

Amin AZİMKHANI<sup>1</sup>

Sadegh ABBASIAN<sup>2</sup>

Ali ASHKANI<sup>3</sup>

Recep GÜRSOY<sup>4</sup>

## THE COMBINATION OF MENTAL AND PHYSICAL PRACTICES IS BETTER FOR INSTRUCTION OF A NEW SKILL

### ABSTRACT

The object of the research was to survey effect of mental practice in learning of a new skill. Today, the world of athletics is changing in such performance is using various mental techniques to improve athletic performance is more widespread than ever. No doubt, among different mental techniques, the role of mental practice is more obvious and professional athletes evidently appropriate some time for it. But much research hasn't been done about the fact that to what extent mental practice can be effective in learning new skill. Methods: The subjects were 200 students of Technical university of Mashhad (Shahid Montazeri) that from among all these subjects 64 were selected. These subjects were taking the general course of physical education in the second term of 2010. They were dividing into four groups: 1) control 2) Physical practice 3) Mental practice 4) Mental – physical practice. After being taught the skill of performing the test ("Three steps jump – shot" of handball) they were evaluated in different times. The analysis of the collected information by SPSS and excel software showed: The average age of subjects was 19 and the average tallness of subjects was 174 cm. Some ways of practice among the four examined groups in acquisition and retention of skill stages were obviously different from one another ( $p < 0,05$ ). Based on the results of performed in this research, physical practice, mental practice & mental – physical practice affected on the acquisition and retention of skill stages. In addition, mental practice in the retention of skill stage is affected more than physical practice. So, mental practice is a way to reach to high performance.

**Key words:** mental practice, acquisition phase, retention phase, three steps jump – shot, handball.

1-Faculty of sport sciences, Imam Reza University, Mashhad, Iran (e-mail: [amin.azimkhani@gmail.com](mailto:amin.azimkhani@gmail.com)).

2- Faculty of Physical Education and Sport Sciences, University of Tehran, Tehran, Iran.

3- Faculty of Physical Education and Sport Sciences, University of Gilan, Gilan, Iran.

4- Faculty of Physical Education and Sport Sciences, Ataturk University, Erzurum, Turkiye

## INTRODUCTION

The sport's man that activity into course of physical education and science and specially sport psychology, using from terms such as imagery, visualization, mental practice and mental personality. This term that occasionally spots as general term that not be correct. Nevertheless, along a longstanding research question in the sport psychology literature has been whether a given amount of mental practice prior to performing a motor skill will enhance one's subsequent performance. The literature, however, has not provided any clear-cut answers to this question (Feltz & Landers, 1983). But mental practice is the cognitive rehearsal of a task prior to performance. Although most researchers contend that mental practice is an effective means of enhancing performance, a clear consensus is precluded because: 1) mental practice is often defined so loosely as to include almost any type of mental preparation and 2) empirical results are inconclusive (Driskell, Copper, & Moran, 1994). But must be mentioning that mental practice not a secret and not a magic and not a charm. Mental practice is an ability that exist in the human character that we not have doing about it. Nevertheless, only some of elite sportsman doing it on the training and competition.

Fond of the mental practice (MP) is a important changing in a recent reach in relationship with MP, but still not determination to decisive, impact of MP on the learning a new skill. On the other hand, only times can be used from MP that subjects not improve (too much) in the skill. But knowing MP is valuable apparatus for sportsman and sedentary man (both). *Imagery* refers to the "creation (or re-creation) of any experience in the mind—auditory, visual, tactile, olfactory, gustatory, kinesthetic, organic. It is a cognitive process employed by most, if not all, humans." Imagery bridges diverse domains of knowledge from psychology to art.

Specifically, *motor imagery* (MI) is the mental representation of movement without any body movement. It is a complex cognitive operation that is self-generated using sensory and perceptual processes, enabling the reactivation of specific motor actions within working memory. Therefore, sensory-perceptual, memory, and motor mechanisms are included in broader definitions of the term. *Mental practice* is the voluntary rehearsal of imagery scenes or tasks, whereas *motor imagery practice* refers specifically to the mental rehearsal of MI contents with the goal of improving motor performance. The terms "motor imagery practice" and "mental practice" (or mental rehearsal) often are used interchangeably. Accordingly, in this update, we also will treat these terms as synonyms—(Bachman, 1990; Decety & Grezes, 1999; Denis, 1985; Dickstein R & Deutsch, 2007; Doheny, 1993; Eunyoung, Eunyoung, & Boin, 2001; Fansler, Poff, & Shepard, 1985; Féry, 2003; Gentili, Papaxanthis, & Pozzo, 2006; C. Hall & Buckolz, 1992; C. R. Hall, 1985; Malouin, Richards, Doyon, Desrosiers, & Belleville, 2004; Maring, 1990; Nyberg, Eriksson, Larsson, & Marklund, 2006).

