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Article : RELATIONSHIP OF PONDERAL INDEX, EXPLOSIVE LEG STRENGTH AND SHOULDER ENDURANCE TO PLAYING ABILITY IN VOLLEYBALL : Physical

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ABSTRACT :

Purpose: The objective of the study was to find out the "Relationship of Ponderal Index, Explosive Leg Strength and Shoulder Endurance to Playing Ability in Volleyball. 30 male Intervarsity level Volleyball players of Lucknow Christian P.G. College and Lucknow University, studying in Physical Education classes, aged 20-25 years were selected as subjects. For Ponderal Index, height was measured against a wall in inches and weight measured in pounds through weighing machine. For Explosive Leg Strength, subjects were asked for vertical jump (jump & reach), 3 trials were given and best of them was recorded as score, measured in inches. For Shoulder Endurance, subjects were asked to perform push-ups and number of push-ups of each individual was recorded. For estimating the Playing Ability, Brady Volley Test was conducted. The score of playing ability was the total number of correct volleys in 1 minute. Correlation between playing ability and each selected variable (ponderal Index, explosive leg strength & shoulder endurance) and only explosive leg strength and ponderal Index were found significant at 0.05 level. Pearson's Product Moment Correlation were computed to get the value that indicated the relationship of Ponderal Index, Shoulder Endurance and Explosive Leg Strength with volleyball Playing Ability. The results shows that Explosive Leg Strength and Ponderal Index of volleyball players correlates with volleyball playing ability (r = 0.45 & 0.44 respectively) significant at 0.05 level. The finding of the study also revealed that there is no significant relationship (r = 0.31) between shoulder endurance and playing ability.

KEY WORDS :

Ponderal Index, Brady Volley Test.

INTRODUCTION :

Sport is one of the avenues of mankind's never ceasing strive for excellence. Its uniqueness lies in the intimacy between the physical happenings of our bodies and their repercussions on our minds, as well as in the general reconcilability of the social and aesthetic values which sport engenders. Sport evokes experiences that are exclusively human and independent of the changing forms, patterns and customs of a civilization which involves profoundly modifying concepts of our environment. The individual difference for body weight & height are great for boys of the same chronological age; these tested boys were within two months of their birthdays, which makes these differences more significant than the usual span of one year.

Different scholars have classified the body types differently. Some has more emphasis on height & someone on weight. Each one has come through with their own positives & negatives, while ponderal index covers both height & weight. The Ponderal Index is a measure of leanness of a person calculated as a relationship between height and weight.It is closely associated with the assessment of somatotype components.

$$\text{Ponderal Index} = \frac{Height}{\sqrt[3]{Weight}}$$

The present study has been undertaken, so that the factors responsible for improving the playing ability could be scientifically investigated and then training could be provided to develop these factors which provides for a better playing ability.

It is obvious that importance of the playing ability in modern volleyball game cannot be ignored or underestimated. Every player and coaches must understands its utility and its need has been felt to establish scientific basis of relationship between certain physical components and playing ability and to this effect the present study of undertaken

METHODS :

Subjects

30 male Intervarsity level Volleyball players of Lucknow Christian P.G. College and Lucknow University, studying in Physical Education classes, aged 20-25 years were selected for the purpose of this study.

Testing Procedures

1. The data for ponderal index, explosive leg strength and shoulder endurance were collected through standard tests of height and weight, vertical jump and push-ups.

2. The data for playing ability was collected through Brady Volley Test.

Procedure of Test & Scoring

1. PONDERAL INDEX

A Nomograph is used for calculating ponderal index. A ruler is placed between the individual's height in inches and his weight in pounds in the right column; read the ponderal index at the point where the ruler crosses the centre column. For e.g. given a height of 70 inches and a weight of 156 pounds, the ponderal index is 13.0.

