ORIGINAL ARTICLE

The effect of exercise using auxiliary tools in learning the forehand and backhand skills of female tennis students

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Abstract

Background and Study Aim: The present study investigates the effect of exercise using auxiliary tools. It should facilitate learning process of the forehand and backhand skills of female tennis students of physical education and sports. It can also be used by workers in the field of performance and different motor responses.

Material and Methods: An experimental method with two group pretest and posttest design approached the 20 volunteers of female sports students (age 19±2), who had participated in a training course. The sample is divided into 2 groups of experimental and control according to the score of the forehand and backhand tests and measurements. Analyses were performed using statistical software SPSS 23 (Statistical Package for social science) program. The following variables were calculated using: Arithmetic mean, Standard deviation, Simplex correlation coefficient (Pearson), T-test for related means.

Results: The study showed a significant value ($p=0.001$, $p<0.05$) in the acquisition of the forehand and backhand skills after post-test assessment when compared to pretest. However, significant differences emerged in developing some basic tennis skills. The special exercises with auxiliary tools made a remarkable development in all basic skills.

Conclusions: Coaches play a key role in use of suitable equipment in tennis teaching programs. Voluntary participation in such tests provides effectiveness feedback on teachers teaching and adequacy of performance acquisition gained by learners. This study will encourage teachers to use special exercises with auxiliary tools in learning and acquiring basic skills in games and sports activities.

Keywords: exercises with auxiliary equipment, tennis skills, teaching method.

Introduction

Play tennis, it means deploying strategies to progress and excel: knowing more to do better. Thus, the purposes and objectives can be different according to the individuals: the physical will be privileged for some, the technique or the tactics for others, finally for some the relational will be essential. As a result, there are many learning strategies: by observation and deduction, by imitation, by trial and error, with the help of a loved one or an instructor. However, nothing replaces experiences that build up knowledge and knowledge that can be used later [1]. According to Sève et al. [2] excellence requires training embedded in structured and formalized practices. They aim to develop motor and decision-making skills by offering individuals the opportunity to practice under usual conditions, so as to allow errors and promote progress. Talent development models prescribed the training of young people as a linear process. Thus, the training is centered on the requirements of the task to be performed: instructions from the coach, movements of the players, type of ball or racket, amplitude of movement of a given joint which amplifies the sources of information allowing players to achieve their goals [4]. However, the beginnings of sports practice motivated by the love of sport. As athletes develop their skills, linear models prescribe disciplined practice to hone sport-specific skills, then applied in competition [5].

In coaching, by Regan [6] manipulation of constraints is nothing new, coaches have always used tasks and environments in seemingly similar ways. He confirms that developments in psychological theory inform best practice in skill acquisition. Far from being trained solely by the prescriptive transmission of experts, coaches must explore ecological and implicit approaches to developing the skills of tennis players. In their goals and interventions, coaches should develop the whole athlete. Training for well-being must take into account the emotional, personal, cultural and social identity of each athlete and how this identity influences athletic development and athletic performance [7].

In economic power, coaches participate in the circulation of symbolic capital within the bourgeoisie. The recommendation is decisive in the career of a coach, they need to draw their legitimacy and authority from fields and worlds that are largely

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autonomous and desirable for their students [8]. When it comes to coaching children, the relationship must be negotiated both with the student and his parents. Indeed, it is a question of arousing fulfillment, interest in tennis and self-confidence. For parents, sports practice is part of both educational strategies and a process of toughening up their son, making him more autonomous, physically and psychologically tough, and tenacious in upsetting situations. Also, endowed with a quality associated with the practice of competitive sport, which the American upper classes call the drive [8]. In this context, the coach can use different strategies to impose task-related constraints [4]. Environmental constraints can be both social and physical. Player development is influenced by the training climate. On the social level, the coach can establish two types of environment on the social level: a self-centered environment or a task-centered environment [9]. In terms of training, it is important to teach coaches how to develop programs and organize sessions whose content and frequency are specially adapted to children [10]. In cases, Pankhurst [11] shows a slowness in integrating new teaching strategies into coach education programs, which means that coaches do not have guidance on which to base their design of their daily training programs for players.

