Turkish Journal of Sport and Exercise /
Türk Spor ve Egzersiz Dergisi
http://dergipark.gov.tr/tsed
Year: 2022 - Volume: 24 - Issue: 1 - Pages: 14-21
10.15314/tsed.974238

Turkish Journal of
Sport and Exercise
Türk Spor ve Egzersiz Dergisi
ISSN: 2147-5652
https://dergipark.org.tr/tr/pub/tsed

The Effect of Shoting Techniques on Accuracy Rates in Infrastructure Basketball Players

Fatih KILINÇ[1A], Ömer PAMUK[2B]

[1]*Karamanoğlu Mehmetbey University, Faculty of Sport Sciences, Karaman/Turkey*
[2]*Akdeniz University, Faculty of Sport Sciences, Antalya/Turkey*

Address Correspondence to Ö. Pamuk: e-mail: omrpmk03@gmail.com
(Received): 04/11/2021 (Accepted): 30.04.2022
A:Orcid ID: 0000-0002-6426-3948 B:Orcid ID: 0000-0002-8980-3648

Abstract

To examine the shoting percentages of the children training in basketball infrastructure according to the angular positions of the joint areas in the shoting techniques. 15 male basketball players training in the infrastructure voluntarily participated in the research. In our research, two groups were formed as High Shot Rate and Low Shot Rate. High Shooting Rate Group n:7 (HSR) (age 15.4±0.7 years, height 1.83±9.1 m., body weight 80.8±16.2 kg., sports age 7.2±1.8 years), Low Shooting Rate Group (LSR) n:8 (age 15.6±0.9 years, height 1.81±6.9 m., body weight 73±7.8 kg. and sports age 4±2.7 years). A total of 60 shots were fired from the foul line (20 shots), right forward (20 shots) and left forward (20 shots) in both groups. The joint angle values of the shooting start and finishing phases of both groups were compared with the Independent t test. While there is a significant difference between the Group with High Shot Rate and Low Shot Rate between Head, Elbow, Wrist and Knee in the starting phase of the shooting technique ($p<0.05$), the shooting technique has a significant difference between all joint regions in the finishing phase ($p> 0.05$) could not be found. Based on the data we have obtained, attention should be paid to basketball players' elbow and wrist angles from the upper extremity and the knee angles from the lower extremity in the shooting technique. In addition, we think that our study will bring a perspective to those who will work in this field.

Keywords; Basketball, Shoting, Technical Analysis, Performance

INTRODUCTION

Basketball is a complex sport with many performance-related components. Optimizing this complex structure is important for success. This optimization is necessary to bring each performance component to a level, both specifically and in coordination with other features. Basketball is a sportive branch with high physical, physiological, biomotoric, psycho-mental and technical-tactical features. Physical structure, physiological capacity, biomotoric features, psycho(anxiaety,stress)-mental state, technical structure, tactical understanding, team discipline and trainer/sport scientist are very important in the competitive characteristics of basketball (strength, speed, endurance, mobility-flexibility, coordination) (7,8,9,12,13,14). It is difficult to attribute success to a single criterion in basketball (10,11). However, priority features can be found, for example, being tall in the physical structure is considered an advantage (5). It has been emphasized that physical structure, technical, tactical and mental abilities come to the fore in collective (basketball, football, etc.) branches, and they are important in technical tactics as well as physical fitness for optimal performance (27,30).

In sports branches, technique is considered very important. Of course, this naturally has a high technical aspect in some sports branches

(Gymnastics) while it can show a low feature in some sports branches (Athletics/Running). Technical; it means making the basic movements of the branch in the most economical way suitable for the purpose (21,25). Or it is the ideal model of the movement of the sports discipline (6). The ideal model of a branch expresses an optimal movement form, which is formed as a result of applying the movement in different ways many times. The technique of each athlete creates his own unique modeling style.

The basics of this formation cover the movements that reach the result in the shortest time unit, use the least energy consumption, and have the lowest error rate against the opponent in team sports. Not every move performed by every athlete is technically acceptable. Because in the formation of the basic movement over time, the positioning of the joint system according to the nerve-muscle coordination is a result of the body's adaptation mechanism. In the adaptation mechanism, the body basically aims to make the movements in the most economical way suitable for the purpose.

