

Effect of mental imagery on penalty shooting in handball

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■ ABSTRACT

The purpose of this study was to find out the effect of mental imagery training on penalty shooting ability in handball. In order to achieve this goal thirty male handball players of Lakshmbai National University of Physical Education, Gwalior, India were selected as subjects with aged between 18-25 yrs. Subjects were randomly placed in to experimental and control group. A pre-test of penalty shooting with objective marking was used as criterion measure. Post tests were conducted after eight (8) weeks of mental imagery training. In this experimental design scores of pretest and post-test were tested by using analysis of covariance (ANCOVA) at the 0.05 level of significance. As the calculated F value was found 7.38 which was significantly higher than tabulated value 4.21 at 0.05 level of significance. It was observed that there was significant difference in performance between the experimental and control group in penalty shooting ability of handball players.

■ **KEY WORDS** : Mental imagery, Penalty shooting, Handball

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Mental imagery is recognized as one of the most important technique used for increasing sport performance and altering psychological states. The concept of mental imagery has evolved over a period of time. Imagery is the mental creation or re-creation of sensory experiences that appear to the person imagining them to be similar to the actual event (Suinn, 1993). Research in the field of imagery use and athletic skill performance dates back prior to World War II (Eggleston, 1936; Perry, 1939). The most important point to understand about imagery is anxiety, increase confidence, enhance endurance, speed recovery from injury or heavy exercise, and much more (Morris *et al.*, 2005).

A mental image is always an image of something or other (whether real or unreal), in the same sense that

perception (whether veridical or not) is always perception of something (Anscombe, 1965). It is in virtue of this intentionality that mental imagery may be (and usually is) regarded as a species of mental representation that can, and often does, play an important role in our thought processes. It is also generally accepted that imagery is, for the most part, subject to voluntary control. Mental imagery is one of the most extensively used techniques to enhance the athletic performance in a very effective way; mental imagery refers to creating or recreating an experience in mind.

As Cohen (2006) stated, "When a child is playing, he or she is using mind, body, heart and social skills". Although most people can identify children at play, scholars debate what characteristics of children's activities constitute this event. One of the earliest

definitions of play comes from Vygotsky (1933, 1978), who defines it as an activity that is self-directed in which the means are more valued than ends. Play has structure that is not dictated by physical necessity but emanates from the minds of the players.

Athletics can be a useful area to parallel the use of mental imagery in adults and children, making it a natural place to begin to test in developmental stages. However, while there are many excellent sources that speak to the effectiveness of mental imagery in adults for improving skills essential to sport performance (Martin *et al.*, 1999; Munroe *et al.*, 2000).

In the game of handball the team tries to put the ball in the opponent's goal, in doing so each player must be able to catch, pass and dribble the ball the success of it depends on every player's running, jumping, receiving, passing ability while simultaneously tackling the opponent. For over a century researchers have performed hundred of studies in order to determine the effectiveness of mental imagery to enhance physical performance. According to most studies many athletes pronounce that mental imagery does lead to enhanced performance. On the other hand some athletes who participated in similar studies indicate no tangible increase or even impaired physical performance. Imagery is a powerful and useful psychological tool that can be applied for various purposes in sport and exercise.

Therefore, the purpose of this study was to investigate the effect of mental imagery on penalty shooting ability on handball players.

■ METHODOLOGY

A sample of Thirty (30) male handball players of Lakshmibai National University of Physical Education, Gwalior, India with ages ranged 22 ± 3 years were selected as subjects for the study. Selection of the subjects was with their readiness after their informed consent and all the subject had participated in All India Inter University Competition of handball. All subjects were randomly placed in experimental and control group and each group had equal number of subjects.

A pre-test data was conducted on ten penalty shooting stroke of handball and successful converted stoke was counted similarly post data was conducted after eight weeks of mental imagery training and objective marking was used. Data was recorded in numbers. During the eight weeks of training program

participants were asked to remove their shoes and lay down with closed eyes on the carpet in a hall. Participants were instructed to be in comfortable position and focus on the center of your body and take deep breath. Imagine with inhalation of breath that you are pulling all the tension from your body into your lungs. With each exhalation, imagine that you are releasing all of the tension and negative thoughts from your body. Next imagine that you are going toward a ground to take part in a competition and there are also other teams and spectators. Imagine that you are getting ready for the match and focus on warm up exercises and get ready. Now finally think match is started and you are playing the game with enthusiasm and confidence. At the end of match there was tie in match now you got penalty stroke. You are standing just in front of the goal post and ball is in your hand and you throw the ball very hard above head height towards the goal and ball is in goal post. Feedback from subjects was also taken from time to time to know the effectiveness of the training program. Total duration of training program was divided into sessions per week and in beginning training session was of 3-5 minutes for first three weeks and then gradually duration of training program was extended up 10 minutes. Whereas control group did not participate in any training program except their daily routine program.

■ OBSERVATIONS AND DISCUSSION

To examine the significant difference of mental imagery training program on penalty shooting ability of handball players, the analysis of co-variance (ANCOVA) was employed at 0.05 level of significance. The data collected was analyzed by using descriptive statistics and scores of mental imagery group and control group with regards to penalty shooting ability of handball players is presented in Table 1.

