"ASSESMENT OF LEG POWER AND DYNAMIC BALANCE AMONG AMATEUR VOLLEYBALL AND BASKETBALL PLAYERS"

Physiotherapy

Vidhi Shah	Assistant Professor, Dr. D.Y. Patil College of Physiotherapy, Pune.
Radhika Taparia*	physical therapist, private clinic, Pune *Corresponding Author

ABSTRACT

The study was done to understand how athletes from different sports perform on balance and leg power tests. When prescribing balance, and strengthening exercises to athletes in different sports, it may be important to recognize performance variations. The target populations were 60 young (18-30yr) amateur Volleyball and Basketball Players. They were assessed for leg power by Vertical Jump Test and for dynamic balance by Y-Test.

Volleyball players have leg power of average of 16.70 which shows they have Average skills along with the basketball players with average score of 16.46 having Average Skills Too. Balance Test shows 93.33% success rates. Also there was no significant difference on leg power and dynamic balance between volleyball and basketball players.

KEYWORDS

Athletes, Dynamic balance, leg power test, Vertical jump test

INTRODUCTION

Each sport likely requires different levels of sensorimotor processes to perform skills and protect the neuromuscular system from injury. Balance is defined as the ability to maintain a stable posture with body mass center. It may be static when the body is either at rest (static balance) or dynamic when the body is in steady-state motion (dynamic balance). Human balance depends on coordinated integration of somato-sensory, vestibular and visual input. [1]

Basketball players often perform upper extremity passing, shooting, and dribbling skills while wearing shoes on flat, stiff surfaces. Their skills require great joint accelerations from jump landings and cutting maneuvers. [2] Volleyball players also exposes to a variety of movements such as speeding jumps and leaps, forearm pass, overhead pass, spike, block, dig, dink and serve. [3]

A good balance is essential to make a pass, after an attack or block and return to the floor. Balance is considered to be an important aspect of performance of all individuals whilst undertaking various daily activities, which is achieved by a complex process involving the function of musculoskeletal and neurological systems. [7] Balance can be described as the ability to control the body's position in space for the purpose of balance and orientation. [8] Sports training enhances the ability to use somatic sensory and monolithic information, which improves postural capabilities. [9] Postural changes are different according to the sport practiced. [10] Training allows sportsmen to acquire new balance control abilities, possibly differing according to the discipline practiced. [11] While static balance comprises the activities that the center of gravity is stable, in dynamic balance activities, the center of gravity is needs to change continually. [12]

The Y-Balance Test has proven to have very good levels of inter rater test–retest reliability (ICC = 0.80 – 0.85). Vertical Jump Test has validity (r=0.99, p=0.001). The interclass reliability of T Test is 0.98.

So the study helps to suggest some guidelines to the concerned professionals in context of assessing, classifying and understanding the level of performance in volleyball and basketball players.

PROCEDURE

The cross-sectional study was done on amateur volleyball and basketball players. Ethical approval was taken from the committee and the subjects who fulfilled the criteria were taken for study by convenient sampling. Total 60 players were selected. The inclusion criteria were age between 18-30 years, Have History of being a player at least from last one year, Plays sports minimum one hour per day (5 days per week) and Amateur players. The subjects with current injury to the upper extremity or lower extremity, any degenerative, inflammatory, musculoskeletal, or neuromuscular conditions in the upper extremity or lower extremity and Subjects with Cardio respiratory insufficiency were excluded for the study.

The aim of the study was explained to the subjects and the preformed consent was taken from them. They were assessed for leg power by Vertical Jump Test and for dynamic balance by Y- Test.

Vertical Jump Test was done by demonstration of the test, pointing out common errors. Have participants warm up by practicing the test.

Have the participant stand with one side toward the wall, heels together, and reach upward as high as possible. Record the maximum standing reach. Then, using a rocking, one-step approach ("step-feet together-jump"), have the participant jump as high as possible, reaching upward at the same time. Record the maximum jumping reach. The number of inches between the standing reach and the jumping reach, measured to the nearest half inch, is the score. Use the best of three trials as the score.

Scoring:		
Excellent	20	21.5 +
	19	20.5-21.0
	18	19.5-20.0
Good	17	18.5-19.0
	16	17.5-18.0
Average	15	16.5-17.0
	14	16.0
	13	15.5
Below Average	12	15.0
	11	14.5
Minimum Acceptable	10	14.0
Substandard	0	< 14.0

Y Balance Test

The YBT requires the athlete to balance on one leg whilst simultaneously reaching as far as possible with the other leg in three separate directions: anterior, posterolateral, and posteromedial. Therefore, this test measures the athlete's strength, stability and balance in various directions. The YBT composite score is calculated by summing the 3 reach directions and normalizing the results to the lower limb length, whereas asymmetry is the difference between right and left limb reach.