When the difficulty level of technical learning is examined in starting sports, it is seen that while a lot of effort is exerted at first, less effort is spent as the technique settles with movement repetitions.

In basketball, technique has an important place in both offensive and defensive systems. In particular, the technical training received in the infrastructure is very important in terms of forming the basis of success in the sportsmanship period. It is important that the technical movement taught in the infrastructure is similar to the ideal model and conforms to its criteria. It is accepted that the correct technical models that children have acquired in the infrastructure will also be the basis for their future sports life. The scientificness, experience and technical evaluation of the trainer/sport scientist plays an important role in the technical development of children or those who are new to sports. In the technical development period, it can be thought that if the strengths and weaknesses are not evaluated in the trainings, it can bring many deficiencies in determining the form of the trainings in the development period. Basketball consists of the basic techniques of dribbling, passing, shooting and rebounding. Although every technique has an important place, the most important factor determining the score of the match is the shot (29). It is considered very important to correct the mistakes in a timely manner, in the infrastructure, to teach the shooting teaching stages and the shooting technical position of the shot correctly. Researchers have made applications on shooting in the field (17). Based on the data obtained by some researchers, six basic teaching points have been proposed for mid-range to long-distance jump shots within the framework of the biomechanical fundamentals of a basketball shot (15).

In basketball, the shot is the most important factor that directly affects the outcome of the match. Drop angle, speed and height of the shot play an important role (18,19). Raiola et al. noted the technical factors that govern shot shooting outside of force as follows: a. Initial height of the ball, b Air resistance, c. Drop rate of the ball, d. Ball exit angle. From a biomechanical point of view, shooting is about the lower limb (feet, leg, and thigh), trunk (stabilizing musculature of the flying body), and upper limb (hand, forearm, and arm). The main muscle groups of the upper extremity that intervene during the movement of the shot are:

Arm Flexor: brachial

Arm Flexors: anterior deltoid, pectoralis (upper fibers), and biceps coracobrachialis

Arm Extensor: triceps

Forearm Pronator: pronator teres

Hand Extensor: extensor the radial and ulnar, radial extensor short and extensor ulnar

Hand Flexor: radial and ulnar

Hand Finger Flexor: lumbrical, interosseous, flexor superficial and deep of the fingers. (24).

In general, the evaluation of shooting technique development is made visually by the coaches on the field (3). Although there are many models in technical evaluation, the American Alliance for Health Physical Education, Recreation and Dance can be given as a few examples of technical tests AAHPERD. The technical evaluation may be difficult to implement due to the necessity of doing it under field conditions. For this reason, trainers and sports scientists mostly prefer laboratory tests. The main reason for this is because of its high validity and reliability (28). However, considering the time, cost and availability of laboratory tests in field conditions, it can be said that it sometimes creates a disadvantage. In addition, it does not comply with the field and competition conditions.

In our country, the evaluation of shooting technique in basketball is done within the framework

of visuality and there are limited studies. The difficulty of technical analysis, the difficulty of evaluating the positions of the joint areas during the movements performed by the priority athlete, as well as the comparison of the movement made with the standards. For example, it was stated that many elements such as the position of the body, the speed of the ball, and the rotation of many elements should be evaluated during the shooting (16). In technical evaluation, it is necessary to evaluate the process from the starting point of the movement to the end point, body positions and the shape of the movement. Due to these difficulties, it is very difficult to perform technical analysis in field conditions. In addition, the fact that basketball is a team sport poses a disadvantage for the sports scientist. Making technical analysis of each athlete separately and validity and reliability in visual evaluations also create some problems. It can be said that the analysis of the body in field conditions is a very difficult and time-consuming process for sports scientists. In this context, there is a need for practical analysis systems with high reliability, suitable for field conditions.

The aim of this study is to analyze the effects of the angular conditions of the joint areas in the shooting position of the basketball players who regularly train in the infrastructure on the shooting percentages by making practically computerized analysis.

