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A comparative study of explosive strength among different age group players

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Abstract

Explosive strength plays an important role throughout life and is also vitally important in old age. Explosive muscle strength can be defined as the rate of rise in contractile force at the onset of contraction, i.e. the rate of force development exerted within the early phase of rising muscle force (Aagaard, Simonsen, Andersen, Magnusson, & Dyhre-Poulsen, 2002) ^[1]. The aim of present study is to compare the various games players on the basis of age groups with regard to their explosive strength. To accomplish the study, purposive sampling technique has been used. For this purpose, total 180 male players were selected as subjects. Six age group categories were profiled and 30 players were selected from each age group category. The selected subjects were between the age group of 10 to 15 years. The subjects were selected from the Bhiwani district of Haryana state. Standing broad jump test was applied to measure the explosive strength. The measurements are calculated in cm. To find out the difference in explosive strength, independent sample 't' test was applied through Statistical Product and Service Solutions (SPSS) version 20.0. The level of significance was set at 0.05. The results of the present study shows that significant difference was found between the age group of ten and eleven years, fourteen and fifteen years while no significant difference was found between the eleven and twelve, twelve and thirteen, thirteen and fourteen years age group players with regard to their explosive strength.

Keywords: Physical fitness, Explosive strength, Age groups, standing broad jump

Introduction

Physical fitness is a state of health and well-being and, more specifically, the ability to perform aspects of sports, occupations and daily activities. Physical fitness is generally achieved through proper nutrition, moderate-vigorous physical exercise and sufficient rest (Tremblay *et al.* 2010) ^[10]. Physical fitness is the sum of five motor abilities namely; speed, strength, endurance, flexibility and co-ordination abilities and their complex form like strength, endurance, maximum strength, explosive strength, maximum speed, and agility were the basic prerequisites of human motor action. Therefore, the sports performances depend to a greater extend on these abilities. (Ahmed, 2010) ^[2]. for physical fitness activity to benefit an individual, the exertion triggers a response called a stimulus. Exercise with the correct amount of intensity, duration, and frequency can produce a significant amount of improvement. The person may overall feel better, but the physical effects on the human body take weeks or months to notice and possibly years for full development. For training purposes, exercise must provide a stress or demand on either a function or tissue. To continue improvements, this demand must eventually increase little over an extended period of time. This sort of exercise training has three basic principles: overload, specificity, and progression. These principles are related to health but also enhancement of physical working capacity. (Blair, 1993) ^[6].

Explosive strength, a component of speed strength, refers to acceleration or rate of force development, or "the neuromuscular system's ability to generate high action velocities (Berry & Staley, 2008) ^[5]. Stone states, "Exercises used to develop explosive strength are defined as those in which the initial rate of concentric force production is maximal or near maximal and is maintained throughout the range of motion of the exercise (Stone, 1993) ^[9]. Explosive strength plays an important role throughout life and is also vitally important in old age. Explosive muscle strength can be defined as the rate of rise in contractile force at the onset of contraction,

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I.e. the rate of force development (RFD) exerted within the early phase of rising muscle force (Aagaard, Simonsen, Andersen, Magnusson, & Dyhre-Poulsen, 2002) [1]. In addition to rate of force development (RFD), an important explosive strength parameter is the impulse that can be produced within a given contraction time (Baker, Wilson, & Carlyon, 1994) [4].

Objectives of the study

1. To found out the significant difference between the Ten and Eleven age group players with regard to their Explosive strength.
2. To found out the significant difference between the Eleven and Twelve age group players with regard to their Explosive strength.
3. To found out the significant difference between the Twelve and Thirteen age group players with regard to their Explosive strength.
4. To found out the significant difference between the Thirteen and Fourteen age group players with regard to their Explosive strength.
5. To found out the significant difference between the Fourteen and Fifteen age group players with regard to their Explosive strength.

Delimitations of the study

- The study is delimited to the age group of 10, 11, 12, 13,

14 and 15 year players.

- The study is delimited to male players only.
- The study is delimited to 30 players from each age group.
- The study is delimited to Bhiwani district of Haryana state.

Method & procedure

To accomplish the study, purposive sampling technique has been used. The sample of the study has been selected from the various games. For this purpose, total 180 male players were selected as subjects. Six age group categories were profiled and 30 players were selected from each age group category. The selected subjects were between the age group of 10 to 15 years. The subjects were selected from the Bhiwani district of Haryana state. Standing broad jump test was applied to measure the explosive strength. The measurements were calculated in cm. To find out the significant difference in explosive strength, independent sample 't' test was applied through Statistical Product and Service Solutions (SPSS) version 20.0. The level of significance was set at 0.05.

Findings of the study

The table no.1 represents the significance of difference between different age groups players with regard to their explosive strength.

Table 1: Significance of difference between different age groups players with regard to their explosive strength

Variable	Age Group	N	Mean	Std. Deviation	t-value	Sig.
Standing Broad Jump	Ten	30	193.33	16.47	3.451	0.001
	Eleven	30	209.83	20.36		
	Eleven	30	209.83	20.36	1.504	0.138
	Twelve	30	217.17	17.29		
	Twelve	30	217.17	17.29	1.288	0.203
	Thirteen	30	223.43	20.28		
	Thirteen	30	223.43	20.28	0.812	0.42
	Fourteen	30	227.57	19.11		
	Fourteen	30	227.57	19.11	2.056	0.044
Fifteen	30	239.67	25.95			

Level of significance was set at 0.05.

T value at 180 degree of freedom was 1.98.