Today, tennis sport; It is an Olympic sport that is embraced by the world and that at the same time arouses excitement and admiration to do and watch. In this sport, it is known as a sport that includes aerobic and anaerobic loads and sudden changes of direction, as well as requiring a high level of basic motor features such as strength, speed, endurance, flexibility and coordination, and athletic performance [12]. Moreover, basic forehand and backhand technical skills are the main requirements that must be mastered in playing tennis. Physical condition and intellectual intelligence were found to be the factors that affect the quality of tennis [13]. In this study, we tried new teaching methods (using some exercises with auxiliary tools) in learning basic tennis skills. At Physical Education College and Sports Sciences for girls at the university of Baghdad, what is the effect of using of using some exercises with auxiliary tools on acquisition of the forehand and backhand tennis skills for female students? Are there statistically significant differences in measurements dimensional between the first and the second experimental group in developing some tennis skills?

Material and Methods

Participants

The research involved a cohort of 20 students (STs) female (13.33 %), from total 150 STs (100 %) studying in physical education college and sports sciences for girls. All participants in this study were volunteers. The group of participants consisted of the third year. The ages of the participants varied from 17 to 21 years old and the mean age was 19 (*SD* = 0.43). All were aged between (19 ± 2 years) registered in the third year, by the master's degree in physical education. The research sample was divided randomly into two groups of 10 students for each group, where the first group applied the experimental group, and the control group (see Table 1). In this study, we chose the experimental approach to ensure internal and external validity of the results. In order to achieve the objective, this approach was used with two equivalent groups.

Measures

This quantitative study used several research methods to access the required research data and results, which are (scientific sources and references, tests and measurement). The tools and devices used: (tennis court, ten tennis balls, tennis rackets, signs, stopwatch, two whistles, tape measure, adhesive tape). After reviewing the tennis academic curriculum and scientific references, the tests and measurements was presented to a group of ST. The measurement of the front and back strokes of a tennis player: (1) the tennis court is planned at one side as shown, (2) a rope shall be fixed at both ends of the two legs of the net, parallel to it, at a height of 2 m from the ground and 1.6 m from the net (3) parallel lines are drawn between the transmission line and the baseline so that the distance between the line equals 1.7 m.

Also, after identifying the forehand and backhand skills for the students of the research sample, performance description and appropriate tests for these skills were fixed and then presented to a group. The performance description and the tests that have been approved are: (i) the player stands on the center mark while the coach stands in the facing half of the court on the center plans, with a box for tennis balls; (ii) the coach hits the ball behind the transmission line, where he moves from his place to take the appropriate position and hit the ball in front, and then background strikes to pass over the net and down the rope. It then falls

Table 1. The research sample for the two experimental groups

Variable	Total number	Group	Experimental
The forehand and backhand tennis skills	10	First	Experimental (1)
	10	Second	Control (2)
	20		Total

in the areas indicated by the numbers in the facing half, trying to achieve the highest score each time in the area Number (5); (iii) the player repeats the previous performance for 5 consecutive attempts to get adequate training for the test; (iv) the test begins with the player performing (10) times in the same way; (v) in all attempts, the coach hits the ball in a consolidated and legal manner so that it is as similar as possible to the balls in the actual play situations; (vi) the player has the right to start with the front or background kicks. The basic skills tests used in the current research are standardized tests and appropriate for the research sample, as they have been applied in previous and similar studies that have been touched upon. Thus, data were collected through the rating score (1) a ball that passes over the rope is counted as half the degree zone where it falls; (2) balls touching the rope at the beginning of the net bounce, and are considered a failing attempt; (3) a player's score is the set of points she gets after hitting ten balls using the front ground kick method and then hitting ten balls using the background kick method.