MATERIAL and METHOD

15 male basketball players voluntarily participated in our study, who regularly training in the infrastructure of the Anatolian Stars Sports Club (Anadolu Yıldızları Spor Kulübü) in Konya. In our study, two groups were formed as the group with high shooting rate (HSR) and the low shooting rate (LSR) group. Participation in regular training was determined as a prerequisite for the determination of the groups participating in the study. Group with high shooting rate n: 7 (HSR) (age 15.4±0.7 years, height 1.83±9.1 m., body weight 80.8±16.2 kg., sports age 7.2±1.8 years), low shooting rate group (LSR) n:8 (age 15.7±0.9 years, height 1.82±7.3 m., body weight 70.1±7.8 kg., sports age 4.4±2.6 years).

Shot tests were planned over the three zones shown in Figure 1 and 20 shots were thrown from each zone. While shooting from the foul shooting zone (zone 2), the shots from zones 1 and 3 (5.80 m from the projection of the center distance right-left striker zone of the circle) were performed with the jumping shooting technique. Average of the total baskets fired from three (3) regions (for example, 1st Region 10 shot on target + 2nd Region 15 shot on target, 3rd Region 10 shot on target (36/3=12) and 11 or more shots on target (n:7) (HSR) as well as 8 other basketball players (LSR).

In the APPA technical analysis program, the position of the basketball players in the shooting position from the 2nd region, when they take the basketball into their overhead areas, was determined as the Shooting Start Phase (in terms of standardization) and the basketball ball was asked to stay in the hand-off position, which was accepted as the Shooting Finish phase.

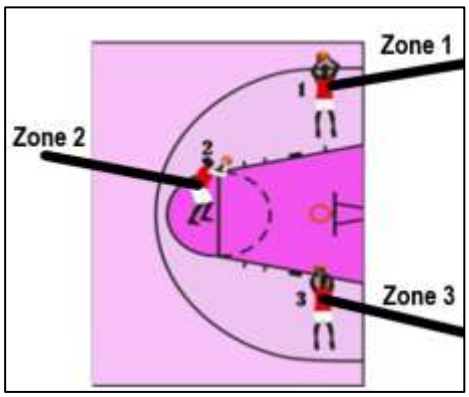

Figure 1. Shooting zones of the infrastructure basketball players participating in the research

High resolution camera and **APPA-BASTECH Technical Analysis Program:** were used in the study.APPA BASTECH Technical Analysis Program: Printed in the Visual Studio IDE using the C# programming language WindowsForm within the framework of the specified algorithm. The codes were written with reference to the joint regions accepted as reference in the technical evaluation in the literature. The photos taken with a digital camera according to the physical posture position in the program were transferred to the designated area within the APPA Bastek Analysis program.

In the physical posture position, 7 regions that can be evaluated angularly according to the Lateral (side) posture (Head, Shoulder, Right Elbow, Right Wrist, Hip, Right Knee, Right Ankle). (22) also conducted angular analyzes on 8 regions in their studies. 3 reference points were determined in the calculation of the interior angle of each region. For example, in the evaluation of the elbow region, Mousla was marked on the program as the lateral deltoid distal point **(1 marker)** as the point where the outer and innermost curves of the cubital region **(2**

markers) and the processus styloid point of the radius **(3 markers)** on the lateral, and a line line between 3 marker points is automatically drawn. drawn by the program. In the next calculation, the second (2) marker point was accepted as the center point and the interior angle was calculated. The interior angle formula was also used as ((180- (sum of two exterior angles)).

Two group comparisons (Independ t test) were used as statistical procedures. Head, shoulder, elbow, wrist, hip, knee-ankle joints were compared angularly between Shot Initiation Stage (HSR) and (LSR). Again, the head, shoulder, elbow, wrist, hip, knee-ankle joints were compared angularly between the Shot End Stage (HSR) and (LSR). In addition to the data we obtained from here, it was requested that the Head, Shoulder, Elbow, Wrist, Hip, Knee, Ankle posture positions of the 2 basketball players who shot the best and the lowest shot were scored according to the Likert system. The angular data obtained by the evaluation made by experienced trainers were also taken into account in order to give an idea in the comparisons.

