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KINEMATIC ANALYSIS OF TECHNIQUE IN HIGH JUMP

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ABSTRACT

The purpose of this study was to find out the kinematic analysis of penultimate step and height of non-take-off leg among inter colligate high jumpers. To achieve the purpose of this study high jumpers from YMCA College of Physical Education, Chennai were selected. The subjects were randomly selected among the players who represented the college at inter college level tournaments. The subjects were in the age group of 19 to25 years. Static group design was followed by the investigator. In this study the investigator measured the penultimate step length and the height of non-take-off leg through Kinovea software. The obtained data were subjected to statistical treatment using correlation test. In all cases 0.05 level of significance was fixed to test the hypothesis of this study. Result depicted high degree of positive correlation between the high jump performance and penultimate step and height of the non-take-off leg.

KEYWORDS: *kinematic analysis, penultimate step, non-take-off leg, correlation, kinovea*

INTRODUCTION

The physical growth of an individual has a pronounced effect on his capacity for physical activities. It is the neutral and inborn quality for a child to participate in physical . The internal and external forces acting on a human body determine how the parts of that body moves during the performance of a motor skill. They determine, in short, what is commonly referred to as the performer's technique.

In some sports activity such as speed, strength and endurance are more important than techniques. The Olympic champion and world record holder might try many different techniques and adopted the one that produces the best result. The technique might be perfect for them. Coping the techniques of champion might not works properly for others. The techniques used by the champion may be the optimum or near the optimum for a person with the same physical attributes as the champion and far removed from the optimum for a person less well- endowed or less well trained. Adoption of the techniques used by the champion may thus be totally inappropriate. Application of biomechanical, both kinetics and kinematics, aspects of sports may help the trainer and coaches to determine the contributory factor and faults limiting the performance.

The importance of biomechanics has well been recognised in learning sports skills. The knowledge of biomechanics principles enhances the performance of skilled athlete. High jump is track and field events where the athlete must be jumped unaided over a horizontal bar without dislodging it. The athlete have introduced increasingly more effective techniques to arrive at the current form. In

high jump the approach run plays vital roll than that of take-off. The approach requires a certain shape or curve, the right amount of speed, and the correct number of strides. The approach angle is also critical for optimal height.Most great straddle jumpers have a run at angles of about 30 to 40 degrees. The length of the run is determined by the speed of the person's approach. A greater run speed allows a greater part of the body's forward momentum to be converted upward. The stepping and foot plant differ in straddle and flop style. Where straddle technique user planted their foot in the same spot at every hight, flop-style jumper adjust their take-off as the bar is raised. The approach run also vary in every style. The effective approach shape can be adopted from the physics so that they can direct the energy into vertical direction. The curved part of radius can be calculated with the help of jumpers speed and the time of take-off foot on ground. This only works if some basic rules are followed in how one executes the approach and take-off. In this study the researcher tried to find the relationship between high jump performance and the height of non-take-off leg from the ground, during take-off and right and left leg toe in penultimate step.

METHODOLOGY

The present study aimed to find out the biomechanical analysis of high jump technique among inter collegiate high jumpers. Total ten (10) jumpers (aged 19 years to 25 years) from Young Men Cristian Association (YMCA) college of physical education, Chennai were selected as subjects for the study. These subjects were selected randomly after their informed consent among the athlete who represented their college in inter collegiate tournaments. After well review the researcher tried to study the roll of hight of non-take-off leg from ground during take-off and distance between right toe and left toe in penultimate step on high jump performances. The data was collected through the Kinovea software. To measure the height of the non-take-off leg and right toe to left toe distance in penultimate step the hight from bend knee to ground level and from right toe to left toe measurement was taken. The collected data was further transferred to personal computer for data analysis and further process.

The illustrative examples are shown in the given pictures

Figure 1: illustrating the measurement of hight of non-take-off leg

Figure 2: illustrating the measurement of right toe and left toe distance in penultimate step

Statistical process

The collected data were analysed to draw meaningful conclusion. To see the relationship between the variable and high jump performance pearson correlation for static group design was employed. The level of significance were fixed at 0.05 level.

Results

Table 1. Showing the mean, standard deviationand obtained correlation value between high jump performanceand penultimate step length among inter colligate high jumpers.

