

Kinematic Analysis of Different Group in Basketball with the Technique of Jump Shot

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ABSTRACT

The purpose of the present study was to kinematics analysis with selected Kinematic variables among three group G1 short height, G2 medium height and G3 tall players in basketball. Thirty (N=30) Basketball player of Basketball academy from NBA Academy Indore are purposively selected as a subject for present study. Further it was divided into three different heights groups of Ten (N=10), subjects each, the first group was heighted from 155 to 165 cm, second group was heighted from 166 to 175 cm and third group was heighted from 176cm and above respectively. The entire subject ranged between ages 15 to 21 years. Videography method was used to biomechanically analysis the selected moments i.e. execution of Jump shot in Basketball. The selected kinematic variables such as Displacement of CG, player's CG height during ball release and velocity of the ball during ball release were selected for the present study. Kinovea software was used in order to obtain the values of selected kinematic from developed stick figure. For the purpose of this study ANOVA test was used. The level of significance was set at 0.05. The result reveled significant difference in player's cg height during ball release but the researcher failed to get the significant result in displacement of cg and velocity of the ball during ball release.

Keywords- Kinovea software, Kinematic, Basketball, Technique of Jump Shot.

I. INTRODUCTION

In present scenario the importance of physical education is increasing greatly, games and sports have made their own identity in this world. In today's world people are very passionate about games and sports, every sports has its own skills and techniques, it has now become very possible to improve the techniques by studying so that the percentage of injuries incurred while playing can be reduced and play smoothly. Basketball is a very popular game, the passion of which can be seen very easily in people, it's a technical game in which a lot of techniques used in done such as jump shot, set shot, lay shot, hook shot, dunk shot etc. jump shot is a very important technique in basketball which is used a lot when playing basketball to convert the basket in to the score. In order to reduce the risk of injury and improve athletic results, biomechanics in sport entails a thorough examination of sport movements. Sport and exercise

biomechanics is a branch of science dealing with the study of human movement mechanics. It is the definition, study, and evaluation of human movement during sports activities. (Brukner, 2012)

II. METHODOLOGY

Selection of subject

Thirty (N=30) basketball player of basketball academy from NBA Academy Indore are purposively selected as a subject for present study. Further it was divided into three different heighted groups of Ten (N=10) subjects each, the first group was heighted from 155 to 165 cm, second group was heighted from 166 to 175 cm and third group was heighted from 176cm and above respectively. The entire subject ranged between the ages 15 to 21 years and were right handed basketball shooter. The purpose of the research was explained to the entire subject and subjects were motivated to put their best during each trial.

Selection of variables

Subjects were introduced to the testing equipment and procedures by the research scholar. The angles at selected joints were used to describe the following angular kinematic variables:

- Displacement of CG,
- Player's CG height during ball release
- Velocity of the ball during ball release

Criterion measures

For the purpose of present study, the stick figures were recorded of the subjects during perform the jump shot.

Tools

Videography method was used to biomechanically analysis the selected moments i.e. execution of jump shot in basketball. Canon EOS 6D mark II camera with the frequency of 60 frames per second was placed on the sagittal plane. The height of the video camera was set at 1.4 meters from the ground and the distance between video camera and the subjects performing area was 6.33 meters. Kinovea software was used to develop the stick figures of the subjects to analysis.

Statistical technique

ANOVA test was used to the selected Kinematic variables among three groups.

Finding

Table 1: Descriptive statistics for the selected kinematical variable of three different height groups

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
Displacement of CG	1.00	10	24.00	4.24264	1.34164	20.97	27.0350	16.00	32.00
	2.00	10	26.10	7.47514	2.36385	20.75	31.4474	13.00	35.00
	3.00	10	28.00	3.74166	1.18322	25.32	30.6766	23.00	35.00
	Total	30	26.03	5.48027	1.00056	23.99	28.0797	13.00	35.00
CG height of ball release	1.00	10	102.60	4.69515	1.48474	99.24	105.9587	96.00	112.00
	2.00	10	109.30	5.51866	1.74515	105.35	113.2478	98.00	117.00
	3.00	10	111.80	6.94102	2.19494	106.83	116.7653	96.00	122.00
	Total	30	107.90	6.84483	1.24969	105.34	110.4559	96.00	122.00
velocity of the ball	1.00	10	12.70	1.33749	.42295	11.74	13.6568	11.00	15.00
	2.00	10	12.80	1.03280	.32660	12.06	13.5388	11.00	14.00
	3.00	10	11.85	1.00139	.31667	11.13	12.5663	10.00	13.00
	Total	30	12.45	1.17701	.21489	12.01	12.8895	10.00	15.00

Table 2: ANOVA Showing F value of selected kinematical variable of three different height groups

Variables		Sum of Squares	Df	Mean Square	F	Sig.
Displacement of CG	Between Groups	80.067	2	40.033	1.367	.272
	Within Groups	790.900	27	29.293		
	Total	870.967	29			
CG height of ball release	Between Groups	452.600	2	226.300	6.743	.004
	Within Groups	906.100	27	33.559		
	Total	1358.700	29			
velocity of the ball	Between Groups	5.450	2	2.725	2.119	.140
	Within Groups	34.725	27	1.286		
	Total	40.175	29			

Researcher found out the significance difference among three Groups that is G1, G2 and G3. In the variables **Player CG height at ball release**, at the significant level 0.05 and whereas researcher failed to get significant difference among three Groups **Displacement**

of CG, velocity of the ball. At the significant level 0.05. For the significant values post hoc test, need to be applied for comparing means of groups (G1, G2 and G3). LSD was applied for post hoc test because numbers of subject of each group are same.

Table 3: The multiple comparison between G1, G2, and G3 on Player's CG during ball release

(J) Group	Dependent Variable: Player's CG during ball release			Post Hoc Tests	
	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
				Lower Bound	Upper Bound
G1&G2	-6.70000*	2.59072	.015	-12.0157	-1.3843
G1&G3	-9.20000*	2.59072	.001	-14.5157	-3.8843
G2&G3	-2.50000	2.59072	.343	-7.8157	2.8157

*. The mean difference is significant at the 0.05 level.

In the Anova table 2 for player Player's CG during ball release, shown the F-value is significant as the p-value (.004) which is less than the 0.05 level of significance hence null hypothesis of no difference among the means of three group may be rejected at the level of significance at 5%.

The multiple comparison between G1, G2, and G3 on Player's CG during ball release, It can be seen that the mean difference between G1 and G2 is significant as the P-value for this mean difference is .015 which is less than 0.05. Similarly, the mean difference between G1 and G3 is significant as the P-value for this mean difference is .001, which is less than 0.05. There is no significant mean difference between G1 and G2 as the P-value for this mean difference is .343 which is greater than 0.05

III. CONCLUSION

Researcher found out the significance difference among three Groups that is G1, G2 and G3. In the variables **Player CG height at ball release**, at the significant level 0.05 and whereas researcher failed to get significant difference among three Groups **Displacement of CG, velocity of the ball** at the significant level 0.05. For the significant values post hoc test need to be applied for comparing means of groups (G1, G2 and G3) it means player cg's height during performing the jump shot was more dominant to developed jump shot technique.

The multiple comparison between G1, G2, and G3 on Player's CG during ball release, It can be seen that the mean difference between G1 and G2 is significant as the P-value for this mean difference is .015 which is less than 0.05. Similarly, the mean difference between G1 and G3 is significant as the P-value for this mean difference is .001, which is less than 0.05. There is no significant mean difference between G1 and G2 as the P-value for this mean difference is .343, which is greater than 0.05, which G1 and G2 means are equal in the performance of jump shot.

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