RESULTS

Table 1. Physical information of the groups with High Shooting Rate and Low Shooting Rate participating in basketball training in the infrastructure

PARAMETERS		n	Mean±SD	df	p
Age (Year)	**High Shooting Rate Group**	**7**	**15,4±0.7**	12	0,552
	Low Shooting Rate Group	8	15,7±0.9		
Height (cm)	**High Shooting Rate Group**	**7**	**183,7±9.1**	12	0,705
	Low Shooting Rate Group	8	182,0±7,3		
Weight (kg)	**High Shooting Rate Group**	**7**	**80,8±16,2**	12	0,002*
	Low Shooting Rate Group	8	70,1±7,8		
Sport Age (Year)	**High Shooting Rate Group**	**7**	**7,2±1,8**	12	0,036
	Low Shooting Rate Group	8	4,4±2,6		

Mean±SD; mean and standard deviation df:: degrees of freedom *p<0,05

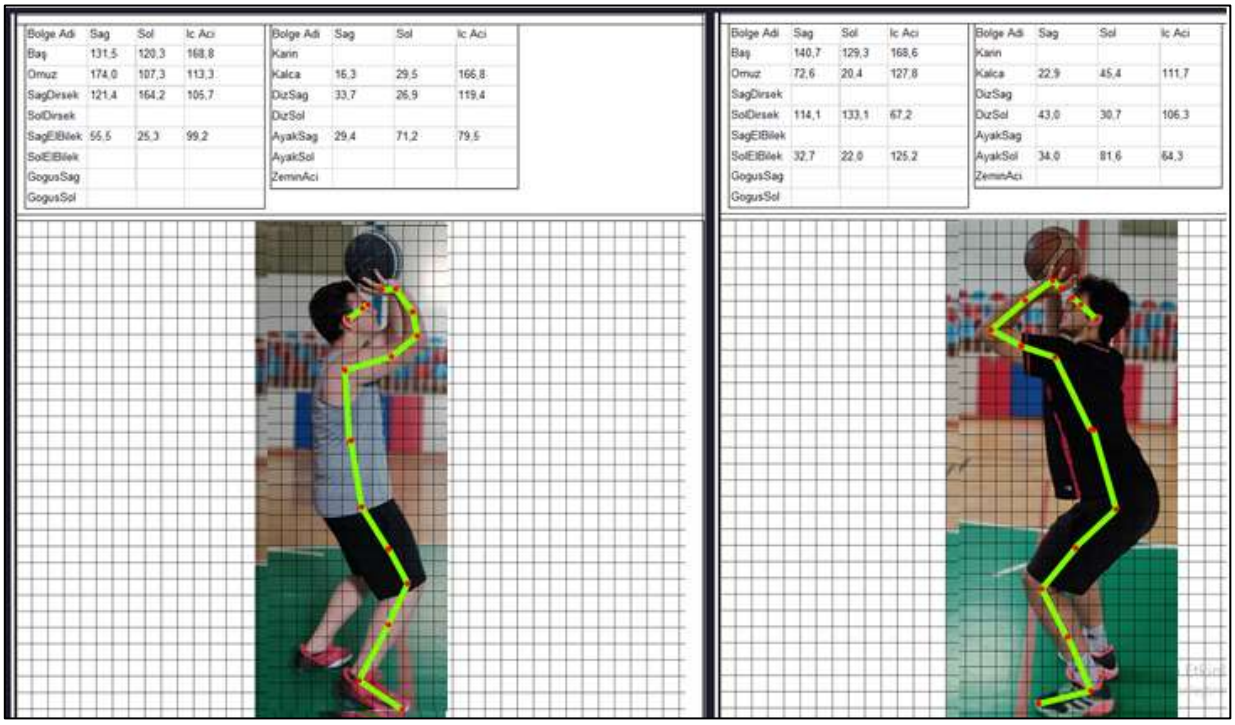

Figure 2. Analysis of the Joint Angles of the Groups with High Shooting Rate (Right Photo) and Low Shooting Rate (Left Photo) Groups Participating in Infrastructure Basketball Training in the Shooting Starting Phase Position.

