INIGATION OF FACTORS PREDOMLNANT TO THE SKILL PERFORMANCE OF ELITE VOLLEYBALL PLAYERS

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The purpose of the study was to analyze the degree of relationship between volleyball serving ability from selected anthropometric measurements and motor fitness components. It was also designed to find out the combined contribution of the selected variables to volleyball skill performances besides developing the multiple regression equation for predicting volleyball serving ability. Twenty university male volleyball players from Tamilnadu Physical Education and Sports University Chennai, in the age group of eighteen to twenty- three years were selected as participants - for the purpose of the study. The following criterion variable namely Russell Longo Serving Test and the independent variables (standing height, weight, arm length, leg length, chest girth, biceps girth, wrist girth, thigh girth, calves girth, explosive power, agility, flexibility and speed) were considered in the study. In order to study the relationship among die selected variables, Pearson's product moment correlation was computed. Multiple correlations were computed to study the best combination of variable, which highly predicts the criterion variable. The results showed significant relationship of Russell Lange Serving Test performance with agility and leg length, The obtained R2 value of 0.898 indicates that weight, flexibility and leg length are having 68% common variance with Russell Lange Serving Test. Out of thirteen independent variables, three of them were selected to derive the stepwise method of multiple regression equation..
Keywords: Prediction, Anthropometric, skill Test, Fitness Variables.

Introduction

Talent identification and its development has become an important area of i march in sports. In performance sports due to rapidly increasing participation and performance density only person who have talent are having the chance of winning medal in an international competition. In prediction results are anticipated beforehand. Usually the anticipated results are not chance of guesses, but are based upon Some known facts of relationship or carefully conceived beliefs (Clarke and Clarke, 1972). Prediction is based on constant and vigil observation, experience and Nolen, ilk analysis. It is the results of intelligent association of facts and discovering of pottorna. The educationist and the economist predict certain things in the respective fields and a person involved very much in sports and games also predict the possible outcome in sports and games. Competent person can do the predictions about the outcome of a match to be played in future. This can be well observed in the selection of players based on their performance to meet their future experiences in a play ground. Further a coach is exploiting the inherent abilities dormant in an individual player. The selection as well as finding out the constitution of a winning team in a challenging task for the selectors and the coaches. Traditionally the members of the team are selected on the basis of subjective observations of the performances of the players during the games. A coach or the selector watches the team, looking for the right types of physical powers that would enable easy shaping of a strong player and a successful team.

The identification of physical characteristics in a sport modality contributes to its success and enables to spot differences among athletes of different modalities, which is of great interest for both sport coaches and scientists. Sports performance is based in a complex and

intricate diversity of variables, which include physical (general and specific conditions), psychological (personality and motivation) and body (body morphology, anthropometry and body composition) factors. The relationship between morphological variables and sports performance is the object of study of anthropometry and is an important element to be analyzed. Studies have pointed out the importance of physical characteristics for different sports such as volleyball (Duncan et al, 2006; Malousarisa et al, 2007), rugby (Gabbett, 2002), and basketball (Neto, 2005). Successful sporting performance at elite levels of competition often depends heavily on the explosive leg power of the athletes involved. In many individual sports such as Track and Field events, Gymnastics and Diving the ability to use high levels of strength as quickly and as explosively as possible is essential to perform at elite levels. Many team sports also require high levels of explosive power, such as Basketball, Volleyball, Nu kill and the Rugby and Football codes for success at elite levels of compel it ion.

