International Journal of Physical Education & Sports Sciences
Vol. 14, Issue No. 2, April-2019, ISSN 2231-3745

Relationship of Centre of Gravity and Horizontal Velocity in the Performance of Kouchi Makikomi Technique in Judo

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Abstract – The purpose of the study was to find out the relationship between centre of gravity and horizontal velocity in performance of Kouchi makikomi in Judo. Five male subjects from 18-23 age group were selected for the purpose of study. The subject's performance was recorded with Nikon D100 camera and then analyzed with Kinovea 8.27 2D motion analysis software. Pearson's product moment correlation technique was used as statistical tool to find out the relationship between selected Kinematic variables. No linear relationship was observed at 0.05 level of significance between Horizontal velocity and height of centre of gravity in the performance of Kouchi maki komi in judo.

Keywords: Kouchi Makikomi, Centre of Gravity.

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INTRODUCTION

Biomechanics is a science which deals with human motion and concerned with the different mechanical principles applied in it. It is the combination of two words 'bio' and 'mechanics', the term Bio stands for living beings and mechanics refers to functioning of living being as a whole. The aim of the biomechanics is to help the players to attain the maximum sports performance, in its best means it assists sportsmen to adopt right technique for attaining their goals.

The game of Judo has its roots in ancient martial art of Japan named Jujitsu. Later is has been transformed from Jujitsu to Judo by Pro. Jigoro Kano in the year 1882. The word Judo has been derived from two Japanese words 'Ju' & 'Do' which means Gentle and way. As a whole it is called as way of gentleness. This sport aims at making best use of opponent's energy to defeat him/her without using any kind of weapon. In competitive Judo, different types of throwing, holding, locking and choking techniques are used in different age categories. Judo has been introduced in the Olympics in the year 1964 for the first time, later it was discontinued in 1968 Olympic and It regained its reputation as Olympic sports from 1972 Munich Olympic. Till day Judo is an Olympic sports and being practiced in more than 200 nations

In Judo it is of immense importance to maintain your balance all the time and to disturb the balance of your opponent with the help of Kuzushi (technique breaking of balance) for the successful application of any throwing technique. Maintaining your balance is equally important to avoid of being thrown by your opponent. It is a prerequisite of so many throws that attacker's Centre of gravity should lie lower than the receiver's Centre of gravity otherwise the receiver may escape from the applied technique. The score (ippon/waza-ari) awarded for a successful throw during contest is determined by three criterions namely Speed of the throw, landing on full back, control at the time of throwing. If a throw fulfills all the criterions the highest score IPPON is awarded for the throw and if the throw lacks in any of the three criterions referee should award Waza-ari score for that performance. The present study is based on one of the mentioned criterions "speed of the throw". We measured the peak velocity of receiver and Height of centre of gravity of attacker while performing Kouchi makikomi technique in Judo with the help of Kinovea software.

Kouchi makikomi (Inner wraparound) is half sacrifice throwing technique which is largely applied on tall opponents where defensive player intends to avoid being gripped by lapel. Attacker needs to take only sleeve grip and lock the opponent's opposite side leg with his/her strong leg and give a thrust by his/her chest from forward to backward direction in continuation he/she has to roll over the opponent's body.

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METHODOLOGY

Five subjects from different classes of UG course were selected for the purpose of study. Their performance was filmed at Judo hall of L.N.I.P.E. Gwalior. Subjects were given three chances to perform Kouchi Makikomi with full intensity. Out of three, the throw with greatest horizontal velocity was selected for the purpose of analysis. The film was analyzed using Kinovea 8.27 2D motion analysis software. Both the Independent variables (horizontal velocity and height of centre of gravity) were measured using advance video analysis tools provided by Kinovea software.

Pearson's product moment correlation technique was used for statistical analysis.

FINDINGS AND DISCUSSIONS

In present study the researchers were interested in observing the relationship between horizontal velocity and height of centre of gravity. The research Hypothesis was, that there will be significant relationship between the two selected independent variables. Level of significance was set at 0.05.

Observed p-value attached with output was found to be greater than 0.05 thus we can say that there is no significant relationship between selected independent variables.

Table-1

Correlation table of Centre of Gravity and Horizontal velocity.

		Velocity	centre of gravity
Velocity	Pearson Correlation	1	.195
	Sig. (2-tailed)		.753
	N	5	5
centre of gravity	Pearson Correlation	.195	1
	Sig. (2-tailed)	.753	
	N	5	5

DISCUSSIONS

The selected independent variables Horizontal velocity and Height of C.G. do not reveal any evidence that the performance of Kouchi makikomi have any relationship with height of C.G. This might be due to small sample size and unequal height of subjects. A large emphasis was given to observe the relationship between the two independent variables but no relationship could be observed with current sample. The present study may reveal significant relationship if different forces exerted by the attacker were also taken as an Independent variable.

Horizontal velocity with which a receiver falls on the mat may not be solely claimed to be the effect of height of C.G. but is one of the factors affecting Receiver's horizontal velocity. If angles at different body joints and different forces produced by most contributing muscles were also taken as independent variable the study could reveal better results in studying the factors affecting horizontal velocity of Kouchi Makikomi.

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