Procedures

First of all, the permission was granted by the director of university of Baghdad and students to realize the current study. Then, the research procedures for experiment were implemented in a pre and posttests, and there was an educational plan for each of them during (9) weeks. Before conducting the pretests, the researcher started the selection process, recording students' names. Then, he delivered an educational unit detailing the test performance method while explaining and clarifying the test on the first week. In addition, the researcher conducted pretests on the research sample members/group. Later, the implementation of the educational curriculum put forward by the researcher proceeded. It comprises: (1) the skills were acquired in the lecture, as prescribed in the educational curriculum which is consistent with the warm-up activities, the physical exercises, the educational activity, and the closing section. However, in practice, differences were revealed as the experimental group used special exercises backed up by auxiliary tools in the learning process of the forehand and backhand tennis skills for female students; (2) the experimental group used special exercises with auxiliary tools in the learning process of the forehand and backhand tennis skills for female students. The educational curriculum that consisted of 16 educational units, was covered over a two-month period: each group was assigned two educational units per week, while each educational unit at (60) minutes period allotted as follows: (i) the preparatory section (15 minutes); (ii) the man section (40) minutes: (10) minutes academic, and (30) minutes for practice; (iii) the final section (10) minutes. After two months, the post-tests were conducted under the same pretest conditions. Then, the researcher carried out the tests as to the forehand and backhand skills.

Statistical Analysis

Analyses were performed using statistical software SPSS 23 (Statistical Package for social science) program. The following variables were calculated using: Arithmetic mean, Standard deviation, Simplex correlation coefficient (Pearson), T-test for related means.

Results

The effect of using exercises with auxiliary tools on acquisition of the forehand and backhand

In order to investigate the effect of using some exercises with auxiliary tools on acquisition of the forehand and backhand tennis skills for female students, the values of the two groups in the present study were compared in the pre-test and post-test. For statistical analysis, parametric statistical method was used, the results of which are illustrated in table 2. According to the test results, some exercises with auxiliary tools enabled participants to make significant progress in the area of the forehand and backhand tennis skills, such that the performance from pre-test to post-test were significantly improved (P = 0.001). In the case of performed forehand and backhand tennis skills, the difference between the pre-test and post-test was statistically significant (P <0.05). Also, significant differences were found in favor of the post-test, it was observed that the experimental group influenced by the exercises with auxiliary tools. Moreover, the results indicate that the progress of the subjects from the pre-test stage to the performance test is statistically significant (P = 0.001). For this reason, exercises with auxiliary tools have a significant effect on acquisition of the forehand and backhand tennis skills for female students.

Table 2. The statistical differences in developing forehand and backhand tennis skills

Basic skills	Measuring unit	Pretest		Post test		Sig	Calculated (t) value
		sd	p	sd	p		
Forehand	Score	18.800	.83666	26.800	1.48324	0.001	1.58114
Backhand	Score	20.6667	27.6667	1.21106	1.86190	0.001	2.28035

Note: * Significant when the error ratio ⩾ (0.05)

Discussion

To provide a training quality in terms of teaching practice for student-trainees that meet the challenges in learning forehand and backhand and performance. Thus, the purpose of this research was to know the possibility of the sample to apply exercises backed up by auxiliary tools are believed for a successful teaching and training in tennis performance and motor skills. According to our results, there are significant differences between the results of the basic skills tests, before and after, for the two experimental and control groups. Therefore, this corresponded to the opinion of experts and specialists in the field of motor learning, who emphasized the importance of exercises with auxiliary tools in responsiveness to the performance of a particular skill. Thus, the changes that occur in the behavior of the learner have an impact on know-how in order to acquire other skills. Also, the educational program developed by the researcher (the exercises performed in the educational teaching and the use of auxiliary tools) has an important role in acquiring and refining the skill of the forehand and backhand. In this field Kilit et al. [14] investigate the acute effect of different stretching methods on speed and agility performance in young tennis players according to conditioning level. They concluded that the acute effect of static stretching had a negative effect on agility and sprint performances. They suggest that dynamic and static dynamic stretching might be use for the performing better performance in acceleration, speed and agility skills during the warm-up session in young tennis players [14].