Data has been produced for many elite individual team sport athletes for physical and physiological characteristics, including standing vertical jump scores, related to specific sports performance (Black. &. Roundy, I 99.I; ('mats, 1976; Latin, et al., 1994; Sawula, 1991). Volleyball is an intermittent slit t that requires players to compete in frequent short bouts of high-intensity exercise, lollowed by periods of low-intensity activity. (Kunstlinger et al., 1987; Polglazo and., Dawson,.1992. Viitasalo et al., 1987.).The high-intensity of exercise, coupled with the total duration of the match (-90 minutes), requires players to have well-developed aerobic and anaerobic alactic (ATP-CP) energy systems, (Mood() et: al., 1987; Hakkinen,1993). Considerable demands are also plased on the neuromuscular system during the various sprints, jumps (blocking and spil,itir,), and high - intensity court movement that occurs repeatedly during competition (Hakkinen, men K .,1993)., As a result, volleyball players require well-developed speed, twilit V, upper body and lower body muscle power, and maximal aerobic power (VO2max), Several studies have documented the physiological and anthropometric characteristics of senior volleyball players,(Fleck SJ, et al .,1985,, Hascelik et al., 1989; 114 islet t al., I 978), with the fitness of players typically increasing as the playing level is increased.(Smith el al., 1992.; Milder and Mayhew ,1991).

The changing nature of the game like volleyball demand the right type ()I' physical abilities on the part of a player .The increasing trend in the professionalism and the acute demand for competitive sports have changed the complex ion of the games which had been initially intended as a recreational activity of the villagers. Today with the advent of modern scientific equipment for training and selection of players, it has been now made possible to measure the fundamental performance characteristics which contribute to a player success. Prediction of skill level of players can be determined accurately to a great extent by taking a number of measures in various skills and parameters specific to a particular game or sport.. The prediction variables will be the different measures of the independent variables. The criterion variables or the dependent variable will be each player's ability in the particular game or event. Hence a subjective rating by a number of experts can be made as a measure of criterion variable for prediction of playing ability in a particular game event. Greater the general quality of speed, strength, power, endurance, flexibility and agility the more quickly will be the specific skill he learned and once learned the better will be the performance (Belay, 1987)

Methodology

Subjects and Variables

Twenty male volleyball players from TNPESU, Chennai volunteered to take part in the study (age 21.6 ± 1.3 years, height 1.74 ± 0.5 m, mass 68.0 ± 6.3 kg). The following criterion variables Russell Lange serving test and independent variables (standing height, weight; arm length, leg length, chest girth, biceps girth, wrist girth, thigh girth, calves girth, explosive power, agility, flexibility and speed) were considered in the study. The selected variables were assessed by using standard testing procedures. In order to study the relationship

between the criterion and determinant variables and inter relationship between determinant variables were computed, using the method of Pearson's product moment correlation. Multiple correlations were computed to select the minimum number of variable that would provide the highest multiple co-efficient with the criterion and also to select them in the order of their contribution to the correlation. The level of significance was accepted at $P < 0.05$.

RESULTS

The mean, standard deviation values and the inter correlation matrix among the criterion and the selected independent variables were presented in table-I

Table - I

Inter – Correlation Matrix

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	1.000													
2	0.351	1.00												
3	-	0.784	1.00											
4	0.375	0.624	0.62	1.00										
5	0.47	0.897	0.820	0.761	1.00									
6	-.116	0.209	0.57	0.479	0.313	1.00								
7	-.377	0.403	0.642	0.46	0.319	0.550	1.00							
8	-.009	0.14	0.36	0.41	0.160	0.80	0.580	1.00						
9	-.386	-.378	-.068	-.203	-.460	0.561	0.08	0.464	1.00					
10	-.335	0.32	0.67	0.11	*0114*	0.59	0.472	0.47	0.44	1.00				
11	0.28	-.042	-.169	-.365	-.042	0.05	-.Ill	0.03	-.044	0.05				
12	-.470	-.089	0.11	-.176	-.021	-.415	-.132	-.645	-.297	0.04	-.487			
13	0.07	0.449	*0.605*	0.27	0.370	0.77	0.472	0.65	0.537	0.748	0.30	-.521		
14	-183	-.467	-.448	-.388	-.467	-.460	-.593	-.552	0.10	-.400	*-519*	0.567	-.619	
$\bar{x}$	25.9	165.	58.8	72.7	101.3	82.4	24.6	13.4	7	30.3	*1.95*	10.3	34.4	1.000
σ	6.58	8	8.67	*215*	7.43	*510*	2.01	I.OS	44.3	2.92	0.17	2	5.28	8.01
		4.83							2.56			0.46		0.32

1. Rusell Lange Service Test, 2.Height, 3.Weight, 4.Arm Length, 5.Leg Length, 6.Chest Girth, 7.Biceps Girth, 8.Wrist Girth, 9.Thigh Girth, 10. Calves Girth, 11 .Explosive Power, 12. Agility, 13.Flexibility, 14.Speed.

