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RELATIONSHIP OF SELECTED BIOMECHANICAL AND PHYSICAL VARIABLES WITH THE PERFORMANCE OF HOCKEY PLAYERS IN FLICK

Physical Education

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ABSTRACT

The purpose of this study was to determine the relationship of Biomechanical and Physical variables selected angular kinematic and physical variables with the performance of Hockey players in Flick. The study delimited to angular kinematic Biomechanical variables and Height, Weight, Grip strength, Shoulder strength, and Leg strength physical variables. For the purpose of this study 8 male hockey players from university of Allahabad who participated in intervarsity hockey competitions, were selected as subjects for the study. The age of subjects was between 18 to 28 years. The subjects were good players and have been practicing the technique of flick for quite a considerable time. The performance of flick of subjects measured in meters. The selected kinematic variables such as angles at ankle joint, knee joint, hip joint, shoulder joint, elbow joint and wrist joint were obtain by measuring with the help of protector from the stick figures at the moment of execution of flick. Physical variables such as leg strength, grip strength, height and weight were measured with the help of leg dynamometers, grip dynamometers, stadiometer and weighing machine. The Pearson's product moment correlation was used in order to find out the relationship between selected angular Kinematics and Physical variables with the performance of Hockey players in Flicks. The level of significance was set at .05. It has been observed from the analysis of given data and interpretation of findings that not be significant relationship between the selected angular kinematics and physical variables with the performance of Hockey players in Flick was found.

KEYWORDS:

Biomechanics, Angular kinematic, physical variable, Flick, Hockey

INTRODUCTION:

Sports performance is the sum of numerous factors which can vary from individual to individual. It is very important to identify and fully mobilize each individual's potential. Importance is not only due to the fact that performance sports are glamorous and spectacular to watch. Sports perform multifarious functions for the human society in the modern age. In fact sports culture and sports sciences as the backbone of the performance sports. This brought into sharper focus of the training system as the means of development of sports performance. Systematic and scientific knowledge is very important for maintain the standard of sports performance and the development of the physical education discipline.

Biomechanics may be defined as the science, which investigates the internal and external forces acting on a human body and the effects produced by these forces. In the last several decades, biomechanics has demonstrated considerable growth evolving from an exercise in the filming of human movement to an applied science with a powerful array of measurement and modeling techniques. The simple descriptive approach which was characteristic of early work has been superseded by attempts to explain the mechanisms underlying movement. Consequently, biomechanics has emerged as an important area of scientific investigation in a variety of disciplines. Included among these are automobile safety, biomedical engineering, ergonomics, exercise science, orthopedic surgery, physical rehabilitation, and sport. Field hockey has developed into highly competitive sports, which requires high level of physiological fitness. Game in itself at a high level of competition requires quick sudden movements and fast reaction. Modern game of hockey is characterized by absolute self control and maximum concentration. To identify a movement as an economic one, it is very essential to analyze the movement first, sometimes it is very difficult for a human eye to analyze all the movements of various body segments and joints at the same time so, various instrument like camera, video camera etc. are used to analyze various movements. As we know that improvement in techniques in any game and sports, the technique should be first mastered. For analyzing the technique, it is very important to know what are the variables which may be given due attention for its improvement. This study may understand the technique of flick, so that those variables which might have contributed to the effectiveness of the technique could be identified.

METHODOLOGY:

For the purpose of this study 8 male hockey players from university of Allahabad who participated in intervarsity hockey competitions, were selected as subjects for the study. The age of subjects was between 18 to 28 years. The subjects were good players and have been practicing the technique of flick for quite a considerable time. The performance of each subject in Flick was measured by using the standard procedures. A flick point was marked. Each subject took six trials and the best performance was used for the analysis. The subjects performed flick. Three judges observed the first drop of hockey ball and measured the distance in meters. The maximum distance covered by the ball was the final performance of each hockey player. Sequential photography was employed for the analysis of flick action of the subjects. The camera used for this purpose was a standard Nikon D40, for obtaining individual photographic sequence, the flick moment was selected for players. The subjects were photographed in controlled conditions. On this basis of the photographs obtained, the investigator developed the stick figures from which various biomechanical variables were taken. The stick figures were developed by using joint point method in which the body projection at the joints facing the camera were considered.





The selected kinematic variables such as angles at ankle joint, knee joint, hip joint, shoulder joint, elbow joint and wrist joint were obtain by measuring with the help of protector from the stick figures at the moment of execution of flick. Physical variables such as leg strength, grip strength, height and weight were measured with the help of leg dynamometers, grip dynamometers, stadiometer and weighing machine. The Pearson's product moment correlation was used in order to find out the relationship between selected angular Kinematics and Physical variables with the performance of Hockey players in Flicks.

The level of significance was set at .05.

OBESERVATION AND DISCUSSION:

TABLE 1
RELATIONSHIP OF SELECTED PHYSICAL VARIABLE WITH THE PERFORMANCE OF SUBJECTS IN FLICK

S.No.	Variables	Coefficient of Correlation (r)
1.	Height	0.268
2.	Weight	0.027
3.	Grip strength	0.244
4.	Shoulder strength	0.605
5.	Leg strength	0.313

r.05(8)= 0.632

Since the required value of coefficient correlation for 8 degree of freedom to the significant at 0.05 level is 0.632 and the obtained values were less than that, therefore, none of the selected physical variables at selected moment have exhibited significant relationship with the performance of players in flick.

Table 2
RELATIONSHIP OF SELECTED BIOMECHANICAL VARIABLES WITH THE PERFORMANCEOF SUBJECTS IN FLICK (N=10)

S.No	Variable	Mean (Degree)	Coefficient of Correlation ®
1.	Right Ankle Joint	108.3	0.139
2.	Left Ankle Joint	125.0	0.257
3.	Right Knee Joint	79.9	0.189
4.	Left Knee Joint	140.4	0.458
5.	Right Hip Joint	130.2	0.026
6.	Left Hip Joint	135.6	0.461
7.	Right Shoulder Joint	90.6	-0.044
8.	Left Shoulder Joint	54.2	0.543
9.	Right Elbow Joint	126.7	0.371
10.	Left Elbow Joint	150.3	-0.010
11.	Right Wrist Joint	169.0	0.053
12.	Left Wrist Joint	172.9	-0.043

r.05(8)= 0.632

As shown in the Table 2 the obtained value of coefficient of correlations for 8 degree of freedom were less than the required value 0.632 for 0.05 level of significance, therefore, none of the selected angular kinematic variables at selected moment have shown significant relationship with the performance of players in flick.

CONCLUSION:

The analysis of the data revealed that none of the selected angular kinematic variables pertaining to the angle at Ankle joint (Right & Left), Knee joint (Right & Left), Hip joint (Right & Left), Shoulder joint (Right & Left), Elbow joint (Right & Left), Wrist Joint (Right & Left) have exhibited the significant relationship with the performance of players in flick, however the left shoulder joint ('r'=.543) and left knee joint ('r'=.458) have shown higher value of coefficient of correlations and physical variables have shown the insignificant relationship with performance of players in flick shot is does not mean that these variables might have not affected the performance of flick in hockey, but it may be due to small size of the sample as well as due to use of unsophisticated instruments or others reasons.

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