The table data represents the comparison between the different age groups on the basis of mean score, standard deviation score, t-value and sig. (p) value registered by the final results. On the age group Ten and Eleven years, the registered mean and standard deviation score for ten years was 193.33 and 16.47 respectively while for eleven years, the registered mean and standard deviation score was 209.83 and 20.36. The calculated t-value 3.451 was found higher than 1.98 of tabulated value. The p-value (.001) was found lower than .05 level, hence significant difference was found between the Ten and Eleven years age group with regard to their explosive strength.

On the age group Eleven and Twelve years, the registered mean and standard deviation score for eleven years was 209.83 and 20.36 respectively while for twelve years, the registered mean and standard deviation score was 217.17 and 17.29. The calculated t-value 1.504 was found lower than 1.98 of tabulated value. The p-value (.138) was found higher than .05 level, hence no significant difference was found between the groups.

On the age group Twelve and Thirteen years, the registered mean and standard deviation score for twelve years was

217.17 and 17.29 respectively while for thirteen years, the registered mean and standard deviation score was 223.43 and 20.28. The calculated t-value 1.288 was found lower than 1.98 of tabulated value. The p-value (.203) was found higher than .05 level, hence no significant difference was found between the groups.

On the age group Thirteen and Fourteen years, the registered mean and standard deviation score for thirteen years was 223.43 and 20.28 respectively while for fourteen years, the registered mean and standard deviation score was 227.57 and 19.11. The calculated t-value 0.812 was found lower than 1.98 of tabulated value. The p-value (0.42) was found higher than .05 level, hence no significant difference was found between the groups.

On the age group Fourteen and Fifteen years, the registered mean and standard deviation score for fourteen years was 227.57 and 19.11 respectively while for fifteen years, the registered mean and standard deviation score was 239.67 and 25.95. The calculated t-value 2.056 was found higher than 1.98 of tabulated value. The p-value (0.044) was found lower than .05 level, hence significant difference was found between the groups with regard to their explosive strength.

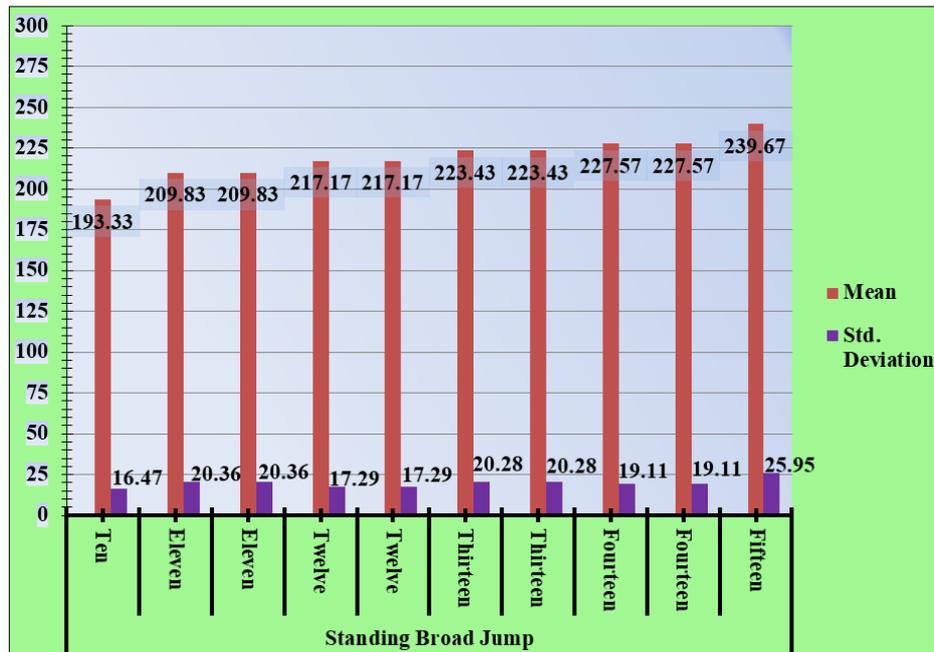


Fig 1: Graphical representation of significance of difference between different age groups players with regard to their explosive strength

Discussion of the findings

The present study was conducted to compare the different age group players with regard to their explosive strength. After the data evaluation, the findings of the study highlighted that significant difference was found between the age group of ten and eleven years, fourteen and fifteen years while no significant difference was found between the age group of eleven and twelve, twelve and thirteen, thirteen and fourteen years age group players with regard to their explosive strength. The significant difference results are supported by the another study conducted by (Nikola Aksović & Dragana Berić, 2017) ^[3] on a sample of 34 basketball players, at the age of 11 and 14 (± 0.5 years) with the aim to determine the differences in explosive power between the basketball players of different age. By applying t-test, we have got the results which show us that there is a significant difference between the basketball players of different age in all observed variables, and all of them are in favor of older players, age 14.

Conclusion

The given results are expected, and the reason for that can be the age, their anthropometric dimension (body height, body weight), genetic predisposition, the level participant preparedness, and playing position in team. Perhaps the most sensitive factor of given results is age, since the training of children and young players mustn't be based on the principles that training for adults is based on. It has to be in compliance with their biological, chronological, psychological and physical growth. The researches show that the players, who belong to the group of young pioneers (10-12 years old), develop their explosive strength through different ways of moving, the body's weight itself makes resistance through the game and the explosive strength is improved through short sprints. At pioneers (13-14 years) the one can influence the most on the development of explosive strength, and can be used minimal external loads (Pavlović, 2007) ^[7]. The given results provide the important information for coaches which helps in players' selection and it helps in making a proper plan and program of work for players of different age and points out to the further researches in the field of explosive strength between players of different age.

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