



# INTERNATIONAL JOURNAL OF ACADEMIC RESEARCH IN BUSINESS & SOCIAL SCIENCES



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To Link this Article: <http://dx.doi.org/10.6007/IJARBSS/v13-i1/15550> DOI:10.6007/IJARBSS/v13-i1/15550

**Received:** 13 November 2022, **Revised:** 17 December 2022, **Accepted:** 30 December 2022

**Published Online:** 21 January 2023

**In-Text Citation:** (Yahya et al., 2023)

**To Cite this Article:** Yahya, N. A., Kram, S., Chan, E. W. M., Catarinella, P., Malek, M. R. A., Ridzuan, M. U. M., & Jaafar, F. (2023). Effect of Acute Imagery towards Performance of Penalty Kick in Football Players. *International Journal of Academic Research in Business and Social Sciences*, 13(1), 1571 – 1579.

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Vol. 13, No. 1, 2023, Pg. 1571 – 1579

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www.hrmars.com

ISSN: 2222-6990

## Effect of Acute Imagery towards Performance of Penalty Kick in Football Players

Nur Atikah Yahya<sup>1</sup>, Suhardi Kram<sup>2</sup>, Ebby Waqqash Mohamad Chan<sup>3</sup>, Piermauro Catarinella<sup>4</sup>, Mohd Ridzuan Abdul Malek<sup>4</sup>, Muhammad Usamah Mohd Ridzuan<sup>5</sup>, Fazeera Jaafar<sup>6</sup>

SK Bukit Garam, Kinabatangan, Sabah, Malaysia<sup>1</sup>, Faculty of Sports Science and Recreation, Universiti Teknologi MARA, Samarahan Campus, Sarawak, Malaysia<sup>2</sup>, Faculty of Sports Science and Coaching, Sultan Idris Education University, Malaysia<sup>3</sup>, Academy of Language Studies, Universiti Teknologi MARA, Shah Alam Campus, Selangor, Malaysia<sup>4</sup>, Academy of Language Studies, Universiti Teknologi MARA Pulau Pinang, Malaysia<sup>5</sup>, Center for Language Studies, Tun Hussein Onn University, Malaysia<sup>6</sup>

Email: suhardikram@uitm.edu.my

### Abstract

This study was aimed at examining the effects of mental imagery towards performance of shooting penalty kicks among novice football players. A total of 32 participants were recruited and randomized into four types of groups [imagery group (n=8), imagery plus practice group (n=8), practice group (n=8) and control group (n=8)]. Results from current study show there was a substantial main effect for time, Wilks' Lambda = 0.82,  $F(1,28) = 6.22$ ,  $p = 0.02$ ,  $\eta^2 = 0.18$ , with three groups (imagery, imagery plus practice and practice) showing an increasing score in accuracy of penalty kicks across pre and post-test. Besides that, there were statistically significant differences between group means as determined by one-way ANOVA:  $F(3, 28) = 8.23$ ,  $p = 0.001$ . Post hoc comparison using the Tukey HSD test indicated that the mean scores for control group ( $M = 2.00$ ,  $SD = 1.51$ ) were statistically significant from imagery group ( $M = 5.13$ ,  $SD = 1.64$ ), imagery plus practice group ( $M = 5.88$ ,  $SD = 1.46$ ) and practice group ( $M = 5.00$ ,  $SD = 2.14$ ) and there is significant difference in mean of image clarity for imagery group ( $M = 7.75$ ,  $SD = 0.16$ ) and imagery plus practice group ( $M = 8.38$ ,  $SD = 0.18$ ;  $t(14) = -2.55$ ,  $p = 0.02$ , two-tailed). In summary, all intervention groups show improvement in accuracy of penalty kicks but, a long-term intervention is needed to improve the effectiveness of imagery. Besides that, imagery implemented alongside with physical practice help the athletes to have better imagery clarity of the outcome of the task that their need to execute.

