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Relationship of foot length and height of longitudinal arch with ability of long jump

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Abstract

The purpose of this study to find out the selection of talent for jumping activities. The study has been conducted on the 50 male and female subjects selected randomly for this study. The subjects were selected from Noida college of physical education, who had persons sports and nonsports between the ages of 19-25 years. of the relationship of foot length and height of longitudinal arch with ability of long jump showed a Significance difference was set at .05 level which was considered adequate for this study. From the result it was found that the correlation coefficient between the foot length and vertical jump and between the height of longitudinal arch and vertical jump are presented in table.

Keywords: Vertical jump test, foot length, height of longitudinal arch, navicular bone, Noida college of physical education

Introduction

The foot is the part of the lower limb distal to the leg. it is often compared with the hand is tactile grasping organ, whereas the functions of the foot are support and locomotion; The arches of the foot are the longitudinal and the transverse, on the medial side of the foot, a longitudinal arch is formed by the calcareous, talus, navicular, cuneiforms, and the first three metatarsal. On the lateral side of the foot, a longitudinal arch is formed by the calcaneus, cuboid and the lateral two metatarsals. The transverse or metatarsal arch is formed by the navicular, cuneiforms, and cuboids together with five metatarsals. These bony arches, which are the result of the intrinsic mechanical arrangement of the bones, are supported by ligaments. During movement, they receive additional support from muscles, chiefly from those that invert and Evert the foot.

The arches act as springs (chiefly the medial longitudinal arch) which are of great help in walking and running, they also act as shock absorber in stepping and particularly in jumping the concavity of the arches protects the soft tissue of the sole against pressure. jumping ability has get its own unique and significant value in various games and sports especially jumping events in track and field shooting and rebounding in basketball and some such sports and games involving the jumping ability of the participants. There are so many exercises recommended by coaches and physical educationist to improve one's jumping ability. The jumping performance of the school age child is more frequently measured by the vertical jump or by the standing broad jump than it is by a series of diverse tasks. While performing vertical jump at time it is widely variable, and unpredictable. Function of the arch: 1). To carry the body weight efficiently and economically. 2). Protection of the planter vessels and nerve 3). Helping in forwards propagation of the body'. 4) minimize the pressure in walking jumping etc. The fundamental pattern for vertical jump consists of four movements in the following sequence. 1). There is flexion at hips, knee and ankles during the preparatory crouch. 2). The jump begins with a vigorous forward lift by the arms. 3). He thrust is continued by forceful extension at the hip, knees and ankle. 4). The body remain in extension until the feet ready to retouch, and then the ankle, knees and hips to absorb the ankles, knees and hips to absorb the shock of landing.

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Materials and Methods

Subjects 50 male and female subjects randomly selected for this study. The subjects were selected from Noida College of physical education Noida, who had person’s sports and non-sports. The age level of the subjects were ranged from 19 to 25 years approximately. All the subjects were oriented to the procedures and the purpose of the test items. All the subjects were equated to long jump in their best in each trail.

Variables and Tests

For the purpose of the study following variables and their were selected:

S. No	Test	Equipments	Position
1	Foot Length	Steel Tape	Standing
2	Height of Longitudinal Arch	Scale	Standing
3	Long jump	Calk, yard stick	Bending

Procedure

50 male and female subjects selected from Noida college of physical education Noida were selected for the study necessary instruction were given to the subjects and were made familiarized with the test of the study. The these three test performance of all the subject were measured with assistance of education teachers of Noida college of physical education and test were divided into 3parts (footlength, height of longitudinal arch and vertical jump)

This test was measured

A) Height of Longitudinal Arch

The farthest medical projection of the navicular (scaphoid) bone was marked with a ball point pen in standing weight bearing position, and then the height of the marked dot was measured scale in millimeters.

B) Foot Length

1. The subject was instructed to stand near a wall by touching their heels to the wall touching the medical border of the foot to the perpendicular line on the wall.
2. The furthest point of greater toe was marked on the floor by pencil.
3. A standard scale with right angle attachments was used to measure the distance of the marked point on perpendicular line.
4. The distance was measured in nearest millimeters.

C) Long Jump

Objective: (sargent chalk jump.)

To measure the power of the legs in long jump upwards.

Age Level

Satisfactory for ages nine though adulthood.

Sex

Reliability Satisfactory for boys. Has been reported as height as .93.

Objectivity

An objectivity coefficient of .93 was obtained jack Clayton 1969.

Validity

A validity of .78 has been reported with the criterion of a sum of four track and field events scores.

Equipment and Materials

A yardstick, several, pieces of chalk, and a smooth wall, surface of at least 12 feet from the floor are required.

