The effect of French variation training on some special physical Abilities and the performance level of the straight backhand stroke for squash juniors

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Abstract:

The research aims to identify the effect of French variation training in developing some special physical abilities (special reactive agility, acceleration, movement speed of the legs, muscular ability of the legs), as well as the level (accuracy, strength, and speed) of the straight backhand strike for squash juniors.

The researcher used the experimental method, using the experimental design for one group using a pre- and post-measurement method, on a sample of (12) squash juniors at the El-Mahalla El-Kubra Municipal Club under 15 years of age, registered by the Egyptian Squash Federation. The researcher measured some special physical abilities - under research – And the skill performance of the level of accuracy, strength, speed of the straight backhand skill. The following statistical coefficients were used: arithmetic mean - standard deviation - torsion coefficient - correlation coefficient (t) - value (t) - percentage of improvement %

The most important conclusions:

1 -The French variation training program, which was applied to the research sample, has a positive effect on the development of some special physical abilities (special reactive agility, acceleration, movement speed of the legs, muscular ability of the legs), - under research - for the junior squash players, the research sample.

2 -The French variation training program, which was applied to the research sample, positively affects the level of accuracy, strength, and speed of performing the straight backhand skill - under research - for the junior squash players, the research sample.

Introduction and research problem:

Academics always strive to research sports sciences to reach optimal and innovative methods in training methods in order to reach the young person's desired goal. Rather, the aspiration for a greater vision is increasing, which is a distinguished global classification in the name of the nation, and this is a noble goal among the goals of sports, so the constant search for the latest and most appropriate A training method that is consistent with the requirements of specialized sports to develop the physical and skill capabilities of young people. So let's look at French method variation training (FCM), which is one of the new methods in the world of sports sciences that is far from stereotypical, which ignites youngsters as well as coaches with enthusiasm for training.

Nagla El Badry and others (2019 AD) mention that the first people to

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discuss French variation training were Cal Diez and Ben Peterson, who explained this training method in their book Triphasic Training, and Gilles Comte took it from them. A French track and field coach who modernized this method by combining the combined training method with differentiated training together. (14:186)

As Cal Diez and Ben Peterson (2012 AD) explain, the use of French variation training demonstrates its method by composing four exercises, provided that the athlete's physiological response is greater than what he is accustomed to, which results in an increase in the muscle's ability by forcing it The four exercises that make up French variation training (FCM) are sequential and begin with a resistance exercise (weights). It applies the maximum load to the player, is immediately followed by a plyometric exercise that simulates the same motor performance, and a resistance exercise in an attempt to maximize energy production, and concludes with the fourth exercise, which is the acceleration exercise (10: 32, 33).

Therefore, we can explain that French variation training (FCM) is subject to the phenomenon of post-activation potentiation (PAP), as it is a physiological phenomenon in which an intense series of voluntary muscle contractions is produced, in which there is a short-term improvement in the muscle's contractile ability to generate force, and then this improvement occurs as a result of employing High motor acuity, improved neuromuscular coordination as well as a decrease in pre-synaptic inhibition. (15)

Nagla Elbadry, et al (2019) also agrees with the above and confirms that French variation training (FCM) is an advanced technique or method for integrating high-strength movements with mechanically similar plyometric movements. I also added that the phenomenon of post-activation strengthening (PAP)) Enhances muscle function after high intensity activity .The heavy load that precedes the explosive movement stimulates the central nervous system, which leads to strengthening the motor unit and its strength, as it lasts from 5 to 30 minutes. (14:226)

Joseba Andoni et al (2018) also see that French variation training (FCM) makes the athlete maintain strength for longer periods of time, so it is an effective way to stimulate greater muscle force production in less time and thus improve physical performance. Therefore, this has resulted in its recent application to sports that require high levels of ability and muscular and nervous strength, as they support the athlete's ability to produce high rates of these variables, which are considered decisive factors for successful performances in sports, as they are effective in the strength and ability of the limbs (upper And the bottom) I have the athlete. (11: 1911)

Through what has been presented in terms of the features and method of applying French variation exercises and the gains of their applications, the researcher finds that the result of this method, especially after explaining the phenomenon of

strengthening after activation, which matches and simulates the requirements of the sport of squash, as the squash beginner always strives to reach the advantage in obtaining the maximum amount of Ability and acceleration, and this is what squash requires in the first place in its performance due to the specificity of its court, as well as the method of collecting points that is not limited by time. Training through French variation exercises allows the junior to maintain strength for long periods, enabling him to focus on the technical aspects and control the attack for longer periods throughout the match, which leads him to victory with less effort and time, and then improve the junior's position, whether locally or internationally, and achieve more championships.

