Sports Scientists Views in
INDIAN JOURNAL OF PHYSICAL EDUCATION, SPORTS AND APPLIED SCIENCES
ISSN:2229-550X(PRINT) BSI: Quality Management System- ISO 9001:2015 ISSN:2455-0175(ONLINE)

AN EXPERIMENTAL STUDY ON IMPROVING EYE-HAND CO-ORDINATION BY PATENTED DRILL EXERCISES IN ORDER TO ENHANCEFOREARM PASSING SKILLS IN INDIAN MALE PROFESSIONAL VOLLEYBALL PLAYERS

Anant Shrinath Gupta[1] and Dr. Moushumi Debnath[2]

AFFILIATIONS

[1] .Research Scholar (Intern) DPO'S Nett College of Physiotherapy, Thane Mumbai (Maharastra)
[2] MPT (Neuro), PGDCR, PGD in Rehablitation, DPO'S Nett College of Physiotherapy, Thane (Maharastra)

ABSTRACT

Background : Eye-hand coordination is the synchronization between vision and hand movements for precise task execution, essential in activities like sports, crafts, and everyday tasks. Eye-hand coordination is crucial for volleyball players, especially in forearm passing. It allows them to accurately judge the trajectory of the ball and position their arms for precise passes. This skill enhances reaction time, agility, and overall performance on the court, making it essential for effective game play.So the Study is done on YMCA Club professional Male Volleyball Players, the population size was 30,2 groups were made Experimental and Conventional Group the Groups were made by Simple Random Sampling (Lottery Method).The Players were given Exercises (Experimental Group) and the other Players were following the Club Routine Exercises only. there was a Eye-hand Coordination Test done thrice in protocol of 6 week Research period as a Screening Tool to find out the Significance with the help of Statistics (Graphpad InStat Version 3.10),The Study Concluded that the patented drill exercise has a significant effect on improving Eye Hand Coordination on Forearm Passing Ability in Indian Male Professional Volleyball Players

Keywords: Volleyball Players, Eye-hand Coordination, Forearm passing, Drill Exercies, Indian

1.INTRODUCTION

Forearm passing is a pivotal technique in volleyball, reflecting broader principles of hand-eye coordination essential not just for sports but also daily activities. Volleyball's strategic elements like passing, serving, smashing, and blocking underscore the sport's complexity and the importance of mastering fundamental skills. Eye-hand coordination is a critical factor in a player's success, impacting their ability to execute precise movements such as forearm passing accurately.

The intricate cognitive skill of hand-eye coordination governs how our hands respond to visual stimuli, affecting motor gestures in sports and everyday tasks. In volleyball, where anticipation and precision are crucial, synchronization between eye and hand movements is paramount. External factors such as training methods also influence coordination, highlighting the holistic approach needed for skill development.

The integration of foot, hand, and eye synchronization is vital for executing techniques like forearm passing effectively. Coordinating body movements reflects high skill levels, crucial for optimal performance in volleyball. Training protocols often focus on improving hand-eye coordination through tailored exercises and assessments, addressing players' proficiency in fundamental skills like passing.

Observations in the field reveal the impact of hand-eye coordination on passing accuracy, with uncoordinated movements leading to errors. This underscores the ongoing need for targeted training to enhance players' coordination and overall performance. The neurological basis of eye-hand synchronization involves intricate activation of sub-cortical structures, highlighting the complexity of motor control in sports like volleyball.

Overall, mastering hand-eye coordination is a continuous process, influencing players' abilities to anticipate, react, and execute movements accurately. It's an essential component of volleyball's technical proficiency and contributes significantly to a team's success on the court.

Two separate training techniques are used three times a week for 90 minutes each.Trainings were created with equal size, repetition, and intensity for all groups (ball contact). The whole part training method is put to practise by the two groups. Additionally, another group practises utilising the mini-game training technique..Conclusion:This study demonstrates that using whole-body and small-group training techniques significantly affects a volleyball player's forearm passing ability (Pratama and Irianto, 2019),

Hand-eye Coordination Drill Exercise 1: Cascade BallJuggling-Each juggling lesson lasted between 10-12 minutes and the instruction given was identical regardless of object color. The final assessment of juggling was done by summing the total number of consecutive catches achieved over three trials the results were not completely expected. Conclusion:Having a brightly lit room would be more effective in enhancing tracking of moving objects, mixed objects are easier to catch (McCoy, 2007).

