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Correlation between physical structure and physical performance of power lifters

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Abstract

Power lifting is power involving sport. The present study was executed to Correlation between physical structure and physical performance of power lifters. For this, one hundred twenty (60 state and 60 national level) power lifters were selected randomly during state and national power lifting championships. Various body measurements including linear measurements, diameters, circumferences and skin folds were taken by following the standard technique of Tanner *et al* (1969). Somatotype was studied with the help of Heath and Carter method (1967). The mean, standard deviation and independent student 't' test were computed to find out the significant difference between physique of state and national level power lifters. Coefficient of correlation was computed to find the relationship of somatotype to physical performance in power lifting.

It was analyzed that national level power lifters have significantly high rate of mesomorphy, low values of endomorphy and ectomorphy rating than state level power lifters. They also perform significantly better in standing vertical Jump, maximum strength. It is concluded that endo-mesomorph type of body and explosive strength are better indicator of one's competition performance in power lifting.

Keywords: Physical structure, Physical performance, circumferences

1. Introduction

Power lifting is power involving sport. It is considered as the show of strength began to get favorable recognition and popularity all over the world. Many researcher (Tappen 1950; Tanner, 1964; Carter, 1970; de Gray *et al.*, 1974; Ward *et al.*, 1979; Orvanova, 1984; Rose and Ward, 1984; Verma S.K., *et al.*, 1985) [2, 5, 9, 11] have concluded that apart from the technical and physiological characteristics the body structure and physical performance plays a significant role in the degree of efficiency and the level of success in power lifting. Studies in the sports of lifting have shown positive relationship between the structure and function (Alnoso, 1980; Chovanova, 1983; Carter, 1984; Orvanova *et al.*, 1984; Katch *et al.*, 1986; Stepnica, 1986; Rajni, 1994; Sodhi, H.S. and Sidhu, L.S., 1994; Kanupriya *et al.*, 2007) [4, 3, 9, 10, 7]. The analysis of performance and its relation to physique would discriminate the best of two contributing factors towards the competition performance.

Material and Methods

One hundred and twenty power lifters comprising state (N=60) and national level (N=60) of different weight categories were taken as the subjects. Power lifters of all the weight categories were combined to form pooled group. Each subject has been measured anthropometrically by following the technique of Tanner *et al.* (1969). Somatotype was assessed by using the method of Heath and Carter (1967) [6]. The mean, standard deviation and independent student 't' test were used to find out the significant difference between physique and performance of two groups. Coefficient of correlation was computed to find the relationship of somatotype to performance. The data was analyzed with the SPSS computerized package.

Result and Discussion

Table1. shows the results of somatotype components of state and national group of power lifters. The mean values of endomorphy component for state and national group are 3.22 and 3.59 respectively and the difference is non-significant. The mean values of mesomorphy component of power lifters of state and national groups are 4.56 and 5.14 respectively. The high significant difference was observed (t value = 4.10, $p < 0.01$). Similarly the mean values of

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ectomorphy component for power lifters of state group is highest .64 and the lowest .56 for national group however the difference was non-significant.

Table 1: Shows mean values and standard deviations of various components of somatotype of State and National level power lifters.

Components	State level (N=60) M SD	National level (N=60) M SD	't' value
Endomorphy	3.22.69	3.59.81	1.32
Mesomorphy	4.56.80	5.14.80	4.10**
Ectomorphy	.64 1.19	.56 1.05	.40

* Significant at 0.01 level

The result on high mean values for endomorphic and mesomorphic component and lower values in ectomorphic component in higher representation group are in agreement with the finding of Stepnica (1986) in which he concluded that the lifters were supposed to have high mesomorphic component for strength training.

The mean values of various physical performance tests of state and national power lifters groups are presented in table 2. The average values of 50 meter dash for state and national group are 7.38 and 7.27 sec respectively. The mean values of standing vertical jump for state level power lifters are lowest 60.12 and the highest 63.08 for national group. It is evident that power lifters having national participation to their credit were found to possess significantly ($p<0.05$) high values of SVJ than their counterparts. The best 1RM each of bench press, squat and dead lift for each subject were added together to give the score of total weight lifted as test of maximum strength. The mean values for maximum strength for state and national group are 502.86 kg. and 517.61 kg. respectively.

