



ORIGINAL RESEARCH PAPER

Sports Science

A COMPARATIVE STUDY ON FLEXIBILITY AND JUMPING ABILITY OF COLLEGE LEVEL VOLLEYBALL AND BASKETBALL PLAYERS

KEY WORDS: Basketball, Volleyball, Flexibility, Jumping ability.

Dr. Bipin Kumar Patra

Baliapal College Of Physical Education, baliapal, Balasore, 756026, Odisha

Dr. Gaganedu Dash

Director Of Sports, KIIT University, KIIT Stadium Campus -13, Bhubaneswar-24. Odisha

Dr. Susanta Kumar Das

Baliapal College Of Physical Education, baliapal, Balasore, 756026, Odisha

Prof. Sakti Ranjan Mishra*

*Corresponding Author

ABSTRACT

The purpose of this study was to compare flexibility and jumping ability of college level Volleyball and Basketball players. Flexibility (sit & reach test) and jumping ability tests (squat jump, Vertical jump, standing broad jump) were made in a total sample of 60 college level players (30 Basketball players and 30 volleyball players). Statistical analysis showed significant differences between Basketball and Volleyball players at flexibility and jumping ability. The present study supports the conclusion that at the ages of 24 to 27 years the Basketball players seem to have much better physical condition compared to Volleyball players at parameters such as flexibility and lower limb muscle strength.

INTRODUCTION:

Volleyball and Basketball are dynamic games that require an intensive load of training to attain desired skills. The training programmes, of these two games theoretically are different and are based on the skills performed during action as they appear different. Besides the differences, these two games present some important similarities in their kinetic characteristics. Furthermore, athletic abilities such as coordination, agility, flexibility and power are very important in both games. Those kinetic characteristics, demand highly developed muscle power of the lower limbs, as well as flexibility for better movement and injury prevention. The lower limbs' muscle power is known as one the most important factors that determine a player's physical condition and resulting into successful. In past research, vertical jumping ability was considered to be a vital parameter for athletes' physical condition (Bisschop et al., 1998, Woodfork, 1998, Piastra et al., 1998, Sidhu & Badhot, 1981), since it describes the level of lower limb muscle strength. It must be stressed that jumping ability controls only the power-speed ability, because for achieving peak strength in high velocities such as jumping, landing or defensive movement, better coordination is needed. The most valid way of measuring and evaluating lower limb power is a maximum vertical jump performed in two different ways. First from the squat static position and secondly from the standing position with a counter movement (Asley & Weiss, 1994, Bosco, 1979, Kraemer & Newton, 1994, Mayhew, Bembem, Rohrs & Bembem, 1994).

Another important factor that describes a player's physical condition is also flexibility. Besides the fact that flexibility is very important for sporting performance, as well as it is highly correlated to players jumping ability and as a result with lower limbs strength (Lee et al., 1989) and therefore, the reason that flexibility is a factor concluded in most research studies that describe physical condition (Naughton, & Carlson, 1991, Nig & Maitland, 2001), for each sport has specific demands in each of the physical condition variables, and thus, provided a logical basis on why these variables differ from one sport to another. In the past studies concluded that the values of physical condition parameters are highly correlated with the type of sport, age, sex as well as with the division that players compete producing different measures for muscle strength and flexibility (Bisschop et al., 1998, Piastra et al., 1998). As there were very few studies concerning with the physical condition level of players that participate in volleyball and basketball and the effects of training in muscle strength and flexibility variables, for

volleyball and basketball players during adolescence, are still a research study that has not been thoroughly studied yet.

The purposes of this study were to measure flexibility and lower limb muscle strength in Volleyball and Basketball players and compare the different age groups between the ages of twenty four and twenty seven.

METHODOLOGY DESCRIPTION

Sample:

The sample of this study consisted of 60 volleyball and basketball players, students of Baliapal College of Physical Education, from the ages of 24 to 27 years old. From these players, 30 were volleyball players (24 years old: 7 players, 25 years old: 8 players, 26 years old: 8 players and finally 27 years old: 7 players), and 30 Basketball players (24 years old: 5 players, 25 years old: 9 players, 26 years old: 8 players and finally 27 years old: 8 players). The sample was stratified to achieve better homogeneity of physical characteristics, and technical ability level.

Measurement:

The tests performed, measured two of the most important parameters that define physical condition: a) flexibility and b) lower limb muscle strength. The sit and reach test which measures range of motion (Liemohn, et al., 1994, Jackson, & Baker, 1986) was used to test athletes' flexibility. For lower limb muscle strength (power-speed), three different jumping ability tests took place. These tests were: 1. Squat jump, 2. Vertical jump, 3. standing broad jump. Only one trial was accepted in which athletes gave the best of their effort.

STATISTICAL ANALYSIS:

Comparisons of the flexibility and jumping ability test values were conducted, between volleyball and basketball players in each of the groups based on age (24, 25, 26, and 27 years old). For data analysis, t-test was used for all variables with a significance level of $p < .05$.

RESULTS:

The results of this study showed that differences existed between basketball and volleyball players in flexibility and lower limbs power-speed values.

Statistical analysis for flexibility showed significant differences between basketball and volleyball players in the ages of 27 ($\text{sig}=.530, p<.004$), 26 ($\text{sig}=.318, p<.002$), 25

(sig=.219, p<.000) and 24years old (sig=.828, p<.001). In all cases, mean values were in favour of basketball players.