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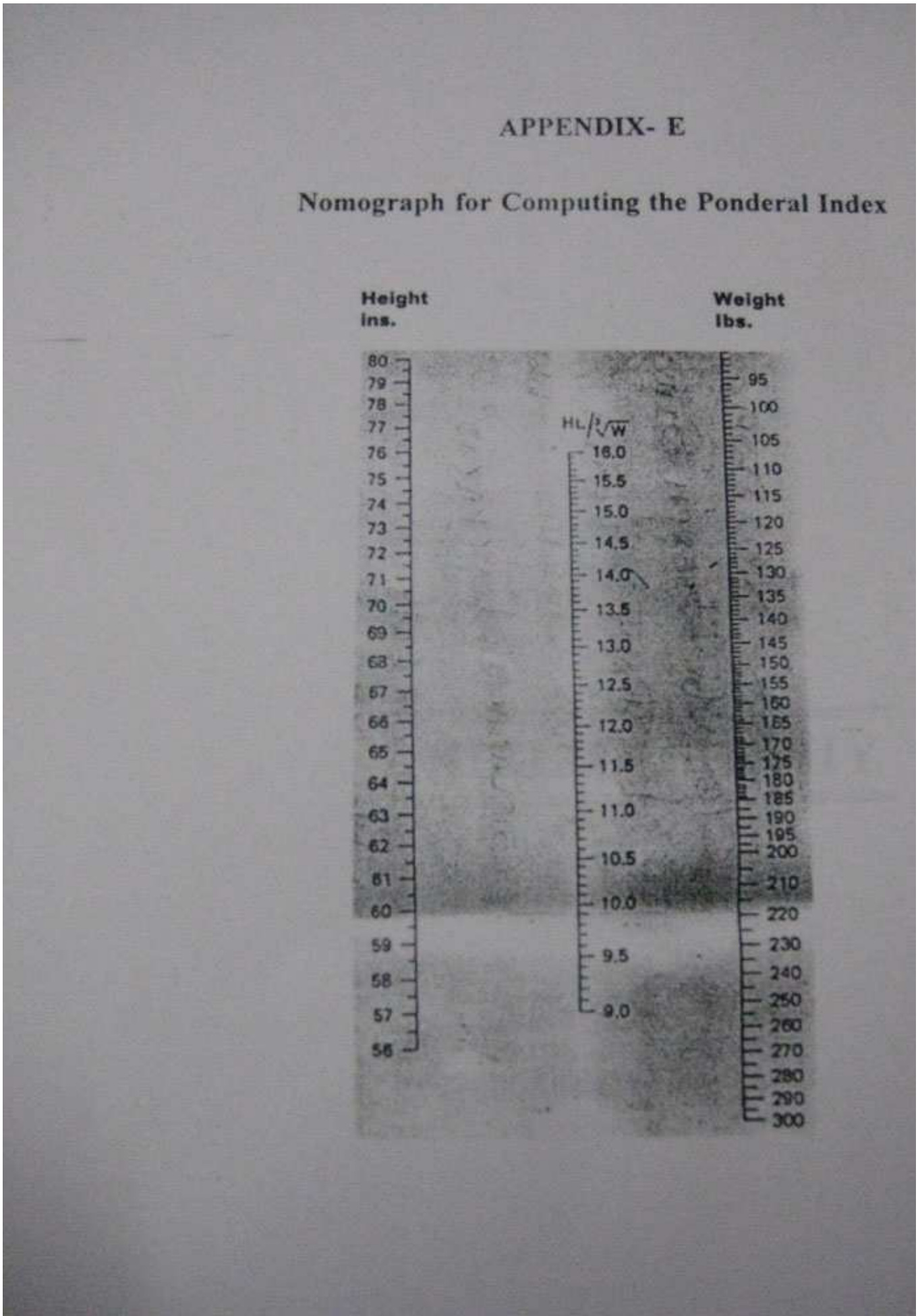
APPENDIX- E

Nomograph for Computing the Ponderal Index



$$\mathrm{PI} = \frac{mass}{height^3}$$

a. Height:

• Purpose - To measure the height of a player.

• Equipments - Tape and card board.