Table 2: Shows mean values and standard deviations of various physical performance tests of State and National level power lifters.

Tests	State level (N=60) M SD	National level (N=66) M SD	't' value
50 meter dash (sec)	7.38.06	7.27.40	1.08
Standing Vertical Jump (inches)	60.12 6.09	63.08 5.26	2.98*
Maximum Strength (kg)	502.86 89.03	517.61 74.64	1.03

* Significant at 0.05 level

Finding supports the statement of Orvanova (1984) [9] who stated that weight lifters require very strong muscular frame. This makes them capable of applying greater dynamic strength and applying strength of static nature where weights were momentarily held in certain position during and at the finish of the lift.

The coefficient of correlation between various somatotype components with physical performance of power lifters have presented in Table 3. It is evident from the table that the endomorphy have shown negative correlation with speed and SVJ and significantly positive correlation with maximum strength, snatch and clean & jerk. Mesomorphy component depicts high positive correlation with all the physical performance tests ($p<0.05$) whereas ectomorphy have significantly positive correlation with SVJ only. It may be seen that speed, SVJ, maximum strength as a test of performance are more a function of mesomorphic component.

Table 3: Shows the value of Correlation of Coefficient of Somatotype to Physical Performance

Component	Physical Performance		
	Speed	SVJ	Max. Strength
Endomorphy	-0.17*	-0.09	0.18*
Mesomorphy	.47**	0.51**	0.63**
Ectomorphy	0.12	0.19*	0.11

* Significant at 0.05 level ** Significant at 0.01 level

Conclusion

On the basis of findings of this study, it may be concluded the physique of power lifter is more a function of his physical performance and consequently his physical performance status is a better indicator of his competition performance. Efforts to be made to select only those individuals who have endo-mesomorph type of body and better physical performance ability as required by this iron game. Further the test of speed, explosive power and maximum strength used in this study seemed to be valid for predicting the performance of the power lifters.

References

1. Alonso J. Aerobic, anaerobic assistant exercise and weight lifting performance capacities in elite weight lifters. *J Sports Med.* 1986; 27:240-246.
2. Carter JEL. The Somatotype of Athlete – A Review. *Human Biol.* 1970; 42:535.
3. Carter JEL. Physical structure of Olympic Athlete, Part II: Kinanthropometry of Olympic Athlete., Basel: Karger, 1984.
4. Chovanova E, Pataki L, Vavrovic D. Somatotypological characteristics of young weightlifters. *Tor. Praxe. Tel Vych.* 1983; 31(1):31-35.
5. de Gray AC, Levine L, Carter JEL. Genetic, anthropological and mental adolescence group. *Proc. Conf. on adolescence.* Oct. 1930 Cleaveland, Ohio, U.S.A., 1974.
6. Heath BH, Carter JEL. A modified somatotype methods, *Am. J Phys Anthropol.* 1967; 27:54-74.
7. Kanupriya, Koley S, Sandhu JS. An Evaluation of Kinanthropometric Measurements in Inter University Female Gymnasts and Rope Mallkhamba Players. *J of Sports Traumatol Allied Sports Sci.* 2007; 8:56-62.
8. Katch VL, Katch FL, Mrfflot R, Gliltelson R. Muscular development and lean body weight in body builders and weight lifters. *Med. Science sports.* 1980; 12:340.
9. Orvanova E, Udher L, Slamka H, Pataki L, Ramacsay L. Body size, shape and composition analysis of weight lifters and variables discriminating them according to performance and age. *Human Growth and Development,* Plenum Press, 1984.
10. Rajni R. A comparative study of fat assessment in top ranking Indian weight lifters. *SNIPES Journal.* 1994; 17(2):29-35.
11. Rose WD, Ward R. Proportionality of Olympic athletes. *Medicine and sports,* 1984; 17.
12. Sodhi HS, Sidhu LS. *Physique and Selection of Sportsmen.* Punjab Publishing House, Patiala, 1984.
13. Sodhi HS. *Sports Anthropometry,* Anova Publication, Patiala, 1991.