Hand-eye Coordination Drill Exercise 2:Cascade ScarfJuggling-Each juggling lesson lasted between 10-12 minutes and the instruction given was identical regardless of object color. The final assessment of juggling was done by summing the total number of consecutive catches achieved over three trials the results were not completely expected. Conclusion: Having a brightly lit room would be more effective in enhancing tracking of moving objects, mixed objects are easier to catch (McCoy, 2007).

Equipment for the test was tennis ball and stop watch. Initial position: torso bent forward, ball in one hand. By command “Go” athlete moves the ball between legs maximally quickly at knees’ level (imaginable “eight” was the trajectory of ball’s movement). With it the ball is

passed from hand to hand Conclusion :Ability to reconstruct and adapt motor actions was assessed with tests 4-5 If only female students are to be included in the sample, for example, the situation can be different (Boichuk, et.al., 2017)

1.2 Limitations

The study was done on professional players of volleyball, playing at different level. The study is also done for forearm-passing ability skill only. The Population Size is Small. To Study the Effect of Eye And Hand Coordination by using patented drill Exercises in Male Professional Volleyball Players

1.3 Justification of Study

Exploring the intricate realm of hand-eye coordination within the context of volleyball demands precise activation of sub-cortical structures governing motor skills, making it a challenging yet crucial area of study. While research on eye-hand coordination exercises in volleyball players is extensive, limited focus has been placed on enhancing forearm passing ability, particularly among professional male volleyball athletes in India, which motivates the focus of my study.

1.4 Objectives

1. To Find out the Effect of Eye And Hand Coordination to Increase Forearm Passing Ability by Using Patented Drill Exercises (Interventional group)
2. To Find out the Effect of Eye And Hand Coordination toIncrease Forearm Passing Ability by Using Routine Exercises (Controlled Group)
3. To Compare the Effect of Eye And Hand Coordination to Increase Forearm Passing Ability in both the groups.

1.5 Hypotheses

H-1: There is no statistically significant effect of patented drill exercises in eye hand coordination on increasing the forearm passing ability on indian male professional volleyball players.

H-2: There is statistically significant effect of patented drill exercises in eye hand coordination on increasing the forearm passing ability on indian male professional volleyball players.

2. METHODOLOGY

2.1 Sample size

30 (95% confidence level) – openepi, Formula [(d2/Z21alpha/2*(N-1)+p*(1-p)]. Simple Random Sampling was choosen by Lottery Method. Volleyball players were selected according to the inclusion criteria.. Inform consent form.was given to participants. Participants were selected randomly by lottery method. Total participants were 30, The Controlled group and Interventional Group consisted of 15- 15 participants respectively

Hand Eye Coordination Test is performed prior to starting of Drill Exercises i.e in start of 1st and after the end of 3rd and 6thWeek.The Interventional drill exercises and Routine exercises in club were given to Group- A and Group B respectively.

2.2 Administration of Exercises

S.No.	Exercise	Frequency	Duration in Minutes
1	Passing Ladder Drill	1 time/day for 6 weeks	10-15
2	Passing Against the Wall:	1 time/day for 6 weeks	10-15
1	Cascade ball Juggling	1 time/day for 6 weeks	10-12
2	Cascade scarf Juggling:	1 time/day for 6 weeks	10-12
3.	Ten-Eight Exercise	5 times/Day for 6weeks	10

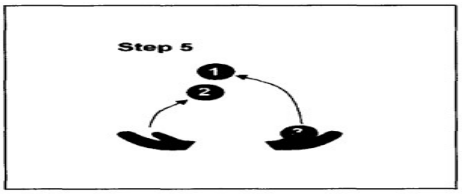


Figure:1- Cascade Ball Jggling Exercise

Figure: 2 - Cascade Scarf Juggling Exercise

Figure: 3- Ten-Eight Exercise

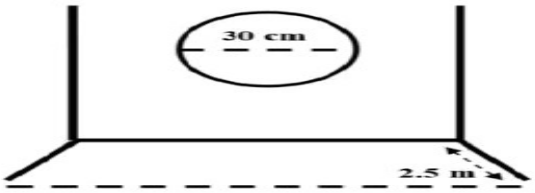


Figure: 4- Hand-Eye coordination test Instrument

2.4 Researcg Design

(i). Experimental Study
(ii) Volleyball Sports Club (YMCA)
(iii). Professional volleyball players
iv) 18 months Duratiom

2.5 Inclusion and Exclusion criteria

Professional Male Volleyball Players were in18-28 age group, mainly Concentrating on Forearm Passing Ability Technique. The female volleyball players, were exckuded from this study. The injured and retired players, and recreational volleyball players were also not included in this research.