Because they can be reduction in the anxiety and increasing to centralization and self-confidence. Increase to self-confidence and centralization equally with improve of performance. Thereupon, amount of anxiety is decreased.

As for developments of competition and features of economic, social and victory from these competitions, attention to principals of psychology and sport psychology must be doing. So, it important, paying to impact of MP on the sportsmen. In this case, Mulder et al (2004) in their research suggest that MP not effected on the learning a new skill (Mulder, Zijlstra, Zijlstra, & Hochstenbach, 2004). In addition, Batson et al (2007) in concerning, effect of combination of MP and physical activity on the older man suggest that combination of MP and physical activity result in to increase of

walking speed in older man (Batson, Feltman, McBride, & Waringa, 2007).

## Methods

### Subjects

A group of 64, non trained young male took part in the experiment. The subjects were familiar with the nature of the study and the each subject written consent questionnaire for participation. The crucial physical personality of the subjects were: (Mean  $\pm$  SD) age  $19 \pm 1.41$  years, weight  $65 \pm 8.04$  kg, height  $1.74 \pm 7.84$  m, and BMI  $21.47 \pm 1.02$ . The subjects were healthy base on physically and mentally.

### Protocol

Method of this research is form type of semi - experimental and in it used different method that include physical practice (PP), mental practice (MP) and combination from PP and MP as physical-mental practice (P-MP) as independence variable and study groups, pay attention into acquisition and retention stages as dependence variable. then for creation of main objective of the research, paying to evaluation of mental imagery control and as for reached results from questionnaire of mental imagery valuator (Cronbach's Alpha = 0,838) (Maxwell Maltz, 1960), started to homogenous of all subjects as viewpoint, ability of mental imagery that amount mental imagery control between all groups was a average level (score of all groups equal with 14-15). In addition because non-homogenous of all subjects as viewpoint it, ability of physical activity can be affected to result of research, by using of physical test like to criterion test (shooting to goal of handball) started to homogenous of all groups. In other word, all groups, was homogenous as for ability of mental imagery and ability of physical activity. After passing of above stages, all subjects that were 64 subjects, choice from 200 collegian of Technical university of Mashhad (Shahid Montazeri). This subject

was taking the general course of physical education in second term of 2010. They were dividing into four groups: 1) control (CON), 2) physical practice (PP), 3) mental practice (MP) and 4) mental -physical practice (M-PP).

All subjects after familiar to how going of criterion test ("three steps jump, shot" of handball), they started to doing of their special training. Thus, CON group only were doing criterion test ("three steps jumps, shot" of handball) after instruction in acquisition phase. also, PP group after doing of 20 continues efforts, were evaluate in acquisition phase. MP group, also, after performance of primary instruction about how to creation of imagery and spent of seven minutes from mental practice by used of "V.M.B.R" (Visuo -Motor Behavior Rehearsal) technique, were training skill and after of slightly times by criterion test, evaluate in acquisition phase. In extremity compound group or M-PP group after instruction and spent of slightly times and performance of slightly technique (V.M.B.R) were doing 20 effort and after slightly times for recovery (1 minutes) by used form criterion test, evaluate in acquisition phase.

After end of criterion test in acquisition phase of skill, after 72 hours, slightly groups only for retention phase of skill, again evaluate with criterion test. It necessary to mention, for reduction of negative transport factors, two efforts that given to each four groups (three experimental groups and control group).

### Statistic analyze

Method of data gathering includes that after gathering of unprepared data and them elicitation slightly to analyzed of this data, initially used from Kolmogorov-Smirnov Test for survey hypnosis of normality in each phase, then used from descriptive statistic for regulation of data and determination of central tendency, measure of variation and graph-drawing. Also for inferential statistics, used from ANOVA, post hoc (LSD) test and repeated

<sup>2</sup> - body mass index

measure test. Also for performance of data analyze, used from some software such as

SPSS (V18) and excel. Statistical differences was accepted at  $p < 0,05$ .