**Keywords:** Imagery, Penalty Kick, Imagery Clarity, Novice Football Players

### Introduction

Imagery is the ability to create an experience in one's mind in a conscious state (White & Hardy, 1998). Imagery is about implementing positive things in the mind and imagining the best performance the athlete can perform during competition. In a sports context, the use of imagery can be implemented in different timelines: during training, competition and post

competition where imagery helps the athletes to increase their performance (Amasiatu, 2013).

In the past decade, there has been much interest in the use of imagery for helping many areas in sports context, for example, help our physical body to work towards desired result (Newmark, 2012), improved time performance on thousand-yards practice of swimmers (Post et al., 2011), improved spike accuracy in volleyball (Ardehjani & Mokhtari, 2013), and improved serving accuracy in tennis (Fowler, 2000). Furthermore, when specific to football, imagery has been an important element in football. Imagery practice can reduce anxiety when the task that is imagined by the athletes is the same as the real executed task (Zandi & Masomi, 2010) and enhanced performance of dribbling and shot on goal among young football players (Veraksa & Gorovaya, 2012). In addition, imagery also has been used as a motivation (Veraksa & Gorovaya, 2012), reduce anxiety during competition (Zandi, 2010) and better control of their thought during pre-competition and in competition event (Smith, 2007).

However, from previous study, there also evidence that imagery did not help improve performance in football. For instance, Munroe-Chandler et al (2005) reported that football athletes that follow cognitive imagery intervention showed no improvement in strategy execution after post-test on seventh week.

Conflicting evidence from previous findings on the effects of imagery on football performance needs further investigation. Therefore, the present study aims to examine the effects of performing mental imagery on performance of novice football player in shooting penalty kicks and to determine differences of imagery clarity between implement imagery condition only and imagery plus physical practice condition.

## **Material and Method**

### *Participants*

A quasi-experimental study was conducted among 32 male students who are novice football players. All participants ages range from 19 to 20 years old and indicated that they had previously received imagery training. Inclusion criteria are male novice football players with no history of injury in lower limb. The 32 participants that met the criteria were asked to fill out an information sheet and a consent form.

### *Instruments*

All participant shoots a stationary ball located 11m in a dimension layout according to FIFA regulations [football goal (7.32m×2.44 m) and aimed to 1.5m of left and right of the football goal]. A standard size 5 ball was used. Only balls that went through the gate between the disc cone and the goalpost were considered as having scored. A ball was not considered to have scored if it missed the gate, struck a cone, or hit a post.

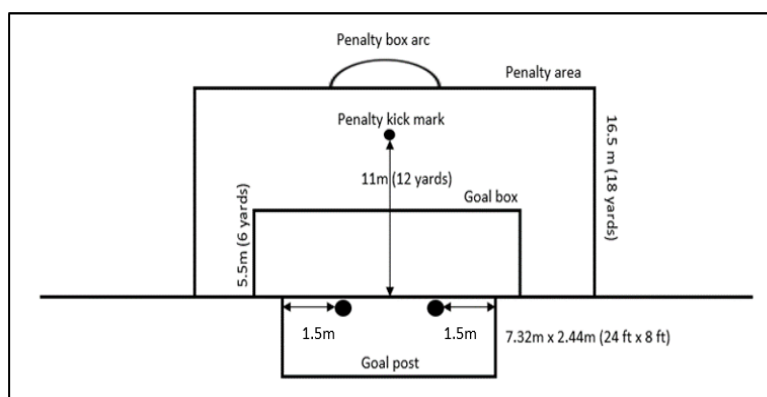


Figure 1: Penalty box layout

Imagery script was adopted from (Sosovec, 2004); "Close your eyes, now get as clear and vivid an image as possible of the ball from the point when it leaves your foot, rolling away from you along the desired line, at the desired speed, towards the gate, and rolling right through the center of the gate and into the corner of the goal. Then, goal! You did it!".

