

## Comparison of physical fitness variables between individual games and team games athletes

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### Abstract

The aim of the study was to investigate the significant differences of selected physical fitness variables between individual games and team games athletes. A group of 30 sportspersons A (Individual games athletes: N=15) and B (Team games athletes=15) of age group 18-25 years were selected from department of physical education (T), Guru Nanak Dev University, Amritsar, Punjab, India. It was hypothesized that there may be significant differences with regard to selected physical fitness variables among individual and team games athletes. The between-group differences were assessed by using an independent samples t-test. The level of  $p \leq 0.01$  was considered significant. An independent samples t-test revealed that individual games athletes had significantly higher muscular strength, agility, power, speed and cardiovascular endurance ( $p < 0.01$ ) than team games athletes. Further investigations are needed on the above studied variables along with physiological variables to assess relationships among them and with performances in team games and individual games athletes.

**Keywords:** Physical fitness, individual games, team games, athletes.

### Introduction

Physical fitness is a state of well-being that comprises skill and health-related components. Fitness is a condition in which an individual has sufficient energy to avoid fatigue and enjoy life. It is necessary for elderly people to maintain and improve their physical fitness in order to satisfy healthy, high quality of daily life (Tanaka *et al.*, 2004). Skill-related physical fitness refers to an individual's athletic ability in sports such as tennis and encompasses skill-related attributes like dynamic balance, power, speed and agility; the health-related aspect is a measure of cardiovascular endurance, muscle strength, endurance and flexibility and body composition (Hopkins & Walker, 1988). Physical fitness is measured by functional tests that are specific and usually normative-based, rather than criterion-based, thereby leaving unanswered as to how much of a specific fitness factor (e.g. muscular endurance) is required for a good quality of life (Chia *et al.*, 2007). There are numerous factors which are responsible for the performance of sportsmen. The physique and body composition including the size, shape and form are known to play a significant role in this regard (Sodhi & Sidhu, 1984). The performance of a sportsman in any game or event also depends on physical fitness. The physical fitness or condition is the sum total of five motor abilities namely muscular strength, agility, power, speed and cardiovascular endurance. Therefore, the sports performance in all sports depends to great extent on these abilities. Improvement and maintenance of physical fitness is the most important aim of sports training (Uppal, 1980). Muscular power, often referred to as explosive power, is a combination of speed and strength which is important in vigorous performance since it determines how hard a person can hit, jump and push etc. Agility is

the ability to change the direction of body or its parts rapidly which is dependent on strength, reaction time, speed of movement and muscular coordination. Quick start and stops and quick changes in direction are fundamental for good performance in athletics. Running speed is not only an athletic event itself, but it is an important factor in almost all court and field games it can result the difference in whether a performer is able to gain an advantage over his/her opponent. Man's existence and effectiveness depends upon his physical fitness. Even now, physical fitness really implies more than the ability to do a work without much efforts. Physical fitness affects ones life's activities not only the physical well being and mental effectiveness but also the personal and social adjustment. (Singh 1986) reported that sport is competitive in nature and every sportsman strives to better the previous records and records are broken more rapidly nowadays. "Sports" he states, "is an ideal character building school for youth. The very nature of sport requires certain amount of skill and physical fitness. It has been due to the growing change in the competitive philosophy of sports that a close liaison has developed among sports scientist, team physician, athletic trainers, coaches and athletes to investigate modern scientific technique in terms of selection of athletes. The performance of a sportsman in any game or event also depends on muscular strength, agility, power, speed and cardiovascular endurance. Along with these physical variables, physiological and psychological components also play an important role in the execution of the performance. Best suited activity and new training methods achieve excellence. The aim of the present study was to determine the differences in selected physical fitness characteristics between the individual game and team game athletes.

## Material and methods

**Subjects:** Thirty randomly selected male students of department of physical education (T), Guru Nanak Dev University, Amritsar (Punjab, India) aged 18-25 years

*Table 1. Details of selected individual and team games athletes as subject.*

A	Sample	B	Sample
Athletics	5	Volleyball	5
Boxing	5	Basketball	5
Judo	5	Baseball	5

$N_1 = 15; N_2 = 15$

volunteered to participate in the study. A written consent was obtained from the subjects. The study was approved by the local ethical committee. All were doing bachelor degree in physical education. They were highly motivated to participate in this study and allowed to quit any time. They were randomly assigned into two groups: A (Individual games: N=15) and B (Team games: N=15) athletes as shown in Table1.

*Table 2. Details of selected physical fitness variables and tests to measure them.*

Variables	Test
Muscular Strength	Sit-ups test
Agility	Shuttle run test
Power	Standing Broad jump test
Speed	50 yard dash test
Cardiovascular Endurance	600 yards run or walk test

**Methods:** As shown in Table 2 the Sit-ups test (AAPHER, 1965) was used to assess the muscular strength. The score of the test is the number of correctly executed sit-ups performed by the subjects in 60 seconds. Shuttle Run test (Jenson & Hirst, 1980) was used to monitor the agility of the subjects. The time taken by the subjects between the audible signal 'start' and the finishing of the run was recorded to be the score. The time was recorded correct in sec. The standing broad jump (AAPHER, 1965) was used to assess explosive power of the legs. A 50 yard dash test (Johnson & Nelson, 1979) was used to estimate Speed. The time taken by the subjects to complete the test in sec was the net score of the subjects. 600 yards Run or Walk test (AAPHER, 1965) was used to measure cardiovascular endurance. The time taken to run 600 yards recorded in min.

