructor will have to enter during training in addition to specific activities for the improvement of anaerobic capacity[15-20] and capacity of the dependent motor control cerebellar [20-23], specific sessions improvement of balance.

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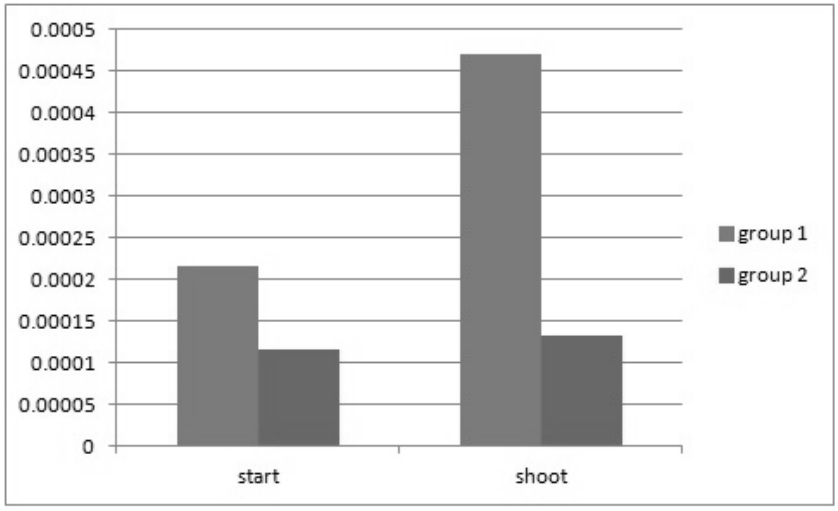

Fig 1 Area of the ellipse of confidence, for positions analyzed, expressed in square meters, for the subjects belonging to the two groups

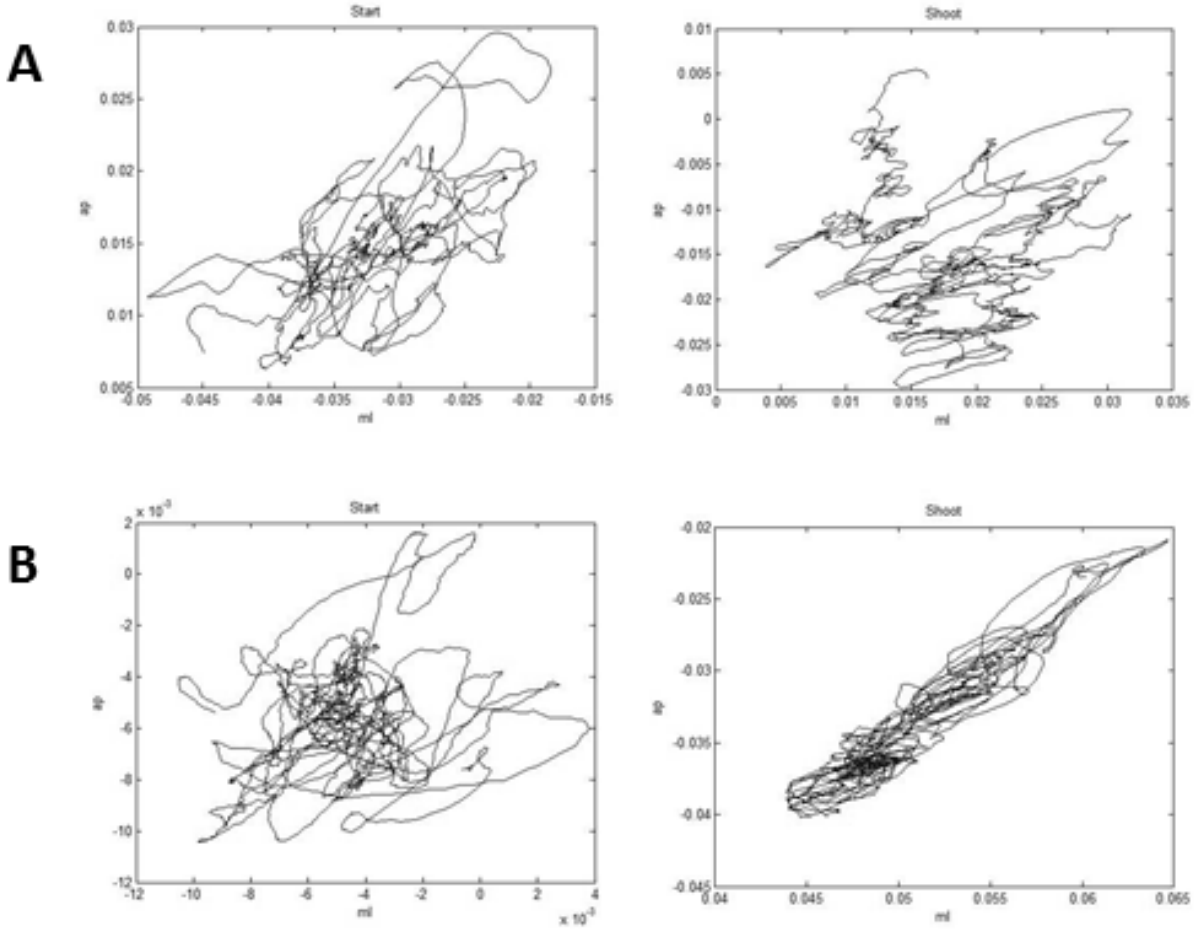

Fig 2 A. COP group 1 in both positions. Fig 2B. COP group 2 in both positions.