Research Paper Commerce

Relatioship of Selected Physical Variables With The Performance in Shot Put in Disco Put Style

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ABSTRACT

Aim: The purpose of this study was to determine the relationship of selected physical variables with the performance of Shot put in Disco put style. Method: Ten male shot putters were selected as subject. For the establishment of relationship of dependent and independent variables the following tests were employed. Height, body weight, maximum strength, explosive strength, arm spam and shoulder strength. The performance was measured from the inner edge of the throwing circle to the point where the Shot touched the ground. Statistics: Product movement correlation was used to compute coefficient of correlation. Result: The explosive strength and shoulder strength had positive contribution on the performance of shot putter. of an individual correlates maximum with shot putters performance as the correlation co-efficient values were found higher than the tabulated value in case of physical variables.

KEYWORDS | Displacement, Release and Velocity

Introduction

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 The simple descriptive approach which was characteristic of early work has been superseded by attempts to explain the mechanisms underlying movement.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(Hay).

Biomechanics is an applied form of mechanics, and consequently the methods used to investigate it must be derived from those of mechanics. However the mechanics have not developed in the wake of mechanics, but a bordering science in other scientific disciplines such as anatomy, physiology and the techniques of sport.

To facilitate a biomechanical analysis and to focus our attention on improvement to enhance the effectiveness of a movement performance, we must know the purpose is usually expressed in mechanical terms for instance, the purpose of throwing the discus is to cover the maximum horizontal distance.

A Kinematics assessment is providing information on the relationship of parts of the body to each other. This is useful in measuring joint angles during complex movement and has provided the basis of understanding functional activities comes from kinematics assessments.

New technology computers hardware and software, video recorders etc. have opened new and simpler ways to collecting biomechanical data. Modern equipment for 3D analysis consists of a computer, videos record and interface device. The whole protocol is precisely designed, stating clearly how to records a movement and how to transfer it to the computer. Recording is a very delicate part as a lot of light is required and high speed shutter on the video camera must be on with the minimum sped 1/250 seconds (usually contemporary software it is then possible to calculate kinematics data, e.g. trajectory, velocity, angle, angular velocity of a particular body point, body segment or whole body. It is also possible to present data in many different ways-numerics, with graphs, with graphs, with different points of view.

Material and methods

The present study is based on randomly selected 10 male shot putters who had participated in National level Tournament, aged (16 to 28 years). The data were collected under natural environmental conditions in practice session.

Procedure for administering the tests for physical variables

The selected physical variables were the height, body weight, maximum strength, explosive strength, arm spam and shoulder strength. The details of collecting the data are as follows:

- Height measurement was recorded up to 1/10th of a centimeter.
- Weight was measured by weighing machine and recorded accurately in kilogram.
- Maximum strength measured by squat was recorded in Kilograms.
- Arm Span was measured with a steel measuring tape and scores was recorded to the 1/10th of a centimeter.
- Explosive leg strength measured by standing broad jump was recorded in meters.
- Shoulder strength measured by medicine ball throw was recorded in meters.

Performance of the Subjects:

The performance of each subject was measured by using standard procedure of Athletic federation of India. Each athlete was given six trials. The athletes put the shot and the performance was measured from the inner edge of the throwing circle to the point where the Shot touched the ground, by using a steel-tape. The performance was recorded in meters.

Statistical technique:

To analyze data, descriptive statistics was used. Further to examine the relationship of selected physical variables with the performance of discus put style in shot put, Pearson's Product Correlation Moment was used.

Results:

In order to find out the relationship between selected physical variables to the performance of shot putters. The collected

data was analysed by using Coefficient of Correlation. The result of the statistical technique used on data are presented in given table

Table - 1
Descriptive Analysis of Disco Put style at Physical variables in Shot Put

	Range	Minimum	Maximum	Mean	Std. Deviation
Height	26.00	158.00	184.00	169.50	7.92
Weight	21.00	77.00	98.00	86.25	6.76
Arm span	.27	1.71	1.98	1.85	.10
Explosive strength	.45	2.45	2.90	2.68	.12
Maximum strength	40.00	155.00	195.00	175.00	14.62
Shoulder strength	8.29	17.35	25.64	22.27	2.33
Performance	4.85	12.89	17.74	15.59	1.35