The clarity of imagery scale in this study was adapted from Sosovec (2004). This scale was used to verify the clarity and vividness imagery of participants and they were asked verbally in every trial. The scoring is as below:

- 1 = No image present at all
- 2 = Unclear image
- 3 = So vague and dim as to be hardly discernible
- 4 = Vague and dim image present
- 5 = Not clear or vivid but recognizable
- 6 = Moderately clear and vivid image
- 7 = Clear and vivid image
- 8 = Very clear and comparable in vividness to the actual experience
- 9 = Perfectly clear and as vivid as the actual experience

#### *Data Collection Procedures*

Participant background information form was distributed to collect information about the participant's demographic profile and participants were initially informed about the penalty kick task.

Two days preceding of this study, a familiarization session was conducted with the main aim is to familiarize the participants with the task of a penalty kick. All participants shoots four trials of penalty kicks, two to each side and they constantly reminded that each shot aimed to place the ball through the gate between the disc cone and the goal post.

All participants was evaluated before (pre) and after an intervention (post). On the first day of testing, all participants did pre-test which is ten trials of penalty kicks, five to each side. Then, they were randomized into 4 types of groups for their interventions on the following morning; (1) imagery group (n= 8), (2) imagery plus practice group (n= 8), (3) practice group (n=8), and (4) control group (n=8).

Early the next morning, participants come for a post-test in their assigned group. Imagery group was implemented with imagery condition before they did trials for post-test. Imagery plus practice group did imagery implementation first and at the same time they practice the task of penalty kick then they did trials for post-test. For the practise group, penalty kick trials were run repeatedly without the use of any imagery conditions. The post-test was conducted following the pre-test. No implementation was given to the control group.

Throughout all trials, the participants were reminded after every shot that the task aimed to put the ball through the gate. For groups with imagery intervention, before every trial, they were asked verbally if they manage to maintain a clear and controlled image of the appropriate outcome based on the imagery clarity scale. When a participant indicated that they could not maintain a clear image, they are advised to take their time and concentrated on the desired outcome image.

### *Data Analysis*

IBM Statistical Package for the Social Sciences (SPSS version 22.0) was used in the current study to run three separated analysis; (a) mixed between-within subjects' analysis of variance (used to determine changes of mean accuracy score between pre and post, compare group in term of the effectiveness of their interventions in helping accuracy of penalty kick and determine the interaction effect), (b) one-way ANOVA (used to determine significant different between groups (control and intervention) on penalty kick performance and a Tukey's HSD post-hoc test to determine significant pairwise differences between groups), and (c) t-test (used to analyse the difference in clarity of images between the imagery and imagery plus practice conditions). Alpha level was set at  $p < 0.05$  to determine significant differences for all analyses.

## **Results**

### *Demographic Information*

Thirty-two novice football players participated in this study. The minimum age of the participants is 19 years old and the maximum is 20 years old with a mean  $\pm$  standard deviation (SD) of age was  $19.09 \pm 0.296$  years. The tallest height recorded is 176.00 cm and the shortest is 153.00 cm with a mean  $\pm$  standard deviation (SD) of  $167.28 \pm 5.19$  cm. As for weight, 38.00 kg is the minimum number and 85.00 kg is the maximum with mean  $\pm$  standard deviation (SD) of weight was  $59.72 \pm 10.62$  kg.

### *Normality Test*

The results from the Shapiro Wilk normality test indicated that all the variables did not deviate significantly from a normal distribution ( $P > 0.05$ ). Hence, parametric methods were applied for the inferential statistics.

