

A comparative study of body composition between sprinters and throwers

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■ **ABSTRACT**

The purpose of the study was to compare the body composition between sprinters and throwers. Specific anthropometric characteristics are needed to be successful in certain sporting events. It is also important to note that there are some differences in body structure and composition of sports persons involved in individual and team sports. Physical performance declines when body weight and percentage of body fat is at extreme level, but depending on the sport, a higher or lower body fat level may be beneficial. Because of this, body composition trends in different sports can help identify potential participants. A total of 30 male (sprinters n = 15 and throwers n = 15) subjects were selected from different colleges affiliated to Karnatak University, Dharwad st: Karnataka. The ages of athletes were between 20 to 25 years. The body composition of the subjects was assessed through Skinfold measurement of four sites *i.e.*, biceps, triceps, supra-iliac and sub-scapular were measured with the help of Skinfold caliper. To the assessment of percentage fat estimated from the sum of skin folds was calculated using equations of Siri (1956) and Durnin and Womersley (1974) was used. For the data analysis, t - test was employed. Results showed that there was a significant difference between sprinters and throwers. Throwers were found to have significantly higher body density and percentage of body fat ($p < 0.05$) than the sprinters, whereas Sprinters had significantly higher lean body mass ($p < 0.01$) as compared to throwers. Whereas in total body mass there was no significant difference between sprinters and throwers.

■ **KEY WORDS** : Percentage of fat body density, Lean body mass Throwers, Sprinters

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Specific anthropometric characteristics are needed to be successful in certain sporting events. It is also important to note that there are some differences in body structure and composition of sports persons involved in individual and team sports. The tasks in some events, such as shot put or high jump, are quite specific and different from each other and so are the successful physiques. This process whereby the physical

demands of a sport lead to selection of body types best suited to that sport is known as “morphological optimization” (Bloomfield *et al.*, 1995). There are number of papers dealing with anthropometrics and body type of athletes in various sports (Heath and Carter, 1967), as well as different playing positions in a specific sport (Matkovic *et al.*, 2003; Jelivic *et al.*, 2002). Rare, but very interesting are studies on the influence of

morphological characteristics on top sport achievements, as the research carried out on javelin throwers (Coh *et al.*, 2002). Running events in track-and-field are marked by an exceptional variety of duration of a single event, energetic demands and the tempo of energy release. Considering the fact that runners need to carry their weight, which means they need to overcome the force of gravity on different distances, unlike, for example, rowers and swimmers, this stipulates a specific (lean) body composition as a prerequisite for more efficient and economic performance in a single event.

Although previous research has demonstrated that athletes in all running events have less body fat compared to most other disciplines (Martin and Coe, 1997; Jackson and Pollock, 1985; Gore, 2000; Matkovic *et al.*, 2003.; Medved, 1987; Hawes and Sovak, 1994), according to our knowledge, no systematic research regarding the morphological characteristics of the athletes in various running events, has been conducted so far. Track and field events are marked by an exceptional variety of duration of a single event, energetic demands and the tempo of energy release. The fact that runners need to carry their body weight, which means they need to overcome the force of gravity on different distances, stipulates a specific (lean) body composition as a prerequisite for more efficient and economic performance in a single event.

Athletes who have acquired the optimal physique for a particular event are more likely to succeed than those who lack the general characteristics (Carter, 1984). In athletes, body composition measures are widely used to prescribe desirable body weights, to optimize competitive performance, and to assess the effects of training (Sinning, 1996). It is generally accepted that a lower relative body fat is desirable for successful competition in most of the sports. This is because additional body fat adds to the weight of the body without contributing to its force production or energy producing capabilities, which means a decrease in relative strength. It is obvious that an increased fat weight will be detrimental in sporting activities where the body is moved against gravity (e.g. high jump, pole vault, volleyball spiking action) or propelled horizontally (e.g. running). Hence, the purpose of the study was to compare fat percentage between sprinters and throwers in Track and Field.

