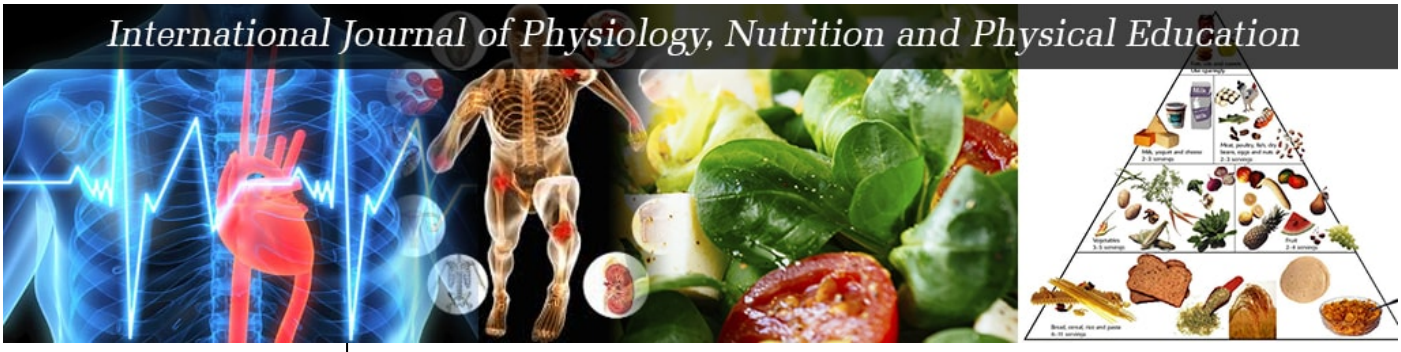
International Journal of Physiology, Nutrition and Physical Education 2018; 3(1): 2289-2291



ISSN: 2456-0057
IJPNPE 2018; 3(1): 2289-2291

www.journalofsports.com
Received: 18-11-2017
Accepted: 26-12-2017

Dr. Vasant Vishram Rathod
Associate Professor, Nagpur Sharirik Shikshan Mahavidyalaya, Dhantoli Nagpur, Maharashtra, India

Correspondence
Dr. Vasant Vishram Rathod
Associate Professor, Nagpur Sharirik Shikshan Mahavidyalaya, Dhantoli Nagpur, Maharashtra, India

Relationship of selected biomechanical variable to the performance in race walking

Dr. Vasant Vishram Rathod

Abstract
The purpose of this study was to find out the relationship of selected biomechanical variables to the performance in race walking. The subjects were 5 male race walkers of junior national level with their age ranging between 18-24 years. The sequential photography technique was employed to record the race walking technique. A motor drives Nikon Model EM camera was used. The subjects were photographed at the two phase i.e. single support and double support in sagittal plane. From the photographic the stick figures were prepared by using joint-point methods and various biomechanical variables were obtained at the two phases. All selected biomechanical also does not show any significant relationship with the performance of race walking. The biomechanical variable i.e. Hip angle showed significant relationship with the performance of race walking at 0.05 level.

Keywords: Race walking, single support, double support

Introduction
Biomechanics is an applied form of mechanics and consequently the methods used to investigate it must be derived from those of mechanics. However, bio-mechanics have not developed in the wake of mechanics, but as a bordering science in other scientific disciplines such as anatomy, physiology and the technique of sports [1]. The role that sports biomechanics widely understood in the sports community and the demand for service increasing, researchers in sports biomechanics will have to consider carefully how much time they can devote to the provision of scientific services without impairing their performance as scholar researchers. To avoid the problems inherent in this situation, it may be necessary to develop programmes of study for the training of technicians in sports biomechanics; technicians who can provide the kind of services sought by sporting bodies [2]. Walking is cyclic movement in which two consecutive strides of one double stride make up a complete cycle of movement. In a double stride all the separate phases of the walking movement are performed, the new cycle follows without a break. In this cycle both legs have alternatively supporting and driving functions. movement permit us to confine ourselves in what follows to running.The cyclic running movement has two main phases: the supporting and the non-supporting phase. The vertical movement, i.e. the vertical projection of the point of support in relation to the body's centre of gravity (CG) is regarded here as the demarcation between the phases. This is the instant when the free driving leg passes the foot bearing the weight of the body.

Statement of the problem
The purpose of the study was to investigate relationship of selected biomechanical variable to the performance in Race walking.

Selection of subjects
In this study 4-6 Male Race Walkers of Junior National Level were selected as subjects for this study. The age of the subjects were ranged between 18- 22 years.

Selection of variables

The following variables are selected for the study:

Biomechanical variables

a) Angles of ankle joint
b) Angles of knee joint
c) Angles of hip joint
d) Angles of shoulder joint
e) Angles of elbow joint
f) Angles of wrist joint

Criterion Measure

The criterion measure chosen for testing the hypothesis of the present study were the performance of 10 km walk.

