Comparison of Physical Fitness Features in Country’s Elite Male Gymnasts and Trampoliners

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ABSTRACT

Among beautiful and fascinating sports that many people seem to be interested in, are gymnastic and trampoline. Every year, formal tournaments of these two athletic fields are held at different levels. Therefore the recognition of main and influencing factors in implementation of gymnastic and trampoline skills should be examined from various angles. So the main purpose of this study is to compare the characteristic of physical fitness in country elite male gymnasts and trampoline athletes. Methods: For this purpose, 15 male gymnasts in the mean age of 20.26 ± 2.52 years and 12.80 ± 3.36 years background and 10.10 ± 3.52 years competitive background, and twelve person trampolists with an average age of 19.25 ± 1.65 years with 11.33 ± 3.02 years of sports background and with 5.66 ± 2.05 years of competitive background who have done purposefully gymnastic and trampoline in 1392 Winter and in 1393 Spring, were selected as subjects. Variables that studied in physical fitness are including explosive leg power, agility, speed, muscular endurance, balance and flexibility which were measured using standard methods and tools. A confidence level at 95 percentages was used, to test the research hypotheses. Results: The results showed that some of the features of physical fitness in gymnasts and trampoline, including, explosive leg power, running speed, balance, trunk endurance and agility, have significant differences but in flexibility, a significant difference in gymnastic and trampoline was not observed. Conclusions: The differences or lack of difference in some of the studied cases in this article can be influenced by factors such as environment, age, nutrition type and exercise type and so on. This study which has done to compare the field of gymnastic and trampoline, suggests that the lack of difference in some physical capabilities may be because, trampolists who are a member of national team, all of them were active in gymnastic for several years.

INTRODUCTION

Ability of working with vigor and without undue fatigue and without consumption of excessive energy [1] are those basic and fundamental skills of human that are exist on their own and are not teachable, but progress due to the practice [2]. Today in sports, one of the important factors that is accounting as the champions building, is talent finding and selection. That is why the professionals of physical education are interested in this subject that is ensured the main and affective features and characteristics of outstanding and impressive success in implementation of sports skills [3]. If people without knowing their physical talent embark on different field of sports, may be due to the inability in implementation of skills or failure suffer from defeat and may become disappointment and despair. They may also lose their motivation to engage in sporting activities [4]. Years of research in the field of championship sports suggests that successful competition requires specific physiological factors and physical fitness. Provided profiles from physical capabilities of elite athletes in different sports field, will support this claim [2].

Among different sports field, “gymnastic and trampoline under its branches” for their own characteristics and for application of different tools in them and because each device can itself be observed as a sport field, so they can be considered as one of the most unique sports fields that the factor of physical fitness is considered as
one of the pillars of them [4]. Physical fitness expression is a profound concept which has defined differently in various documents. Routinely, the human ability to adapt to the physical activities is called as physical fitness.

For general definition, Janchel’s definition can be used that defined the physical fitness as the ability of the heart, blood vessels ability and ability of appropriate function of the muscles [5]. Dr. Gotsell who is a famous physiologist, expresses that a person who has physical fitness earlier makes himself compatible with physical activities that require muscular efforts, later becomes tired, sooner comes out from exhaustion and return to normal mode [6].

Pafen Berger believes that physical fitness is a feature that shows the performance of the functions and shows duties of our organs; also it reveals our motional abilities and physical active forces [7]. So we can defined the expression of physical fitness as following, physical fitness’s concept in general meaning is the ability of body in implementation without fatigue of daily activities and/ or having enough storage energy to engage in leisure activities and to face with unexpected events, and physical fitness’s concept in special meaning is successful and useful implementation of sports skills [8].

Lack of knowledge of affecting factors for developing the elite athletes and lack of attention to individual differences, may push persons toward sports that are not compatible with physical traits and their abilities. Today it is proven that presence of different science along with athletic sports is a necessary component, in the sports competitions, for proportion of athletes. Scientific efforts in sports will develop the knowledge of coaches and athletes and all those who involved in athletic sports and will enhance the existing knowledge [9]. Development of scientific approaches to recognizing the talents and bio-motational and physical capabilities and their relationship to success of athletes, have led to research in the fields of gymnastic and trampoline [10].

With this approach, the present study has examined the comparison of the physical fitness of elite male gymnasts and trampoline athletes in order to that officials and coaches of these two sports’ fields, guidance people from the early ages of childhood to one of these two fields that have more talent in.

