

# The Idea of Using Systematic Imagery – Physical Practice on Netball Jump Shot Performance

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**Abstract** Previous researchers found that systematic imagery – physical practice also known as Practice in Mind (PIM) training does help to resolve physical and psychological problem in sport skills performance. Therefore, the present study was done to investigate the effectiveness of PIM training on netball jump shot performances of state netball players. Twenty state level netball shooters, aged between 17 to 21 years old ( $M = 18.80$ ,  $SD = 1.47$ ) with 2 to 4 years playing experiences ( $M = 4.00$ ,  $SD = .80$ ) participated in this study. They were divided into PIM training group and control group. Participants in the PIM training group performed 10 imagery practices together with 10 physical practices (jump shot). Meanwhile, control group only had 10 physical practices. The mixed between – within subjects' results showed that the PIM training group improve their netball jump shot scores from pre-test to post-test compared to control group. However, the mean flow was slightly decreased from post-test to retention test but higher than the pre-test scores. The finding supports the benefit of using PIM training in team sport particularly for netball goal shooters. The netball association, coaches, and athletes should be educated with the importance of imagery training such as PIM training and should not focus on their skills only to be successful but also their psychological training.

**Keywords** PIM training, Imagery, Physical training, Netball jump shot, Goal shooter

## 1. Introduction

In the game of netball, there are several skills that have been used by the goal shooters (GS) in order to get point. A successful goal shooter should work towards mastery of these techniques to ensure that she is comfortable and able to adapt to all types of defences in all game situations. During a competition, shooters may suffer from pressure and fatigue to complete an hour of competitive match that involves running, jogging, jumping, passing, catching, guarding, defending, and dodging movements to perform a shooting through a goal ring. Consequently, this fatigue may influence their shooting techniques such as jump shot techniques [1].

In particular, jump shot is another variation of shooting in netball and provide advantages to the shooter who tries to score goals to counteract the action of tall defender, action of long distance or have overbalanced baseline [1]. In addition, jump shot can increase the height at which the ball is released i.e, the release point. The technique for jump shots is to slightly jump at the release level to provide additional momentum to overcome the extra distance the

ball needs to travel. More flexion in the knee is also advantageous which is to ensure vertical alignment is maintained [2]. Furthermore, the balance of the body should be maintained and is critical to the success of the jump shot. Jump shot technique brings a high degree of difficulty, and requires a very good dynamic balance, as the shot is taken from the airbase [3, 4]. Imagery training plays important role in preparing the body and mind to overcome the pressure [5]. In particular, specific imagery intervention or strategies should be provided to enhance shooting accuracy and to develop motivation among the netball shooters [6]. This is because the use of imagery has been established to enhance cognitive and motivation, maintain their self-confidence, improve the skill, and is used to stay relaxed and focused in the competition [6, 7].

PIM training is six week imagery – physical training program which involve motor imagery to sport setting. PIM training program consists of PETTLEP (Physical, Environment, Timing, Task, Learning, Emotion, and Perspective) elements which were derived from functional equivalence between imagery and physical performance of a motor task [8]. The imagery content in PIM training is also integrated to facilitative imagery direction and stimulus – responses propositions other than motivation, visual and kinesthetic directions [9, 10, 11]. Past researchers found that the rugby players in PIM training group improved in their 22-meter kicking performance [12]. Additionally,

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recent study found that PIM training also helped to improve netball standing shot scores but, there is no study investigating on jump shot performance [13]. Therefore, the effectiveness of PIM training requires further research and need to be investigated respectively.

## 2. Methods

**Participants:** Twenty state level netball shooters, aged between 17 to 21 years old ( $M = 18.80$ ,  $SD = 1.47$ ) with 2 to 4 years playing experiences ( $M = 4.00$ ,  $SD = .80$ ) participated in this study. Given that the previous studies have suggested using Movement Imagery Questionnaire – Revised (MIQ-R) [14]. This questionnaire is to evaluate kinesthetic and visual imagery ability before they engaged with the imagery program [9, 10, 11]. For this study, all players had moderate imagery ability (visual and kinaesthetic). The participants in this study have scores of 16 and above in imagery ability and they were reminded to not receive any other imagery training or participate in netball competitions during the intervention program.