The researcher also attributes the learning of the two skills to the adequacy of the teaching units to perform the two skills and the inclusion of the exercises. Also, the use of auxiliary tools effective time management. therefore, the diversification of the exercises and their organization, the demands of play and the variety of movements will help to gain experience and optimize performance [15]. Here we can say that one of the fundamentals of the learning process is the development phase. in this context, the teacher must respect the learning stages and focus on performance towards the consolidation phase. Learning and teaching skills are influenced by the choice of strategy and instructional technique used with apprentices [16.17]. Thus, according to Vickers [18] it becomes essential for coaches to set up appropriate and different environments for children 10 and under, for the following reasons: (i) we know that children like to have fun and be in the presence of adults; (ii) coaches need to change activities frequently to keep children motivated; (iii) children learn mainly by reproducing what they see; (iv) children like to be surrounded by their friends, even if they do not necessarily have the same skills as them. Gallo-Salazar et al. [19] proposes to analyze the effects of 2 tennis matches on the same day on the physical performance of young tennis players. Physical impairments occurred in neuromuscular performance variables involving lower (jumping, sprinting, and change of direction) and upper (isometric strength and range of motion) limbs the day after playing a competition with 2 consecutive matches on the same day. These alterations in neuromuscular and sport-specific performance need to be taken into consideration when planning tournament schedules for young tennis players, as well as preparing match and recovery strategies [19].

Moreover, it can be said that the learning was the result of following the right method, providing regular presentation and explanations, and offering feedback to the learner, which stimulate motivation and arouse their passion and the desire to act. thus, for significant progress, the basic rule in learning motor skills is to seriously consider exercise attempts and their diversification [20]. In this study, the sample focused on repetition of skill performance, which is an effective process for ensuring performance. it appears that the repetition of motor performances is a prerequisite for high-level motor learning. Thus, children like to move, and tennis is a movement game in which players must use a variety of different skills in a dynamic environment. Waiting behind each other to be able to hit a ball [11]. According to recommendations from several studies [10], the amount of physical activity should be proportional to children and adults.

On the other hand, the mental rehearsal that accompanies the physical rehearsal by following an integrated action plan for each skill facilitates the process of memorization. Generally, the learner is forced to reconstruct an action plan for each skill in each performance due to overlapping skills. Then, in practicing the drill technique, the learner repeats the skill action plan in the initial repetitions to apply that plan repeatedly in further drill attempts. The process of learning an action plan enriches the process of acquiring performance and helps develop the skill of storing and retrieving information from memory in order to give solutions to the tasks assigned to the learner. Tennis is an open-skill dynamic sport in which players over a limited period of time have to process and integrate complex visual information (VT). Bonato et al. [21] suggest that VT was effective to improve on-court tennis performance in junior. In multiple comparison test, they showed significant improvements in speed during second serve were found. Moreover, the time course between the split step and shoulder rotation in forehand, backhand, and return to serve improved significantly. Changing game conditions dictate that decision-making and action must be time-sensitive. The perception of information sources is the fit between the characteristics of the player and the properties of the task to be performed. According to

Dana et Gozalzadeh [22], the use of mental imagery improves the precision of the serve in tennis. Their research aimed to determine the effects of visual imagery on the forehand, backhand and serve in novices. The results were able to demonstrate that all groups showed an improvement in accuracy. Miles and al. [23] focusing on ball sports highlighted the importance of the realism of the sports environment in which the learner finds himself. Thus, Milazzo et al. [24] shown that video-based perceptual training improves cognitive and perceptual skills resulting in decrease in decision time and increase in decision's accuracy in simulations and field. Furthermore, the benefits of explicit approaches in early stage of learning to promote rapid acquisition of knowledge is highlighted. On the other hand, it is suggested that implicit approaches will be more conducive to the experts to ensure that they "reinvest" their knowledge in stressful situations. Finally, it is envisaged that guided approaches are relevant alternatives to explicit and implicit approaches.

This corresponded to what had been indicated by the literature, in the exercise, the individuals must recall the program and identify it before each movement, because they produce different movements from one attempt to another. Thus, in exercises, they can use the same program (without maximum modification) for a series of motor attempts Finch et al. [25]. Moreover, the ability to achieve a goal is limited by the conditions of the task execution. Thus, the behavior of the player will be different if he is asked to play five groundstrokes, taking care to keep the ball in play, before triggering an attack shot. If he performs this attack with a forehand, he scores a point [4]. Therefore, in individual sports, the athlete is in constant interaction with his coach during training and competition. Thus, the coach-trainee relationship, the behaviors of the coach or the leadership of the coach have an effect on the well-being and the performance of the athletes [26, 27]. In research contributing to an evolutionary epistemology of junior tennis training, Gowling [5] confirms that young tennis players focus on winning, which can influence their attitude towards learning and reduce their enjoyment of competition. To do this, the situated activity approach makes it possible to understand how individuals adapt to the modification of the situation in which they act. She apprehends their explanations and judgments on the situation and unexpected events in order to adjust to them [2]. Visioli, Petiot et Ria [28] confirm in their study that a subject will have more pleasure when learning a movement when it is done in the form of a game.

