209 - INFLUENCE OF KINETIC VARIABLES DURING THE PROPULSION IN THE LONG JUMP OF CHILDREN IN DEVELOPMENT

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INTRODUCTION

In a child's development, regular increases in body size and strength are perceived and thus, are also expected consistent increases in the basic skills of running jump and shoot, since childhood is considered the golden age of learning and motor development (Eckert, 1993).

In addition, Ozmun and Gallahue (2003) stated that the motor patterns of children become increasingly problematic after the myelination of the cerebellum, motor development may be perceived by the progressive improvement of movement skills. And, according to Ferreira Neto (1995), follows a certain sequence of changes in the movements that differ from individual to individual as to the time of evolution, but not about the sequence in which these changes occur.

The horizontal jump and used as an indicator of lower limb strength in analysis of performance. However searching for literature on the subject, pointed out this cinematic movement reporting segmental postures during the execution of the jump and its performance. How Horita et al (1991).

According to these authors, children under 6 years of age does not have a good preparation to jump, resulting in a poor jump and will directly influence the outcome of the jump.

The importance of horizontal jump, and motor development during infancy, made up this study to evaluate the characteristics of force during the propulsion of the long jump applied on jump performance in children in developing countries.

METHODS

This descriptive study had a sample of 33 children of both sexes aged between 5 and 12 years, performing 3 jumps each analyzed. We used a two-dimensional kinematic through the Peak Motus System, with two video cameras at a frequency of 60 Hz, ready to capture the sagittal plane left and right at the same time during the jump. Heels valid were scanned and processed by the system software for calculating the distance jumped. For the kinetic variables, we used a force platform AMTI at a frequency of 900 Hz Children performed the jumps from the top of the platform, which was reached indicated that the greatest horizontal distance possible.

The variables were: peak vertical force (PFY), less amount of force in y (MVFy), Time of the propulsion force (TFP), Eccentric Boost stage in the y-axis (IFEy) Boost phase in Concentric y-axis (IFCy) Total impulse in the y-axis (ity), maximum pulse rate in the y-axis (TIMaxY), average pulse rate in the y-axis (TIMY), maximum pulse rate in the y-axis (TDMaxY), peak horizontal force (PFX), Impulse Total axis "X" (ITX), average pulse rate in the x-axis (TDMX).

Following data analysis, the distance of the jumps were normalized by the length of the lower limb, and the kinetic variables by weight. In statistical analysis was applied to multiple linear regression with all variables and a second time with only the variables that were significant in the first test. The level was set at 0.05.

RESULTS AND DISCUSSION

In search of a better understanding of the kinetic factors that influence the performance of the horizontal jump was applied to multiple linear regression of all kinetic variables and the distance reached by each child.

Thus, the following table contains the linear regression between the kinetic variables and the distance reached by children normalized by the length of the lower limb.

Table 1: Multiple linear regression of the dependent variable distance achieved for all kinetic variables.

Independent variable	B Value	Beta Value	Significance
PFy	-0,40	-0,27	0,09
MVFy	0,33	0,17	0,31
TFP	0,87	0,27	*0,05
IFEy	0,06	0,04	0,75
IFCy	1,50	0,31	*0,02
ITy	-2,14	-0,52	*0,00
TIMaxY	0,04	0,56	*0,01
TIMy	0,04	-0,26	0,26
TDMaxY	0,01	-0,08	0,54
TDMy	-0,03	-0,01	0,95
PFx	-0,76	-0,22	0,34
ITx	8,89	0,66	*0,00
TDMx	-0,04	-0,06	0,72

Regression implemented in SPSS 10 for Windows was the linear regression of the type "enter", which makes the calculation of the regression without ignoring any variable. With this calculation, the program may be calculating variables that play no aid to the performance of the horizontal jump, so I applied again this regression for variables that were significant in the first test, and that this sample in Table 2.

Table 2: Multiple linear regression of the dependent variable distance achieved for the kinetic variables significant for the dependent variable.

Independent variable	B Value	Beta Value	Significance
PFy	-0,45	-0,31	*0,02
TFP	0,70	0,21	0,07
IFCy	1,07	0,22	*0,05
ITy	-1,15	-0,28	*0,05
TIMaxY	0,01	0,19	0,11
ITx	6,49	0,48	*0,00

This second test aims to remove information called "junk", amending the importance of the variables that really matters for the performance of the jump. With this, the second test the significance was found in variable peak force in the y-axis, force impulse concentric "Y" total impulse "Y" and total impulse "X".

For each unit of the lower limb for children skipped the variable peak force in the axis "Y" had a negative contribution of 31%, keeping other variables constant. The total impulse "Y" also makes a negative contribution of 28%. Therefore, the increase in the value of these two variables can mean a lower performance.

Among the variables that contributed positively to the extent we have the momentum of concentric force in Y, that each limb prefaced jumped 22% contribution. Indicating that the phase of knee extension in propulsion is important to the achievement of horizontal jump.

These variables that were significant that stood out was the total impulse "X", for every unit of lower limb bounced it exerted a positive contribution of 48%, keeping other variables constant. Therefore, it can be argued that this variable should be considered of fundamental importance for the distance achieved in the horizontal jump.

