

COMPARATIVE STUDY ON LOWER ARM LENGTH OF ATHLETES AT DIFFERENT LEVEL OF COMPETITION

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ABSTRACT

The main purpose of the present study was to compare lower arm length of among the all India intervarsity, national and state level long distance runners. The study consisted of 227 all India intervarsity, 131 national and 42 state long distance runners from different levels of competition. The age group ranged from 18 to 25 years. Measurements included the lower arm length of all athletes. For measuring the lower arm length. The measuring tape were used. It was found that there is a significant difference between the mean lower arm length of all India intervarsity and national level long distance runners. Whereas there is a no difference exists between national and state level long distance runners and also between all India intervarsity and state level long distance runners.

Keywords: Lower arm length, long distance runners, cardio respiratory endurance.

1. INTRODUCTION

Running events which are longer than 3000 meters is considered as long distance running event. The most common of these races are 5000 and 10000 meters. The marathon race is one of the examples of long distance race, which take place on paved roads over a course of 42.195 km (26 mile and 385 yard). Most of the best distance runners are small and light-framed (Jayakumar, Rameshkanan, & Chittibabu, 2013). They use a running style that avoids excess motion. Knee action is slight, arm movements are reduced to a minimum and the strides are shorter than those used in sprinting or middle-distance running. Along with fitness, strategy is also very essential for competing in long distance events. The

top racers use a variety of techniques to outperform their opponents, from abrupt changes of pace during the race to fast finishing kicks.

Kinanthropometry helps and improve the understanding of the gross functioning of the human body by measurement of body's size, shape, proportions and composition and relating these to health, exercise and performance. The central interest of kinanthropometry is that of physical performance, in particular, though not limited to, sport performance (Mohammad, 2015). By examining the relationship between body measurements and aspects of performance, kinanthropometry helps in optimizing training to improve performance, and also helps to reduce injuries (Koley, & Kaur, 2011; Brunkhorst, & Kielstein, 2013; Hussain, Ahmed, Mohammad, & Ali, 2013). Thus, measurement plays an important role to reaching the peak level of performance to long distance runners. The measure anthropometrical traits are as, tall height, lighter in weight and lower the center of gravity provides the maximum level of perfection in the running events. Measurement of body size includes such descriptive information as height, weight and surface area. While measures of body proportions describe the relationship between the height and weight among lengths, widths and circumference of various body segments. Jalliffe (1966) defined the measurement of the variation of physical dimension and gross composition of the human body at different age levels and degrees of nutrition. Eiben (1981) studied the importance female athletes, size, and shape and body composition and reported that female sprinters were smaller in stature than female hurdlers, jumpers and throwers. Chauhan, (1986) studied relationship between selected anthropometric variable and endurance running performance. He concluded that height, leg length, thigh length, total arm length, shoulder, chest, abdomen, hip and knee girths, thigh and calf skin folds and lean body mass had significant and negative correlation with 1500 m endurance running performance, where as 10,000 m running performance had statistically insignificant correlation with linear segment, girth and diameter measurements except with skin fold measurement (triceps, suprailiac, midaxillary, thigh and calf skin-fold) and body composition variables (i.e. body density, fat percentage, fat weight and lean body mass). Multiple correlations of 1500 meters running performance with combination of selected anthropometric variable were significant. Similarly the multiple correlation of 10,000 meters running performance with combination of selected skin fold and body composition variables were significant. But the multiple correlations were not sufficient size to put them in to the prediction equation.

Thus physical characteristics play a very vital role in all games and sports whether it is team or individual game, ideal body segments as per the demand of the particular event is necessary for higher achievement in that particular sport. Earlier studies reported that body height, body mass, palm span and palm length were important for the performance enhancement of athletes and were considered as basic criterion for their selection in various playing positions (Srroj 2002; Taborsky 2007). Skoufas (2003) reported that wider palm span and longer palm length influenced specific motor abilities.

2. METHODS AND MATERIALS

2.1 Subjects

For the purpose of this study three sample groups were formed. 1st group comprises of 227 All India Intervarsity Long Distance Runners, 2nd group comprises of 131 National Long Distance Runners and 3rd group comprises of 42 State Long Distance Runners were selected from different level of competition. They are in the age group of 18 to 25 years.

2.2 Procedure

The subject was made to stand with arms hanging down normally. Radial and dactylion were marked on the right hand. The distance between these two points was measured with the help of a measuring tape and the value was taken.

2.3 Statistical Analysis

One way analysis of variance was used to test whether there is any significant difference among the chosen lower arm length variable of long distance runners at different level of competition.