Conclusions

The forehand and backhand skills are among the most important basic skills in tennis, as most scientific sources confirm the similarity of the course of these two skills in terms of performance and different motor responses. They are at the core of the tennis learning process as mastering these two skills will quickly help develop and build up other skills. According to the results reached by the researcher, it was concluded that:

- the specific exercises backed up by the auxiliary tools that were used on the research sample helped them master the tennis forehand and backhand tennis skills;
- the auxiliary tools produced a significant effect on the learning outcomes of the forehand and backhand skills by the research sample.

In light of the researcher's conclusions, the researcher recommends the following: Stressing the necessity of using special exercises with auxiliary tools in learning and acquiring basic skills in games and sports activities owing to their effective role in the learning process, based on the significantly inherent advantages in this educational method. In addition, the urge to employ various up-to-date educational methods that make up for traditional ones. Finally, proceed with the learning process by starting with the easy skills to acquire more difficult ones to ensure smooth progression.

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References

1. Peter JM. The process of self-training through the practice of tennis. Textual analysis of life stories. *Staps*, 2005;1:23–40. https://doi.org/10.3917/sta.067.0023
2. Sève C, Saury J, Theureau J, Durand M. The construction of knowledge in high-level athletes during a competitive interaction. *Human Labor*, 2002; 652(2): 159–190. https://doi.org/10.3917/th.652.0159
3. Anastassova M, Burkhardt JM, Mégard, C, Ehanno P. The ergonomics of augmented reality for learning: a review. *Human Labor*, 2007; 70(2): 97–125. https://doi.org/10.3917/th.702.0097
4. Carvalho J, Correira V, Araujo. Constraints-based Coaching. *Coaching and Sport Science Review*, 2013; 60 (12):10–11.
5. Gowling C. The" performance narrative" in junior tennis. *Coaching & Sport Science Review*, 2022; 30(88): 25–28. https://doi.org/10.52383/itfcoaching.v30i88.359
6. Regan L. Comparing the traditional and constraints-led approaches to skill acquisition in tennis. *Coaching & Sport Science Review*, 2021; 29(84): 28–30. https://doi.org/10.52383/itfcoaching.v29i84.205
7. Boudreault 1V, Thibault J. Competitive anxiety in sport. *Quebec Journal of Psychology*, 2021; 42(3): 21–42. https://doi.org/10.7202/1084578ar
8. Cousin B, Chauvin S. Training the dominant: Tennis, yoga and serving the ultra-rich. *Proceedings of social science research*, 2019; (5): 76–91. https://doi.org/10.3917/arss.230.0076
9. Roberts G, Treasure D, Conroy D. Understanding the dynamics of motivation in sport and physical activity: an achievement goal interpretation. In: Tenenbaum G, Eklund R. (Eds.), *Handbook of Sport Psychology* (3rd ed.). Hoboken, NJ: John Wiley, 2007. P. 3–30.
10. Balyi I, Way R, Higgs C. *Long-term athlete development*. Leeds, UK: Human Kinetics; 2013.
11. Pankhurst A. 10U Tennis: The essentials of developing players for the future. In: Colvin A, Gladstone J. (Eds.). *The Young Tennis Player*. Switzerland: Springer International Publishing; 2016. P. 1–16. https://doi.org/10.1007/978-3-319-27559-8_1
12. Przybylski P, Janiak A, Szewczyk P, Wieliński D, Domaszewska K. Morphological and motor fitness determinants of shotokan karate performance. *International Journal of Environmental Research and Public Health*, 2021; 18(9): 4423. https://doi.org/10.3390/ijerph18094423
13. Nugroho D, Hidayatullah MF, Doewes M, Purnama SK. The effects of massed and distributed drills, muscle strength, and intelligence quotients towards tennis groundstroke skills of sport students. *Pedagogy of Physical Culture and Sports,* 2022;27(1):14–23. https://doi.org/10.15561/26649837.2023.0102