This is what Khairiya Al-Sukkari and Muhammad Bariqa (2009 AD) pointed out, that the sport of squash requires sufficient ability and explosive power, as well as speed and motor speed when performing various skill strikes. (2:72)

Because the skill of the straight backhand strike has a different characteristic that gives it some difficulty, as it leads in the opposite direction to the striking arm, which is a movement pattern that is not common in daily life, while the goal of that stroke is to hit the ball a long distance or close to the front wall, whether the ball is Coming from a plane or bouncing from the ground or from the side, and as is the case in squash law, the opponent scores a point without having the ball with him due to the player committing a skill error. Through the experience of the field researcher, she noticed that youngsters - the research sample - avoided using the backhand strike, even when required by tactics on the court, as well as adopting a wrong position to try to overcome the stroke with the back side of the racket and trying to use the front side, which leads to the inability to perform the stroke at the appropriate time. Nor in the appropriate place due to the resulting hesitation in using the backhand strike, as a result of his lack of confidence or ability to perform it optimally, and here results in either Losing a point and transferring it to the opponent, or it results in a very weak way, the player loses possession of the court and switches from attack to defense weakly, as the opponent understands it and takes advantage of it, so he plays on that throughout the half and then loses the entire match, and from here the research problem appeared, as the researcher strives to improve the performance of the back skill. The research sample obtained straight straight lines by developing the physical characteristics of this skill, which were presented to the experts To determine the extent of its effect in raising the level of accuracy, strength and speed of the straight backhand strike, which resulted in determining (the muscular ability of the legs, the motor speed of the legs and acceleration, as well as the reactive agility of the squash player - the research sample - an exploratory study was also conducted on these physical variables in the research sample, which showed a decrease Level among junior

squash players - research sample - The researcher is trying to use French variation exercises as an attempt to raise the level of these variables - under research - as mentioned by some reference studies, and the results of their use were positive, and through the reference survey and - within the researcher's knowledge - there is no study that touched on the effect of French variation exercises on some special physical abilities and level. Performance of the backhand straight shot for junior squash.

Research objective:-

Identifying the effect of French variation training in developing some special physical abilities (special reactive agility, acceleration, movement speed of the legs, muscular ability of the legs), as well as the level (accuracy, strength, and speed) of the straight backhand strike for squash juniors - research sample -.

Research hypotheses:-

1 - French variation training has a positive effect on developing some special physical abilities (special reactive agility, acceleration, movement speed of the legs, muscular ability of the legs) for squash juniors - research sample -.

2 - French variation exercises have a positive effect on developing (accuracy, strength, and speed) the backhand straight shot for squash juniors - research sample -.

Search term:-

French variation exercises (FCM)

French contrast method (FCM) training is performed using a protocol consisting of four exercises, in which the athlete's physiological response is greater than usual, which forces the muscle to increase its ability. (10:32)

Reference studies:

Study "Khaled Hussein Ezzat" (2022) (1)

Topic: "The effect of differentiated training using the French method on some variables and the speed of jumping shots in handball." This study aims to identify the effect of differentiated training in the French style on some physical variables and jump shooting speed in handball. The researcher used the experimental method on a sample that included 15 handball players from Al-Shamal Sports Club in the State of Qatar. The most important results resulted in an improvement in the variables. Leg muscle strength, vertical jumping, and throwing a medicine ball with the dominant hand also contributed to improving the speed of shooting jumps.

Study "Mahmoud Abdel Majeed Salam" (2021) (6)

Its topic: "The effect of differentiated training in the French method on some physical variables and the speed of motor response to blade grabs by a fencing master." This study aims to identify the effect of differential training in the French method on some physical variables and the speed of motor response to blade grips by a fencing master. The researcher used the experimental method on a sample that included 16 junior swordsmen divided equally into two experimental and control groups. The most important results resulted in that French variation training contributed to improving the variables of (endurance of explosive force of the legs, endurance of explosive force of the arms, muscle strength of the legs, and broad jump). Of stability, time 10 m sprint).

Study "Yaqut Zidane Ali" (2021) (9)

Its topic: "The effect of French variation training on some physical variables and the level of smashing performance of volleyball players." This study aims to identify the effect of French variation on some physical variables and the level of smashing performance of volleyball players. The researcher used the experimental method on a sample that included 16 player, The most important results resulted in the proposed French variation exercises improving the variables of leg muscle strength, right grip strength, vertical jump with a rising step, and an 18-meter sprint time. It also contributed to improving the accuracy of the diagonal smash from position (6), and the accuracy of the diagonal smash from position (6). Center (2).