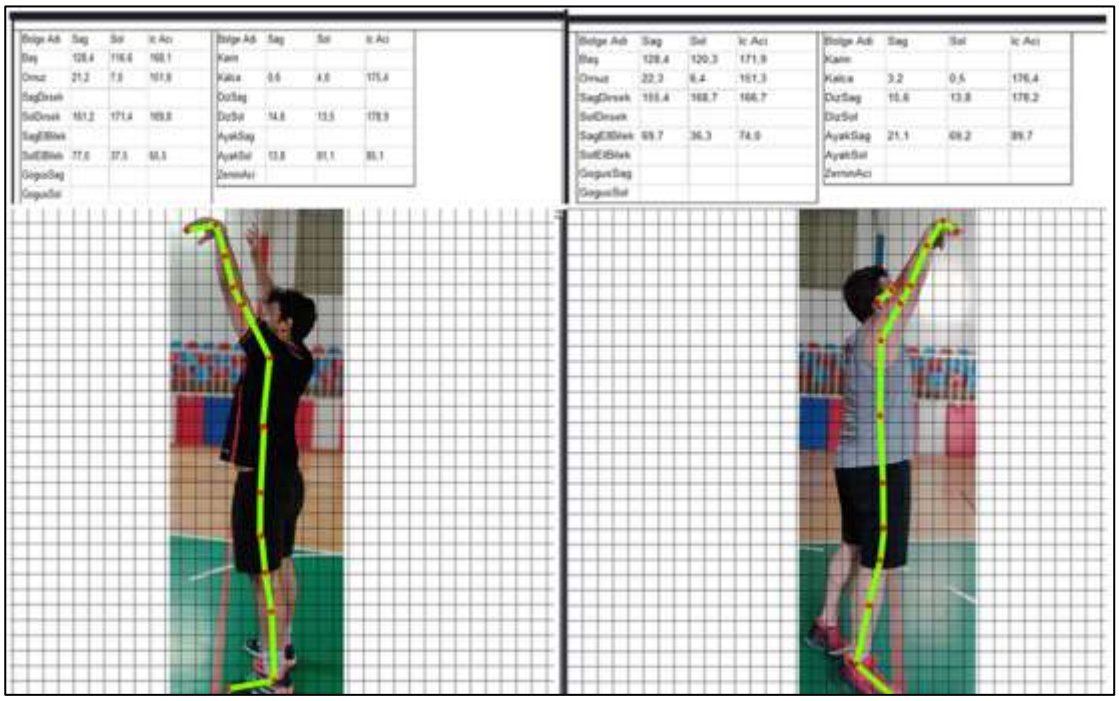

Figure 3. Analysis of Joint Angles of the Groups with High Shooting Rate (Left Photo) and Low Shooting Rate (Right Photo) Groups Participating in Infrastructure Basketball Training in Shooting Finishing Position

Table 2. Regional Shot Rates of High Shot Rate (Right Photo) and Low Shot Rate (Left Photo) groups participating in basketball training in the infrastructure

PARAMETERS		n	Mean±SD	df	p
Zone 3	**High Shooting Rate Group**	**7**	**12,5±2,5**	12	0,001*
	Low Shooting Rate Group	8	7,8±1,4		
Zone 2 (FoulLine)	**High Shooting Rate Group**	**7**	**13,0±2,3**	12	0,002*
	Low Shooting Rate Group	8	8,4±1,8		
Zone 1	**High Shooting Rate Group**	**7**	**11,4±1,9**	12	0,001*
	Low Shooting Rate Group	8	7,4±1,5		
Avarage Shot	**High Shooting Rate Group**	**7**	**12,4±1,2**	12	0,000*
	Low Shooting Rate Group	8	7,8±1,3		

Mean±SD; mean and standard deviation df:: degrees of freedom *p<0,05

Table 3. Comparison of the Joint Angles of the Groups with High Shot Rate and Low Shooting Rate Groups Participating in Infrastructure Basketball Training in the Shooting Starting Phase Position

PARAMETERS		n	Mean±S.D.	df	p
Head (Degree)	**High Shooting Rate Group**	**7**	**157,5±5,8**	13	0,004*
	Low Shooting Rate Group	8	168,6±6,2		
Shoulder (Degree)	**High Shooting Rate Group**	**7**	**120,1±5,1**	13	0,425
	Low Shooting Rate Group	8	114,6±16,8		
Elbow (Degree)	**High Shooting Rate Group**	**7**	**79,6±6,0**	13	0,000*
	Low Shooting Rate Group	8	116,7±8,2		
Hand Wrist (Degree)	**High Shooting Rate Group**	**7**	**91,7±2,0**	13	0,000*
	Low Shooting Rate Group	8	108,4±9,2		
Hip (Degree)	**High Shooting Rate Group**	**7**	**148,9±18,2**	13	0,111
	Low Shooting Rate Group	8	161,1±8,0		
Knee (Degree)	**High Shooting Rate Group**	**7**	**113,9±3,4**	13	0,000*
	Low Shooting Rate Group	8	141,1±10,4		
FootWrist (Degree)	High Shooting Rate Group	7	76,3±6,4	13	0,157
	Low Shooting Rate Group	8	86,8±17,3		

