

# Effect of Internal - Visual Mental Imagery Training on Hitting Performance of Hockey Players

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## ABSTRACT

The study aimed at studying the effectiveness of Internal Visual Mental Imagery on hitting skills of Hockey players. 30 subjects were randomly selected who had general practice of around 2 years and were aspirants for university participation. The subjects were randomly segregated into two groups. The Kinesthetic mental imagery training was given to the subjects for 6 weeks and their hitting performance was recorded. ANCOVA was used to eliminate the effect of initial differences and the findings reveals that after 6 weeks of training there was significant differences between the Treatment and Control group. The study concludes that 6 week Internal-Visual mental imagery training can be beneficial to hockey players and must be clubbed with regular practice.

**Key word:** ANCOVA, Internal-Visual Mental Imagery, Hockey, Hitting.

## INTRODUCTION

Imagery is a cognitive-behavioral technique in which the picture or the process of certain task gets imprinted using the senses and memory. It is often known as mental rehearsal which helps in automatization of certain movements. In today's competitive sports scenario the use of mental imagery technique is on the rise (Langton, 2015). The mental imagery technique is guided by many theories and one of the most established theories is the psycho-neuromuscular theory. The theory suggests that muscular movement of small magnitude occurs during mental imagination which helps in automatization of the task (Neuman, 2010). Out of all the researchers the studies pertaining to the effectiveness of Internal Visual Imagery training is very limited and that too in the context of field hockey.

### Research Questions:

Can Internal Visual Imagery training improve the hitting performance of Hockey players?

**OBJECTIVE:**

To evaluate the effectiveness of Internal Visual Imagery training programme in improving hitting performance of hockey players

**HYPOTHESIS:**

There will be significant difference in mean hitting performance between Internal Visual Imagery training group and Control Group.

$H_0(\text{Hitting Performance}): \mu_{\text{Adj-Po-Internal Visual Imagery training Group}} = \mu_{\text{Adj-Po-Control Group}}$

**METHOD****SELECTION OF SUBJECT**

For the purpose of the study 15 Hockey players ( $20.5 \pm 1.15$ ) were selected randomly from University aspirants (Approx. training age of 2 years ). They were randomly divided into two groups. The treatment (Experimental & Control) groups were also assigned randomly to minimize the effect of extraneous variables.

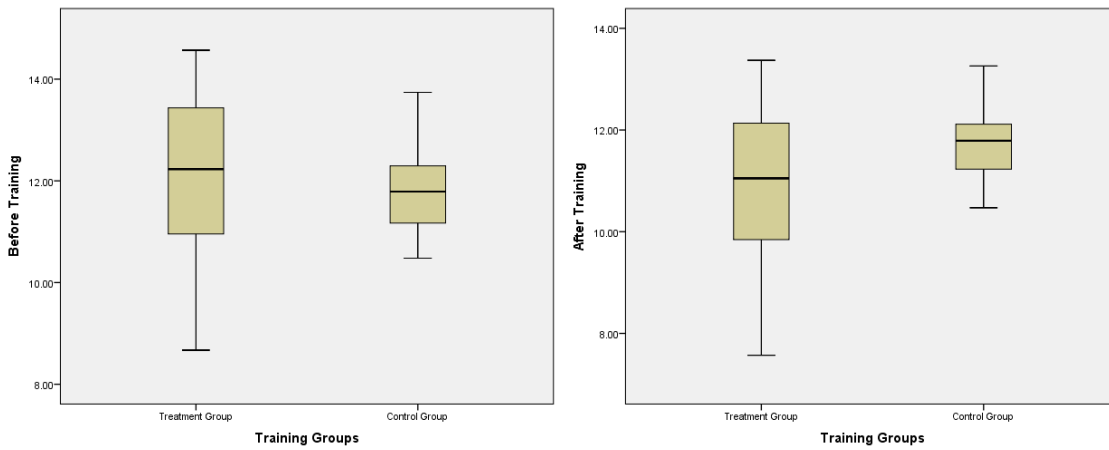
**EXPERIMENTAL DESIGN AND PROTOCOL**

For the purpose of the study *Pretest-Posttest Randomized groups design* (Thomas, Nelson, & Silverman, 2005) was used. The treatment was imparted for 6 weeks, with a daily (excluding Saturday & Sunday) 25-30 min session by the researcher. During testing three trials were provided and the best score was considered. ANCOVA (Verma, A text book on sports statistics, 2009) was applied and level of significance was set at 0.05. SPSS 20 (Trail Version) was used for the analysis of the data.

**RESULTS**

ANCOVA has certain assumption which needs to be fulfilled before proceeding further. If assumptions are not fulfilled then the validity of the findings gets reduced. The major assumptions are and its tests are mentioned below:

The assumption of <b>Outlier</b>	: Tested through <i>Box-Plot Test</i>
The assumption of <b>Normality</b>	: Tested through <i>Saprio-Wilk's Test</i>
The <b>Homogeneity of Variance</b>	: Tested through <i>Levene's Test</i>



**Figure 1: Box Plot test showing outliers**

It is clear from the graph that none of the group had any significant outliers.