Study by "Heba Abdel Moneim Muhammad" (2020) (8)

Its topic: "The effect of differentiated training in the French method on some physical variables and the level of skill performance on the floor movement apparatus among female gymnasts." This study aims to identify the effect of differentiated training in the French method on some physical variables and the level of skill performance on the floor movement apparatus among female gymnasts. The researcher used the experimental method on a sample of 10 young girls, and the results showed that differentiated training in the French method contributed to improving the physical variables and the level of skill performance on the floor movement apparatus - under research -.

Study by Julianuspint et al. (2019) (12)

Its topic: "Comparison between the effects of French variation training and traditional strength training for soccer players." This study aims to compare the effects of French variation training and traditional strength training for soccer players using the experimental approach, on a sample of 22 soccer players. The most important results revealed the presence of differences. Statistically significant between the two groups in the 5 m sprint performance time in favor of the French variation group, and there were no statistically significant differences between the two groups in the rest of the variables.

Study "Matthew Welsh et al" (2018) (13)

Its title: "The effect of French variation training on maximum strength and vertical jump performance." This study aims to identify the effect of French variation training on maximum strength and vertical jump performance. The researchers used the experimental method and the research sample included 10 high-level athletes. The results of the research resulted in: There was an improvement of 11.87% in the performance of the vertical jump, and 6.21% in the maximum strength of the experimental group.

Search procedures:

Research methodology:

The experimental approach was used with a one-group experimental design method, using a pre- and post-measurement method for the experimental group, as it suits the nature of this research.

Search sample:-

Sample selection method: The intentional method was used in

selecting the research sample from squash juniors under 15 years of age who were registered by the Egyptian Squash Federation at the Mahalla El-Kubra **Municipality Club.**

Sample size: The study sample included (20) junior squash players under 15 years of age who were registered by the Egyptian Squash Federation at the El-Mahalla El-Kubra Municipal Club. They were divided into 12 juniors as the experimental research sample to apply the proposed program to them, in addition to 8 juniors from the same original sample community. Research and outside the original research sample from Tanta Sports Club to conduct the exploratory study and find the validity and reliability coefficient for the physical tests And skill - under research -.

Sample characterization:

To ensure that the sample was free of defects in the moderate distribution, the researcher conducted a skewness coefficient in order to ensure the homogeneity of the sample in the rates of growth indicators (age, height, weight, training age) as well as the physical variables affecting the research (specific reactive agility, acceleration, movement speed of the legs, ability musculature of the legs) As well as the variables of the level of skill performance - under research - (strength, accuracy and speed) of the straight backhand, after ensuring the safety and calibration of the tools and devices, as shown in Table (1).

Table(1)

The arithmetic mean, standard deviation, and skewness coefficient in variables (Semantics of growth - physical and skill variables) - under research N20=

Variables		m. unit	Arithmetic mean	Median	Variation	Skewness
Age		year	13.61	13.50	0.52	0.64
s Weight		kgm	44.87	45.00	2.88	-0.14
Tallnes		cm	156.90	157.00	3.18	-0.09
Training age		year	5.17	5.00	0.61	0.84
Physica l	Special interactive agility	S	16.87	17.00	1.06	-).38
	Acceleration	S	3.03	3.00	0.07	1.29
	Movement speed of the legs	S	13.97	14.00	2.01	-).05
	Muscular ability of the legs	M	1.63	1.65	0.62	-).09
SKILL	Accuracy of performing the straight backhand shot	degree	6.15	6.10	1.13	0.13
	The power of performing a straight backhand shot	M	2.10	2.10	0.45	0.00
	Speed of performing a straight backhand shot	number	4.85	4.90	0.67	-).22

It is clear from Table (1) that the value of the skewness coefficient ranges between (±3), which gives a direct indication that the data is free from the defects of unequal distributions, which indicates the homogeneity of the sample members in these variables.

Data collection tools and methods:-

A - Expert opinion poll form on the most important and appropriate physical variables contributing to improving the level of skill performance of the straight backhand shot is attached (1)

It was presented to 7 experts who hold doctoral degrees in sports training and racket sports training, attached (2). The researcher used physical variables that obtained 80% or more of the experts' approval.