Moreover, the peak horizontal force (PFX), which is characterized by the highest curve in horizontal reaction force during the propulsion phase of the jump. The results of this study the values found increased as the stages: initial (0.69 PC), basic (0.70 PC) and mature (0.72 PC). When compared to the preliminary study on the subject (Estrázulas et al, 2006) one can see the similarity between this finding, because in this preliminary study the group found increasing values, and the early PC 0.52, the elementary and mature PC 0.69 0.76 PC. In the study by Aguado et al (1997) met for this variable average value of 0.63 PC, or as low as those found in this study for the initial stage. Ashby and Heegaard (2002) found peak horizontal force of 0.85 PC to a total value higher than that found for the mature stage in this study (0.72 PC).

The similarity found for this variable in this study, according Gress (2004), is due to heterogeneity in groups and form of assessment of the stages in the author used. This author found values for elementary and mature PC 0.58 and 0.71 respectively.

CONCLUSION

The kinetic variable exerted more influence on the distance jumped by the children of this study was the total impulse "X", which is a variable measured from the back-front component of reaction force from the ground. This variable served to each unit of the lower limb hopped a positive influence of 48%.

Thus we can conclude that the total impulse "X" is the most important kinetic variable for the horizontal jump performance of children, with the largest positive contribution to the jump performance, and other variables constant.

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INFLUENCE OF KINETIC VARIABLES DURING THE PROPULSION IN THE LONG JUMP OF CHILDREN IN DEVELOPMENT

The propose of this study was to analyze the influence of kinetic characteristics for the stand long jump of children in the development. We used a AMTI`s force platform with a frequency of 900 Hz for the acquisition of the jump in the propulsion phase. We analyzed 33 children, age between 5 and 12 years old, of both sexes, were analyzed 3 attempts each. The results indicate that during the preparation of long jump the most important variables in performance is the total horizontal impulse and peak horizontal force, and that the variable that affected negatively the jump was the vertical impulse. Thus we can conclude that specifies using a preparation towards the kinetics of the jump may result in better performance in the long jump, which facilitates the process of teaching and learning.

KEYWORDS: stand long jump, children, biomechanics.

INFLUENCE DES VARIABLES CINÉTIQUE LORS DE PROPULSION DANS LE SAUT HORIZONTAL DES ENFANTS DANS LE DÉVELOPPEMENT

L'objectif de cette étude était d'analyser l'influence des caractéristiques cinétiques pour la poussée horizontale du talon d'enfants dans la phase de développement. Nous avons utilisé une plateforme de force AMTI avec une fréquence de 900 Hz pour l'acquisition du saut dans la phase de propulsion. Dans tous les analysé 33 enfants âgés entre 5 et 12 ans des deux sexes ont été analysées 3 essais chacun. Les résultats indiquent que durant la préparation de l'horizontale sauter les variables les plus importantes dans la performance est le mouvement horizontal total et le pic de force horizontale, et que la variable qui a affecté négativement le saut a été l'impulsion verticale. Ainsi, nous pouvons conclure que spécifie l'utilisation d'une préparation en vue de la cinétique du saut mai aboutir à une meilleure performance dans le saut horizontal, ce qui facilite le processus d'enseignement et d'apprentissage.

MOTS-CLÉS: Aller horizontale, enfants, biomécanique.

INFLUENCIA DE LAS VARIABLES LORS DES CINÉTIQUE DE PROPULSIÓN DANS LE SAUT HORIZONTAL DES ENFANTS DANS LE DÉVELOPPEMENT

El objetivo de este estudio fue analizar la influencia de las características cinéticas de la fuerza horizontal del talón de los niños en la fase de desarrollo. Se utilizó una plataforma de fuerza AMTI con una frecuencia de 900 Hz para la adquisición de el

salto en la fase de propulsión. En todos los analizados 33 niños con edades comprendidas entre 5 y 12 años de ambos sexos y de 3 intentos cada uno. Los resultados indican que durante la preparación del salto horizontal de las variables más importantes en el rendimiento es el impulso total horizontal y pico de fuerza horizontal, y que la variable que afecta negativamente el salto fue el impulso vertical. Así pues, podemos concluir que especifica el uso de un preparado a la cinética del salto puede resultar en un mejor rendimiento en el salto horizontal, que facilita el proceso de enseñanza y aprendizaje.

PALABRAS CLAVE: salto de longitud, los niños, la biomecánica.

INFLUÊNCIA DE VARIÁVEIS CINÉTICAS DURANTE A PROPULSÃO NO SALTO HORIZONTAL DE CRIANÇAS EM FASE DE DESENVOLVIMENTO

O objetivo deste estudo foi analisar a influencia de características cinéticas durante a propulsão no salto horizontal de crianças em fase de desenvolvimento. Foi utilizado uma plataforma de forca AMTI com freqüência de 900 Hz para a aquisição do salto na fase de propulsão. Ao todo foram analisadas 33 crianças com idade entre 5 e 12 anos, de ambos os sexos, sendo analisados 3 tentativas de cada. Os resultados indicam que durante a preparação do salto horizontal as variáveis mais importantes no desempenho são o impulso total horizontal e o pico de força horizontal, e que a variável que influenciou negativamente no salto foi o impulso vertical. Desta forma podemos concluir que uma preparação especifica utilizando a cinética no sentido do salto pode implicar em um melhor desempenho no salto horizontal, o que facilita o processo de ensino e aprendizagem.

PALAVRAS-CHAVES: salto horizontal, crianças, biomecânica.

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