Test	N	Mean	SD	Correlation
Penultimate Step	10	187.5	18.128	0.771*
Performance		179.7		

*Correlation is significant at 0.05 level

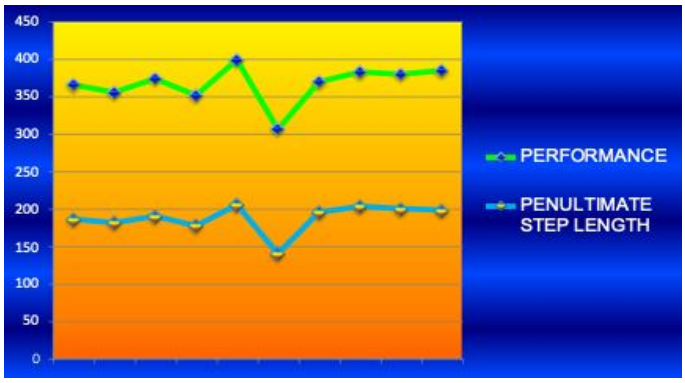

Figure 3: Line diagram showing the penultimate step length and the performance of inter collegiate level high jumpers. High degree of positive (0.771) correlation is witnessed in the present study.

The results presented in the table 1 showed the characteristics of penultimate step and high jump performance. The mean of penultimate step length (187.5) and high jump performance was (179.7). The obtained correlation value of(r= 0.771) was greater than the required value of 0.582 at 0.05 level with 9 df. Hence, there was significant relationship between high jump performance and penultimate step length of intercollegiate level men high jumpers.

Table 2: Showing the mean, standard deviation and obtained correlation value on high jumpers performance and the height of non- take-off leg among inter collegiate high jumpers

Test	N	Mean	SD	Correlation
Height of the non-take-off leg	10	130.6	12.232	0.714*
Performance		179.9		

*Correlation is significant at 0.05 level

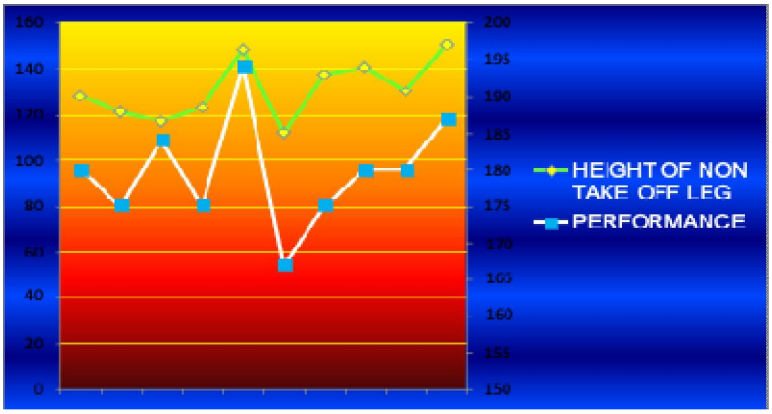

Figure 4: Line diagram showing the height of non-take-off leg and the performance of inter collegiate level high jumpers. High degree of positive (0.714) correlation is witnessed in the present study.

The results presented in the table 2showed the characteristics of height of non-take-off leg and high jump performance. The mean of penultimate step length (130.6) and high jump performance was (179.9). The obtained correlation value of(r= 0.714) was greater than the required value of 0.582 at 0.05 level with 9 df. Hence, there was significant relationship between high jump performance and height of the non-take-off leg of intercollegiate level men high jumpers.

DISCUSSION

At the beginning it was hypothesised that significant relationship will be witnessed between performance and right and left leg toe in penultimate step and height of the non-take-off leg. Result of the study revealed high degree of positive correlation between the high jump performance and both studied variable namely hight of the non-take-off leg and left toe to right toe penultimate step. Execution of perfect technique in kinematic analysis of errors, correction in high jump requires and systematic training. The investigator was interested to find the relationship between penultimate step length and height of non-take off leg and the performance in high jump. It was found that there was significant relationship between high jump performance and penultimate steplength of intercollegiate level men high jumpers. There was significant relationship between high jump performance and the height of non-take off leg of the Inter collegiate level men high jumpers.

CONCLUSIONS

Within the limitations and delimitations of the study, the following conclusions were drawn.

It was concluded that left toe and right toe of penultimate step had significant relationship with high jump performance.It was concluded that the height of non-take-off leg during take-off were had significant relationship with high jump performance.Kinematic analysis study may be included in the training schedule for analysis correction of high jumpers.The kinematic analysis on specific event of athletics such as, running, jumping, throwing etc ought be studied for better performance.

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