Regarding the Jumping ability level based on the three jumps (squat jump, Vertical jump, standing broad jump), statistical analysis illustrated that significant differences existed for:

- a. The squat jump in the age of 26(sig=.029, p<.003),
- b. The Vertical jump in the ages of 26 (sig=.034, p<.001) and 25 (sig=.168, p<.010) and finally
- c. The standing broad jump in the age of 26 (sig=.467, p<.001).

Table. 1. Mean values for flexibility and jumping ability tests at both sports and all ages.

	Squat jump	Vertical jump	Standing Broad jump	Sit and reach
Basketball 24Yrs. old	26.27	28.63	32.77	-3.45*
Volleyball 24 Yrs. old	26.29	27.43	32.66	-2.96
Basketball 25 Yrs. old	32.85	31.22*	36.83	-7.83*
Volleyball 25 Yrs. old	27.54	27.82	34.83	-0.96
Basketball 26 Yrs. old	32.79*	35.41*	41.87*	-8.59*
Volleyball 26 Yrs. old	29.78	31.94	37.95	-3.02
Basketball 27 Yrs. old	34.29	36.46	43.08	-11.57*
Volleyball 27 Yrs. old	34.04	36.01	42.3	-3.56

* Significant difference (p<.05)

Furthermore, it appeared that in all cases and at all ages the values registered, presented to be higher for basketball players, especially in the age of 26 years old, where the differences appeared to be higher. This phenomenon was even more evident for flexibility (figures 1, 2, 3, 4).

Discussion: Despite the fact that volleyball and basketball seem to have several similarities during competition in parameters such as jumping, starting, and conditioning, demands in athletic abilities such as speed, power, agility and coordination, present differences in training. Until now it could not have been said that this difference could affect the level of athletes' physical condition in those sports, especially in the ages that this study is concerned with.

For flexibility alone, the greatest differences that were observed in the present study between volleyball and basketball players, may lead to the conclusion that little concern is given for flexibility improvement through practice in young volleyball players. Even though the test values present some improvement as the athletes become older, the mean values for volleyball players performing the sit and reach test are considered to be generally low.

In the present study, it is evident that training may affect lower limb muscle strength in these two sports, especially, in the ages of 25 and 26, where the values of the jumping ability were in favour of basketball players. Basketball players appeared to be stronger. Jumping ability describes power-speed ability and not relative strength. Based on Zaka, (1993), it appears that this ability cannot be affected dramatically by the training practices. As a conclusion the results of this study may not become because of training exclusively. It is possible that the inhibiting factor that affects these results is no other than the "rapid growth" of volleyball players. Growth combined with low flexibility levels leads to low values of power-speed ability especially when compared to basketball players.

CONCLUSION:

A conclusion supported by the evidence of the present study is that at the ages of 24 to 27, basketball players seem to have a much better physical condition compared to volleyball players at parameters such as flexibility and lower limb muscle strength. The influence of training practice in the

present study measurements cannot be described accurately in both games. Different conclusions could be presented, only if an examination of the type and load of training practice in both games is recorded. Hence, only if these variables that significantly affect flexibility and lower limb strength are thoroughly examined the results would be more meticulous.

REFERENCES:

1. Asley C.D, Weiss L.W. (1994) Vertical jump performance and selected physiological characteristics of women, *J.S.C.R.*, 8:5-11.
2. Bisschop C, Darot D, Ferry A. (1998) Physical fitness in young mature athletes. *Science & Sports*, 13(6) :265-268.
3. Bosco C, Komi P.V. (1979) *Influence of countermovement amplitude in potentiation of muscular performance.* In: VIth International Congress of Biomechanics, Varsavia, Poland, 18-21.
4. Jackson A.W, Baker A.A. (1986) The relationship of the sit and reach test to criterion measures of hamstring and back flexibility in young females. *Research Quarterly for Exercise and Sport*, 57(3): 183-186.
5. Kraemer W.J, Newton R. Training for improved vertical jump. (1994) *Gatorade Sports Sci. Inst.*, 7:4.
6. Lee E.J, Etnyre B.R, Poindexter H.B.W, Sokol D.L, Toon T.J. (1989) Flexibility characteristics of elite female and male volleyball players. *J. Sports Med. Phys. Fitness.*, 29: 49-51.
7. Liemohn W, Sharpe G.L, Wasserman J.F. (1994) Criterion related validity of the sit-and-reach test, *J.S.C.R.*, 8(2):91-94.
8. Mayhew J.L, Bembem M, Rohrs D.M, Bembem D.A. (1994) Specificity among anaerobic power tests in college female athletes. *J.S.C.R.*, 8: 43-47.
9. Naughton G, Carlson J. (1991) Sports participation: a physiological profile of children in four sports over a 12-week season. *Pediatric exercise science.*; 3(1):49-63.
10. Nig G.Y.F, Maitland M.E. (2001) Relationship of kinetic demands of athletic training and knee joint laxity. *Physical Therapy in Sport Journal*, 2(2):66-70.
11. Piastra G, Capanna R, Cipolloni C, Lazzini F, Bondi S. (1998) Anthropometric observatiodns and astonishing strength of the lower limbs in young men playing football. *Medicina Dello Sport*, 51(1):23-28.
12. Sidhu L.S, Badhot J.L. (1981) Maximal anaerobic power in national level Indian players. *Br.J. of Sports Med.*, 15(4):265-268.
13. Woodfork D.R. (1998) *A comparison between professional and non-professional football players using selected anthropometric and performance variables.* Thesis (M.S.) Purdue Un., U.S.A.
14. Zakas A, Sentelidis A, Liapis D. (1993) Isokinetic peak torque strength at flexion and extension muscle groups of selected handball and basketball athletes. *Physical Education & Sports*, 2 (33): 37-46.