The effect of mental and physical practice and its combination on badminton short serve learning

1Hasan Abdi, 2Elham Mahmoodifar, 3Hassan Gharayagh Zandi and 3Mohammadsaleh Abdi

1Department of Physical Education, Shahrood Branch, Islamic Azad University, Shahrood, Iran
2Department of Physical Education, Mobarakeh Branch, Islamic Azad University, Mobarakeh, Iran
3Department of Physical Education, Tehran University, Tehran, Iran

ABSTRACT

The aim of this study was effect of mental and physical practice and its combination on badminton short serve learning. For this reason, 40 subjects (boy) were selected voluntarily with the ranging age from 18 to 25 years were divided randomly in two groups: Then subjects were randomly assigned to five groups 4 experimental groups and 1 control group (CG). Experimental groups were a physical practice group (PPG), a mental practice group (MPG), a combined physical practice and mental practice group (PP+MPG), and a combined mental practice and physical practice group (MP+PPG). Data was tested using paired t test (for mean different compare of between pre and post test x in per group), ANOVA test (for mean different comparing between post test in 5 groups), and Tokay test (for comparing between pre and post test mean different in per all groups) were run on the post – test data p<0.05. The results shown that were significant differences (p<0.05) between post – test in five groups. The results of Tokay test shown that the mean short serve score of the MP and PPG groups (expect PP+ MP ratio MP+ PP) were significantly faster than of the MG and CG groups.

Keywords: Badminton short serves, mental practice, physical practice

INTRODUCTION

The basis for the use of mental practice comes from an array of empirical research that includes chronometric explorations of actual and imagined actions [1, 2]. The mental chronometric paradigm documented striking similarities between the duration times of actual and imagined movements. Such similarities are considered to reflect the motor processes involved in action preparation and programming [3]. Research also demonstrates that there are cases when imagined movement durations are dissimilar when the task is particularly novel such as spring board dives [4]. Mental practice (MP), which involves cognitive rehearsal of physical movements, is a non-invasive, inexpensive method of enabling repetitive, task specific practice (RTP) [5]. There is also an impressive number of studies using functional neuroimaging techniques, such as positron emission tomography and functional magnetic resonance imaging, that demonstrate that cortical and subcortical regions involved in motor control are activated when an individual mentally simulates an action [6,7]. Mental practice has been used to rehabilitate motor deficits in a variety of neurological disorders [8]. Mental practice of action seems to improve balance in individuals with multiple sclerosis [9] and balance in elderly women (Fansler, Poff, & Shepard, 1985). For instance, mental practice
has been used with success in combination with actual practice to rehabilitate motor deficits in a patient with sub-
acute stroke [10]. While the literature has evolved within sport psychology [11] and cognitive neuroscience [12] on
mental imagery, cross-fertilization of research is still rare. However, a new emerging field called motor cognition,
which is concerned with understanding the computational mechanisms and their neural underpinnings associated
with action and its functional role in social cognition, [13] includes imagery within its remit and offers the potential
for research at the interface of these two domains. One approach that has emerged is the use of elite participants in
the sport context as experts in human movement. This is essentially a paradigmatic shift away from the traditional
neuroscience model of studying those with neurological deficits, and augmenting it by studying experts (e.g.,
athletes). It has been suggested that this paradigm offers great potential for understanding imagery and action [14].
Stephen (2009) suggested that mental practice (MP), when combined with a repetitive, task-specific practice (RTP)
therapy program, increases affected arm use and function significantly more than RTP only [5]. Recent research on
motor skills of golf has pointed to the usefulness of mental imagery. In golf, such training is rarely used as a teaching
 technique for beginners on the grounds that only top professionals stand to gain from mental imagery. This study
tested whether mental imagery combined with physical practice can improve golf performance for the approach shot.
Analysis showed that the beginners’ approach shot performance improved most in the group combining physical
practice and mental imagery when compared with the group just physically practicing the approach shot. It seems
mental training can be used effectively to improve performance even with beginners [15]. Researcher in this study
wants to find that, is mental and physical practice and its combination effect on badminton short serve learning or
not?

