

E-ISSN: 2583-9667

Indexed Journal

Peer Reviewed Journal

<https://multiresearchjournal.theviews.in/>



Received: 14-10-2023

Accepted: 29-12-2023

INTERNATIONAL JOURNAL OF ADVANCE RESEARCH IN MULTIDISCIPLINARY

Volume 1; Issue 2; 2023; Page No. 279-281

Kinematics analysis and research on volleyball serving

¹Vinay Joshi and ²Dr. Pradeep Kumar

¹Research Scholar, Department of Physical Education, Monad University, Hapur, Uttar Pradesh, India

²Assistant Professor, Department of Physical Education, Monad University, Hapur, Uttar Pradesh, India

DOI: <https://doi.org/10.5281/zenodo.12737643>

Corresponding Author: Vinay Joshi

Abstract

The principle aim of this investigation was to analyse the biomechanical parameters of main three levels i.e. Toss the ball phase, contact the ball section and Execution section of the over head serve in guys volleyball in which six (06) intervarsity volleyball gamers have been randomly chosen as concern for the study. Their age institution ranged from 20 to 24 years. The problem's movements or motions of the provider turned into recorded by way of using a Canon Liguria S-10 video digital camera in subject placing. The chosen variables of the look at are top of toss launch, the front Knee angle, perspective of Arc, Base of assist, front Knee angle, peak of toss, Elbow attitude, attitude of Arc, top of ball release, attitude of release and Ball speed. The objective of the study was done by means of applying Pearson product movements' correlation statistical technique with degree of enormous zero.05. In the end, it is recognized that the front knee perspective, peak of toss, angle of arc and attitude of launch had been extensive correlated whereas peak of toss release, perspective of arc, Base of support, front Knee perspective, Elbow attitude and height of ball release have been located as non-substantial. The peak of toss represents the positive correlation with the ball speed in preference to the front knee angle, attitude of arc and perspective of release which displaced the negative correlation.

Keywords: Volleyball, Biomechanics, Ball speed

Introduction

The now days Volleyball game grow to be a quick and more complicated because of responsibility of its gambling regulations and laws which has made the effective and appealing game. On this recreation all through fit every participant ought to need to rotate clock smart of their court docket what creates problems to advantage rating. In volleyball, serve is the first weapon in an character arms to get rating lead and build strain on opponent team and worse their mixture and confidence. To carry out effective serve there is want to use the kinetic chain well-arranged movement from decrease limb where movement receives beginning to generate electricity followed through trunk bypass that electricity and places handover in to upper limbs and that energy utilize on ball to attain in opponent court docket over the internet. All these movements of different body segments finished at a time create a few problem to human eye to examine and analyze systems of kinetic chain.

A very good know-how regarding the collection of moves function is a fantastic dimension for the advancement and development of the game overall performance in volleyball. The actions of volleyball are a complex aggregate of electricity, electricity, agility, ability and cleverness. This investigation will assist to recognize the connection among the ball velocities with the exceptional frame kinematic variables. It's essential to recognize right biomechanics system of volleyball overhead serve. Scarce papers posted yet on concerned subject matter, so there's want to analyze modern-day biomechanics of overhead serve. The intention of research has to stumble on the impact of upper and lower extremity's movements on overhead serve. The goals of this take a look at have to look at the volleyball overhead serve actions used by players in pinnacle level competition, and additionally describe the upper and decrease frame kinematic variables and impact on the ball speed.

Materilas and Methods

Six (06) intervarsity volleyball players have been randomly decided on as issue for take a look at. The subjects had no accidents on the time of information series (video recording). Their long time ranged from 20 to 24 years. The character and cause of interest informed prior to information collection to the selected topics. The frame weight in kg, top in cm and age in chronological of each player turned into recorded. The challenge’s movements or motions had been recorded with the aid of the usage of one synchronized Canon Legria S-10 video digicam in discipline putting. The digital camera was located on inflexible tripod at 12 meter distance from trail area and height of the digicam from the ground degree turned into 1.5 meter. The digicam become set at sports mode and the sampling fee of the video digital camera was sixty (60) discipline in step with 2nd. Shutter speed of digital camera became fixed at speedy speed (Hz 2000). Evaluation the video recording Silicon instructs pro eight.1 and Statistical package deal for the Social science v21.0 (SPSS) software program have been used.