### *Effect of mental imagery towards the performance of football player in shooting penalty kicks*

Result of multivariate test for accuracy performance of penalty kick significant effect for time hence, there was a change of accuracy performance during pre-test and post-test. The mean value (figure 2) during the pre-test for the imagery group is 4.38 and a mean value of 5.12 for the post-test. Imagery plus practice group show a slightly higher mean of 4.75 for pre-test and 5.88 for post-test. The practice group has a mean of 3.75 during pre-test and 5.00 for the post-test. Lastly, the mean value for the control group for pre-test and post-test is 2.00. Based

on the overall mean value, there an increase of penalty kick accuracy performance in all four groups (total of the mean value for pre-test is 3.72 then increase 0.75 to 4.47 for post-test). Besides that, the practice group has the highest mean different between pre-test and post-test.

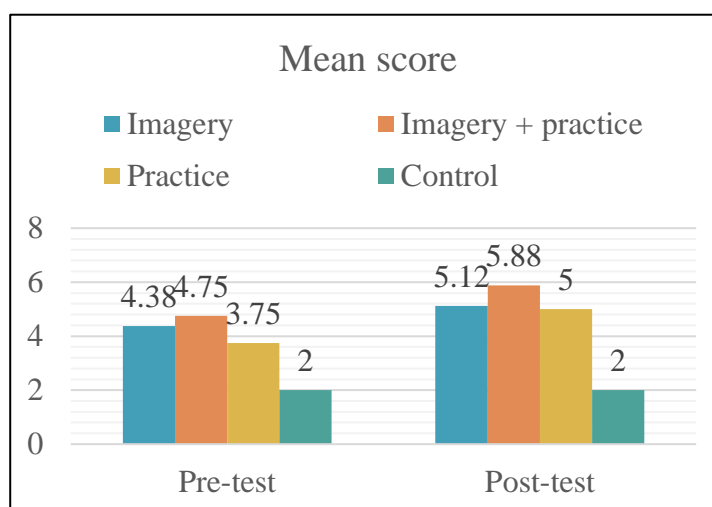


Figure 2: Mean score for penalty kick accuracy performance for groups during pre-test and post-test

#### *Difference between the group on penalty kick among the control and intervention group*

One way between groups ANOVA is used to determine overall group differences on task accuracy performance after the intervention. There were statistically significant differences between group means as determined by one-way ANOVA:  $F(3, 28) = 8.23, p = 0.001$ . A Tukey post hoc test revealed a significant difference in mean score between groups. The result indicated that the mean score for control group ( $M = 2.00, SD = 1.51$ ) were statistically significant from imagery group ( $M = 5.13, SD = 1.64$ ), imagery plus practice group ( $M = 5.88, SD = 1.46$ ) and practice group ( $M = 5.00, SD = 2.14$ ). However, there is no significant different were noted between the intervention group.

#### *Differences in imagery clarity between imagery group and imagery plus practice group*

Result from independent sample t-test (table 1) is there are significant difference in mean of image clarity for imagery group ( $M = 7.75, SD = 0.16$ ) and imagery plus practice group ( $M = 8.38, SD = 0.18; t(14) = -2.55, p = 0.02$ , two-tailed). The magnitude of the differences in the means (mean difference =  $-0.63$ , 95% CI:  $-1.15 - -0.09$ ) was very small (eta squared = 0.32). The clarity of imagery for imagery plus practice group had significantly greater clarity of image when compared to imagery only group.

Table 1

*Comparison of mean clarity for imagery condition between the imagery group and imagery plus practice group.*

	Group	N	Mean (SD)	t	df	p-value
Image clarity	Imagery	8	7.75 (.16)	-2.55	14	0.023
	Imagery + Practice	8	8.38 (.18)			

## Discussion

This study was aimed to determine (a) effects of performing mental imagery on performance of football player in shooting penalty kick, (b) significant difference between groups (control and intervention) on penalty kick and (c) differences of imagery clarity between imagery group and imagery plus practice group.