It is important to understand that whenever fitness testing is performed, it must be done so in a consistent environment (e.g. facility), so that it is protected from varying weather types, and with a dependable surface that is not affected by wet or slippery conditions. If the environment is not consistent, the reliability of repeated tests at later dates can be substantially hindered and result in worthless data.

Test Procedure

Warm-up

In addition, sufficient recovery (e.g. 3-5 minutes) should be administered following the warm-up and prior to commencement of the test.

IMPORTANT: This testing procedure is explained. The athlete should be wearing lightweight clothing and remove their footwear. After doing so, they are the required to stand on center platform, behind the red line, and await further instruction. The test should be performed in the following order:

Right Anterior
Left Anterior
Right Posteromedial

Left Posteromedial
Right Posterolateral
Left Posterolateral

With their hands firmly placed on their hips, the athlete should then be instructed to slide the first box forward as far as possible with their right foot and return back to the starting upright position. Reach distances should be recorded to the nearest 0.5cm.They should then repeat this with the same foot for a total of 3 successful reaches. After they have completed 3 successful reaches with their right foot, they are then permitted to repeat this process with their left foot. Once the athlete has performed 3 successful reaches with each foot, they can then progress onto the next test direction (i.e. postero medial). The test administrator should be recording the reach distance of each attempt in order to calculate the athletes YBT composite score.

NOTE: Failed attempts include the following:
The athlete cannot touch their foot down on the floor before returning back to the starting position. Any loss of balance will result in a failed attempt. However, once they have returned to the starting position, they are permitted to place their foot down behind the center/balance foot box. The athlete cannot place their foot on top of the reach indicator in order to gain support during the reach – they must push the reach indicator using the red target area. The athlete must keep their foot in contact with the target indicator until the reach is finished. They cannot flick, or kick, the reach indicator in order to achieve a better performance.

Scoring System: The test administrator can then calculate the athletes YBT performance scores using the following equation:

Absolute reach distance (cm) = (Reach 1 + Reach 2 + Reach 3) / 3
Relative (normalized) reach distance (%) = Absolute reach distance / limb length * 100.

Normative Data

| Direction	Lower Extremity	Normalized Reach (%)
Posterolateral	Left Right	100.5 ± 9.1 101.4 ± 9.6
Anterior	Left Right	63.6 ±7.2 63.5 ±7.7
Posteromedial	Left Right	102.7 ±8.6 102.0 ±9.4

| Vertical jump test | Postero-medial Reach | Postero-medial Reach |

DATA ANALYSIS
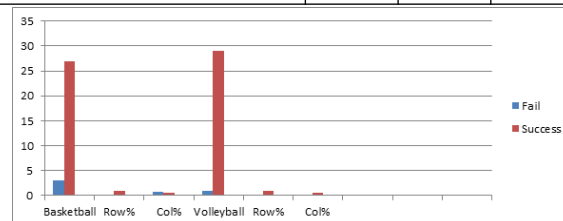**Table 1:** Comparison of Leg Power of Basketball and Volleyball Players on vertical Jump Test

Vertical Jump Test		P Value
Sport	Mean	0.686
Basketball Players	16.46	
Volleyball Players	16.7	
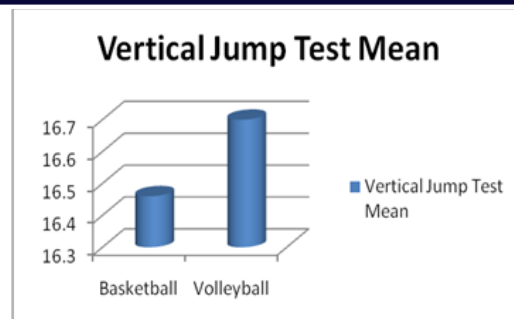
Graph 1: The comparison of leg power of Vertical Jump Test.

Table 2: Comparison of Dynamic Balance skills of Basketball and Volleyball players on Y Balance Test.