Method:

Initially agreements and necessary corresponding had done with the Gymnastic Federation, coaches and team managers. Then demographic questionnaire was completed by elite gymnasts and trampoline athletes. In the statistical population that can be also included the research sample, in 1392 Winter and in 1393 Spring, 15 male gymnasts in the mean age of 20.26 ± 2.52 years and twelve person of trampoline athletes with an average age of 19.25 ± 1.65 years were selected purposefully as the subjects. These athletes had been selected before to preparing themselves for the 2014 Asian Games.

The purpose of physical fitness in this study is the leg power, hip flexibility, muscular endurance, speed, balance and agility which were measured as follows:

Speed [30 m]: to measure the speed of athletes, a 30 meter running test was used for measuring the speed. The tested athlete is placed behind the starting line in a position of standing start and with a command of “go” as quickly as possible begins to start running on a 30 meters path. This procedure is repeated 3 times and the record will be noted each time. The best record of three times of implementation per second would be the record of him. The less time shows the higher rate of the athlete.

Leg power: to do this, the double jumping was used and records were noted in centimeters.

Flexibility: by using a flexible meter box which is scaled by centimeters, the measurements were performed. In this case the subject glues his soles to the box and takes his hands forward without bending of his knees. Then according to the scaled position of the contact site of fingertips, be measured.

Strength: the test of “exercise sit-up” [hands on chest] can be used to assess the strength of the abdominal muscles.

Agility: in this test, two cones put next to each other, in the distance of 15 meter from the starting line. Athlete is placed behind the starting line and with the command of “go” he must start running in a reciprocating motion for 4 times. And in every time of running to the cones, he must touch them and back quickly. Time is calculated by using of chronometer, less time is indicative of higher agility in athlete.

Balance: the athlete on his foot is placed on a wood plate [width 5.2 cm, Height 5.2 and length 30 cm]. And with the command of start, lifts the other leg off the floor and as much as possible remains in equilibrium. This test should be done six times, three times on each leg. The average of time which is obtained from six repetitions is the score of the athlete.

These variables were measured with a tape measure, caliper, chronometer, measuring box of flexibility, as follows.

Descriptive data of research variables including mean and standard deviation are presented in figure and table. The normal range of distribution and homogeneity of variances of the research variables were determined by using statistical tests of Kolmogorov–Smirnov and Lelvene. The comparison of research variables was done.
by using a two-tailed t test for independent samples. All calculations were implemented by using the SPSS-18 software programs. The significant level for all tests was $0.05 > p$.

Conclusions:

Demographic characteristics:

Demographic characteristics are shown in Table 1. Statistical test results showed that the two groups in the mean age variables $\{ t_{[25]}=1.20 \text{ and } p=0.241 \}$ and sports background of $\{ t_{[25]}=1.17 \text{ and } p=0.251 \}$ not show significant differences; but in the competitive background variables $\{ t_{[25]}=3.85 \text{ and } p=0.001 \}$ and weekly practice hours $\{ t_{[25]}=3.23 \text{ and } p=0.003 \}$, were significantly different from each other.

Schema 1: Demographic characteristics in the gymnastic group [15 persons] and trampoline group [12 persons].

Physical fitness indexes of subjects:

Descriptive statistics for physical fitness indexes are shown in Table 1 and Chart 2.

There are no significant differences between the leg power of Iran’s elite male gymnasts and trampoline athletes. As indicated in table 2, the difference between the means of the two groups of trampoline athletes and gymnasts, in the variable of leg power is significant. Thus, the noted hypothesis which suggest no significant difference between the leg power variable in Iran’s elite male gymnast and trampoline, is rejected and there are differences between the two groups $\{ t_{[25]}=6.23 \text{ and } p=0.001 \}$.

There is no significant difference between the flexibility of trunk, related to Iran’s elite male gymnasts and trampoline athletes. As it is shown in table 2, means difference of two groups of gymnasts and trampoline athletes in trunk flexibility, is not significant. Thus, the noted hypothesis which suggest the lack of significant
difference between the variable of trunk flexibility of Iran’s elite male gymnasts and trampoline athletes, is supported and there is no difference between the two groups \( t [25] = 2.04 \) and \( p = 0.052 \).

There is no significant difference between Iran’s elite male gymnasts and trampoline athletes in tolerance of trunk.

As can be seen in table 2, the mean difference of the two groups of gymnasts and trampoline athletes is significant in trunk tolerance. Therefore, the noted hypothesis which suggest no significant difference between the trunk tolerance variable in Iran’s elite male gymnasts and trampoliners, is rejected and there are differences between the two groups \( t [25] = 6.71 \) and \( p = 0.001 \).