Results and Analysis

Table 1: Description of the subjects

Variables	Number of Subjects	Mean	Std. Deviation
Height (cm)	06	174.41	8.45
Weight (KG)	06	66.25	5.96
Age (year)	06	22.17	1.60

The table-1 shows that the mean height of six participants is 174.41 cm, whereas standard deviation (SD) is ± 8.45, the mean Weight of six participants is 66.25 kg whereas SD is ± 5.96 and the mean Age of six participants is 22.17 years old, whereas SD is ± 1.60.

Table 2: Parameters of overhead serve at toss the ball phase in volleyball

Variables	No. of Trail	Mean	Std. Deviation	Minimum	Maximum
HTR	36	156.18	13.64	136.50	195.90
KAT	36	151.47	28.10	111.00	187.00
AAT	36	158.22	12.01	132.00	177.00
BS	36	75.63	10.05	48.70	95.90

- HTR = Height of toss release
- KAT = Front Knee angle
- AAT = Angle of Arc
- BS = Base of Support

The table-2 shows the descriptive statistics of the selected kinematic parameters of the six participants at toss the ball phase. In which the means for HTR for 36 numbers of trail is 156.18, whereas SD is ±13.64, the Minimum value for HTR is 136.50 and maximum is 195.90. The means for KAT for 36 numbers of trail is 151.47, whereas SD is ± 28.10, the minimum value for KAT is 111.00 and maximum is 187.00. The means for AAT for 36 numbers of trail is 158.22, whereas SD is ± 12.01, the minimum value for AAT is 132.00 and maximum177.00. The means for BS for 36 numbers of trail is 75.63, whereas SD is ± 10.05, the minimum value for the BS is 48.70 and maximum is 95.90.

Table 3: Parameters of overhead serve at the contact phase in volleyball

Variables	No of trails	Mean	Std. Deviation	Minimum	Maximum
KAC	36	170.69	8.04	145.00	185.00
HT	36	208.09	25.96	167.40	246.50
EA	36	144.31	17.23	112.00	171.00
AAC	36	162.11	5.82	151.00	178.00

- KAC = Front Knee Angle
- HT = Height of Toss
- EA = Elbow Angle
- AAC = Angle of Arc

The table-3 shows the descriptive statistics of the selected kinematic parameters of the six participants at contact the ball phase. In which the means for KAC for 36 numbers of trail is 170.69, whereas SD is ±18.04, the minimum value for KAC is 145.00 and maximum is 185.00. The means for HT for 36 numbers of trail is 208.09, whereas SD is ± 25.96, the minimum value for HT is 167.40 and maximum is 246.50. The means for EA for 36 numbers of trail is 144.31, whereas SD is ± 17.23, the minimum value for EA is 112.00 and maximum171.00. The means for AAC for 36 numbers of trail is 162.11, whereas SD is ± 5.82, the minimum value for the AAC is 151.00 and maximum is 178.00.

Table 4: Parameters of overhead serve at the execution phase in volleyball

Variables	N	Mean	Std. Deviation	Minimum	Maximum
HBR	36	190.12	18.62	165.20	267.40
AR	36	18.78	6.23	7.00	36.00
BV	36	14.10	2.19	9.21	20.80

- HBR = Height of ball release
- AR = Angle of release
- BV = Ball velocity

The table-4 shows the descriptive statistics of the selected kinematic parameters of the six participants at execution phase. In which the means for HBR for 36 numbers of trail is 190.12, whereas SD is ±18.62, the minimum value for HBR is 165.00 and maximum is 267.40. The means for AR for 36 numbers of trail is 18.78, whereas SD is ± 6.23, the minimum value for AR is 7.00 and maximum is 36.00. The means for BV for 36 numbers of trail is 14.10, whereas SD is ± 2.19, the minimum value for BV is 9.21 and maximum 20.80.

Table 5: Correlation of kinematic parameters with ball velocity

Variables	R
HTR	0.044
KAT	-0.580*
AAT	0.300
BS	-0.001
KAC	-0.146
HT	0.368
EA	0.383
AAC	0.533*
HBR	0.622*
AR	-0.824*