(all angular variables were measured in degrees)

(N= 12)

Table- 1 reveals the descriptive analysis of descriptive analysis of disco put style at physical variables in shot pu**t** the measurement of Height, Weight, Arm Span, Explosive Strength, Maximum Strength, Shoulder strength and Performance mean and SD values were 169.50± 7.92; 86.25 ± 6.76; 1.85 ± .10; 2.68 ± .12; 175.00 ± 14.62, 22.27 ± 2.33 and 15.59 ± 1.35respectively. The minimum and maximum values of the measurement of Height, Weight, Arm Span, Explosive Strength, Maximum Strength, Shoulder strength and Performance measurement were 158 & 184, 77 & 98, 1.71 & 1.98, 2.45 & 2.90, 155 & 195, 17.35 & 25.64 and 12.89 & 17.74 respectively.

The graphical representation of physical variables of disco put style in shot pu**t** has been presented in figure 18.

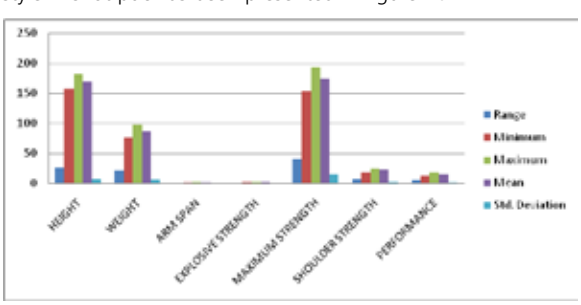

Figure 18: Graphical chart of physical variables of disco put style in shot put

Table - 2
Correlation between Dependent Variable (*Shot-putter performance*) and Independent Variables (selected physical variable*)*

Independent Variables	Correlation coefficient
Height	.393
Weight	.394
Arm span	.422
Explosive strength	.807(*)
Maximum strength	.562
Shoulder strength	.872(*)

*** Significant at .05 level**

r.05 (10) = .576

Table - 2 clearly indicates that there exists a significant relationship between *Shot-putter performance and Explosive Strength and Shoulder Strength* as the correlation co-efficient values were found higher than the tabulated values at .05 level of significance.

On the other hand, there exists an insignificant relationship between *Shot-putter performance and Height, Weight, Arm Span, Explosive and Maximum Strength* as the correlation co-efficient values were found lower than the tabulated values at .05 level of significance.

Discussion of Finding
The descriptive analysis of disco put style at physical kinematic variables in shot put the measurement of velocity of shot release, velocity of wrist, height of shot release and displacement of shot mean and SD values were 51.90± 5.46; 22.08 ± 3.84; 2.29 ±.086 and 3.39 ±.24respectively.

The statistical findings show that there is a significant relationship of Height of shot in releasing phase of disco put style in shot put this might be due to greater extension of various joints involved at this phase of putting the shot.

In present study insignificant was found in relation to *Velocity of Shot Release, Velocity of Wrist in Releasing hands, Displacement of shot,* this might be due to in technique full extension of body and arm, clearly visible extension of both legs and unwinding of torso. Scientific Research Project Biomechanical Analysis at the IAAF World Championships (Daegu 2011) conducted study on "Biomechanical Analysis of Men's Shot put – Qualification (Group A & Group B)" and similar result was found in rotational technique in relation to velocity of shot release, velocity of wrist, height of shot release and displacement of shot. Present study is supported by the study conducted by (Daegu 2011). Lindsay (1994) found that throwers of rotational technique maintained a significant forward velocity of the COM together with a progressive rise in vertical velocity of COM up until the point of release. Ariel (1973b) reported similar findings.

Discussion of Hypothesis
The hypothesis stated earlier that there would be no significance relationship between selected physical variables and the performance in shot putter were partially accepted and partially rejected.

Conclusion
The explosive strength and shoulder strength had positive contribution on the performance of shot putter.

The physical variables such as height, weight, arm span and maximum strength did not have significant relationship with the performance of shot putter at the release phase.

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