The correlation coefficient of Russell Lange serving test with leg length and agility was significant at 0.05 level, since the obtained value of 0.479 and -0.470 respectively was greater than the required value of 0.444 for 18 degrees of freedom. The investigator further utilized multiple correlation to select the minimum number of independent variables that would provide the highest multiple co-efficient with a criterion variable and to select them in the order of priority to the correlation. In the process of computing multiple correlations, leg length was selected with the correlation coefficient of 0.479 and the common variance of 12% for the R2 value of 0.229 with Russell Lange test The process was continued and a higher multiple correlation of 0.873 was obtained by selecting weight as the second variable for Russell Lange test. The obtained R2 value of 0.762 denotes that leg length and weight are having 51% common variance with Russell Lange volleyball test. The process was further continued and a higher multiple correlation of 0.948 was obtained by selecting flexibility as the third variable for Russell Lange test. The obtained R2 value of 0.898 denotes that leg length, weight and flexibility are having 68% common variance with Russell Lange volleyball test.

Multiple Regression (Equation) Analysis

Multiple regression analysis is a statistical method used to predict the mu variable from a group of selected independent variables. Stepwise method of multiple regression analysis was used to find out the best combination of variable, which highly predicts the criterion variable. As per the present study Russel Lange saving test was chosen as criterion variable and selected anthropometric measurements (Standing Height, Weight, Arm Length, Leg Length, Chest Girth, Biceps Girth, Wrist Girth, Thigh Girth and Calves Girth) and motor fitness (Explosive Power, Agility, Flexibility and Speed) as independent Val tables. Out of the thirteen independent variables three variables were selected to '(' multiple regression equation by obtaining a higher multiple correlation co-efficient. The process of multiple regression equation is presented in Table — II.

Table II - Stepwise method of Multiple Regression Quotation for Russel Lange Serving Test

The results of the study indicate that the Russell Lange volleyball test performance can be predicted from leg length, weight, and flexibility of the players. The obtained multiple regression equation is as mentioned below.

Russell Lange serving test = — 71.61 + 1.516 (Leg Length)
— 1.307 (Weight) + 0.605 (Flexibility).

Discussion

The correlation coefficient of Russell Lange serving test with leg length and was significant at 0.05 level, since the obtained value of 0.479 and —0.470 respectively was greater than the required value of 0.444 for 18 degrees of freedom. I lie obtained R2 value of 0.898 denotes that leg length, weight and flexibility are having 89% common variance with Russell Lange volleyball test. The multiple correlation of 0.948 was obtained by selecting leg length, weight and flexibility for Russell Lange. The process of statistical analysis was further continued to derive multiple regression equation due to high multiple correlation. Out of thirteen independent variables, three variables were selected to sketch out the multiple regression equation.

Lower-body muscular power, agility, and estimated maximal aerobic power with increased playing level, and given the importance of these qualities to competitive performances (Gabbett and Georgieff, 2007) and the combination of tunny-set, height, weight, and shoulder flexibility allowed correct classification of 78% of the starters and nonstarters (Thissen and Mayhew, 1991). Significant anthropometric and strength differences exist among playing positions in elite male volleyball players. In addition, these findings provide normative data for elite male volleyball players competing in specific individual playing positions. From a practical perspective, sport scientists and conditioning professionals should take the strength and anthropometric characteristics of volleyball players into account when designing individualized position-specific training programs. According to (Stamm and others ,2003) the anthropometric factor was significant in the performance of all the elements of the game, being most essential (71-83%) for attack, block and feint.