Directions

The performer should stand with inside toward a wall, heels together, and hold a 1 inch piece of chalk in the hand nearest to the wall. Keeping the heels on the floor, he should reach upwards as high as possible and make a mark on the wall. The performance then jumps as high as possible and makes another mark at the height of his jump.

Scoring

The number of centimeters between the reach and the jump markers measured to the nearest half of centimeter. These trials are allowed and the best trial is reloaded as the score.

Analysis Result of Data

To analyze the collected data, to find out to analyze the collection data to find out relationship of foot length height of longitudinal arch with ability of long jump correlation statistics was applied for testing of this study.

Statistical Analysis

To find out relationship of foot length and height of longitudinal arch, with the ability of long jump. correlations statistics was applied for testing of this study. The test was established by the test method using the correlation. The level of significance was set at .05 level which was considered adequate for this study.

The formula used was karl-pearson:

$$r = \frac{\sum dx dy - \frac{\sum dx \times \sum dy}{N}}{\sqrt{(\sum dx^2 - \frac{(\sum dx)^2}{N}) (\sum dy^2 - \frac{(\sum dy)^2}{N})}}$$

Results

The coefficient of correlation between foot length and long jump and height of longitudinal arch and vertical jump are presented in table-1

Table 1

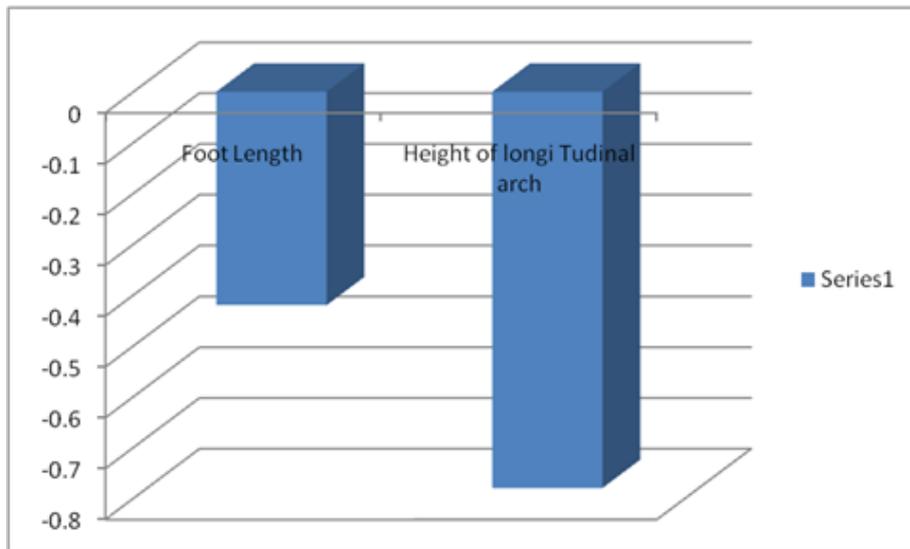
Test	Coefficients of correlation
Foot length V/S Long jump.	-0.42*
Height of longitudinal arch V/S Long jump.	-0.78*

*significant at .05 level

Needed for significant at.05 level with 50 at =1.38

The table shows that the coefficient of correlation for foot length V/S long jump in statistically significant and showing a negative significant correlation having the value of = -0.42. The coefficient of correlation for height of longitudinal arch V/S long jump also show a negative significant correlation r = -0.78 but this value is not much high as foot length show with long jump. The needed value of ‘r’ being significant with 50 at 1.38.

Foot Length	-0.42
Height of longi Tudinal arch	-0.78



Graphical representation of the coefficient of correlation between foot length and long jump and height of longitudinal arch and long jump.

Discussion

The present study shows not significant negative correlation between the variable. The degree of correlation is very low. Co-relation near to '0' as found in the field of physical education and sports. It might have occurred that some other have affected its relationship as muscular strength, neuromuscular coordination, increasing performance etc. If the effects of above factors are induced with the half of partial correlation or the effect of above factors are induced with the half of multiple correlation, value of foot length with the performance of long jump ability could have well established. But this findings also doesn't indicate that foot length is not contributing the performance of long jump instead the statistical value of $r = -0.42$ indicated that foot length is a contributing variable for the performance of long jump as the needed value of 'r' for significant at .05 level. The findings of this study also supporting the principle of lever i.e. longer the level greater the force. The correlation coefficient for height of longitudinal arch v/s long jump performance is also found statistically not significant but its value is low i.e. = - 0.78 which show that instead of having a not significant relationship height of longitudinal arch does not contribute more to the performance of long jump.

Conclusions

On the basis of the analysis of data the following conclusions may be drawn.

- Foot length is does not contribute the performance of long jump as it is negatively correlated with the long jump ability.
- Height of longitudinal arch in negatively correlated with the long jump performance but the value is low. So it doesn't contribute much to the performance of long jump.

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