## RESULT

After data analyze, reached this results:

### Acquisition phase

Better times in acquisition phase related to PP group but from viewpoint of scoring,

best record in acquisition phase related to M-PP group and PP group from viewpoint of scoring, placed into second rank. In a table 1 bringing this parameters .

Table 1. Average and standard deviation of the study groups in acquisition phase

	Average		Standard deviation	
	Time	score	Time	Score
Control group	36.00	4	4.87	1.93
Physical practice group	34.31	4.81	3.59	1.83
Mental practice group	38.62	4.68	3.15	1.62
Physical – mental practice group	35.68	6.06	2.75	2.14

The results of ANOVA shown a significant effect in between of all groups in both spent times ( $F_{(3,63)} = 3.835$  ,  $p = 0.014$  ) and gained scores ( $F_{(3,63)} = 3.298$  ,  $p = 0.026$  ). LSD post hoc test shown during acquisition phase, MP group were

significant difference only with PP group (only in spent times) ( $p < 0.05$ ) .M-PP group were significant differences with CON group (only in spent times) and with MP group (both spent times and gained score) ( $p < 0.05$ ). In table of 2, bringing this parameter .

Table 2. Results of LSD post hoc test in acquisition phase of skill.

Acquisition phase	Control group		Physical practice group		Mental practice group		Physical – mental practice group	
	Time	score	Time	Score	Time	Score	Time	Score
	Control group	---	---	---	---	---	---	---
Physical practice group	0.229	0.055	---	---	---	---	---	---
Mental practice group	0.225	0.308	0.002	0.852	---	---	---	---
Physical – mental practice group	0.234	0.003	0.425	0.067	0.015	0.044	---	---

\* Statistically significant difference between groups in acquisition phase of skill ( $p < 0.05$ )

### Retention phase

Better score in retention phase related to M-PP group with 6.62 and after it, MP group had best record. PP group had a

lessees score respected to both above groups but nevertheless their score (MP) was a higher respect to CON group. In table of 3 bringing in this parameters .

Table 3. Average and standard deviation of the study groups in retention phase.

	Average		Standard deviation	
	Time	score	Time	Score
Control group	37.37	4.06	5.89	2.08
Physical practice group	34.78	5.25	3.81	1.61
Mental practice group	35.56	6.12	4.13	1.82
Physical – mental practice group	34.06	6.62	3.45	1.50

The results of ANOVA shown a significant effect in between of all groups in both spent times ( $F_{(3, 63)} = 1.627$ ,  $p = 0.192$ ) and gained scores ( $F_{(3, 63)} = 6.64$ ,  $p = 0.001$ ). LSD post hoc test that shown during retention phase was a significant differences between MP group and CON

group (only in spent times) ( $p < 0.05$ ). Also during this stage, was a significant differences between M-PP group with CON group (both spent times and gained score) and PP group (only gained score) ( $p < 0.05$ ). These parameters shown in table 4 .

Table 4. Results of LSD post hoc test in retention phase of skill.

	Control group		Physical practice group		Mental practice group		Physical – mental practice group	
	Time	score	Time	Score	Time	Score	Time	Score
Control group	---	---	---	---	---	---	---	---
Physical practice group	0.115	0.062	---	---	---	---	---	---
Mental practice group	0.251	0.002	0.662	0.167	---	---	---	---
Physical – mental practice group	0.038	0.000	0.605	0.032	0.341	0.427	---	---

\* Statistically significant difference between groups in retention phase of skill ( $p < 0.05$ )

Compare absolute effect of MP, PP and M-PP on the subject pre and post of their special training methods was reached. Absolute effect of training methods shown