3. RESULT

Statistical Analysis was done on Software Graphpad InStat Version 3.10 on Pre-Test and Post-Test Analysis was been done. Test of Normality was been done by Shapiro-wilk Test

The statistical analysis was done by Graphpad In Stat Version 3.10 • The Intragroup analysis of both the conventional and experimental group was done by using one way analysis of variance (ANOVA), The P -value of Conventional group was found to be 0.3728 and considered not significant, and Experiment group P -Value was 0.0005 and considered extremely significant. The Post Test Analysis of each week between both the group was done by unpaired t-test Where 1st and 3rd week P -value was found to be s >0.9999, considered not significant and 0.2252, considered not significant Respectively, Where as the P value of 6th week was 0.0012 and considered very significant. The Results Shows that there is statistically significant effect in Interventional group then the Conventional group. The data analysis has been presented from Table 1 to 5 and depicted in graphs from 1 to 5.

TABLE 1

M	SD	N	P -Value	Passed Normality Test ?
23.87	2.356	15	> 0.10	Yes
24.4	2.354	15	> 0.10	Yes
24.2	2.274	15	> 0.10	Yes

As the Mean and Standard deviation for all the three weeks passed the normality Test The P Value was found out by using one way analysis of variance ANOVA, After doing Repeated measures The P value was found to be 0.3728, not considered significant.

Graph No:1

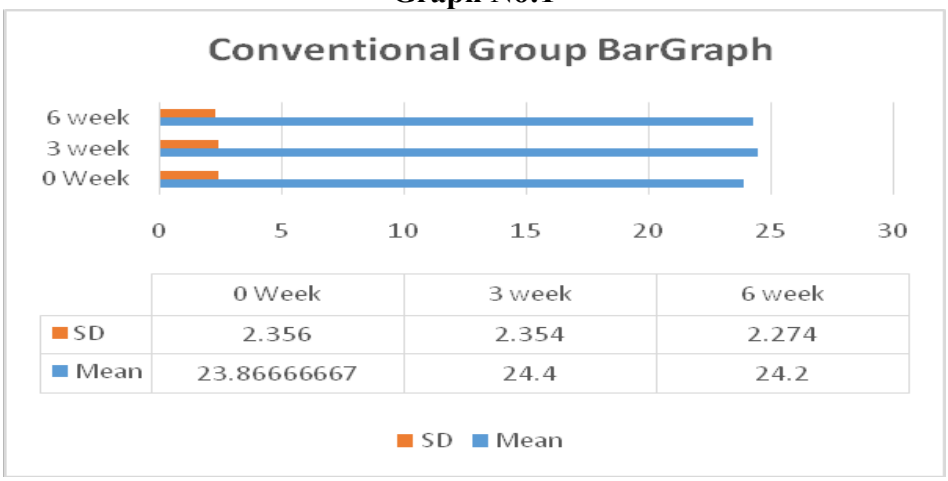


TABLE 2

M	S D	N	P-Value	Passed Normality Test ?
23.87	2.295	15	0.0439	No
25.33	1.718	15	> 0.10	Yes
27	1.964	15	> 0.10	Yes

After using shapiro Wilk test for normality the Mean and Standard deviation for First week didn't passed the Normality test but the third and sixth week passed the normality test the P Value was found out by using one way analysis of variance ANOVA, The P value was found to be 0.0005 considered extremely significant.