Y Balance Test	P Value		
SPORT	Fail	Success	0.305
Basketball Players	3	27	
Row%	10.00%	90.00%	
Col%	75.00%	48.21%	
Volleyball Players	1	29	
Row%	3.33%	96.67%	
Col%	25.00%	51.79%	

Graph 2: The Comparison of Dynamic Balance skills on Y Balance Test

RESULTS
The study consists Of 60 players,30 From Basketball And 30 from Volleyball which comprise 48 female and 12 male players who were assessed on two tests- Vertical Jump Test And Y Balance Test. The comparison of mean of Leg Power Of Basketball and Volleyball Players On Vertical Jump Test where p =0.686 So the test is not significant as $p > 0.05$. Comparison of mean of Dynamic Balance skills of Basketball and Volleyball players on Y Balance Test. where p = 0.305, So the test is not significant as $p > 0.05$.

DISCUSSION
The study has been conducted on amateur players who lack efficient training to leg power and balance strategies. Amateur players are not consistent with the hours of play and almost end up playing the game without any prior conditioning. In consequence of this results there is no significant differences amongst players of both the sports and in amongst each other.

Comparison of mean of Dynamic Balance skills of Basketball and Volleyball players on Y Balance Test where p = 0.305 So the test is not significant as p > 0.05, but it reveals that Dynamic Balances of Volleyball player was higher than Basketball players. Hence, balance scores difference among players in this study may be due to differences in joint strength. Volleyball is an invasive game wherein the players require more of dynamic balance in order to change direction. Volleyball player must make rapid changes of direction constantly throughout the game to hit the ball. Volleyball required high muscular endurance in both upper and lower body, as the player has to make high intensity intermittent sprints throughout the game. There is requirement of good dynamic balance during the sequence of passing, setting, spiking and blocking in volleyball. Although in Basketball players such actions are less seen.

The comparison of mean of Leg Power of Basketball and Volleyball players On Vertical jump test where p = 0.68 So the test is not significant as p >0.05. This could be because Sports like basketball and volleyball have high ground reaction forces when players land from a high jump.

CONCLUSION

This Study concludes that Volleyball players have leg power of average of 16.70 which shows they have Average skills along with the basketball players with average score of 16.46 having Average Skills Too. Balance Test shows 93.33% success rates.

Also there was no significant difference on leg power and dynamic balance between volleyball and basketball players.

References

1. Hossein Berenjeian Tabrizi, Ali Abbasiand Hajar Jahadian Sarvestani; Comparing the Static and Dynamic Balances and Their Relationship with the Anthropometrical Characteristics in the Athletes of Selected Sport; Middle-East Journal of Scientific Research 15 (2): 216-221, 2013
2. Eadric Bressel, EdD*; Joshua C. Yonker, MS, LAT, ATC†; John Kras, EdD*; Edward M. Heath, PhD*; Comparison of Static and Dynamic Balance in Female Collegiate Soccer, Basketball, and Gymnastics Athletes Journal of Athletic Training 2007;42(1):42–46.
3. P Ratan Khuman, Thongam Kamlesh1, Lourembam Surbala; Comparison of static and dynamic balance among collegiate cricket, soccer and volleyball male players; International Journal of Health & Allied Sciences; 2014.
4. Jacobson, G.P., C.W. Newman and Kartush, 1992. Handbook of balance function testing, New York: Mosby.
5. Shumway-Cook, A. and M.H. Woollacott, 2007. Motor Control: Translating research into clinical practice, lipicott Williams and wilikins, Philadelphia, PA, USA.
6. Winter, DA., A.E. Patla and J.S. Frank, 1990. Assessment of balance control in humans. Medical Progress through Technol., 16(1-2): 31-51.
7. Bringoux, L., L. Marin, V. Nougier, PA. Barraud and C. Raphel, 2000. Effects of gymnastics expertise on the perception of body orientation in the pitch dimension. Journal of Vestib Res., 10(6): 251-258.
8. Davlin, C.D., 2004. Dynamic balance in high level athletes. Percept Mot Skills. 98(3): 1171-1176.
9. Taekwondo Stabilite. 2009 http://www. sakintaekwondo.com/.
10. Dr. Sadashiv S Kotyal; Comparison of agility volleyball and basketball players; International Journal of Physical Education, Sports and Health; 2017; 4(1): 269-270.
11. K.L. LAMB, D.A. BRODIE and K. ROBERTS; Physical fitness and health-related fitness as indicators of a positive health state; HEALTH PROMOTION © Oxford University Pros 1988
12. Suman Mondal, Biswabandhu Nayek and Dr. Kallol Chatterjee; A comparative study on strength, agility and dynamic balances between volleyball and basketball players; International Journal of Physiology, Nutrition and Physical Education; 2016; 1(2): 81-84.