**Statistical analyses:** Values are presented as mean values and SD. Independent samples t tests were used to test if population means estimated by 2 independent samples differed significantly. Data was analyzed using SPSS Version 16.0 (Statistical package for the social sciences, version 16.0, SPSS Inc, Chicago, IL, USA).

## Results and discussion

Table 3 shows that the mean of muscular strength of Individual and team games athletes was 22.33 and 19.4 respectively, whereas the mean of agility of individual games and team games athletes was 13.69

and 13.19 respectively. In case of power and speed of individual game and team games athletes mean value were 2.01 and 6.98 and 1.92 and 6.34 respectively. The mean of cardiovascular endurance was 1.55 and 1.45. In case of muscular strength (8.87\*\*), agility (6.39\*\*), power (6.75\*\*), speed (6.99\*\*) and cardiovascular endurance (3.80\*\*) the value of t-test Significant at  $p < 0.01$ . Fig.1 show the comparison of mean of selected physical fitness variables of Individual and team games athletes. It is evident from the data that there was significant difference exists between the individual games and team games athletes in the physical fitness variables. The  $H_0$  (null hypothesis) is accepted at  $p < 0.01$  level of significance. These results are in conformity with the study conducted by Das, et al. (2007) to compare the physical fitness components of junior footballers and sprinters of Kolkata. Results revealed that there exist significant difference in flexed arm hang (arm & shoulder strength), bent knee sit-ups (muscular strength & endurance), shuttle run (co-ordinative ability), standing broad jump (explosive strength of legs), 600 yard run/walk (endurance) and sit and reach test (flexibility) of team and individual game players.

Physical fitness variables are very important in both athletes and form a condition for higher performance. Mal (1982) stated that the components of physical fitness like strength, speed, endurance, flexibility and the various coordinative abilities are essential for a high technique and tactical efficiency. Depending upon the demand of the game, each factor of physical fitness should be optimally developed. In the present study there was significant difference observed between the individual game and team game athletes in all the selected physical fitness variables. Results show the muscular strength, agility, power, speed and cardiovascular endurance of individual games athletes were significantly greater when compared to team games athletes.

*Table 3. Mean, SD and t-value of selected physical fitness variables of individual games & team games athletes.*

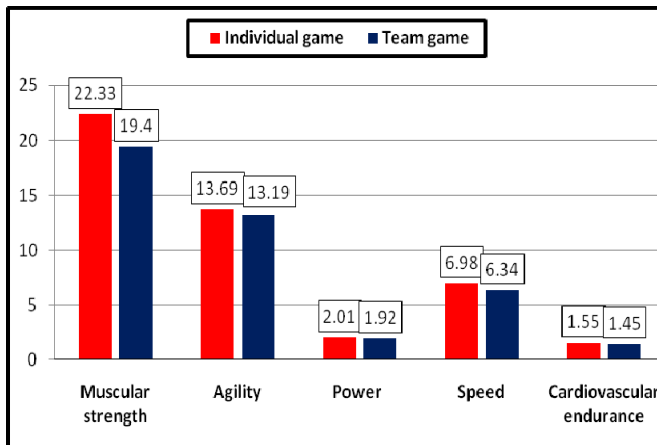
Variables	Individual games (N=15)		Team games (N=15)		t-value
	Mean	SD	Mean	SD	
Muscular strength	22.33	1.71	19.4	1.59	8.87**
Agility	13.69	0.54	13.19	0.55	6.39**
Power	2.01	0.11	1.92	0.12	6.75**
Speed	6.98	0.55	6.34	0.35	6.99**
Cardiovascular endurance	1.55	0.13	1.45	5.87	3.80**

Significant at \*\* $p < 0.01$ .

These results do not agree with the study of Saini (1996). He undertook a comparative study of psychomotor components between the athletes of individual and team sports. Four psychomotor components of kinesthetic perception, speed of movement, orientation ability and differentiating ability were taken. T-test was applied to test the hypothesis. No significant difference was found

between athletes of individual and team sports in kinesthetic perception and differentiation ability. Jan Percival *et al.* (1982) concluded that every individual has different level of fitness, which may change from time to time, it may also change from place to place and sometimes it may changes with work or situation also.

Fig. 1. Comparison Physical fitness variables of individual & team games athletes.



### Conclusion

Significant differences were found between the individual and team games athletes on selected physical fitness variables. Findings of this exploratory study suggest that the players of individual and team games differ significantly in relation to physical fitness variables. Further investigations are needed on the above studied variables along with physiological variables to assess relationships among them and with performances in team games and individual games athletes. The information derived from this study will not only serve scientists and coaches in their selection of young athletes, but provide guidelines for training programs for individual and team games athletes.

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