**Table 1: Saprio-Wilk’s Test to check normality of data**

Training Groups		Shapiro-Wilk		
		Statistic	df	Sig.
Before Training	Treatment Group	.964	15	.762
	Control Group	.961	15	.714
After Training	Treatment Group	.974	15	.918
	Control Group	.980	15	.970

The data is said to be normal if the Shapiro-Wilk test output is not significant. From table 1 it is evident that the data of all the groups not significant as the obtained sig. values are more than 0.05. Hence, the data for all the groups are normal.

**Table 2**  
**Levene's test for equality of variance among groups**

<b>F</b>	<b>df1</b>	<b>df2</b>	<b>Sig.</b>
3.736	1	28	.063

Levene's test for equality of variance depicts that the test statistic was not significant at 0.05 level of significance as the obtained significance value was greater than 0.05. Thus it concludes that there is equal variance among groups and performing of ANCOVA is optimally valid.

**Table 3: Descriptive analysis of Training Groups before and after the Training**

	<b>Before Training</b>		<b>After Training</b>	
	<b>Treatment</b>	<b>Control</b>	<b>Treatment</b>	<b>Control</b>
	<b>Group</b>	<b>Group</b>	<b>Group</b>	<b>Group</b>
Mean	12.14	11.84	10.95	11.78
Std. Deviation	1.69	0.90	1.62	0.77

Table 3 reveals that the groups were similar before training and after the training the performance of treatment group improved (as less timing resembles better performance)

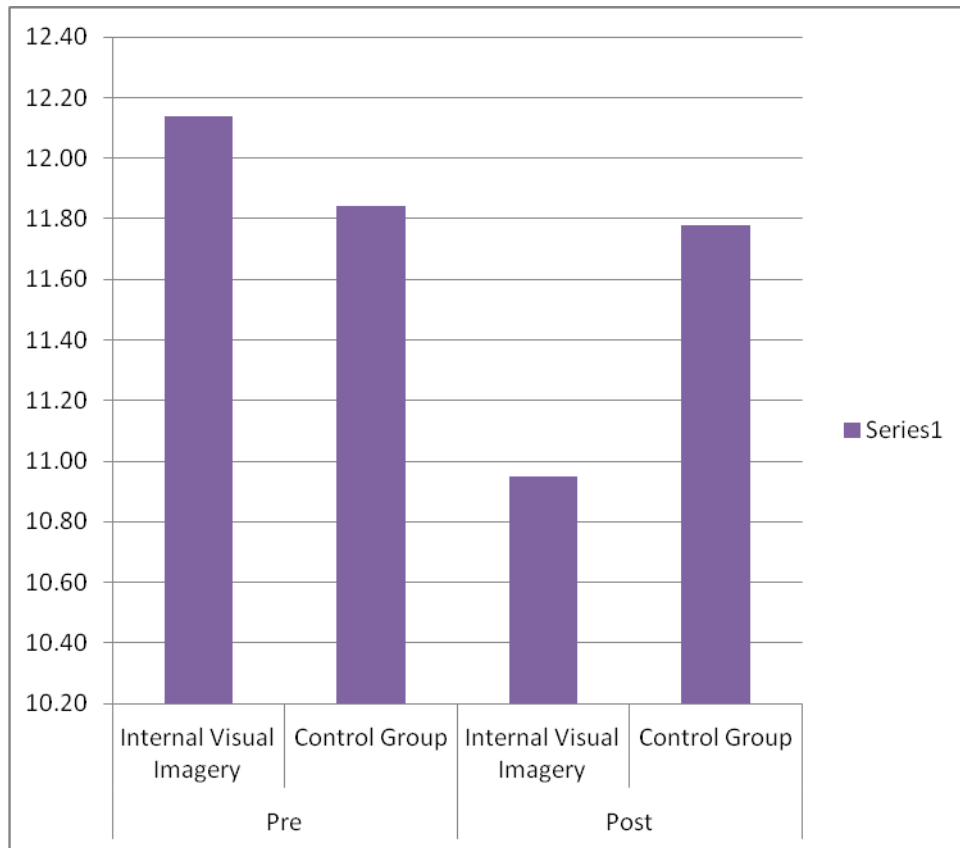


Figure 2: Mean hitting performance of Treatment and Control Group

Table 4: Analysis of Covariance for post test data on Hitting performance

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
IVI_Pre	21.249	1	21.249	24.023	.000
Group	7.741	1	7.741	8.752	.006
Error	23.882	27	0.885		
Total	3924.285	30			

Table 4 denotes that the performance of the groups differed significantly before commencement of training as the p-value for IVI\_Pre is less than 0.05. This implies that difference between the groups existed before commencement of training and the pre test performance could act as covariate. Further, there exists a significant difference in post test result of experimental group and control group, as the obtained p-value (0.006) is less than 0.05.

## DISCUSSION

From the findings it is very clear that the 6 week Internal Visual Imagery training helped in improving the hitting performance among hockey players of University level. This could be because of the fact that in internal visual imagery technique the player imagines himself repeating the task and in this manner it develops a confidence among the players in overcoming the mental barrier. It also helps in identifying his own mistakes and the neural pathways gets redefined. Thus the corrected stimulus helps in better execution of the skill. Thus the study laid the emphasis that even 6 week internal-Visual training can be effective in enhancing physical skill. In a similar study the positive impact was found on soccer kicking skills (Sosovec, 2004). This is however a questionable matter for different level of players and needs further deep investigation. Also, the various other methods of imagery should be studied all together for relative effectiveness and even combination of such techniques can also be studied.

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