Graph No:2

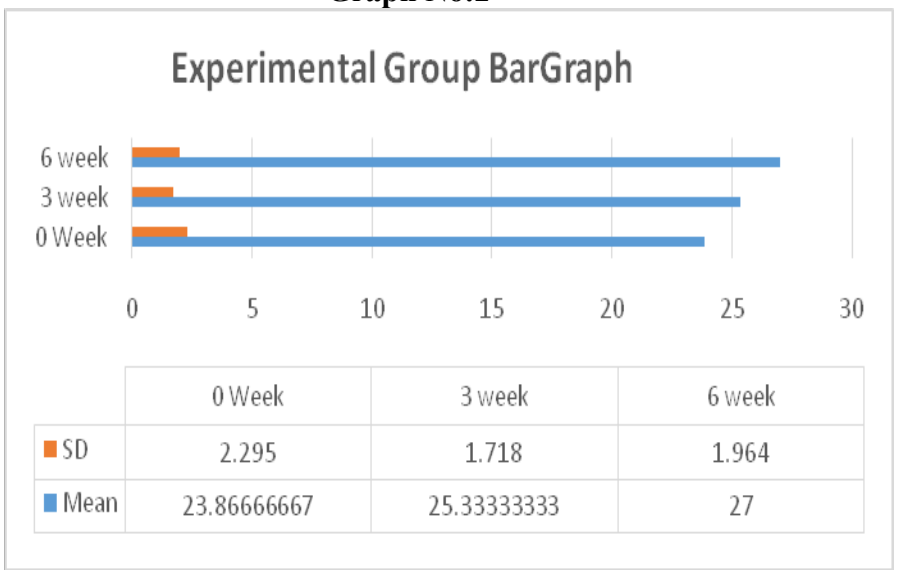


TABLE 3

M	S.D	N	P - Value	Significance
23.87	2.295	15	> 0.9999	Not significant
23.87	2.356	15		

Unpaired T-Test was performed. Each value was paired with the value next to it, The Values are sampled from Gaussian Distribution and the value followed by Two Tail P value. The two-tailed P value is >0.9999, not considered significant. t = 0.000 with 28 degrees of freedom.

Graph No:3

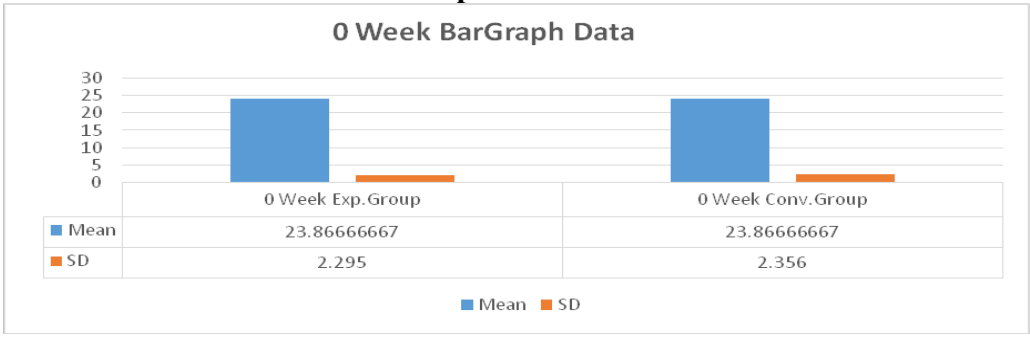


TABLE 4

M	SD	N	P- Value	Significance
25.33	1.718	15	0.2252	Not Significant
24.4	2.354	15		

We performed unpaired T-Test as each value was paired with the value next to it, The Values are sampled from Gaussian Distribution and the value followed by Two Tail P value.The two-tailed P value is 0.2252, not considered significant. t = 1.240 with 28 degrees of freedom.

