



The effect of a variable practice on tennis groundstroke learning of adult beginners

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ABSTRACT

The aim of study is to determine the effect of a variable practices method on groundstroke performance in tennis. Twentytwo beginner university students participated in the study voluntarily (age:22±3,4). The subjects were randomly assigned to each of the two groups: Constant Group (N=11) and Varied Group (N=11). The Constant Group practiced serve, volley and flat groundstrokes in each training session. The Varied Group practiced serve, volley and flat groundstrokes together with topspin and slice groundstrokes in each training session. Sessions were scheduled for two hours two days a week with a total of eleven weeks of training. A Tennis Skill Test (TST) was applied to all subjects with pre-tests and post-tests. Results showed that a variable teaching methodology in groundstrokes may have increased the ability of beginner and intermediate players to learn variations of groundstrokes more than the constant practice.

Key words: variable practice, constant practice, contextual interference, tennis.

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INTRODUCTION

Players use many different methods to learn a new skill. When the degree of difficulty and interferences from other skills increase, the ability to learn also increases. Determining which method facilitates learning is an important issue for players (Maslovat, Chua, Lee, and Franks, 2004). Optimal training techniques and training programmes have significant impact on the teaching of motor skills (Dadkhah, Shojaei, and Farhadizad, 2013).

One of the training methods that facilitate skill learning is variable practice. In general, the skills in the variable practice conditions are learned by changing some aspects of the task such as, for instance: the distance, the speed and the direction of the shot. Practicing in similar conditions to the ones during the competition will also affect positively the performance (Williams, and Hodges, 2005). In this method, the skills should not be practiced in a repeated sequence. In variable practice conditions, each trial should be different from the previous and the next ones. Research has shown that variable practice methodology could improve skill acquisition and performance in open skill sports such as tennis (Davis, Kimmert, and Auty, 1986).

Variable practice conditions are based on two hypotheses. According to Schmidt's variability hypothesis (Schmidt, 1991) the conditions designed under various situations provide more flexible applications in the learner. It is thus recommended that

variable practices should use unpredicted environmental conditions or open skills. When using variable condition practices in open skill tasks such as tennis, the players should face all possible solutions for a given task. Variable practice conditions can have various effects according to the level of difficulty of the tasks given (Moreno and Ordoño, 2015). Some studies conclude that variable practice conditions led to less performance during the acquisition stage of the skill but to an increase in learning during the memory and the transfer stages (Douvis, 2005). Permanent changes are important goals for teaching and learning situations and it has been concluded that variable practice conditions produced more permanent changes than those under constant practices (Memmert, 2006).

The second hypothesis in variable condition practices is the Contextual Interference Effect (Shea and Morgan, 1979; see also Magill and Hall, 1990), which suggests that contextua

interference would be more effective by increasing in the amount of the task to be learnt and would improve the learning process (Hall and Magill, 1995).

Variable condition practices are important in tennis because every stroke is different from the previous one. Tennis is a sport in which there are many unpredictable situations. Many variables such as unpredictable tactics, shot selection, strategy, competition/match conditions, and weather conditions affect the complexity of our sport (Schmidt and Wrisberg, 2004).

There are three main spin variations in tennis groundstrokes: flat, topspin and slice. Classically, flat stroke technique is considered as the basic stroke technique and it is the one taught in the initial stages of learning. Topspin and slice stroke techniques are the variations of the flat stroke technique and they are taught in later stages (ACEP, 2002; Höhm, 1997). The aim of the study is to determine how a variable practice method will affect groundstroke performance in tennis by teaching the three spin variations of the groundstroke at the same time.

MATERIALS AND METHODS

Subjects

A total of 22 university students participated in the study voluntarily. The subjects were randomly divided into two groups (n=11 in each group) and they were instructed using two different tennis coaching methods. One group (21.62±1.54 years) was taught the groundstrokes using a constant practice (CG) method. Another group (21.80±2.07 years) was taught the groundstrokes using a variable practice method (VG). None of these subjects have had a tennis experience before.

Application

All participants were given detailed information about the study at the start. After the same tennis training program was applied to both groups for two weeks (coordination training and flat groundstroke technique), at the end of a 8-hour tennis training, a Tennis Skill Test (TST) was applied as a pre-test. Tennis training was given to the participants in both groups for 11 weeks (two hours in two weeks). At the end of 44-hour tennis training in total, TST was applied as post-test again. Main strokes (groundstrokes, volley, serve) were taught to both groups in the study. However, while only the flat groundstroke was taught to the CG group; flat, topspin and slice groundstrokes were taught in each training session to the VG group.