• Test Administration: An upright wall without wainscot was used to measure the standing height of the subjects. On the wall, markings were done in inches. After removing the shoes the subject stand erect with his heels, buttocks and upper back in contact with the scale, the arms are hanging naturally at the side. Height was measured by placing some flat object, such as chalk box, with one of the ends against the scale and the long side resting on the highest point of the head

• Scoring: The height was recorded to the nearest inches

b. Weight:

• Purpose - To measure the weight of a player.

• Equipment - Weighing machine.

• Test Administration - Weight of each subject was recorded by using a standard weighing machine, the subject to be weighed wearing a minimum amount of clothing and stand on the weighing machine. The weight was recorded from the scale to the nearest pounds.

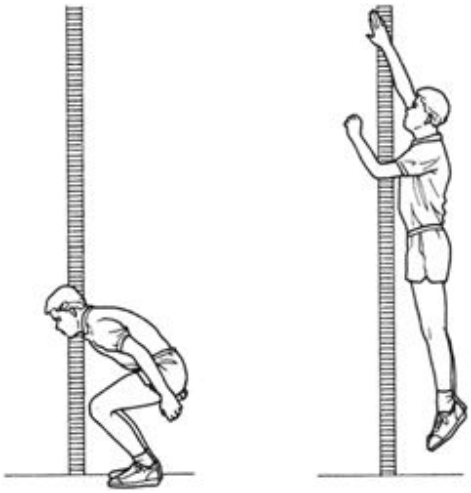
2. Explosive Leg Strength: Vertical Jump

• Purpose - To measure the explosive leg strength of a player.

• Equipment - chalk and a smooth wall surface with adequate ceiling height.

• Test Administration - The subject stands with his side towards wall, reach as high as possible with heels on the floor and make a mark on the wall with a piece of chalk or chalked finger. The subject then swings arms downward and backward, assuming a crouched position with the knees bent at about a right angle. He then jumps as high as possible swinging arms upward, as the highest point of the jump comes, another mark will make above the initial one.

• Rules- Three trials were given.



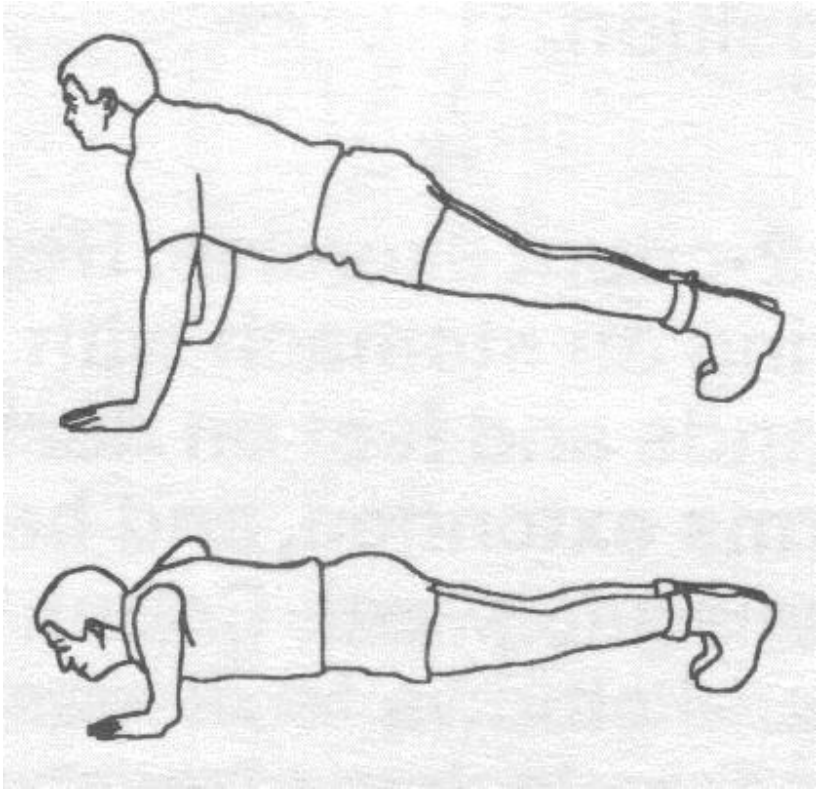
3. Shoulder Endurance: Push-ups

• Purpose - To measure the shoulder endurance of a player.