B- French variation training program for squash juniors - research sample - attachment (6)

C- **Skill performance tests** (accuracy, strength, and speed) of the straight backhand skill. Attached (4)

D- Physical tests used in the research:

The researcher reviewed the specialized scientific references and reference studies, where the physical tests for each variable for squash juniors - the research sample - were determined after confirming their use in other studies, which achieved high scientific coefficients. Attached (3)

E - Devices and tools used:

Restameter device (for measuring height and weight) - squash courts, squash rackets and balls - calibrated tape measure for measuring distances - barbell bar - free weights - rated rubber band - jumping platform - rubber frame - Swedish chairs - small cones - hurdles of different sizes - jumping boxes - Stop watch

The first exploratory study:

The researcher conducted this study on a sample of 8 squash juniors under 15 years of age who were registered by the Egyptian Squash Federation. They were drawn from the research community and from outside the main research sample, during the period from Monday, 1/7/2024 AD, to Wednesday, 10/2024. 7/2024

The study aimed to:

- Finding scientific coefficients (validity - reliability) for physical and skill tests - under research -
- Ensure the validity of the devices and tools used for measurement
- Discover the difficulties that may occur during the implementation of the selected measurements

This study resulted in:

- Calculating the validity and reliability of physical and skill tests - under research -.
- Validity of devices and tools used in measurement.

Scientific transactions for the selected tests under research:

- Validity and reliability of tests:

The researcher found the reliability coefficient for the physical and skill tests using the test application and re-application method, Test Re test, which was applied to (8) young people (the exploratory group) from outside the basic research sample and from the same research community. After a week, the application was repeated under the same conditions as the first procedure. Table (2) shows the reliability coefficient for the physical and skill tests. The self-reliability coefficient was also found, which is represented by the square root of the reliability coefficient.

Table(٢)

Calculating the reliability and self-validity coefficient of the tests Physical and skill - under research− n=8

	Variables	m. unit	Application		Re-application		R	Self-honesty
			M	Variation	M	Variation		
Physical	Special interactive agility	S	16.90	0.67	16.88	0.89	0.82**	0.91
	Acceleration	S	3.04	1.02	3.02	1.06	0.96**	0.98
	Movement speed of the legs	S	14.02	0.13	14.00	0.11	0.90**	0.95
	Muscular ability of the legs	M	1.66	0.05	1.67	0.08	0.84**	0.92
SKILL	Accuracy of performing the straight backhand shot	degree	6.17	0.03	6.19	0.05	0.82**	0.91
	The power of performing a straight backhand shot	M	082.	0.87	2.12	0.88	0.80**	0.89
	Speed of performing a straight backhand shot	number	4.86	0.05	4.89	0.03	0.76**	0.87

The tabular R value is at a significance level of 0.05 = 0.64

It is clear from Table (2) that there is a significant correlation between the first measurement and the second measurement for both physical and skill variables, as the correlation coefficient (t) between the first measurement and the second measurement for the calculated values is higher than its tabulated value, which indicates the stability of the test, and all The tests recorded a high degree of reliability, ranging from 0.91 to 0.98 for physical tests and 0.87 to 0.91 for skill tests, using a value calculation. Self-validity represented by the square root of the reliability coefficient.

The second exploratory study:

The second exploratory study was conducted from Saturday, 7/13/2024 to Wednesday, 7/17/2024, on a random sample (the exploratory sample) from the same original research community and from outside the basic research sample, which consisted of 8 squash juniors under the age of 15. years and those registered by the Egyptian Squash Federation. The study targeted:

- Identifying the suitability of the French variation exercises used in the program for squash juniors - the research sample.
- Determine the time required for each stage of the program.
- Regulating the training loads of the program and the suitability of the program content and the inter-rest periods.
- Ensure that the program is valid for the application.

This study resulted in:

- Adapting the French contrast exercises used in the program to the sample.
- Determine the time for each stage of the training program.

The training loads for the program were standardized, and thus the training program became applicable.

The proposed training program:-

Program goal:

The program aims to have a positive impact on the development of some special physical abilities (special reactive agility, acceleration, movement speed of the legs, muscular ability of the legs), as well as the level (accuracy, strength, and speed) of the straight backhand strike for squash juniors. Through French variation exercises.

Content of the proposed training program:

The content of the proposed program was chosen based on the researcher's experience and what was reported by some references and scientific studies related to French contrast training, such as the study of "Khaled Hussein Ezzat" (2022 AD) (1), the study of "Mahmoud Abdel Majeed Salam" (2021 AD) (6), study "Yaqut Zidane Ali" (2021 AD) (9), study by "Heba Abdel Moneim Muhammad" (2020 AD) (8), The study of Juliano Spinet, et al (2019 AD) (12), the study of "Matthew Welch, et al" (2018 AD) (13), in order to limit the ways of developing some special physical abilities - under research - and study them. And analyze it so that the researcher can identify and choose French variation exercises, codify them within a training program, and apply them to the experimental research sample of junior squash players. Under 15 years old Those registered by the Egyptian Squash Federation, taking into account their ability and abilities, will have a positive impact on the level of developing some special physical abilities (special reactive agility, acceleration, movement speed of the legs, muscular ability of the legs) as well as a return on the level of skill performance in the accuracy, strength and speed of the skill performance of the straight backhand shot. The maximum benefit is made from the French variation exercises by applying his method with intensity and training volumes During a period of two months, at a rate of three training units per week, within the main part of the unit, to include French variation exercises and training in the skillful performance of the straight backhand shot, taking into account repetition, intensity, and volume, leading to the concluding part and reaching the state of recovery. Attached(6)