Table 1 depicts mean scores, standard deviation and minimum and maximum scores of penalty shooting ability of handball players pertaining to mental imagery and control group. For mental imagery group, pre-test mean and standard deviation of subjects was 3.60 ± 1.06 and minimum and maximum scores were 2.00 and 5.00, respectively, post-test mean and standard deviation of subjects was 5.13 ± 0.99 and minimum and maximum scores were 3.00 and 7.00, respectively similarly for control group, pre-test mean and standard deviation of subjects was 3.47 ± 1.06 and minimum and maximum



scores were 2.00 and 5.00, respectively, post-test mean and standard deviation of subjects was 4.20 ± 1.01 and minimum and maximum scores were 3.00 and 6.00, respectively.

The adjusted post test data of mental imagery and control group with regards to penalty shooting ability of handball players is presented in Table 2.

Table 2 revealed the adjusted post test mean obtained after considering the pre-test mean difference in the initial phase. This was further considered for ANCOVA to find out the exact difference present due to the training between the two groups.

The analysis of covariance (ANCOVA) was used to find out the significant difference between mental imagery and control group after eliminating the effects of covariate is presented in Table 3.

Table 2 clearly revealed that there was a statistically significant difference among mental imagery and control group as the calculated 'F' value 7.38 was found higher than tabulated 'F' value 4.21 in case of penalty shooting ability at 0.05 level of significance. This proved that there was a significant difference among the means due to eight weeks of mental imagery training on penalty shooting ability of handball players.

The graphical representation of pre, post and adjusted mean scores among experimental group and control group of mental imagery training on penalty

shooting ability of handball players is presented in Fig. 1.

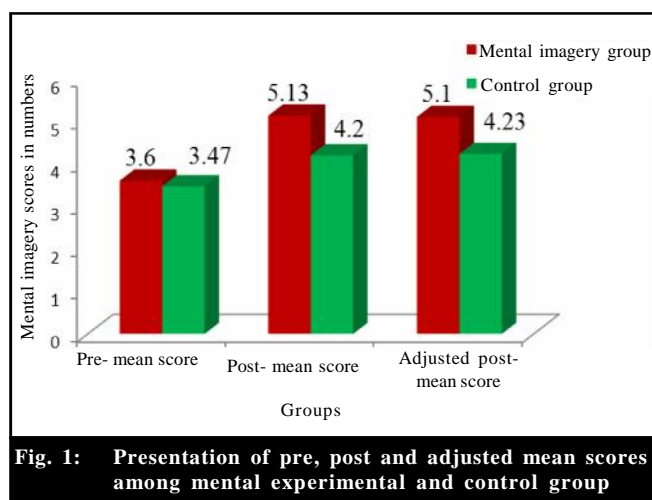


Fig. 1: Presentation of pre, post and adjusted mean scores among mental experimental and control group

Imagery has been widely suggested as a means of enhancing self-confidence. Images that create feelings of competence and success, such as performing well or executing skills correctly increase an athlete's confidence. The finding of this study revealed that the mental imaginary group had significant difference with control group in penalty shooting ability of handball as a result of treatment. Penalty shooting ability significantly improved after eight weeks of mental imaginary training programme. The effectiveness of mental imagery in

Table 1 : Descriptive statistics of pre and post-test performance in penalty shooting ability of handball players among mental imagery and control group

		Mean	S.D.	Range	
				Minimum	Maximum
Mental imagery group	Pre-test	3.60	1.06	2.0	5.0
	Post-test	5.13	0.99	3.0	7.0
Control group	Pre-test	3.47	1.06	2.0	5.0
	Post-test	4.20	1.01	3.0	6.0

Table 2 : Adjusted post test mean in penalty shooting ability of handball players among mental imagery and control group

	Adjusted mean	Standard error	95 % confidence interval	
			Lower bound	Upper bound
Mental imagery group	5.10	0.23	4.64	5.56
Control group	4.23	0.23	3.77	4.70

Table 3 : Analysis of co-variance of adjusted post test means in penalty shooting ability of handball players among mental imagery and control group

	df	Sum of squares	Mean square	F-value
Contrast	1	5.62	5.62	7.38
Error	27	20.56	0.76	

* indicate significance of value at $P=0.05$

$F_{05} (1, 27) = 4.21$

improving the skill performance may be attributed to the following reasons; mental imagery can aid performance by enhancing the learning and execution of physical skills and involves recalling from memory pieces of information stored from experience and shaping these pieces into meaningful images. Imagery is actually a form of stimulation, it is similar to a real sensory experience (seeing, feeling or hearing) but the entire experience occurs in mind. It enhances psychological skills such as concentration, self-confidence, motivation, attention, and anxiety control. Imagery can help athletes focus attention and regain focus when they become distracted. To help focus attention athletes can imagine relevant aspects of the upcoming performance. It is a fascinating device for influencing thoughts, affective states, and behaviours in sport and exercise, and its application is limited only by our imagination and creativity. Mental imagery reinforces nerve pathways that will be used during training and competition (Castella, 1996). Effectiveness of mental imagery on performance enhancement has been found in studies by Hall *et al.* (1990); Mamassis and Doganis (2004); and Bakker and Kayser (1994). Imagery may strengthen muscle memory, for a task, by having the muscles fire in the correct sequence for a movement, without actually executing that movement (Martin *et al.*, 1999). These results are in consonance with the previous results obtained by Blair *et al.* (1993).

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