■ METHODOLOGY

Selection of subjects :

For the purpose of the study was to compare the fat percentage between sprinters and throwers. A total of 30 male (sprinters n = 15 and throwers n = 15) subjects were selected from of different colleges affiliated to Karnataka University, Dharwad, Karnataka. The age of athletes were between 20 to 25 years.

Administration of test and collection of data :

The weight of subjects was measured by using Digital Weighing machine to the nearest 0.5 kg. Skinfold measurement by means of Lange skinfold caliper with proper anatomical mark sites of Biceps, Triceps, Supra iliac, Subscapular.

Percentage body fat as estimated from the sum of skin folds was calculated using equations of Siri (1956); Durnin and Womersley (1974) and Durnin and Rahaman (1967) . The regression equations for the prediction of body density from the log of the sum of skin fold thickness at four sites in mm are as follows:

- For 20 to 29 years age group: Body Density (g/cc) = 1.1631 - 0.0632 (X) (Durnin and Womersley, 1974)

where as,

- $X = \log (\text{Biceps} + \text{Triceps} + \text{Subscapular} + \text{Suprailliac})$ (Wilmore and Behnke, 1970).
- % Body fat = $[4.95 / \text{Body density} - 4.5] \times 100$ (Siri, 1956)
- Total body fat (kg) = (% Body fat/100) \times Body mass (kg)
- Lean body mass (kg) = Body mass (kg) – Total body fat (kg).

■ OBSERVATIONS AND DISCUSSION

Values are presented as mean values and SD. Independent samples t tests were used to test if population means estimated by two independent samples differed significantly. Data was analyzed using SPSS Version 16.0 (Statistical Package for the Social Sciences, version 16.0, SSPS Inc, Chicago, IL, USA).

Table 1 presents the various components of body composition of the Sprinters and Throwers. The Throwers were found to have significantly higher body density and percentage of body fat ($p < 0.05$) than the Sprinters, whereas Sprinters had significantly higher lean body mass ($p < 0.01$) as compared to Throwers. In total



Table 1 : Components of body composition of sprinters and throwers

Variables	Sprinters		Throwers		T-value
	Mean	SD	Mean	SD	
Body density	1.05	0.002	1.06	0.0015	2.31 *
% body fat	12.76	1.04	14.55	0.77	2.31 *
Total body fat (kg)	9.72	1.00	8.56	0.89	0.027
Lean body mass (kg)	53.60	3.008	58.41	3.71	4.15 **

* and ** indicate significance of values at P=0.05 and 0.01, respectively

body mass there was no significant difference between sprinters and throwers.

The purpose of the present study was to compare the composition between sprinters and throwers. The result of the study indicated that there is a significant difference in the mean values of two group in body composition ($p < 0.05$) this significant difference may be attributed to the nature of training programme generally followed by the sprinters and throwers. While the source of energy for sprinters and throwers remain same that is anaerobic system but sprinters indulge in a greater proportion of endurance related activity also as require speed endurance. For throwing event weight of equipment influence the performance, but sprinters generally have less weight as compare to throwers therefore throwers also have a higher proportion study after analyzing proportion of fat mass the value of different sports on fat percentage. Within the limitation of the study after analyzing the result it might be concluded that throwers have greater proportion of body composition than sprinters. Similar work related to the present investigation was also carried out by DeLorenzo *et al.* (2000); Hammer (1981); Thorland *et al.* (1981); Toriala *et al.* (1987); Wickkiser and Kelly (1975).

