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## CORRELATION STUDY BETWEEN THE EXPLOSIVE FORCE OF THE LOWER LIMBS AND THE KINEMATIC PARAMETERS DURING THE SUSPENDED LAUNCH IN BASKETBALL

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### ABSTRACT

The aim of this study was to analyze the correlation between the explosive strength of the lower limbs and the kinematic parameters (linear speed of the ball and the angular velocities of the elbow and wrist) during the launch of the free-throw distance ( $\pm 4.6$  m of basket) suspended in basketball. To quantify the kinematic parameters of the study program was utilized Ariel Performance Analysis System (APAS). To determine the explosive force resorted to platform "Ergo-jump" (1000 Digitime, DIGITEST Finland). To analyze the relationship between the parameters of the study we used the Pearson correlation.

**Keywords:** basketball, biomechanics, kinematics.

### INTRODUCTION

The coordination of the different body segments during performance of the Release in suspension is critical in the effectiveness of the launch. The alignment of the legs and against movement, for example, allows the smooth transfer of weight up at launch maximized by raising the arms, thus increasing the output speed of the ball (Mitchell & Taverner, 1995). By using a biomechanical analysis is possible objectively recognize the basic features of a particular style or technique and, thus, to establish the different techniques of a specialty sports, finding among them the most appropriate (Hochmuth, 1973). Dai that is essential to study the correlation between the explosive strength of the lower limbs and the kinematic parameters of the launch was suspended in basketball.

### RESULTS AND CONCLUSIONS

In correlation made the kinematic parameters (VangC and VangP), and the explosive strength of the lower limbs, we found a weak correlation does not, verifying that both in females ( $r = 0.30$  and  $r = 0.23$  to  $P < 0.05$ ) as in male ( $r = 0.42$  and  $r = 0.37$  to  $P < 0.05$ ), did not show a direct relationship between the variables, which means that the ability to jump higher, could allow more time to release the ball. However, agreeing with (Miller, Bartlett, 1993), the maximum height of release of the ball is related to lower speed and launch angle.

Table 1 - Values of explosive strength and elasticity index.

| Group  | SE             | SCM            | IE  |
|--------|----------------|----------------|-----|
| male   | 32.3 $\pm$ 2.3 | 33.7 $\pm$ 3.4 | 1.4 |
| female | 28.3 $\pm$ 2.6 | 29.2 $\pm$ 2.5 | 0.9 |

SE - static jump, SCM - countermovement jump, IE - elasticity index.

Table 2 - Values of the correlation between the explosive force and kinematic parameters at time of launch.

| Group  | VangC       | IE  | r    | VangP       | IE  | r    |
|--------|-------------|-----|------|-------------|-----|------|
| male   | 378.7±136.8 | 1.4 | 0.42 | 428.6±120.9 | 1.4 | 0.37 |
| female | 345.9±96.3  | 0.9 | 0,30 | 407.4±107.9 | 0.9 | 0.23 |

**VangC**- angular velocity of the elbow, **VangP**-angular velocity of the wrist, **r**-Pearson correlation coefficient

By observing the results of Okasaki et al. (2006) shows that the throw away from the rim requires higher amplitude of the wrist joint, and in anticipation higher rate of elbow joints and wrist beyond the vertical jump, not contradicting thus the values found in our study here. It is likely that this fact is directly connected with the time, too old or the weight of athletes. Thus, these can also be - as additional load and lack of systematic training, also evidenced by other players (Canyon, 1991).

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