There is no significant difference between the running speed of Iran’s elite male gymnasts and trampoline athletes.

As it is shown in table 2, the difference between the two groups of trampoline and gymnastic in running speed variable is significant. Therefore the noted hypothesis which suggest no significant difference between the running speed variable in Iran’s elite male gymnasts and trampoline athletes, is rejected and there are differences between the two groups \( t [25] = 5.54 \) and \( p = 0.001 \).

There is no significant difference between balance of Iran’s elite male gymnasts and trampoline athletes.

As it is shown in table 2, the difference between the two groups of trampoline and gymnastic in balance variable is significant. Therefore the noted hypothesis which suggest no significant difference between balance variable in Iran’s elite male gymnasts and trampoline athletes, is rejected and there are differences between the two groups \( t [25] = 3.91 \) and \( p = 0.001 \).

There is no significant difference between agility of Iran’s elite male gymnasts and trampoline athletes.

<table>
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<th>Mean difference</th>
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**Discussion:**

Measuring the dimensions of athletes’ body is one of the key aspects for understanding of their capabilities. Also one of the effective approaches to predict the performance is talent finding and elite sports training; one of the main objectives of physical education at various levels of championship is physical fitness. To solve essential needs and obtain physical health with fitness, attention was paid for better performance of sports skills [11]. In connection with this research, any study has been not conducted within and outside of the country, so far. So the interpretation of the results presented in this section classified.

Power: in this current study significant difference was seen between the leg power of elite gymnasts and trampoline athletes, so that gymnasts have higher degree of leg power. It is worth to mention that the legs power and/or the legs explosive power in gymnastic, in some devices, such as, floor exercises and vault gymnastics is an important factor for good implementations. Maybe because the elasticity or recoil tracks of ground movements and also the board in vault, is less than trampoline. Thus gymnasts have more leg power. Since similar research has not been done in this regard, it is not possible to compare it with other studies.

Balance: the results obtained from this research shows that significant difference was found between balance of the elite gymnasts and trampoline athletes. So that gymnasts have higher degree than trampoline athletes. The balance factor in movements especially the pommel horse has a large role. It helps gymnasts in better implementation of movements in devices like horizontal, parallel and bearing rings. And at the end of the program, gymnasts must keep their balance for landing. Therefore gymnasts have higher balance.

Agility: the results obtained from this research shows that significant difference was found between agility of the elite gymnasts and trampoline athletes. So that gymnasts have higher degree of agility than trampoline athletes. Since gymnasts at most 6 devices of gymnastic include ground movement, vault gymnastics, parallel bars, horizontal, bearing rings and pommel horse must have high degree of agility to be able to move correctly and by changing the direction, do faster his movement.

Muscular endurance: the results obtained from this research shows that significant difference was found between muscular endurance of the elite gymnasts and trampoline athletes. So that gymnasts have higher degree of muscular endurance than trampoline athletes. Since 6 devices of gymnastic take more muscular endurance. Especially in the pommel horse, the abdominal muscles are contracting from the beginning to the end of the
implementation of the program without any interruption or breaks. Due to similar research has not been done on this factor, so the comparison with other studies is not possible.

Speed: the results obtained from this research shows that significant difference was found between muscular endurance of the elite gymnasts and trampoline athletes. So that gymnasts have higher degree of speed than trampoline athletes. This finding suggests that the speed factor plays a large role, especially in the part of vault gymnastic that gymnasts must run the distance of 25 meter with a high speed. Because similar research has not been done on this factor, the comparison with other studies is not possible.

Flexibility: in this study, a significant difference has not been found between the degree of flexibility in elite gymnasts and trampoline athletes. Because similar research has not been done on this factor, the comparison with other studies is not possible.

Conclusion:

Based on the results of this research, there are significant differences between the factors of physical fitness as well as indexes like legs explosive strength, the degree of balance, speed and the degree of agility related to gymnasts and trampoline athletes. Difference or no difference in some of the studied cases with this research can be affected by factors such as environment, age, nutrition type, and exercise type and so on. This study which was conducted to compare the fields of gymnastic and trampoline, implies that lack of difference in some of the physical abilities can be for the reason that trampoline athletes who are members of the country team, all were active in the field of gymnastic for several years. However, data and information obtained from this study are appropriate and valuable criteria for assessment and studying of the players’ condition and youth selection in the discussion of sports’ talent finding and future research in this area.

REFERENCES