## 3. Instrumentation

Practice In Mind (PIM) Training Program Intervention Script Guides: Participants used a written PIM training program intervention script developed by the researcher. The script had been approved by Universiti Teknologi MARA Sports Psychology Lecturer (PhD), and Professional State Netball Coaches. The written script is related to facilitative imagery and the Bioinformational Theory, namely stimulus and response propositions [15]. As stimulus and response propositions is effectively used in this study particularly when the emotion elements are involved during the performance [9, 10, 11, 16]. The script also will include sections exploring all functions of imagery (i.e., cognitive and motivational functions), imagery ability (i.e., visual and kinesthetic) and imagery perspective (i.e., internal). The script explored the functions of the seven PETTLEP of imagery model [8]. This is consistent with previous study [9, 10, 11].

**Shooting Task Performance and Scoring:** The participants had performed jump shot task performance. The participants in PIM training group had completed 10 imagery practices and continued with 10 physical practices on the actual netball court. As suggested by the previous studies, 10 shots for each task were taken directly in front of the netball post at 10-feet (3.2metre) distance [13, 17]. Each attempt for that shooting task was recorded using the following scoring system (Complete miss=0 points, Hitting the ring and not going through the net =1 points, Hitting the ring and going through the net =2 points, and Clean net=3 points). The reliability of this score by Spearman's rank-order correlation coefficient of 1.00. [17]. Thus, each participant was awarded a total score out of the maximum of 30 points.

## 4. Procedures

All the participants were required to perform pre-test by doing 10 netball jump shots from a 10-feet distance. The shooting test was performed on a netball court to obtain the similar environment as the actual tournament. As suggested by the previous study the scoring system was; Complete miss = 0 points, hitting the ring and not going through the net = 1 points, hitting the ring and going through the net =2 points, and Clean net=3 points [17]. Following the pre-test, the intervention was introduced to the participants.

All participants were asked to complete the practice session three times per week for the entire 6 weeks. The participants in PIM training group practiced on three alternate days and listen to their own imagery script by using a voice recorder. They were asked to modify the script in each of the sessions based on their own skill to shoot. In the script, they were asked to imagine themselves performing 10 shots at the net, with a short rest in between. In total, 10 minutes was taken to do 10 imagery practice and another 10 minutes for physical practice. On the other hand, the participants in the control group performed 10 netball jump shot task at an actual netball court for 3 times per week for the entire 6-week. They recorded all the practice sessions for the six week in a training program diary.

After completing eighteen intervention sessions, a post-test was conducted to all the groups. During post-test, all the participants performed a shooting test involving 10 times of shooting from 10-feet distance. The shooting task was performed on the actual netball court. After 6 weeks from the post-test, the retention test was conducted to all the participants. During retention time, the researcher only asked the shooters to continue to use the PIM training program during the 6 weeks so the training program depended much more on the shooters themselves. During retention-test, all the participants also performed a shooting test involving 10 times of jump shot from 10-feet distance.

## 5. Results

Table 1 showed means scores for three assessment for jump shot between PIM training group and control group. Pre, post and retention test were conducted to compare the shooting performance from the 10-feet distance scores for PIM training group (combined imagery - physical practice) and control group (only physical practice). The mean score for PIM group increased from pre-test ( $M=12.00$ ,  $SD=2.58$ ) to post test ( $M=20.70$ ,  $SD=2.45$ ). Meanwhile, the mean flow was slightly decreased from post-test to retention test ( $M=19.90$ ,  $SD=1.91$ ). The retention scores were notably higher in the PIM training group compared to pre-test scores. It is possibly due to the instruction by the researcher to continue to use PIM training after the post-test. The mean scores for control group was increased from pre-test ( $M=11.90$ ,  $SD= 2.28$ ) to post-test ( $M=14.10$ ,  $SD=3.07$ ) and slightly decreased from post-test to retention test ( $M=12.10$ ,

$SD=3.78$ ).