Mean±SD; mean and standard deviation df:: degrees of freedom *p<0,05

Table 4. Comparison of the joint angles of the High Shot Rate and Low Shot Rate groups participating in the infrastructure basketball training in the Shooting Finishing Phase Position

PARAMETERS		n	Mean±S.D.	df	p
Head (Degree)	**High Shooting Rate Group**	**7**	**160,4±12,3**	13	0,674
	Low Shooting Rate Group	8	157,5±13,7		
Shoulder (Degree)	**High Shooting Rate Group**	**7**	**144,0±7,8**	13	0,851
	Low Shooting Rate Group	8	144,7±6,7		
Elbow (Degree)	**High Shooting Rate Group**	**7**	**176,8±2,4**	13	0,091
	Low Shooting Rate Group	8	172,3±6,1		
HandWrist (Degree)	**High Shooting Rate Group**	**7**	**88,2±2,8**	13	0,252
	Low Shooting Rate Group	8	98,0±21,3		
Hip (Degree)	**High Shooting Rate Group**	**7**	**174,7±3,2**	13	0,844
	Low Shooting Rate Group	8	174,1±6,3		
Knee (Degree)	**High Shooting Rate Group**	**7**	**171,4±5,7**	13	0,837
	Low Shooting Rate Group	8	170,7±78		
FootWrist (Degree)	**High Shooting Rate Group**	**7**	**91,8±5,9**	13	0,761
	Low Shooting Rate Group	8	94,7±23,9		

Mean±SD; mean and standard deviation df:: degrees of freedom *p<0,05

DISCUSSION AND CONCLUSION

In our study, we compared the differences in technical shooting (starting and finishing phases) of basketball players with high accuracy in basketball shooting position compared to the group with low shooting rates. In the literature, it is seen that angular values and ball speed have gained weight in basketball shooting analysis. It has been seen that the position of the joint areas that make up the angular probolic (curvilinear) trajectory of the basketball, the kinetic movement chain, the stabilization during the shooting and the neuromuscular optimization in this position are important.

In a similar study by (26), they examined the release of the ball and whether the shot was scored or missed over a certain formulation. In our study, all joint regions were examined as analysis and it was determined that there were significant differences ($p>0.05$) in the wrist regions, especially at the start and end points of the shot, where the differences were found.

Raiola et al., in 2016 (24), stated that in order to change the motion of the ball in the definition of the shot shot they made, the motion force that starts from the feet of the shooter and progresses to the fingertips on the body and ends should be applied to direct the ball to the desired target. In our study, systematic analysis of all joints in all technical movements of the body was made and the angular values of these regions were determined.

Mondoni (20) reported that when various shot shots from different positions and distances are examined, the trajectories of the ball form a parabolic curve depending on the angle of motion of the ball. (24) focused on 4 main issues besides the force in their analysis of the shot. These are: Initial height of the ball, b Air resistance, c. Drop rate of the ball, d. The parts related to the angle of exit of the ball from the hand (wrist volar flexion) were examined. In our study, the stance position of the wrist after the shot was evaluated at the end of the shot in relation to these four basic issues. No statistically significant difference ($p>0.05$) was found between the group with high shot rate (HSR) and the group with low shot rate (LSR). However, there was an angle difference of 10 degrees. In other words, it was determined that the group with high shot rate had lower volar flexion more angularly. When evaluated in terms of this position, it is seen that the fingertips of the group with high shooting rate show a lower position after the ball release position.

In a similar study, increasing angular velocities of both shoulder flexion and elbow extension and an increase in the velocity of the center of mass in the direction of the crucible. Hand-release angles for the two short distances (52-55°) tended to provide the advantage of a steep entry angle to the basket, while those that required the minimum possible release velocity at the longest distance (48 50°) reported (18).