Conclusions

From the results obtained after analyzing the data, it was concluded that weight, leg length and flexibility have a significant relationship with Russell Lange serving test.

References

1. Black, W. & Roundy, E. 1994. Comparisons of size, strength, speed and power in NCAA Division 1 Football players.journal of strength and conditioning research Vol.8(2) pp.80-85.

2. Clarke, H.Harrison and Clarke, David H., (1972), Advanced Statistical with Application to Physical Education (New Jersey: Prentice Hall, Inc :).
3. Coutts,K.D. 1976. Leg power and Canadian female volleyball players. The Research Quarterly Vol.47(3) pp. 332-333.
4. Duncan, M.; Woodsfield, L.; Al -Nakeeb, Y. Anthropometric and physiological characteristics of junior elite volleyball players. Br J Sports Med v. 40, p. 649-651, 2006.
5. Fleck SJ, Case S, Puhl J, Van Handle P. Physical and physiological 1 characteristics of elite women volleyball players. *Can J Appl Sport Sci*. 1985;10:122-126.
6. Gabbett T, Georgieff B, Physiological and anthropometric characteristics of Australian junior
7. Gabbett, T. Physiological characteristics of junior and senior rugby league players. Br J Sports Med v. 36, p. 334-339, 2002.
8. Hakkinen K. Changes in physical fi tness profi le in female volleyball players during the competitive season. J Sport Med Phys Fitness. 1993;33:223-232.
9. Hascelik Z, Basgoze 0, Turker K, Narman S, Ozker R. The effects of physical training on physical fitness tests and auditory and visual reaction times of volleyball players. J Sport Med Phys Fitness. 1989;29:234-239.
10. Hosler WW, Morrow JR, Jackson AS. Strength, anthropometric, and speed characteristics of college women volleyball players. Res Q. 1978;49:385-388.
11. James A.Belay (1987) Illustrated Guide to Developing Athletic Strength, Power and Agility, (New York: Parking Publishing Company), P.16
12. Kunstlinger U, Ludwig HG, Stegemann J. Metabolic changes during volleyball matches. Int J Sports Med. 1987;8:315-322.
13. Latin, R.W. et al 1994. Physical and performance characteristics of NCAA Division 1 male basketball players. Journal of Strength and Conditioning Research. Vol. 8(4) pp. 214 -218
14. Malousarisa G, Bergelesa N, Barzouka K, Bayiosa I, Nassis G, Koskolou M. Somatotype, size and body composition of competitive female volleyball players. J Sci Med Sport v. 11, p. 337-44, 2008.
15. national, state, and novice volleyball players. J Strength Cond Res. 2007 Aug;21(3):902-8
16. Ncto, A. P.; Cesar, M. C. Avaliacao da composicao corporal de atletas de basquetebol do sexo masculino participantes da liga nacional 2003. Revista Brasileira de Cineantropometria e Desempenho Humano v. 7, p. 35-44, 2005.
17. Polglaze T, Dawson B. The physiological requirements of the positions in state league volleyball. Sports Coach. 1992;15:32-37.
18. Sawula, L. 1991. Tests used by volleyball coaches for determining physical fitness. International Volleytech. Vol. 2 1991 pp 18 -24
19. Smith DJ, Roberts D, Watson B. Physical, physiological and performance differences between Canadian national team and universiade\aq\ volleyball players. J Sports Sci. 1992;10:131-138.
20. Stamm R, Veldre G, Stamm M, Thomson K, Kaarma H, Loko J, Koskel S., Dependence of young female volleyballerst performance on their body build, physical abilities, and psycho-physiological properties. J Sports Med Phys Fitness. 2003 Sep;43(3):291-9.
21. Thissen-Milder M, Mayhew JL. Selection and classifi cation of high school volleyball players from performance tests. J Sport Med Phys Fitness. 1991;31:380-384.
22. Viitasalo J, Rusko H, Pajala 0, Rahkila P, Ahila M, Montonen H. Endurance requirements in volleyball. *Can J Appl Sports Sci.* 1987;12:194-201.