• Equipment and Facilities - A plane surface such as ground.

• Test Administration - The boy takes a front leaning rest position with body supported on hands and balls of feet, the arms are straight at right angle to the body. He then dips or lowers the body so that the chest touches or nearly touches the floor, then pushes back the starting position by straightening the arms and repeats procedure as many times as possible. In performing floor push-ups, only the chest should touch the floor, the arms must be fully extended with each push¬ups and the body must be held straight throughout.

• Scoring- Maximum number of correct push-ups.



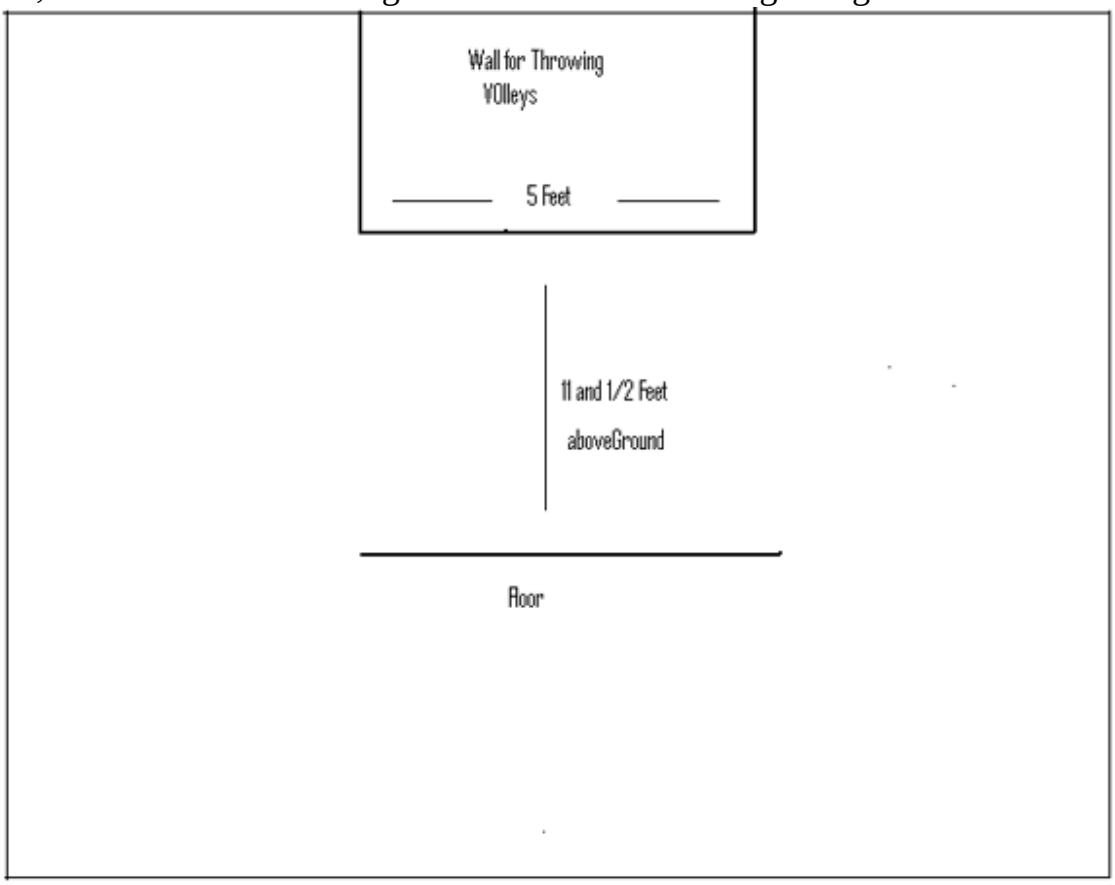
4. Brady Volley Test

• Purpose - To measure general volleyball playing ability.