In a similar study by Okazaki, & Rodacki, (23), it was determined that the ankle was 14.37 degrees, the knee 169.84 degrees, the hip 171.8 degrees shoulder, 102.5 degrees, the elbow 139.9 wrists 208.07 degrees when releasing the ball in children. In our study, ankle HSR/ LSR 91.8/84.7. degree, knee HSR/LSR 171.4/170.7 degree, HSR/LSR hip 174.7/174.1 degree HSR/LSR shoulder 144/144.7 degree, elbow 176.8/172.3 degree, wrist HSR/LSR 88.2/98 determined in degrees. Although we think that the differences in some joint areas in our study may be due to our evaluation in the stable shooting position, we also think that the body joint areas may have more closed angular values in jump shot. In our study, it is seen that the joint angular values show parallelism in most of the groups with both high shot rate and low shot rate in the fixed position.

Raiola, and D'ısanto, (24) stated that as a result of the smash analysis, some technical scientific elements referred to in sports practice are provided not only in terms of scientific and theoretical study of the subject, but also as a tool for further validation of training programs at all times. It's a good idea to remember that the highest level of coordination retains the ability of the player to successfully perform the movement, as well as to change and adapt to the "real situation" while maintaining efficiency(1,2).

Silverberg, Tran, & Adcock, (26) et al. reported that shooting accuracy depends on the shooter's skill level and testing. It can be said that besides the skill level is important in accurate shots, it is important to ensure the correct technical formation of the body's positions, nerve-muscle coordination and to do many repetitions in accurate shots.

In the light of the data we have obtained, analysis methods can be used in the practical APPA computer program to determine the shooting technical positions of basketball coaches and sports scientists. However, for the formation of norm values, it is necessary to analyze the steady and jumping shooting techniques of good shooters. Norm values will be formed over time with the increase of these and similar studies, and we think that coaches and

sports scientists working in this field can contribute to the development of the basketball branch by using the data.

Implementation Recommendations

It will be useful for athletes to perform multi-dimensional performance analysis (3 minutes of loading, 1 minute of rest x 3 rounds) in individual sports, anthropometric, posture, strength, anaerobic power, aerobic power and branch-specific tests, and to determine the loading intensities (Zone) in the training periodization based on the determination of the maximals.

