



Relation Between Knee Angle and Performance of Blocking in Volleyball

KEYWORDS

Blocking, knee angle, dip regulator, manual Goniometer.

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ABSTRACT Purpose of the study was to analyze and understand the relation between knee angle and blocking performance in volleyball. Twenty four male volleyball players within the age ranged from 14 to 22 years were selected as subjects. Performance of blocking in volleyball was measured for different knee flexion within the range of 60° to 130°. Knee angle for jumping was controlled by a dip regulator. The knee angle was measured by a manual Goniometer. Results indicated that the jump of the player during blocking performance increased with the increase of knee angle from 60° to 110° and there after the blocking performance decreased with increase of knee angle. The highest blocking performance was obtained with the knee angle of 110°. Values of coefficient of correlation confirmed the positive relation between knee angle and blocking performance for the range from 60° to 110° of knee angle and negative relation for the range from 110° to 130° of knee angle.

Introduction:

In blocking of volleyball Vertical jump is a fundamental and basic movement used in a wide variety of this game. It is also used as an exercise to improve leg explosive strength. For this importance considerable interest has been focused on understanding the nature of vertical jump in blocking. A number of research studies have been done to analyze different mechanical parameters involved in the exercise and their influence on the jumping performance. Martin and Stull (1969) and Wilson (1975) experimented with effect of different foot spacing on vertical jumping performance. Bosco (1983), Brown et.,al. (1986) and McGown et al. (1983) conducted research on effect of depth jumping on improvement of leg power. Clarke and Smith (1978) and Sargent (1969) worked on the effect of the combination of knee angle and foot spacing on performance of vertical jump. Present investigation was planned to analyze the relationship between knee angle and blocking performance in volleyball.

Procedure:

Twenty four male school and college students within the age group of 14 to 22 years, volunteered as subjects for the present study. The mean age, weight and standing vertical reach of the subjects were 17.9 ± 1.8 years, 51 ± 7.5 kg and 210 ± 9.5cm respectively. The subjects were allowed to take initial stance for jumping with foot spacing between 5" to 10" as per finding of Martin and stull (1969). From stance the subject flexed hip, knee and ankle. Joints to lower body's Cg to achieve a position for blocking with a particular knee angle. The knee angle was measured by a manual Goniometer. From this position the subject jumped vertically upward as high as possible and put a mark on the wall at the highest reach. The difference between the highest reach with a jump and the standing reach was considered as the blocking performance in volleyball for that knee angle. Following this procedure blocking height of the subjects were measured for seven different knees angle from 60° the 130° with an interval of 10°.

Results and Discussion:

The mean values of blocking height for different knee angles have been shown in Table - I.

Table - I: Mean blocking height for different knee angles.

Knee Angle (Degree)	Vertical jumping height (cm)
60°	33.16 cm
70°	36.55 cm
80°	36.58 cm
90°	36.60 cm
100°	37.86 cm
110°	39.00 cm
120°	37.19 cm
130°	31.12 cm

It is seen from the table values that the blocking height was increasing with increase of knee angle from 60° the 110°. After that the blocking height decreased gradually with the increase of knee angle. Change of blocking height with increase of knee angle from 60° to 130° has been shown in fig. 1. It is seen from the figure that the highest blocking height was achieved with the knee angle of 110° before which the jumping height showed increasing trend. But after 110° the jumping height showed decreasing trend.

Figure - 1: Changes of blocking height with increase of knee angle

To analyze the relationship between knee angle and blocking height, the coefficient of correlation was computed between knee angles and respective blocking height for two different ranges. Table -II shows the results.

Table - II: Coefficient of correlation between blocking height and knee angle.

Range of Knee Angle	Co- efficient of correlation (r)
60° – 110°	0.83
110° – 130°	- 0.95

Form the table values of coefficient of correlation, it is clearly understood that there was a highly significant positive correlation between knee angle and blocking height for the range from 60° - 110° and there was a highly significant negative correlation between knee angle and jumping height for the range beyond 130°.

From the above results the following regression equations were developed.

For the range of 60° - 110°, the equation was:

$$Y = 0.09506x + 32.4292$$

For the range of 110° - 130°, the equation was:

$$Y = 58.242 - 0.16335 x$$

Discussion on the Results:

Results of the present study indicated that there was a positive correlation between knee angle and blocking height in volleyball from 60 to 110 degrees, and thereafter the relation becomes negative. When compared these results with those of other leading researchers, it becomes evident that Hess (1975) reported better vertical jumping height with initiated movement for the range of 65 to 95 degrees of knee angle. In another study Martin and Stull (1969) reported that the greatest vertical jumping height was obtained for the knee angle of 115 degrees. Difference between the results of the present study and those of others might be due to the fact that the subjects studied were rather different in respect of physical maturity and training.

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