MATERIALS AND METHODS

40 subjects were selected with the ranging age from 18 to 25 years and all their having a background of at least three
years of continues athletic activity from ten sport fields expect badminton. Their average age was 22.4±3.5 years,
height 174.7±3.2 cm, and weight 73.5±3.3 kg. Sampling was selected from among the boy athletes in Islamic Azad
University, Shahrood Branch voluntarily and non-randomly. And the subjects were homogenized after passing the
Vividness of Visual Imagery Questionnaire (VVIQ). These subjects have been normal visual, the intelligence
quotient (IQ) and mental imagery ability. Then subjects were randomly assigned to five groups 4 experimental
groups and 1 control group (CG). Experimental groups were a physical practice group (PPG), a mental practice
group (MPG), a combined physical practice and mental practice group (PP + MPG), and a combined mental practice
and physical practice group (MP + PPG). In order to measure the badminton short serve of subjects, performed ten
warm-up serves, followed by ten short serves test. Subjects scored ‘hits’ with their serves by putting the shuttle in the
grid as close as possible to one corner of the target grids. Accuracy was assessed by calculating the average radial
error (RE) of the serves, and consistency by calculating the standard deviation of the RE. After recording stage pre-
test, the subjects performed wanted program during two weeks (three days in each week), through 5 minutes (20
trials). In each session, the subjects of the PPG performed actually doing with physical practice of badminton short
serves; the MPG mentally doing with elite athletes video, the PP + MPG in the first week doing actually and in the
second week mentally doing with physical practice, the MP + PPG worked the opposite of the PP + MPG. After two
weeks, again measured post test badminton short serve from each one. Statistical analyses were done using
SPSS/16. The effect of mental and physical practice and its combination was tested using paired t test (for mean
different compare of between pre and post test x in per group), ANOVA test (for mean different comparing between
post test in 5 groups), and Tokay test (for comparing between pre and post test mean different in per all groups) were
run on the post – test data p<0.05.

RESULTS AND DISCUSSION

The results shown that were significant differences (p< 0.05) between pre and post test in five groups (Table I). The
results of Anova test shown that the significant differences between post test in 5 groups were significantly faster
than of the MG and CG groups (Table II). The results of Tokay test shown that the mean short serve score of the MP
and PPG groups (expect PP+ MP ratio MP+ PP) were significantly faster than of the MG and CG groups (Table III).
### TABLE I: Mean Different Compare Of Between Pre And Post Test In Per Group

<table>
<thead>
<tr>
<th>Groups</th>
<th>PAIRED T TEST</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>PP</td>
<td>3.9</td>
<td>0.01*</td>
</tr>
<tr>
<td>MP</td>
<td>4.6</td>
<td>0.02*</td>
</tr>
<tr>
<td>PP+ MP</td>
<td>2.8</td>
<td>0.03*</td>
</tr>
<tr>
<td>MP+ PP</td>
<td>3.1</td>
<td>0.00*</td>
</tr>
<tr>
<td>C</td>
<td>2.5</td>
<td>0.04*</td>
</tr>
</tbody>
</table>

PP = Physical Practice, MP = Mental Practice, PP+ MP= Physical Practice+ Mental Practice, MP+ PP= Mental Practice+ Physical Practice, C = Control

* = Significant

### TABLE II: Comparing of post test by anova in Groups

<table>
<thead>
<tr>
<th>Variable</th>
<th>F</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post test</td>
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<td>0.00*</td>
</tr>
</tbody>
</table>

### TABLE III: Mean different comparing between post test (tokay) in 5 groups

<table>
<thead>
<tr>
<th>Groups</th>
<th>Groups</th>
<th>Mean Diff</th>
<th>S.d</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
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<td>PP</td>
<td>MP</td>
<td>0.2</td>
<td>0.02</td>
<td>0.03*</td>
</tr>
<tr>
<td>PP</td>
<td>PP+ MP</td>
<td>0.5</td>
<td>0.03</td>
<td>0.02*</td>
</tr>
<tr>
<td>PP</td>
<td>MP+ PP</td>
<td>0.1</td>
<td>0.02</td>
<td>0.00*</td>
</tr>
<tr>
<td>PP</td>
<td>C</td>
<td>0.7</td>
<td>0.06</td>
<td>0.01*</td>
</tr>
<tr>
<td>MP</td>
<td>PP+ MP</td>
<td>0.4</td>
<td>0.01</td>
<td>0.03*</td>
</tr>
<tr>
<td>MP</td>
<td>MP+ PP</td>
<td>0.1</td>
<td>0.04</td>
<td>0.00*</td>
</tr>
<tr>
<td>MP</td>
<td>C</td>
<td>0.6</td>
<td>0.08</td>
<td>0.01*</td>
</tr>
<tr>
<td>PP+ MP</td>
<td>MP+ PP</td>
<td>0.1</td>
<td>0.2</td>
<td>0.10</td>
</tr>
<tr>
<td>PP+ MP</td>
<td>C</td>
<td>0.7</td>
<td>0.6</td>
<td>0.03*</td>
</tr>
<tr>
<td>PP</td>
<td>MP</td>
<td>0.8</td>
<td>0.9</td>
<td>0.04*</td>
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</table>

### CONCLUSION

Research has indicated that random physical practice of a motor skill enhances effects of long-term learning more than blocked practice. Moreover, the use of mental rehearsal coupled with physical practice has been shown to accelerate motor skill acquisition in many different contexts and is better than no practice at all. Others have found that some mental rehearsal strategies are better than others for maximizing performance.

The results of the t-test indicated that there was a significant difference between the pre – and post – tests mean badminton short serve in all groups. Therefore, we conclude that a combination of MP + PPG is more effective than PPG, MPG, PP + MP, and non – exercise [5, 15].

### REFERENCES