Tennis Skill Test (TST)

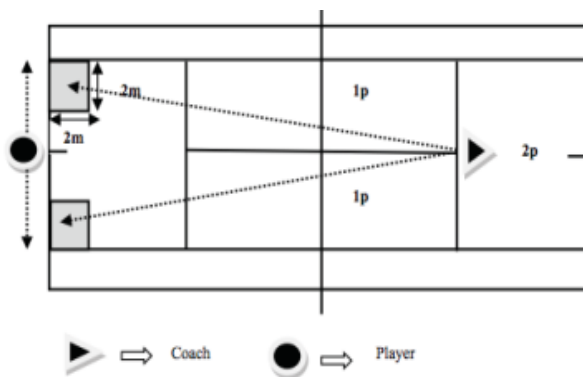


Figure 1. Tennis Skill Test application.

The coach alternately feeds 11 balls to both the left and right sides of the player. The player should try to direct the ball above a rope located 1.5 m over the net to the area with the highest score (2 points). A ball bouncing into the service boxes counts 1 point. Balls at the net count as 0 points. 22 is the maximum score per trial. The percentage point of 11-stroke trial was calculated by the formula "taken point/22x100" and the best one of three trials was recorded. All the participants rested for 3 minutes after each 11-ball trial breaks.

Statistics Analysis

Shapiro-Wilk Normalization test was performed to pre-test and post-test parameters of each group and showed normal distribution (pre-test p=0.97; post-test p=0.16). Paired t test was used to evaluate the difference between pre-test and post-tests and independent t test was used to compare two groups in pre-tests and post-tests.

RESULTS

Average lengths of the participants were determined to be (174±44 cm), average weights to be (55±10.3 kg), and average ages to be (22±3,4 year).

	Pre-test(%)		Post-test(%)	Difference(%)	Effect size
(n=22)					
Constant group(n=11)	45,86±18,68	t=-2.94 p=0.02*	64,05±10,65	18.19	1,30
	t=0.16 p=0.87		t=-1.99 p=0.06		
Varied group(n=11)	44,63±16,86	t=-5.16 p=0.00**	74,38±13,52	29.75	2,06

*p<0,05 **p>0,01

Table 1: Tennis Skill Test Results of Constant and Variable Groups.

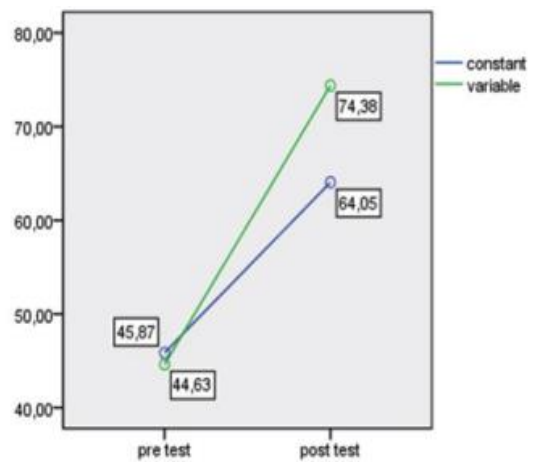


Figure 2. Comparison of the group's pre-post test improvements and differences.

DISCUSSION

We investigated the effects of the variable practice conditions on tennis groundstroke performance. In this study the variability was ensured by working on different variations of the stroke.

In a study performed on the acquisition of a basketball skill, the performances of shooting the ball of both groups as constant and variable practices were evaluated. Learning and transfer (by changing the stroke distance and ball size) performances were evaluated before and after the sessions. It was found that skill retention performances of the constant practice group gave better results than the random practice group (Memmert, 2006). In a study investigating variable applications of football on long distance shoot performance, the accuracy of shooting the ball of the variable practice was found to be better in both post-test and the retention tests than the constant practice group (Yamamoto, 2004). In another study performed to detect the effects of alternative approaches on the learning of tennis, two different groups were used one using a constant practice method and another one a varied practice method. In this study, variability of the forehand and backhand strokes was ensured by alternating each stroke. It was concluded that the varied practice group showed greater increase in their performance than the constant practice group (García, Menayo, Sánchez, 2017).

In our study, we conclude that during the learning of open sports such as tennis, which include complex tasks and require high level of performance, variable practices increase performance more than constant practices.



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