Assessment of Relationship between Various Jumps and Throwing Performance in Judo

Mr. Shubham Pal[1]*, Dr. Vinita Bajpai Mishra[2]

[1] Research Scholar, L.N.I.P.E. Gwalior

Email: shubhampallnipe@gmail.com

[2] Associate Prof. L.N.I.P.E. Gwalior

Email: vinitadivyansh@rediffmail.com

Abstract - This study was conducted to assess the relationship between various jumps and throwing performance in Judo. This study was conducted on 10 all India Inter-varsity level male subjects. They had participated in intervarsity or higher level of competitions. Subjects performance was recorded on RCMJ (Repeated counter movement jump), CMJ (Counter movement jump), CMJAT (counter movement jump with arm thrust). All these jumps were recorded using G-Sensor device. The device was fixed at the level of L5 (5ᵗʰ Lumbar disk). Subjects throwing performance was taken as dependent variables for the study. They were asked to perform maximum number of throws of IpponSeoiNage technique in one minute. Pearson's r was calculated as to provide statistical validity to findings of this study. Level of significance was set at 0.05. Out of three selected jumps two (Counter movement jump with arm thrust, Repeated counter movement jump) were found to be significantly correlated with throwing performance in Judo.

Keywords - Ipponseoinage, Repeated counter movement jump, G-sensor.

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INTRODUCTION

Society of present era is highly impacted with influence of technology. So as our lives are made easy by latest technological advancement which took place in almost every field: be it Medicine, Agriculture, I.T., Sports, Infrastructure or any other field. As like other fields, sports have also been highly benefitted with the use of latest technologies. For example earlier Calisthenic exercises were used for the improvement in strength, but now we are using Various Isometric, Isotonic, and Isokinetic machines for the same purpose which are very much capable of providing graded resistance and monitoring gain in strength quantitatively. Some other advanced equipment are available in the market which can identify any abnormality in gait. The present study is based on similar sophisticated device named as G-sensor. This device is being used for two purposes: The first in the order is rehabilitation and second is Sports research. The device is useful in quantifying the sports performances like stride length, stride frequency, stride rate, jump height, impact force etc. The findings of the study are based on the outputs presented by G-sensor device. The game of Judo is a body contact sport where one athlete tries to defeat another using various throwing, holding, locking, and choking skills. To apply these skills in sports one need to possess a good level of explosive strength,

endurance, speed, agility and excellent coordinative abilities. Several studies have been conducted attempting to identify some responsible factors which affect Judo performance largely. As a result of those long term studies now we are in a position to conclude all responsible factors into some valuable variables. The present study has been conducted under the influence of one such study conducted by Georgios Zaggelidis and SavvasLazaridis(2013). The results of the study presented enough evidences regarding importance of jumping ability in determining Judo performance. Trained Judokas shown better neuromuscular adaptation at their knee joint for the quick execution of selected Judo throwing techniques. This thought leads to find out relationship between these jumping performances andthrowing performance in Judo. There is a similarity in various forms of jump and Judo hip throwing techniques that greater the stretch shortening cycle better the throwing performance. This experiment was conducted to identify which jump's performance is the better indicator of Judo throwing performance.

METHODOLOGY

10 subjects were selected randomly from bunch of specialized Judokas of L.N.I.P.E. Gwalior. The

subjects were told about the purpose of the study and a written consent was received from them. The jumping performance was tested inside the Institute's Biomechanics laboratoryand the data were collected with the help of G-sensor device. Later the subject's performance was tested on throwing performance of Judo inside the Judo hall of the Institute. Subjects were asked to chose an uke (receiver) of similar body weight and height. Two Ukes (2 subjects who are ready to receive throws of Ipponseoinage) were made stand 6 meters apart. On the tester's command Hazime the subject needs to start throwing each partner one by one continuously for 1 minute. He has to run towards another partner after throwing 1st receiver and vice versa. The tester records the total number of throws performed by subjects in 1 minute. To observe statistical findings Pearson's product moment correlation technique was implied. Level of significance was set at 0.05. All kinds of statistical processes were performed using IBM SPSS software.

ANALYSIS OF DATA

The data on various jumps were recorded with the help of G-sensor and analyzed by using G-studio software out of various jump outputs the average height attained by the subject in each jump was recorded. Total number of throws performed by subject were recorded by the researcher. At last whole parametric data was analyzed with the help of IBM SPSS software for its statistical significance. The score obtained from subjects on different variables were first analyzed for its normality. Then Pearson's product moment correlation was implied.

FINDINGS

Table 1 Test of Normality

	Shapiro-Wilk		
CMJ	.938	10	**.484**
CMJAT	.834	10	**.256**
RCMJ	.869	10	**.199**
Throwing performance in Judo	.943	10	**.943**

Table 1 shows that corresponding values of all the selected independent variables are higher than 0.05 hence it can be inferred that the present data satisfies the normality assumption. Since Shapiro-Wilk test is significant, parametric tests can be applied on the present data.

Table 2: Descriptive Statistics of selected variables

Variable	Mean	Std. Deviation	N
CMJ	38.50	1.90	10
CMJAT	42.23	2.13	10
RCMJ	34.65	2.30	10
Throwing performance in Judo	14.00	1.50	10

In table 2 mean and standard deviation of all the selected independent variables have been reported.

On the basis of present data following findings were observed:

- The mean performance of subjects on counter moment jump was found to be 38.50cm with SD 1.90
- The mean performance of subjects on counter moment jump with arm thrust was found to be 42.23cm with SD 2.13.
- The mean performance of subjects on repeated counter moment jump was found to be 34.65cm with SD 2.30.
- The mean performance of subjects on throwing performance was recorded as 14 with SD 1.50.

Table 3: Correlations matrix of all the jumps with throwing performance

		CMJ	SJ	CMJAT	RCMJ	DJ	Throwing performance in Judo
Counter Moment Jump	Pearson Correlation	1	.340	.558	.770	.302	.451
	Sig. (2-tailed)		.198	.694	.072	.550	.711
	N	10	10	10	10	10	10
Counter Moment Jump with Arm Thrust	Pearson Correlation			1	.557	-.041	.791*
	Sig. (2-tailed)				.232	.371	.770
	N			10	10	10	10
Repeated Counter Moment Jump	Pearson Correlation				1	.651	.884*
	Sig. (2-tailed)					.186	.670
	N				10	10	10
Throwing performance in Judo	Pearson Correlation						1
	Sig. (2-tailed)						
	N						10

In table 3 correlation matrix have been presented for various independent variables (Jumping performance) with one dependent variable (throwing performance in Judo). Only 2 independent variables out of 3 were found to be significantly correlated with throwing performance of Judo.

CONCLUSIONS

On the basis of present sample the following conclusions were drawn:

- Repeated Counter movement jump is the best indicator of Judo throwing ability amongst all the selected jump variables.
- The r-value of Repeated Counter movement jump was found to be .884 which means that 88.4% change in Judo throwing ability may be claimed due to Repeated Counter movement jump Performance.
- The r-value of Counter movement jump with arm thrust was found to be .791 which means that 79.1% change in Judo throwing ability may be claimed due to Counter movement jump with arm thrust performance.
- For the development of test battery repeated counter movement jump can be one of the important variables for the determination of skillful Judokas.

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Corresponding Author

Mr. Shubham Pal*

Research Scholar, L.N.I.P.E. Gwalior

Mr. Shubham Pal[1]*, Dr. Vinita Bajpai Mishra[2]