**Table 1.** Jump Shot Means Scores for PIM Group and Control Group across Three Time Periods

		<i>Group</i>	<i>M</i>	<i>SD</i>	<i>n</i>
Jump	Pre Test	PIM	12.00	2.58	10
		Control	11.90	2.28	10
	Post Test	PIM	20.70	2.45	10
		Control	14.10	3.07	10
	Retention Test	PIM	19.90	1.91	10
		Control	12.10	3.78	10

**Table 2.** The Effect of PIM Training Program on Jump Shot

Effect	Wilks' Lambda	F	Sig.	PartialEta Squared
Time	.25	25.43	.000	.75
Time*group	.50	8.71	.002	.51

A mixed between-within subjects analysis of variance (ANOVA) results in Table 2 showed that there was a significant main effect obtained, Wilks' Lambda=.25,  $F(2, 17) = 25.43$ ,  $p < .001$ , partial eta squared = .75, with PIM group showing an increase in scores from pre-test to post-test. There was also an interaction effect found between group of intervention training and time Wilks' Lambda = .50,  $F(2, 17) = 8.71$ ,  $p < .05$ , partial eta squared=.51. The findings showed that the training method had a different effect on jump shot performance for each of the three times of assessment in PIM training group and control group. The main effect comparing the two types of intervention was significant,  $F(1, 18) = 30.17$ ,  $p < .001$ , partial eta squared = .63, suggesting there was difference in the effectiveness between PIM training and control group approaches. It is shown that the procedure used in this study was effective for participants in the PIM training group. Interestingly, the results completely support the idea that PIM training program can help the goal shooters to increase the level of confidence to use the techniques of jump shot in their game, especially in high intense games.

## 6. Discussion

Consequently, PIM training had clearly found the usefulness in enhancing self-confidence, which can have a positive impact on performance particularly on jump shot. It is consistent with the previous studies when PIM training and imagery used is able to help the elite netball shooters to increase the shooting accuracy [6, 13]. Additionally, previous researchers suggested that the right type of training and well-planned strategy must be carried out as the application of jump shot gives advantages to show a greater release height and contributes to more successful shooting [3]. Thus, the imagery can be described as an additional method to the physical practice, which certainly can give an advantage to athletes in competitions.

By combining the imagery practice with the real physical movement, athletes can accelerate and improve the process

of learning a skill. As similar impulses occur in the brain and muscles when athletes imagine the movements without actually performing them [18, 5]. Therefore, the present study strongly suggest that mental practice in PIM training program which combines physical and imagery practice plays a main role to improve the netball shooting skills. As supported by the previous studies, the advantageous of PIM training group improved in netball jump shooting compared to only physical practice (control group), maybe related due to the presence of the seven components of PETTLEP imagery. Also the effectiveness of imagery script with facilitative direction and stimulus – responses proposition in PIM training give an incredible effect to the skills performance [9, 10, 11].

Furthermore, the learning component in PIM training significantly helps the participants perform the difficult techniques such as jump shot. The results of the current finding found that PIM training program is able to produce high impact to this jump shot technique by showing improvement of shooting accuracy. Past researchers have mentioned that imagery training is an effective mental skill for enhancing skill acquisition of complex skill [19]. As previous researchers found the effectiveness of imagery training is due to the athlete's ability to use imagery effectively with a concentration on the information that was given through the senses [5]. This is also consistent with the previous finding, who reported the PETTLEP model produces great effect to improve learning and performance of challenging skills in volleyball [20]. In the present study, the results show an encouraging achievement of the pre-test to post-test after six weeks of intervention. This may be because the participants can control the imaging process and can focus more on proper techniques, enabling the skills to become more familiar in order to bring participants closer to success.

## 7. Conclusions

The present study provided clear evidence that PIM training is an effective program to improve netball shooting performance. The study provided guidelines for the netball association, coaches, and athletes in development performance. The netball association must be aware about the current findings to develop and enhance the netball shooter's performance in order to compete at the international level. The results support the idea of using functional equivalence enhancing methods to produce the most effective imagery intervention, with many practical implications for sport psychology, coaches and athletes. Future research should be carried out particularly in comparing between two different shooting techniques (standing & jump shot) and the mediating role of psychology factors like self-efficacy and anxiety on the PIM training program. It warrants that researchers may explore this procedure in any sports particularly in the aspect of improving sports skills.

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