*Significant
Level of Significant 0.05

The table-five shows the correlation price of the selected kinematic parameters of the six participants with the ball velocity. They are HTR, KAT, AAT, BS, KAC, HT, EA, AAC, HTR & AR. The correlation between HTR and ball velocity is 0.044 which is insignificant effect on ball speed. The correlation among the KAT and ball velocity is -0.580 which suggests a terrible significant impact on ball velocity. Correlation between AAT and ball pace is zero.300 it's miles insignificant impact on ball pace. The correlation among BS and ball speed is -0.001 it suggests meaningless effect on ball speed and suggests poor correlation. Correlation between KAC and ball speed is -0.146 that's insignificant effect on ball speed and it represents the negative correlation. The correlation between HT and ball pace is 0.368 shows insignificant wonderful effect on ball velocity. Correlation among EA and ball velocity is 0.383 taken into consideration nonsignificant impact on ball velocity it represents the effective impact. The correlation among AAC and ball speed is 0.533 which taken into consideration as tremendous significant effect on ball velocity. Correlation among HBR and ball speed is 0.622 massive superb effect on ball pace. Correlation between AR and ball pace is -0.824 suggests the most poor significant impact on ball speed.

Discussion

This examine was aimed to have a look at decided on Biomechanical parameters and has been discovered that the correlation of HTR is insignificant. Newkirk, 2015 in the artwork of coaching said that height of launch ought to be at suitable degree and keep away from awful conduct as little dipper, huge dipper and Teapot kind activities. The correlation of KAT with ball pace is -0.580 and AAC is 0.533 which can be extensive and EA, AAT and KAC are nonsignificant Nathial, 2012 ^[7] agree with EA, AAT and KAC parameters whereas disagree with KAT and AAC discovered in his examine that the front Knee perspective Elbow perspective and attitude of Arc are not good sized correlated. The correlation of BS with the ball speed has detected insignificant as earlier recognized by way of (Khan, *et al.* 2019) ^[5]. The correlation of the further decided on variables which include AR & HBR with ball pace has located -0.824 & 0.622 respectively which are giant and HT is not significant. On the idea of theory recognized that the more the height of release the greater the space gained. whilst serving overhead in volleyball a taller athlete has an advantage over a shorter athlete due to the fact they've higher top of launch, The taller athlete is capable of recover from the ball and feature a lower angle of launch in evaluation to a shorter athlete.

Conclusion

The serve is one of the most essential fundamental skill in volleyball game because the sport begins. powerful serve allow us to build stress on opponent and advantage score lead. it is concluded that inside the volleyball overhead serve the selected kinematic variables like front Knee attitude, angle of Arc, perspective of release and peak of Ball release are the critical parameters which plays a wonderful have an impact on in gaining a a success clearance of the serve. So there is want to be focus on above said kinematical parameters for the Coaches, running shoes

and gamers in the schooling and practices to advantage the peak performance within the overhead serve in the course of volleyball competitions.

References

1. Aka H, Yilmaz G, Aktug BZ, Akarcesme C, Altundag E. The contrast of the purposeful motion display check effects of Volleyball country wide team gamers in one-of-a-kind international locations. *J Educ Learn.* 2019;8(1):138-142.
2. Das M, Roy B, let B, Chaterjee K. Research of courting of power and size of different frame components to pace of Volleyball Serve and Spike. *IOSR J Sports Phys Educ.* 2015;2(3):18-22.
3. Jian L. Biomechanical analysis of overhand floater serve [master's thesis]. Western Michigan University; 1994.
4. Khan TM, Hussain I, Ahmad F. Spatio-temporal evaluation of Volleyball Serve. *Int J Eng Dev Res.* 2021;7(3):805-810.
5. Khan TM, Hussain I, Ahmad F, Rani N. Kinematics research on distinctive varieties of Volleyball Serve; c2019.
6. Mohammadi M, Malek A. Improving the serving movement in a volleyball recreation: A layout of test method.
7. Nathial SM. Motion assessment of volleyball overhead serve. *Int Sci J Sport Sci.* 2021;1(2):105-112.
8. Neville WJ. Training volleyball efficaciously. Campiagn, IL: Leisure Press; c1990.
9. Voralek R, Tichy M, Suss M. Motion analysis related to functional characteristics of upper extremities in female junior volleyball players. *Int J Volleyball Res.* 2009;10(1):6-13.
10. Yu O, Shuici U, Keita O, Kazuyuki K, Hiroshi Y. Biomechanical analysis of volleyball overhead pass. *Sports Biomech.* 2019. DOI: [insert DOI here]
11. Altaf A, Khan T, Ahmad F, Hussain I, Alyas M. Analysis of Volleyball Serve—A Kinematic Study. *Int J Creative Res Emerg Trends.* 2020;8(4):[page range], ISSN: 2320-2882.

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