REFERENCES

1. Altavilla, G., Raiola G. (2015). Sports game tactic in basketball, Sport Science, 8(1).
2. Altavilla, G., Raiola, G. (2014). Global vision to understand the game situations in modern basketball. Journal of Physical Education and Sport, 14(4).
3. Apostolidis N.; Nassis G. P.; Bolatoglou T.; Geladas N. D. (2004) Physiological and technical characteristics of elite young basketball players, Journal of Sports Medicine and Physical Fitness;44, 2; pg. 157
4. Button, C., Macleod, M., Sanders, R., & Coleman, S. (2003). Examining movement variability in the basketball free-throw action at different skill levels. Research Quarterly for Exercise and Sport, 74, 257–269. doi:10.1080/ 02701367.2003.10609090
5. Carter JEL; Ackland TR; Kerr DA; (2005) Stapff AB Somatotype and size of elite female basketball players, Journal of Sports Sciences, 23: 10, 1057–1063
6. Çetin N.H, (1997) Teknik Analizi ve Teknik Antrenmanı, Ankara, s.3
7. Drinkwater, E. J., Pyne D. B., McKenna, M. J. (2008). Design and interpretation of anthropometric and fitness testing of basketball players. Sports Medicine, 38, 565–578.
8. Gaetano, R., Domenico, T., Gaetano, A. (2015a. Physical activity and its relation to body and ludic expression in childhood Mediterranean. Journal of Social Sciences, 6(3).
9. Gaetano, R., Gomez, F.P., Gaetano, A., (2015b), Anxiety in the youth physical and sport activity. Mediterranean Journal of Social Sciences, 6(3).
10. Gocentas A., Landõr A., Andziulis A. (2004) Dependence of intensıty of specific basketball exercise from aerobic capacity, Papers on Anthropology XIII, pp. 9–17.
11. Kalkavan, A., Pınar, S., Kılınç, F., & Yüksel, O. (2005). Basketbolcu Çocukların Fiziksel Yapılarının, Bazı Fizyolojik Ve Biyomotorik Özellikler Üzerine Etkisinin Araştırılması. Sağlık Bilimleri Dergisi, 14(2), 111-119.
12. Kılınç F, (2008) An Intensive Combined Training Program Modulates Physical, Physiological, Biomotoric And Technical Parameters in Basketball Player Women, The J of Strength and Conditioning Research, Volume 22, 1064-1068.
13. Kılınç F, Erol A. E, Kumartaşlı M, (2011) Basketbol alt yapıda uygulanan kombine teknik antrenmanların bazı fiziksel, kuvvet ve teknik özellikler üzerine etkisi, Uluslararası İnsan Bilimleri Dergisi, Cilt 8, S 1
14. Kılınç M.Y. Genç basketbolculara uygulanan teknik geliştirici ve kalistenik kuvvet antrenmanlarının performans üzerine etkisi (Danışman Doç.Dr.Ahmet UZUN) Necmettin Erbakan Üniversitesi / Eğitim Bilimleri Enstitüsü / Beden Eğitimi ve Spor Ana Bilim Dalı / Beden Eğitimi Yüksek Lisans Tez. 2021
15. Knudson D., (1994) Biomechanics of the Basketball Jump Shot-Six Key Teaching Points, Journal article by Duane Knudson; JOPERD-The Journal of Physical Education, Recreation & Dance, Vol. 64.
16. Knudson, D. (1993). Biomechanics of the basketball jump shot—six key teaching points. Journal of Physical Education, Recreation, and Dance, 64, 67–73. doi:10.1080/07303084.1993.10606710
17. Malone, L. A., Gervais, P. L., & Steadward, R. D. (2002). Shooting mechanics related to player classification on free throw success in wheelchair basketball. Journal of Rehabilitation Research and Development, 39, 701 –709
18. Miller, S. A., & Bartlett, R. M. (1996). The relationship between basketball shooting kinematics, distance and playing position. Journal of Sports Sciences, 14, 243–253.
19. Miller, S., & Bartlett, R. M. (1993). The effects of increased shooting distance in the basketball jump shot. Journal of sports sciences, 11(4), 285-293.
20. Mondoni M. (2002) Basket e biomeccanica, Edizioni Libreria dello sport, Milano, Italia
21. Muratlı S., Şahin G., Kalyoncu O., (2005) Antrenman ve Müsabaka, Yaylım Yayıncılık, İstanbul, s.479
22. Okazaki, V. H. A., & Rodacki, A. L. F. (2018). Basketball jump shot performed by adults and children. Human movement, 19(1), 71-79.
23. Okazaki, V. H., Rodacki, A. L., & Satern, M. N. (2015). A review on the basketball jump shot. Sports biomechanics, 14(2), 190-205.
24. Raiola, G., & D'ısanto, T. I. Z. I. A. N. A. (2016). Descriptive shot analysis in basketball. Journal of Human Sport and Exercise, 11(1), S259-S266.
25. Sevim Y., (2002) Antrenman Bilgisi, Nobel Yayınları, Ankara, s.403
26. Silverberg, L., Tran, C., & Adcock, K. (2003). Numerical analysis of the basketball shot. J. Dyn. Sys., Meas., Control, 125(4), 531-540.
27. Smith Hk, Thomas Sg., (1991) Physiological characteristics of elite female basketball players, Can J Sport Sci.; 16 (4): 289-295,
28. Stapff A. (2000), Protocols for the physiological assessment of basketball players. In: Gore CJ editör, Physiological tests for editör, Phyiological tests for elite athletes Champaing, IL Human Kinetics, p.224-37.
29. Struzik, A., Pietraszewski, B., & Zawadzki, J. (2014). Biomechanical analysis of the jump shot in basketball. Journal of human kinetics, 42, 73.
30. Tsunawake N, Tahara Y, Mojı K, Murakı S, Minowa K, Yukawa K., (2003) Body composition- and physical fitness of female volleyball and basketball players of the japan ınter-high school championship teams, J Physiol Anthropol Appl Human Sci.; 22 (4): 195-201