■ REFERENCES

- Bloomfield, J., Peter, A. Fricker and Kenneth, D. Fitch (1995).** Can running injuries be effectively prevented. *Sci. Med. Sports.*, **1**, 161.
- Carter, J.E.L. (1984).** Physical structure of Olympic athletes. Part II: *Kin anthropometry of Olympic athletes. Med. Sports Sci. Karger Basel*; NEW YORK.
- Coh, M., Milanovic, D. and Emberevic, D. (2002).** Morfological anthropometric characteristics of elite junior male and female javelin throwers. *Coll. Antropol.*, **26** : 77-83.
- DeLorenzo, A., Bertini, I., Iacopino, L., Pagliato, E., Testolin, C. and Testolin, G. (2000).** Body composition measurement in highly trained male athletes: A comparison of three methods. *J. Sports Medicine & Physical Fitness*, **40** (2) : 178-183.
- Durnin, J.V. and Rahaman, M.M. (1967).** The assessment of the amount of fat in the human body from measurements of skin fold thickness. *British J. Nutr.*, **21** (3) : 681-689.
- Durnin, J.V.G.A. and Womersley, J. (1974).** Body fat assessed from total body density and its estimation from skinfold thickness measurements of 481 men and women aged from 16-72 years. *Br. J. Nutr.*, **32** : 77-97.

- Gore, C.J. (2000).** *Physiological tests for elite athletes.* Champaign, IL. Human Kinetics.
- Hammer (1981).** Body composition and somatotype characteristics of Junior Olympic athletes. *Med. Sci. Sports Exercise*, **13**(5): 332-333.
- Hawes, M.R. and Sovak, D. (1994).** Morphological prototypes, assessment and change in elite athletes. *J. Sports Sci.*, **12** (3): 235-242.
- Heath, B.H. and Carter, J.E.L. (1967).** A modified somatotype method. *Amer J. Anthropol.*, **21** (1) : 57 – 74.
- Jackson, A.S. and Pollock, M.L. (1985).** Practical assessment of body composition. *Physican & Sports Med.*, **5** : 76 – 90.
- Jelivic, M., Sekulic, D. and Marinovic, M. (2002).** Anthropometric characteristics of high level European junior basketball players. *Coll. Antropol.*, **26** : 69-76.
- Kellet, D.W., Mohan, M. and Willian, P.L.T. (1983).** A comparison of some biophysical characteristics in British male sprinters and marathon runners. *J. Sports Sci.*, **1** : 76.
- Martin, D.E. and Coe, P.E. (1997).** *Better training for distance runners.* Human Kinetics. U.S.A.
- Matkovic, Br., Misigoj-Durakovic, M., Matkovic, B., Jankovic, S., Ruzic, L., Leko, G. and Kondric, M. (2003).** Morfological differences of elite croatian soccer players according to the team position. *Coll. Antropol.*, **27** (1): 167-174.
- Medved, R. (1987).** *Sportska medicina.* Zagreb: Jumena.
- Sinning, W.E. (1996).** Body composition in athletes In Human Body Composition. Human Kinetics. Roche AF, Heymsfield SB, Lohman TG (Eds.), Champaign, I.L. pp. 257-26.
- Siri, W.E. (1956).** The gross composition of the body, In : *Advances in Biological and Medical Physics* edited by J. E. Lawrence and C. A. Tobias, Academic Press.
- Tanner, J.M. (1964).** *The physique of the Olympic athletes,* George Allen and Unwin, LONDON, UNITED KINGDOM.
- Thorland, W.G., Johnson, G.O., Fagot, T.G. and Tharp, G.D. (1981).** Body composition and somatotype characteristics of Junior Olympic athletes. *Med. Sci. Sports Exerc.*, **13** (5) : 232-238.
- Toriala, A.L., Adeniran, S. and Ogunremi, R.T. (1987).** Body composition and anthropometric characteristics of elite male basketball and volleyball players. *J. Sports Med.*, **27** (2) : 235-239.
- Wickkiser, J.D. and Kelly, J.M. (1975).** The body composition of college football team. *Med. Sci. Sports*, **7** (3) : 199-202.
- Wilmore, J.H. and Behnke, A.R. (1970).** An anthropometric estimation of body density and lean body weight in young women. *American J. Clinic. Nutr.*, **23** (3) : 267-274.

■ WEBLIOGRAPHY

<http://www.topendsports.com/index.htm>

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