Graph No:4

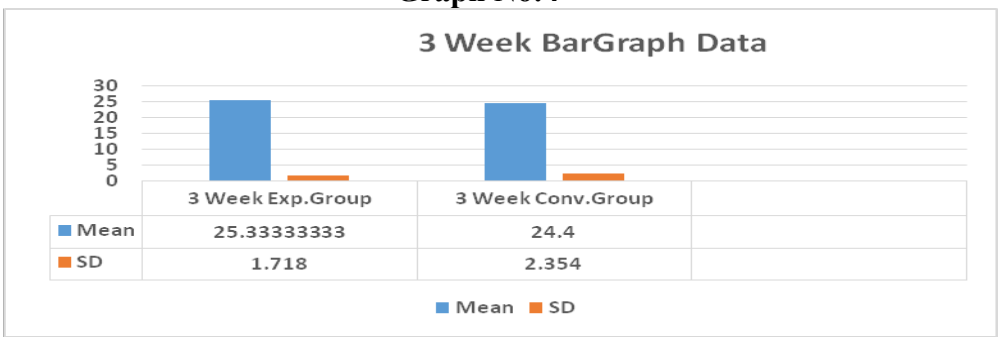
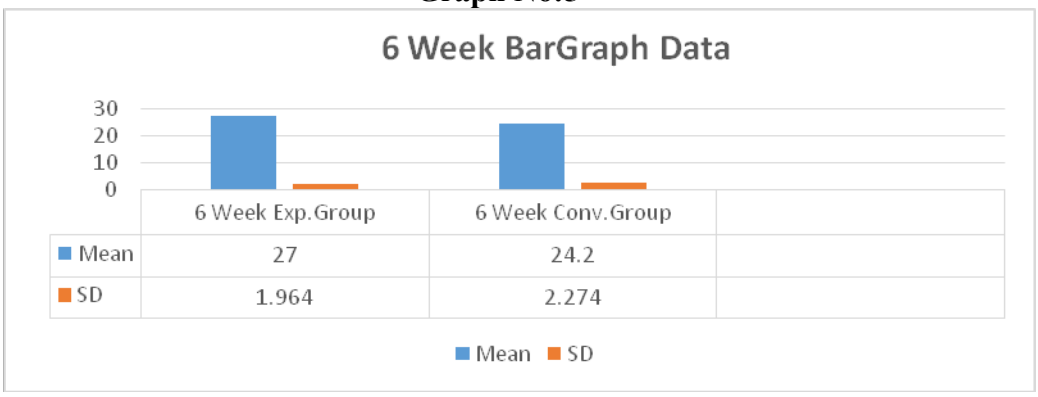


TABLE 5

Mean	Std. Deviation	Sample Size (N)	P Value	Significance
27	1.964	15	0.0012	Very Significant
24.2	2.274	15		

We performed unpaired T-Test as each value was paired with the value next to it, The values are sampled from Gaussian Distribution and the value followed by Two Tail P value. The two-tailed P value is 0.0012,considered very significant = 3.609 with 28 degrees of freedom.

Graph No:5



4. DISCUSSION

To study the effect of eye and hand coordination exercises in male professional volleyball players by using eye hand coordination test In my Parent Article i.e Pratama Y, Irianto D. Whole Part or Mini Games, which one is the most effective training method to improve forearm passing ability in volleyball?. In 6th International Conference on Educational Research and Innovation (ICERI 2018) 2019 Jul (pp. 81-84). Atlantis Press. There are various studies being done on Eye Hand Coordination Exercises On Volleyball Players on various domains but a very few studies have been done for the increase of forearm passing ability and that too on professional male volleyball in India,which motivated me and So the purpose of study.participant selected randomly by lottery method. total participants-30, control group-15 and 15-Interventional group, hand eye coordination. Test is performed prior to starting of drill exercises i.e in 1st,3rd and after the end of 6th Week. The Inclusion Criteria were population 18-28 Age group, professional male volleyball players and mainly concentrating on forearm passing ability technique,did statistical The statistical analysis by Graphpad In Stat Version 3.10, For the Conventional Group the P value is 0.3728, considered not significant. By using one Way analysis of variance ANOVA and for Experimental Group The P value is 0.0005, considered extremely significant. By using one way analysis of variance anova. For 0 week we performed unpaired T-Test as each value was paired with the value next to it,The Values are sampled from Gaussian Distribution and the value followed by Two Tail P value. After doing Repeated measures The two-tailed P value is >0.9999, considered not significant, By using one way analysis of variance anova. For 3 week we performed unpaired T-Test as each value was paired with the value next to it, The Values are sampled from Gaussian distribution and the value followed by Two Tail P value. After doing Repeated measures The two-tailed P value is 0.2252, considered not significant, By using one way analysis of variance anova For 6 week we performed unpaired T-Test as each value was paired with the value next to it, The Values are sampled from Gaussian Distribution and the value followed by Two Tail P value. After doing Repeated measures The P value is 0.0012,considered very significant. T 3.609, By using one way analysis of variance anova.There was a statistically significant difference seen between Group 1 which was given exercises and Group 2 which were following their club routine for all domains at all time intervals.

