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A study on normal and restricted swing of upper extremities on speed difference on male sprinters

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Abstract

How we hold our arms affects how we run, this article enlightens the importance of normal swinging of upper extremities during running. 20 male athletes are selected and they were made to run 50 yard dash with their both hands were fixed behind the body. The study reveals that the normal running is found to be speedier than the restricted type of running.

Keywords: Upper extremities, arm swings

Introduction

Running is the natural activity which helps in the process of physical growth and development. This activity is unique in the field of competitive sports in ancient age as well as in modern age. Running is a process of advancement in a particular direction; here the purpose is to cover a required distance as fast as possible.

Most of us swing our arms when we run, but why? Scientists know there is a mechanical benefit to the motion: Swinging arms counterbalance the momentum of a person's legs, providing stability to the runner. The jury was out, however, on whether the activity saves energy. In a new study, researchers compared the energy cost of running in four different positions. The experiment looked at 13 subjects' oxygen consumption and carbon dioxide production while running. Reporting this week in *The Journal of Experimental Biology*, the team concludes that swinging your arms uses 3% less energy than keeping your hands behind your back, 9% less energy than folding your arms over your chest, and 13% less energy than running with your hands above your head. The study notes that the muscular power used while holding the arms in unusual positions may contribute to some of the extra energy cost.

For analysing the action of running, the general tendency of attention is on the leg movement ignoring the action of upper extremities.

Hay¹ stated that the rotary action of the hips evoke contrary reaction in athletes upper body, for as the athlete's left knee in swing forward and upward, the right arm is sewing forward and upward and the left arm backward and upward to balance this leg action.

Powell² has described that hand action during running should be forward and backward rather than across. This helps the body to move in a straight line. If the runner's hands cross the midline of the body in their forward drive they will create a rotational effect in the hips which will be transferred to the feet. A short radius (like sprinting) moved through a full range will give faster leg action because the speed of the arms determines the speed of the leg.

The Importance of Arm Swing

The relationship between the arm and leg swing is critical for the runner to move in a straight line. Running is a coordinated movement between the upper body and the lower body. Many runners think the lower body is the most important part of running. However, the arm swing controls what the lower body does. If your arms cross the midline of your upper body, your lower body has to counteract that swing. What will happen is that your lower body will copy your upper body, causing your feet to cross the midline of your body. Over time, this will cause injury, usually causing pain in the lower back, outside of the knee (IT Band) or ankle.

The arm swing plays a major role in the balance and momentum of the body during running.

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The faster you move your arms forward and backward, the faster your legs will follow. Swinging the arms forward and backward helps propel the body forward in a straight line. If the arms swing across the body, your body will be moving right and left, causing you to use more energy and be less efficient.

So in this research work an attempt has been made to find out the effects of restricted hand swing during the running speed.

Statement of the Problem

In this study the researcher intended to observe the effect of the hand swing when legs are active. This problem is stated as "A Study on Normal and Restricted Swing of Upper Extremities on Speed Difference on Sprinters"

Purpose

The purpose of this study was to find out the effect in running speed due to restricted swing of upper extremities during running condition.

Methodology

In this chapter the subjects, instruments are used for collecting data, procedure followed and the analytical procedures have been described.

Selection of Subject

The subjects of this present study were taken from various colleges of Kalyani University. Total 20 numbers of male sprinters were volunteered themselves as the subjects of this study. All of them had experience of training and competition in the field of games and sports. Their ages ranged 22-23 years.

Personal Data

Male Sprinters	Age (Year)		Height (CM)		Weight (KG)	
	mean	S.D	mean	S.D	mean	S.D
	23.62	0.523	164.8	1.662	54.09	8.368

Criterion Measured

50 m Run

The Instrument and Tools Used

The following instruments and tools were used for collecting data.

- Stop watch for measuring time
- Measuring tape
- Clapper as a starting device
- Tape for binding the hand

Procedure

To measure the effect of swing of upper extremities during running two types of running style were introduced. All subjects ran the distance in usual running style or normal style and no hand action style or restricted style (both hands were fixed behind).

1st type: Two hands were free

2nd type: The both hands were fixed behind the body

Two subjects stood behind the starting line and after proper set position they started running after hearing the sound of the clapper. All the subjects were tested in the same style of running. The restricted style of running was taken after a complete recovery period and the time of each subject was taken in two style of running.

Scoring: For both the style

Time taken covered the distance of 50 mt. was recorded in pp 1/10 of a second.

Result and Discussion

In this chapter the data presented in a tabular form and the result was interpreted with the help of proper statistical application.

Table 1: Comparison of Mean value of Normal style and restricted style in 50mt Run

Test Item	Style/0	Mean	SD	SED	t
50 mt. Run	Normal	7.58	0.658	0.1192	4.76*
	Restricted	8.16			

*Significant of .05 level of confidence

Table No.1 indicated the comparison of Mean value of the two different style of running. The mean score of Normal Style was 7.58 and that of restricted style was 8.16. The 't' value was 4.76, which is significant of 0.05 level of confidence. The 't' value should be greater than 1.729. From the table it was observed that in normal style the subject performed better in 50 m run than that of restricted style situation.

After comparing the mean value of two different styles it may be stated that there was a significant difference in performance of 50mt. run between normal style and restricted style (both hand tied). Upper extremities swing affects body position and it is easier to correct body lean and body position during running with the help of upper extremities. So effects of swing of upper extremities are essential in the total process of acceleration in running. According to Hay "the arm action balanced the leg action. So this statement supported the findings of the present study".

Conclusion

Within the limitation of study and on the basis of statistical interpretation, the result of the following conclusions may drawn:

- Swing of upper extremities was superior to the normal type of running than the restricted style of running.
- Speed of swing of upper extremities is closely related with speed of running.

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