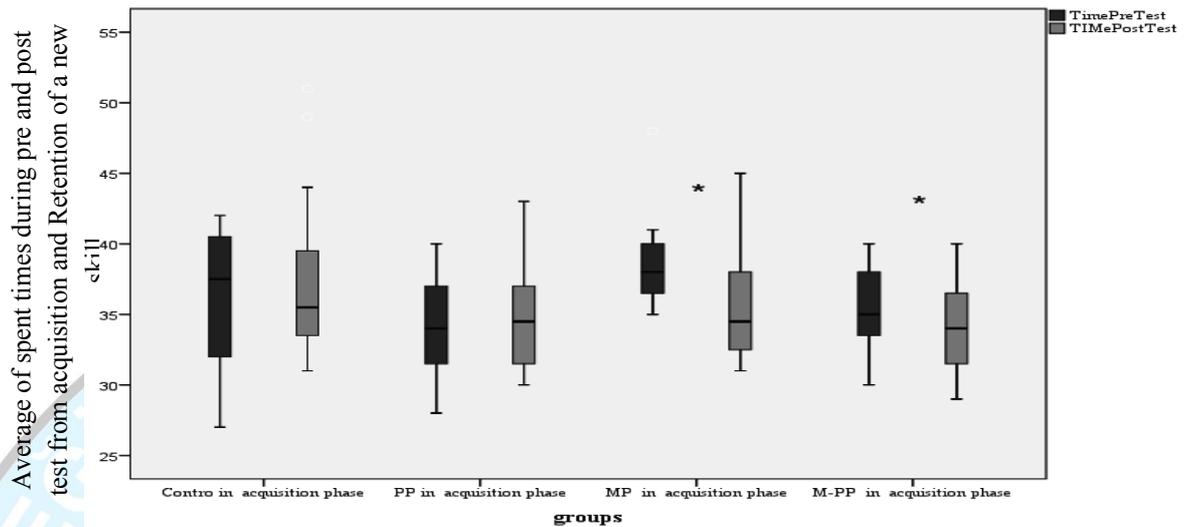
that in spent times from slightly skill, mental practice was a significant difference on the pre and post test (table 5 and figure 1).

Table 5. Results of Absolute effect of training methods during spent times of a skill in the pre and post test.

	Pairs	groups	t	df	Sig. (2-tailed)
Time	Pair 1	CON acquisition – CON retention	-.649	15	.526
	Pair 2	PP acquisition – PP retention	-.445	15	.663
	Pair 3	MP acquisition – MP retention	3.095	15	.007 *
	Pair 4	M-PP retention – M-PP acquisition	2.521	15	.024 *

\* Statistically significant difference between groups in retention phase of skill ( $p < 0.05$ ), CON; Control, PP; Physical practice, MP; Mental practice and M-PP; Mental – Physical practice.

Figure 5. Results of Absolute effect of training methods during spent times of a skill in the pre and post test.



\* Statistically significant difference between groups in retention phase of skill ( $p < 0/05$ ).

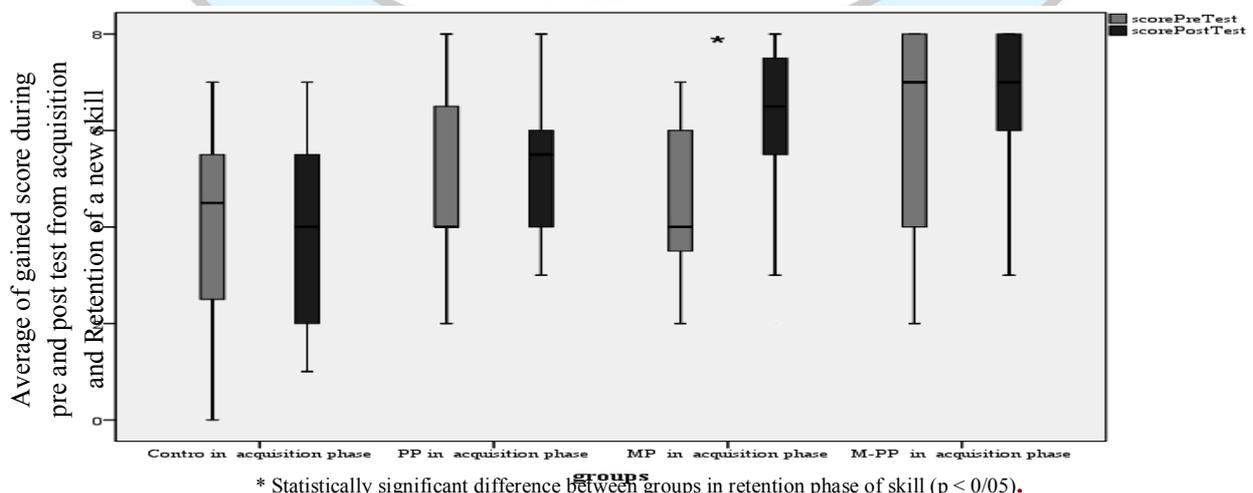
Also, absolute effect of training methods shown that in spent times from slightly skill, mental practice was a significant difference on the pre and post test (table 6 and figure2)

Table 6. Results of Absolute effect of training methods during gained score of a skill in the pre and post test.

