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**GRT** **RELATIONSHIP OF MAXIMUM STRENGTH AND  
SPEED WITH VERTICAL JUMP ABILITY IN  
VOLLEYBALL PLAYERS**

**Shailendra Barange**

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**Abstract:-**The present study was conducted with the purpose of investigation the relationship between maximum strength and speed with vertical jump ability in volleyball player. For the purpose the study a total of 18 male inter university level volleyball players were selected. All the subject performed vertical jump, 50 m sprint (to test speed), half squat (1 RM to test maximum strength) and medicine ball throw (shoulder explosive strength). All the subjects have underwent practice sessions earlier. Pearson product moment correlation was applied to find out the relationship between at 0.05 level of significance. The result revealed a significant correlation of vertical jump ability with speed and maximum strength but the correlation between vertical jump and shoulder explosiveness strength. Although the relationship may be insignificant but at a large if an individual is able to use the explosive shoulder strength in well co-ordinated manner, it may be of greater advantage for jumping, it was concluded that the maximum strength and speed are needed to be developed for greater vertical jump ability.

**Keywords:** Relationship, Vertical Jump, Maximum Strength,

**INTRODUCTION**

In the sports of volleyball it can be noticed that there is a frequent need of jumping vertically as required in spiking and blocking. Today with growing standards, the coaches implement several strategies through which they try to develop greater motor component among in training schedule strength training has an important place.

Strength can be defined as the ability to produce force. Strength can be displayed isometrically or dynamically and depends on a number of factors such as the type of contraction, rate of motor unit activation, and degree of activation. Because power is the product of force and velocity, then alterations in force should affect changes in power production. There has been a vast improvement in the overall speed, size, and power displayed in all sports over the last 10 years. Athletes are by and large bigger, stronger, and faster than their predecessors of yesteryear. It has been proven that athletic performance depends either directly or indirectly on qualities of muscular strength. The primary function of the 600+ muscles in the body is to contract in order to cause movement in body parts. Only muscle can cause movement. The stronger muscles and the more forceful the contractions are in relationship to one's own bodyweight, the faster one will run, the higher he will jump, the further he will throw, and the harder he will hit. (Hatfield, F.C.). Success in many sports depends heavily upon athletes explosively leg power. Increases in power given the athletes the possibilities improved performance in sports in which the improvement of speed, strength, and relationship sought.

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Power heavily depends upon on maximum strength with an increase in strength the later being corrected with an improvement in relative strength and therefore with improvement in power ability. A significant relation has also been observed between one repetition maximum (1 RM) and acceleration and movement velocity. Explosive strength, or the ability to develop force within a very short time, is of primary importance in many sports. (Bührle M).

In this study the researcher has attempted to find out the relationship between the maximum strength, speed and vertical jump ability of volleyball player.

**METHOD**

For the purpose of the study a total of to 18 male volleyball players (age 21±3 years), who have at least once represented LNIPE Gwalior in all India interuniversity were selected. The subjects were fit at the time of study and they were asked to report any kind of discomfort due to tests administered. All the subjects were well oriented with purpose and procedures of study.

Before participation in the actual data collection, the subjects were given practice trails, even after all the subjects were well acquainted of these items. After the subjects performed moderate warm-up, involving jogging for 5 to 7 minutes. Followed by dynamic stretching the subject then performed vertical jump, 50 meter sprint, medicine ball throw, the data on squat performance was taken on other day following same warm up. The subjects were asked to perform the test which best of their ability.

**Table 1**  
**Descriptive Statistics of the performance of selected tests indicating particular motor components**

	Mean	Std. Deviation	N
vertical jump	50.6667	6.97053	18
50 m sprint	6.7111	.33412	18
medicine ball throw	12.5000	2.57248	18
half squat	166.9444	20.54113	18

Table 1 show the descriptive statics of means and standard deviation of scores of related test items. The means and standard deviation of vertical jump, 50 m sprint, medicine ball throw and half squat is 50.66 ± 6.97, 6.71 ± .33, 12.50 ± 2.57, and 166.94 ± 20.54 respectively.

**Table 2**  
**Correlation coefficient of selected motor components with vertical jump**

	vertical jump	50 m sprint	Medicine ball throw	Half squat
vertical jump	1	-.819	.239	.880
		.000	.339	.000
	18	18	18	18

Table 2 show the significant of value of correlation co-efficient of related motor component

with vertical jump ability of volleyball player. The result indicate the there is a significant correlation (.89) between vertical jump and 50 m sprint an p-value is less the 0.05 level of significance. It also indicate that there is significant relationship between vertical jump ability and half squat performance as the p-value is less than 0.05 level of significance. But there is a insignificant relationship between vertical jump ability and medicine ball performance on the p-value is greater the 0.05 level of significance.

### DISCUSSION

The finding of this study suggested that there is a high correlation between maximum squat performance and vertical jump ability. It may be noted that all the participant were undergoing practice session for intervarsity competition. They have been involved in regular weight training in which squat was one of the exercises included in the weight training program. Performing high intensity squat leads to recruitment of greater number of motor unit in the leg muscles. As the athlete also performed plyometric drills during training session, the muscles were trained for the recruitment muscles fiber with high frequency. Performing plyometric training also requires reasonably. Higher level of coordination among motor unit leading to greater power output with this phenomenon it can be understood that there is a high demand of maximum strength in related muscles. In present study it was observed that those having higher squat performances were relatively better in vertical jump ability.

In a study conducted by Kent Adam Et. Al. they have clearly illustrated a close working relationship between neuromuscular efficiency (e.g. multiple fiber requirement and facilitating the stretching reflex and dynamic strength performance. They have will be reasonably confidence stated that squats are conducive to the development of the hip and thigh strength, while simultaneously application of plyometric training permit effective use of this strength to produce explosiveness it the sports or events demanding speed and quickness.

The result also revealed a significant relationship between sprinting performance vertical jump ability. Sprint is an ability which required stimulation of muscles fiber at highest frequency are athlete processing higher sprinting abilities not only is able to involve more motor unit but at same time highest coordination also. While performing vertical jump extension of knee joint occurs in explosive manner. In high intensity sprinting also a runner extends the knee joint rapidly. So it is evidence that a better performance in sprint may helping reaching higher during vertical jump effort.

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