3. RESULTS

Table 1: Lower arm length of different level long distance runners

Source of Variation	df	Sum of Squares	Mean Square	F
Treatment	2	15.79	7.89	6.15*
Error	397	509.54	1.28	
Total	399	525.33		

*Significant at .05 level

Tab.F._{.05} (2,397) = 3.02

It is observable from the Table 1 regarding the lower arm length of the different level long distance runners. Calculated value of F (6.15) is more than the tabled value of F (3.02). So it can be conjectured that there is a significant difference in the mean lower arm length of different level long distance runners. Further to find out which level is greater than the other scheffè's test was applied, the analysis is related to this is given in Table 2.

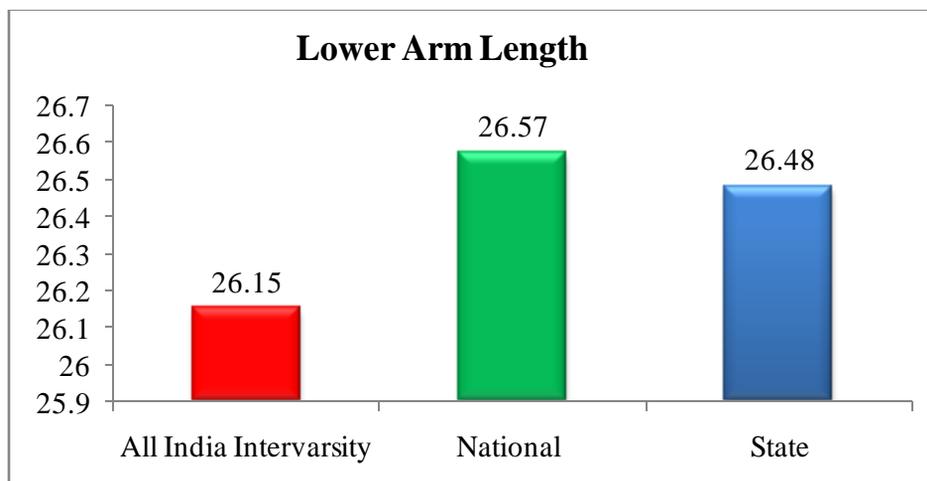
Table 2: Comparison of lower arm length of different level long distance runners

All India Intersarsity	Level		Mean Difference	Critical Difference
	National	State		
26.15	26.57		0.42*	0.30
26.15		26.48	0.33	0.49
	26.57	26.48	0.09	0.46

*Significant at .05 level

In Table 2 comparison of lower arm length of different level long distance runner's pair wise mean difference with the critical difference is shown. It is evident from the readings that there is a significant difference between the mean lower arm lengths of all India intersarsity and national level. Whereas there is a no significant difference between national and state level and also between all India intersarsity and state level long distance runners.

Figure 1: Mean lower arm length (cm) of different level long distance runners



4. DISCUSSION

From the results it is evident that there is significant difference amongst all three groups on the variable of lower arm length of long distance runners. It is further found that there is significant difference amongst the mean lower arm lengths of all India intervarsity and national levels long distance runners. Whereas there was no significant difference between national and state level and also between all India intervarsity and state level long distance runners. There is height very important role in lower arm length. For height is similar of national and state level and all India intervarsity and state level long distance runners.

Greater lower arm length of long distance runners' provides greater range of movement and momentum, which favors in maintaining their speed. As the distance of race increases, the requirement of maintaining running movement for longer time also increases. Therefore, all India intervarsity and state long distance running athletes had to compromise for speed and power. So, they avoid wider movement of lower arm to save the energy for prolonged period of running time (Singh, & Khan, 2013). Thus with increase in the level of participation of long distance runners, the arm length increases. Mohammad (2015) also documented in his study performance is highly correlated with the arm length of the athlete. In this study same sort of results are reported. Ali and Mohammad (2012) in their study stated that as length of the arm increases the strength also increase simultaneously. So for good results coaches and players should work on this factor. Cureton (1941) stated that in general, people with long legs and long arms and relatively short and small trunks were physically weak in long sustained heavy work, but they might show great speed and endurance at high levels of athletics activity. Long third-class levers are noted for speed and range of action as well as for their efficiency for force. The coaches should trainee who has wider arm.

5. CONCLUSIONS

Based on the results it is concluded that there is significant difference amongst all three groups on the variable of lower arm length of long distance runners. It is further found that there is significant difference amongst the mean lower arm lengths of all India intervarsity and national levels long distance runners. Whereas there was no significant difference between national and state level and also between all India intervarsity and state level long distance runners.

On the nutshell, it is documented that arm length influence the performance of the athletes, thus the coaches should design a training programme for the proper development of the arm length or they can find a trainee who has wider arm.

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