Reliability of data

To obtain measurement, standard and calibrated equipment like camera, stadiometer, , steel tape etc. was used. In order to established reliability the test re-test method was employed.

Collection of data

Filming protocol, analysis of procedure for locating center of gravity, and performance of Race walking was the part and parcel of collection of data.

Filming Protocol

Sequential photograph was employed for conducting the biomechanical analysis of performance of Race walkers. The camera being used for the purpose was a standard Nikon D100 model EM with motor drive. The frequency of camera was 4 frame / second. Even though this camera register photograph, at the moment of stance, at the moment of Execution was selected for the purpose of analysis. The photographic sequence was taken under controlled condition. The distance of the camera from the subjects was 10 mts away and was fixed at one-meter height. The distance was measured manually for each subject.

Analysis of Film

The photographs as obtained by the use of digital photograph was analyzed (the best trial) by standard analysis method. With the help of a standard Nikon D100 model EM with motor drive we can measure the dimension of each photograph with the help of which various biomechanical variables were calculated.

Statistical technique

The relationship of selected biomechanical variables were correlated with the performance in Race Walking using Pearson's product moment correlation and for testing the hypothesis the level of significance was set at 0.05.

Analysis of Data

The collected scores on each selected biomechanical variables and the performance of race walking were analyzed by product moment correlation method, the significance of the relationship was tested at 0.05 level of significance. The scores pertaining to each selected biomechanical variables have been presented in table.

Table 1: Relationship of Selected Biomechanical Variables with the Performance of Race Walking

S. No	Variables	Co-efficient of correlation(Single Support)	Co-efficient of correlation(Double Support)
1.	Ankle(R)	0.484	-0.194
2.	Ankle (L)	-0.705	0.452
3	Knee (R)	-0.824*	0.000
4.	Knee (L)	-0.516	0.817*
5.	Hip (R)	0.406	-0.863*
6.	Hip (L)	0.90*	0.820*
7.	Shoulder (R)	-0.757	-0.330
8.	Shoulder (L)	-0.600	0.546
9.	Elbow (R)	-0.459	0.217
10.	Elbow (R)	0.141	0.000
11.	Wrist (R)	0.475	0.323
12.	Wrist (L)	-0.763	0.371
13.	Height of C.G.	-0.753	-0.555

It is evident from table-4 that co-efficient of correlation of selected biomechanical variables namely Ankle(R), Ankle (L), Knee (R), Knee (L), Hip (R), Shoulder (R), Shoulder (L), Elbow (R), Elbow (R), Wrist (R), Wrist (L), Height of C.G is not significant with the performance in race walking at single and double support phase.

However, the co-efficient of correlation for Knee(R), Hip (L) with the performance in single support phase of race walking is 0.82 &0.90 respectively which is significant at 0.05 levels. Also the co-efficient of correlation for Knee (L), Hip(R) and Hip (L) with the performance in double support phase is 0.82,0.86 & 0.82 also significant at 0.05 level.

Findings

The obtained values of co-efficient of correlation of selected biomechanical variables at the two phases i.e. single support and double support to the performance of race walking has shown insignificant relationship. The statistical insignificance may be attributed to the fact that the selected biomechanical variables namely Ankle(R), Ankle (L) ,Knee (R), Knee (L), Hip (R), Shoulder (R), Shoulder (L), Elbow (R), Elbow (R), Wrist (R), Wrist (L), Height of C.G are not contributing very much to the performance as race walking a cyclic type of activity which requires smooth and easy execution of technique and basically hip joint and shoulder joint actions are playing more dominating role , might be the smaller sample size and level of participation of athletes must be the cause of statistical insignificance. However the co-efficient of correlation for Knee(R), Hip (L) with the performance in single support phase of race walking is 0.82 &0.90 respectively which is significant at 0.05 levels. Also the co-efficient of correlation for Knee (L) ,Hip(R) and Hip (L) with the performance in double support phase is 0.82,0.86& 0.82 also significant at 0.05 level.

References

1. Charles E. Dull, *et al*. "Modern physics" (New York: holt rainchart and Winston in corporated 1960)

2. Donald Mathew K. “Measurement in Physical Education” (Philadelphia: W.B. Saunders company 1976.
3. Dr. Kay Flatten “Biomechanics of Javelin Throw” track technique (Los Altos California USA) March 1978.
4. James G. Hay “The Biomechanics of Sports Technique” (Prentice – Hall Inc. Englewood cliffNew Jersey.
5. Karaynne The Biomechanics of Triple Jump: Track and field quarterly spring 1987.
6. Nathalie Guessard Jacques Duchatean and Karl Hainout” Low starting block angle is more effective” track and field coach review. Vol. 95 Published by Jimmy Carnes 1995.
7. Ralphmann “The Elite athlete project sprint and Hurdles” Track technique Los Altos Califsormina Published by E.D. Fox 1978.