Football involves a series of stressors which require players to employ psychological strategies to attain peak performance and wellbeing (Dossil, 2006) while in this study, the task of penalty kick is executed without outside stimuli. External and internal stressor such as pressure from coaches, team mates and the public, crowd noise, and anxiety are needed to make sure the players focus on their real aim (Afifi et al., 2021). Result of practice group has the highest mean different between pre-test and post-test show that implicit learning (from familiarization session and pre-test) have influence and increase shot accuracy of football players when making strategic decision during penalty kick (Navarro et al., 2018). Grushko et al (2016) stated that less experienced football players are less intrinsically motivated to experience emotional stimulation in sport and to only fewer know new methods and techniques to enhance sport performance. Imagery involve integration of sensory experiences to create a clear and vivid image such as visual, auditory, tactile, emotional, and kinesthetics cues (Parnabas et. al., 2015, Sosovec, 2004).

There were statistically significant differences between group means and post hoc comparison using the Tukey HSD test indicated that the mean score for control group were statistically significant with intervention groups (imagery, imagery plus practice, and practice). This result show there was no significant different were noted between the intervention groups. The penalty kick task in the present study involved very little muscle movement and subjects may already adapt to the movement during familiarization session that has been done before the actual trial. Besides that, result from this study also can be related to bioinformation theory that assume mental image is something that stored in our long-term memory (Pam, 2013). This is the action when people can recall the feeling and vivid image in the mind when thinking about a situation or perform a skill. An acute mental training may not suitable to be implemented towards novice players. A long-term intervention is needed to improve the effectiveness of imagery as mention by (Dean & Shepherd, 1997), over repetitive, task specific, affected limb practice, the size of brain region representing that particular limb increase and functional changes occur thus, improve the skill execution and performance.

Comparison of imagery clarity resulted on imagery plus practice has the highest mean. The greater effects of imagery clarity may be cause by muscle memory as stated in

psychoneuromuscular theory. When athletes imagine any sport movement of a skill, it can stimulate our muscle similar to actual physical execution. Mental imagery helps to strengthen our muscle imagery by imagine the correct sequence of the execution because according to theory purposed by Carpenter (1894), motor pattern that generated during imagery practice are the same as those used for physical practice. The imagery clarity for imagery plus practice group may improve because the imagery implementation in this study is specific to the task of penalty kick. This was supported by previous study by Mizuguchi, Nakata, Uchida, & Kanosue (2012), brain activation during the imagery of an action is stronger when sensory input is similar to those that occur during the real execution of the task.

This study has several limitations that needed to be addressed. Firstly, implement long-term imagery training is needed in order the imagery to be effective for novice football players. Secondly, imagery should be done in a holistic process that included all sensory experience (visual, auditory, tactile, emotional, and kinaesthetics cues from outside stimuli such as coaches, teammates, opponent team and spectators) for the imagery training to be easily apply during competition. Thirdly, the outcomes of this study may be affected during testing by the physical and mental state of the participants (fatigue, affective-motivational factor) which may cause difference in their accuracy of penalty kicks performance and clarity of imagery when execution of task.

Skills practice and mental imagery was found to be important component during the preparation phase before and after the competition. In accordance with our results, practice and imagery both increased football accuracy among novice players, but combining the two psychological skills training resulted in much greater benefits. Football coaches can thus use either practice or imagery during athletes' training, or they can combine the two techniques for greater effect. Practical implication include to emphasize the imagery and practice approach in athletes' psychological training program before, during and after competition to improve performance.

### **Conclusion**

To conclude, all intervention groups (imagery, imagery plus practice and practice) shows improvement in accuracy of football penalty kicks as compared to control group but a long-term imagery intervention is needed to improve the effectiveness of imagery. Implement imagery alongside with physical practice of the same task has better imagery clarity when compared to only implement imagery without physical practice. In imagery training, a number of factors such as facilitative and debilitating imagery directions may influence individual performance (Ismail & Ismail, 2019). Future study is recommended to investigate outcome of long-term intervention of imagery if imagery were tested before and after a game like situation for novice or professional athletes or making comparison between the two levels.

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