As Experimental group is more significant than Conventional Group ,Thus Null hypothesis is rejected and Alternative hypothesis is Accepted. Given that the proper spatiotemporal activation of the sub-cortical regions that also control hand and eye movements is necessary for coordination, Eye-hand coordination involves complex physiological processes that integrate visual information with motor responses.The players' eye-hand coordination improved by the help of these exercises by use of Neural Pathways, Visual Perception, Motor Control, Proprioception, Neuroplasticity, Recation Time, Muscle Memory and Feedback Mechanism. Overall, integrating targeted eye-hand coordination exercises into training regimes can be a valuable strategy for optimizing athletes' skills, reaction times, and performance in sports requiring precise visual-motor coordination, such as volleyball

5. CONCLUSION

According to the statistical analysis the results concluded was that the patented drill exercise has a significant effect on improving Eye Hand Coordination on Forearm Passing Ability in Indian Male Professional Volleyball Players.

6. RECOMMENDATION

The study can be doneon Female Volleyball Players. The study can be doneon a large population. The study can be done Restricting to any one Professional level The study can be done for Other skills in Volleyball playing

REFERENCES

Pratama Y, Irianto D.(2019). Whole Part or Mini Games, Which One is the Most Effective Training Method to Improve Forearm Passing Ability in Volleyball?. In6th International Conference on Educational Research and Innovation -2018- 2019. Atlantis Press, pp. 81-84.

McCoy, Anne C..A(2007). The Influence of Color on the Teaching of Juggling to Elementary School Children. Master of Science in Education, Thesis, Human Movement Sciences, Old Dominion University, DOI: 10.25777/q9fy-9689

Boichuk R, Iermakov SE, Kovtsun V. (2017). Special aspects of female volleyball players' coordination training at the stage of specialized preparation. Journal of Physical Education and Sport, 17(2), Art 135, 884 – 891.

Pamungkas WP, Rahayu T, Rahayu S.(2019). The influence of learning approeach and eye-hand coordination on the learning outcomes of mini volleyball passing skill. Journal of Physical Education and Sports, 8(1). 39-43.

Liunokas, O. and Soegiyanto, S. (2019). The Impacts of Training and Eye-Hand Coordination toward Smash Outcome of Volleyball Extracurricular Members. Journal of Physical Education and Sports, 8(1), 83-6.

Astuti, Y. (2017). The Power Contribution Of Arm Muscle Strength And Eyes-Hand Coordination To Volleyball Set Up Passing Skills. Journal Pendidikan Indonesia, 6(2), 163-71.

Saparia, A., Firmansyah DL., and Hanif A.S. (2020). Plyometric Training Methods and Hand Eye Coordination on Volleyball Smash Skills in Sport Education Students, Tadulako University. International e-Journal of Educational Studies, 4(8). 167-75.

Ngadiyana H. (2019). The Effect of Eye-Hand Coordination Training on Accuracy of Service in Volleyball Players. In1st South Borneo International Conference on Sport Science and Education (SBICSSE 2019), Atlantis Press. pp. 138-140.

Sin Th, Prasetia I.(2019). Correlation Between Emotional and Eye-Hand Coordination Ability Towards Passing Ability in Volleyball. In1st International Conference on Sport Sciences, Health and Tourism (ICSSHT 2019), Atlantis Press. pp. 36-40.

Addivinola S, Cereda F, Aliberti S. (2021). Teaching method to improve eye-hand coordination in volleyball serve, Proceeding - Spring Conferences of Sports Science. Costa Blanca Sports Science Events, 21-22 June 2021. Alicante, Spain.

Syahruddin S, Saleh MS, Saleh MS. (2022). The Influence of Body Structure and Eye-Hand Coordination on Upper Passing Ability in Volleyball Games. Competitor: Jurnal Pendidikan Kepelatihan Olahraga.;14(1):92-101.

Prasticia A, Soegiyanto S, Rahayu S. (2020). The Effect of Drill Exercise Methods and Eye Coordination on Forearm Passing Skills of Volleyball. Journal of Physical Education and Sports, 15, 9(2), 195-200.