• Equipments and Facilities - A plane wall, ball, stop watch, chalk and measuring tape.

• Test Administration - In this test, a simple target is marked on a smooth side wall, consisting of a horizontal chalk line 5 feet long and 111/2 feet from the floor. Vertical lines are extended upward towards ceiling at the ends of the horizontal line. In the test the subject stands where he wishes and throws the ball against the wall; He then volleys it as many times as possible in one minute. Only legal volleys are counted, that is, they must be volleys, not thrown balls, and they must hit the wall within the boundaries of the target. If the ball is caught or gets out of

control, it is started again as at the beginning of the test.



STATISTICAL ANALYSES :

The relationship of ponderal index, explosive leg strength and shoulder endurance to playing ability was established by computing “Pearson’s Product Moment Correlation”. The level of significance was set at 0.05 levels.

RESULTS :

Relationship of Independent Variables to Dependent Variable

The relationship between independent variables (Ponderal Index, Explosive Leg Strength & Shoulder Endurance) and criterion/dependent variable (Playing Ability) was obtained by correlation. The dependent variable was taken as "X" and independent variables were taken as "Y". For obtaining the correlation "rxy" between the independent variables and dependent variable, following formula was used

$$r_{xy} = \frac{}{\sqrt{[N(\sum X}}$$

The value of correlation of playing ability to pondered index, shoulder endurance and explosive leg strength is presented in Table -1.

TABLE-1
Coefficient of Correlation of Independent Variables to Dependent Variable

Independent Variables	Dependent variables	Coefficient of Correlation
Ponderal Index	**Playing Ability**	**0.44***
Explosive Leg Strength	**Playing Ability**	**0.45***
Shoulder Endurance	**Playing Ability**	**0.31**

Significant at 0.05 level r0.05 (28) = 0.38

Table-1 reveals that Explosive Leg Strength and Ponderal Index correlates maximum with the playing ability. The coefficients of correlation of Explosive Leg Strength and Ponderal Index with playing ability were found to be 0.45 and 0.44 respectively. The coefficient of correlation of other independent variable i.e. Shoulder Endurance was not found significant with the playing ability at 0.05 level of confidence. Therefore the Explosive Leg Strength and Ponderal Index of the men volleyball players were an important variable for the playing ability in volleyball, especially when each selected independents variables were separately compared with playing ability.

DISCUSSION :

The result of this study shows that Explosive Leg Strength and Ponderal Index of volleyball players correlates with volleyball playing ability (r = 0.45 & 0.44 respectively) significant at 0.05 level. This might be due to the fact that explosive leg strength and ponderal index helps in better vertical jump for dropping & spiking the ball at maximum height, which is most important factor in volleyball.

The explosive leg strength and ponderal index also helps the volleyball player not only to reach maximum height but also to make arch in the air for the spike.

The finding of the study also revealed that there is no significant relationship between shoulder endurance and playing ability. The finding may be attributed to the fact that playing ability depends upon combination of various factors. When the independent factor shoulder endurance correlated with playing ability may not show significant relationship because in present study each independent variable was correlated with dependent variable separately.

DISCUSSION OF HYPOTHESIS :

On the basis of the findings, the first hypothesis that there may be significant relationship between Ponderal Index and Playing Ability in volleyball is accepted. The second hypothesis that there may be significant relationship between Explosive Leg Strength and Playing Ability in volleyball is also accepted as per the findings. However the third hypothesis that there may be significant relationship between Shoulder Endurance and Playing Ability in volleyball is rejected.

CONCLUSIONS :

From the findings of the study, it may be concluded that-

1. There is significant relationship between the Ponderal Index and playing ability.
2. There is significant relationship between the Explosive Leg Strength and playing ability.
3. But there is no significant relationship between the Shoulder Endurance and playing ability.

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