	Pairs	groups	t	df	Sig. (2-tailed)
Score	Pair 1	CON acquisition – CON retention	-.080	15	.937
	Pair 2	PP acquisition – PP retention	-.652	15	.524
	Pair 3	MP acquisition – MP retention	-2.274	15	.038 *
	Pair 4	M-PP retention – M-PP acquisition	-.783	15	.446

\* Statistically significant difference between groups in retention phase of skill ( $p < 0.05$ ), CON; Control, PP; Physical practice, MP; Mental practice and M-PP; Mental – Physical practice.

Figure 2. Results of Absolute effect of training methods during spent times of a skill in the pre and post test.



\* Statistically significant difference between groups in retention phase of skill ( $p < 0/05$ ).

## DISCUSSION

The results of tests in this research shown that all of training methods as viewpoint of descriptive statistics , noticeably affected on the learning of a new skill during both of acquisition and retention stages and also as viewpoint of statistics , was a significant differences between M-PP group with CON and MP groups in during of acquisition phase and MP group in during of acquisition phase and was significant differences between M-PP group with CON and PP group in during of retention phase from learning skill of three steps shot of handball . These differences are shown between MP and PP groups in during of acquisition phase and between MP and CON groups in during of retention phase from the skill.

Wonderfully, in this research, during retention phase, MP group had most best performance after M-PP group and even noticeably performance in comparison to PP group that high likely was result in decreasing of stress level , especially in talented persons to anxiety . In this case, can be application research results as for to cognitive explanation (one of explanations that related to affective of mental practice) and especially in during of cognitive stage into Poul Fitts and Michael Posner (1976) theory(Magill, 2010; Schmidt & Lee, 2005). They beloved that first stage in learning of movement skills is cognitive stage that subject further faced to this question "how to doing skill?" so, not be wonderful that mental practice is useful for a individuals that learned a new skill. Mental practice can without help to persons that response to vary of question in case of skill. They beloved, mental practice can be useful in better learning and integration formation of slip movements (Magill, 2010).

In addition, results of research are shown that M-PP group had best performance in both acquisition and retention stages from sightly skill but the group that only were doing sightly skill in their minds (MP group) not only in comparison of CON group, had best

performance but in retention phase , were highly improvement in comparison to PP group.

In background the effect of mental practice during early stage of learning a new skill in amateur person, finding of the study consonant with finding of batson (Batson, et al., 2007). Not only, Grouios, G finding such results (Grouios, 1992) but Rayn, E & Simons, J reported this results (Rayn & Simons, 1981). Also, Bohan et al and Blair et al expression similar results (Blair, Hall, & Leyshon, 1993; Bohan, Pharmer, & Stokes, 1999). In extremity, Overdrof reported such results in normal person (Overdrof , page, Schweighardt, & McGrath, 2004). This means that in such studies (expression above), to now, not doing on amateur person.

Although, this results conflict with finding of Kohl (Kohl, Ellis, & Roenker, 1992). Also, Jackson, P not shown statistically significant results in their study,(Jackson, Doyon, Richards, & Maluin, 2004; Jackson, Lafleur, Malouin, Richards, & Doyon, 2001) . In addition, Mulder, et al (2004) and Rayn and Simons (1982) not reported significant findings and expression in conclusion (Mulder , et al., 2004; Rayn & Simons, 1982). Also, vandell et al and Bucher notable that shown significant results statistically in their studies (Bucher, 1993a, 1993b; Vandell & etal, 1943). In extremity, results of Yaguez not able to show a significant results in practice(Warner & McNeill, 1988; Yaguez, et al., 1998). This means that in such studies (expression above), to now, not doing on amateur person, that our study utility it, in amateur person.

Generally, it can deduction that all training methods of the study, result in to improvement of movement skill that in this case, method of M-PP was better

performance in during of acquisition and retention stages from the skill.

### Conclusion

As for the slightly results, it now can be shown that mental practice not only result in to improvement of acquisition a new skill but affected during of the retention a new skill and so suggest to in during instruction of new skills for amateur person, using combination of mental and physical training

to improvement, better learning of a new skills.

### Acknowledge

The authors would like to thank the participants and Technical University of Mashhad (Shahid Montazeri) and Faculty of Physical Education and Sport Sciences, Ferdowsi University of Mashhad, Mashhad, Iran.

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