14. Kilit B, Arslan E, Soylu Y. Effects of different stretching methods on speed and agility performance in young tennis players. *Science & Sports*, 2019; 34(5): 313–320. https://doi.org/10.1016/j.scispo.2018.10.016
15. Colomar J, Corbi F, Baiget E. Improving Tennis Serve Velocity: Review of Training Methods and Recommendations. *Strength & Conditioning Journal*. 2022; Publish Ahead of Print. https://doi.org/10.1519/SSC.0000000000000733
16. Zayed W, Zguira MS, Souissi N, Bali N. The determination of cooperative teacher's knowledge problems: training device and attractiveness of Tunisian student-teachers. *Physical Education of Students,* 2018;23(2): 98–105. https://doi.org/10.15561/20755279.2019.0208
17. Farkash E., Zayed W, Bali N. The effect of using the two competitive teaching styles and stations on learning some basic football skills for physical education students. *Physical Education of Students*, 2022;26(6): 308-315. https://doi.org/10.15561/20755279.2022.0605
18. Vickers J. Skill acquisition: Designing optimal learning environments. In: Collins D, Button A, Richards H. (Eds.). *Performance psychology: A practitioner's Guide*. Oxford, UK: Churchill Livingstone; 2008. P. 191–206.
19. Gallo-Salazar C, Del Coso J, Barbado D, Lopez-Valenciano A, Santos-Rosa FJ, Sanz-Rivas D, Fernandez-Fernandez J. Impact of a competition with two consecutive matches in a day on physical performance in young tennis players. *Applied Physiology, Nutrition, and Metabolism*, 2017; 42(7): 750–756. https://doi.org/10.1139/apnm-2016-0540
20. Mujika I, Halson S, Burke L M, Farrow D. An integrated, multifactorial approach to periodization for optimal performance in individual and team sports. *International Journal of Sports Physiology and Performance*, 2018; 13(5): 538–561. https://doi.org/10.1123/ijspp.2018-0093
21. Bonato M, Gatti C, Rossi C, Merati G, La Torre A. Effects of visual training in tennis performance in male junior tennis players: a randomized controlled trial. *The Journal of Sports Medicine and Physical Fitness*, 2019; 60(3): 493–499. https://doi.org/10.23736/s0022-4707.19.10218-6
22. Dana A, Gozalzadeh E. Internal and external imagery effects on tennis skills among novices. *Perceptual and Motor Skills*, 2017; 124(5): 1022–1043. https://doi.org/10.1177/0031512517719611
23. Miles CM, Serban RP, Simon JW, Gavin P L et Nigel WJ. A review of virtual environments for training in ball sports. *Computers and Graphics*, 2012; 36: 714–726. https://doi.org/10.1016/j.cag.2012.04.007
24. Milazzo N, Bernier M, Rosnet E, Farrow D, Fournier JF. Video-based cognitive-perceptual training and its modes of instruction. *French Psychology*, 2016; 61(4): 273–289. https://doi.org/10.1016/j.psfr.2015.07.004
25. Finch CF, Doyle TLA, Dempsey AR, et al. What do community football players think about different exercise-training programmes? Implications for the delivery of lower limb injury prevention programmes. *British Journal of Sports Medicine*, 2014; 8 (48): 702–707. https://doi.org/10.1136/

bjsports-2013-092816
26. Martinent G. The coach-trained relationship in table tennis: practical implications and avenues for intervention. *Staps*, 2022; 138(4): 21–39. https://doi.org/10.3917/sta.138.0021
27. Wadii Z, Naila B, Nizar S. Repercussions of behavior of Cooperative Teacher's on health and attractiveness of Tunisian Student Teachers. *Physical Education of Students*, 2018; 22(2): 104–111. https://doi.org/10.15561/20755279.2018.0208
28. Visioli J, Petiot O, Ria L. Towards a social conception of teachers' emotions?. *Education Hubs*, 2015; (2): 201–230. https://doi.org/10.3917/cdle.040.0201

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