Original Article

The PETTLEP on Free Throw Skill in Basketball Players

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Objective: The PETTLEP (Physical, Environment, Task, Timing, Learning, Emotion and Perspective) is an imagery model to improve performance in sports. However, there is limited data of the PETTLEP on shooting skills in basketball shooting performance particularly in Thai basketball players.

Materials and Methods: The present study was a quasi-experimental study; pre- and post-test method. The study was conducted at Phetchabun Rajabhat University from October to November, 2018. The inclusion criteria were university representative basketball players (age between 18 and 23 years) who were willing to participate in the study and had no experience on imagery training. Both pre- and post-test measurement were performed with a mark shooting at 2- and 3-point at the middle of the field for 20 times. The PETTLEP intervention was conducted for six weeks with regular shooting practice.

Results: There were 24 basketball players participating in the study. Male: female ratio was 1:1. After six weeks of PETTLEP, the free throw scores were significantly increased from baseline in both 2-point and 3-point regardless of sex. In overall, the average 2-point free throw increased from 18.83 to 24.00, while the average 3-point free throw increased by 7.96 or 2.65 times of 3-point free throws.

Conclusion: The 6-week course of PETTLEP plus shooting practice significantly improved the free throw skill in collegiate basketball players.

Keywords: Age, Sex, Shooting skill

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The PETTLEP (Physical, Environment, Task, Timing, Learning, Emotion and Perspective) is an imagery model to improve performance in sports[1,2]. It has been introduced by Holmes and Collins in 2001[1]. It has been shown that the PETTLEP can improve performance in several sports including golf bunker shot performance, jumping performance in national rhythmic gymnastics athletes, or passing skills in volleyball players[3-5]. Additionally, the PETTLEP is also applied in medical field such as blood pressure measurement in nursing students[6].

Basketball is one of the popular sports worldwide. To make a score in basketball required both physical and psychological skills. The PETTLEP has components to improve both physical and psychological functions in sports. Therefore, it may be effective in basketball shooting skill. A previous study showed that the PETTLEP three times/week for four weeks significantly improved netball shooting performance[7]. The present study aimed to evaluate if the PETTLEP is also effective in basketball shooting performance particularly in Thai basketball players.

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Materials and Methods

This study was a quasi-experimental study; pre- and post-test method. The study was conducted at Phetchabun Rajabhat University from October to November, 2018. The inclusion criteria were university representative basketball players (age between 18 and 23 years) who were willing to participate in the study and had no experience on imagery training. Those with physical/psychological limitations or contraindications for exercise or the PETTLEP were excluded including neuromuscular diseases, respiratory diseases, cardiac diseases, renal diseases, psychological diseases, osteoporosis, or vision problems. Those with incomplete study protocol were also excluded.

Pre-test measurement

All eligible participants were invited to the shooting

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competition. Prizes were awarded to the top three scorers. Each participant had a chance to shoot for 20 times at a mark for both 2- and 3-point at the middle of the field.

Intervention

The PETTLEP was applied to all participants combined with regular shooting skills. The intervention was performed with duration of 45 minutes prior to the 45-minute regular shooting practice schedule of the basketball players; 90-minute session. The total duration of the intervention was six weeks with frequency of three days/week (Monday, Wednesday, and Friday). The PETTLEP protocol was followed the standard regimen with a slightly increasing of desired effective shooting from five times in the first two weeks to ten times in week four and to 15 times in the final week.

Post-test measurement

After completion of the intervention, all participants performed the shooting competition again as the pretest protocol. Prizes were also awarded to the top three scorers.

Statistical analysis

The scores of the 20 shootings for both 2- and 3-point were collected for each participant. The pre- and post-intervention scores were compared by a paired t-test if data were normally distributed. A subgroup analysis was computed by sex. All statistical analyses were performed by STATA software, version 10.0 (College Station, Texas, USA).

Results

There were 24 basketball players participated in the study. Male: female ratio was 1:1. After six weeks of PETTLEP, the free throw scores were significantly increased from baseline in both 2-point and 3-point regardless of sex (Table 1). In overall, the average 2-point free throw increased from 18.83 to 24.00, while the average 3-point free throw increased by 7.96 or 2.65 times of 3-point free throws.

Table 1. Free throw scores of basketball players before and after the PETTLEP for six weeks categorized by all players and by sex

Types	Baseline	Week 6	*p*-value
All players			
2-point	18.83 (5.75)	24.00 (5.66)	<0.01
3-point	18.50 (8.09)	26.46 (8.22)	<0.01
Male			
2-point	20.00 (1.82)	25.17 (1.76)	<0.01
3-point	21.75 (2.76)	30.42 (2.58)	<0.01
Female			
2-point	17.67 (1.47)	22.83 (1.48)	<0.01
3-point	15.25 (1.35)	22.50 (1.50)	<0.01

Data presented as mean (SD); 20 throws per player

Discussion

A previous study conducted by using a motor imagery in four young basketball players for 84 days found that an individual free throw was improved but not quite impressive[8]. Compared with the PETTLEP intervention in this study, the significant improvements for both 2- and 3-point free throw were shown regardless of sex (Table 1). The PETTLEP has been shown to be beneficial over motor imagery alone[5]. The passing skill of volleyball players was significantly better in PETTLEP over traditional imagery ($p<0.05$). These findings may be explained by multiple interventions of PETTLEP both physically and mentally[2,3,9]. The study composed of 290 participants found that the PETTLEP significantly predicted imagery skill as well as imagery strategy, goal, affect, and mastery ability[9]. The skill imagery ability had the highest impact with a beta of 0.38.

The previous study of motor imagery in basketball free throw was conducted in only female players[8]. The present study found that both male and female basketball players had benefit from the PETTLEP (Table 1). The male group seemed to have slightly more score improvement than female group in both 2-point (5.17 vs. 5.16) and 3-point (8.67 vs. 7.25) free throw. A systemic review on motor imagery and gender found there might be slight differences on gender responses to the motor imagery intervention[10]. Male participants might be better at imaginations due to better brain activation and inhibition for imagining. Additionally, the most effective age group for motor imagery was between 20 to 29 years[10]. The present study was conducted with participants in the age group between 18 and 23 years, which benefited most from the PETTLEP.

There are some limitations in this study. As mentioned earlier, this study was conducted with young adult basketball players who represented a university. The results may not be applicable to other settings of basketball players. The outcomes of the present study were focused only on 2- and 3-point free throw at the mark point. Finally, the study period was six weeks. The effects of PETTLEP may be seen faster than six weeks as in the netball study. Further studies are required to demonstrate the effectiveness of PETTLEP in shorter duration of intervention.

In conclusion, the 6-week course of PETTLEP plus shooting practice significantly improved the free throw skill in collegiate basketball players.

What is already known on this topic?

A motor imagery improved free throw skills in female basketball players.

What this study adds?

The PETTLEP improved shooting skills in both male and female basketball players at collegiate level.

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Potential conflicts of interest

The authors declare no conflict of interest.

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