Adjusting the program content in light of expert opinions:

The researcher presented the content of the program to a group of (7) experts from the faculty members of the faculties of physical education, specializing in sports training and racket sports training, attached (2), and in light of the opinions and observations expressed by the experts, the researcher chose a series of French variation exercises that received 100% approval (70% or more According to the opinions of the experts, the content, after the necessary amendments, attached to (5), became suitable for developing a training program using French variation exercises to develop some of the physical abilities - under research - as well as the accuracy, strength, and speed of performing the straight backhand skill in squash.

Fundamentals of developing the program:

1- Achieving the goal for which the training program was developed using French variation exercises.

2- The exercises range from easy to difficult, from simple to complex, and from stability to movement.

3- Muscle stretching and flexibility exercises should be performed immediately after the warm-up, after special strength exercises, and during periods of rest.

4- The contents of the program should be consistent with the growth characteristics of the research sample.

5- The program should be comprehensive, flexible, and easy to practice.

6- Focus on diversity and moving from fixed resistance training and static muscle work (isometric) to dynamic strength training and kinetic muscle work (isotonic), using graduated resistances for all angles and directions of the muscles involved in motor performance.

7- The gradation of the load in terms of intensity, volume and rest should be taken into account during the program stages, and that the inter-rest periods should be sufficient for each child individually.

Program download features:

The researcher applied the training program for a period of two months, 8 weeks, (three training units) per week, with a number of monthly units of 12 training units, with a total number of units within the program 24 training units. The time of the training unit ranged from 30 to 50 minutes, excluding the warm-up and cool-down time, so the time of the units ranged per week. From 90 to 150 minutes per week, and the number of units per month ranged between 360 and 600 minutes The total time for the units in the program was between 720 and 1200 training minutes, by forming degrees of load that must follow the wavy shape. This means that the degrees of successive training loads must not proceed at the same pace (to achieve stimulation of force production). Therefore, the researcher followed the application of the program by gradually increasing. To the degree of pregnancy (1:2) There were 4-minute breaks between groups over the weeks of the program during its implementation period, in a manner consistent with the program periods and the specific objectives. The program now consists of a group of training series that are added in a

complementary manner within the basic training program for juniors. These series are implemented during the main part of the training unit with 8 training series. Each training series contains 4 exercises in the following order:

- High-intensity resistance exercise (80: 90% of maximum repetition).
- Plyometric jumping exercise.
- Jumping exercise with resistance (30: 40% of maximum repetition).
- Assisted jumping exercise (short holding time).

All this during the special preparation period for a period of 4 weeks, then during the pre-competition period for a period of 4 weeks, with a gradual progression of the training load. Each training unit includes a warm-up in order to stimulate blood circulation and prepare the muscles and joints, and in it, stretching exercises are put in place for the muscles working in the main part to a greater extent. Specialized, with a duration of 10 minutes, followed immediately by the main part For the program, then comes the skill part of the straight backhand skill of skill exercises, followed by the concluding part of reaching and helping to prepare the body for the recovery state. It also includes lengthening exercises for the muscles that are the main contributor during the main part and for a period of up to 5 minutes. Attached (6)

Carrying out the basic study:

Pre-measurement:

The pre-measurement was conducted on the experimental research sample in the period from Saturday, corresponding to July 20, 2024 AD: Sunday, corresponding to July 21, 2024 AD, as follows: -

- Speed measurements (specific reactive agility, acceleration, movement speed of the legs, muscular ability of the legs) - under research.
- The level (accuracy, strength, speed) of the skill performance of the straight backhand shot skill of the research sample was also measured.

Basic search experience:

The French contrast training program was applied to the experimental research sample in the period from Monday, corresponding to July 22, 2024 AD: Saturday, corresponding to September 14, 2024 AD, for two months, at the rate of three training units per week.

Dimensional measurement:

The post-measurement of the research sample was conducted in the period from Wednesday, September 18, 2024 AD: Thursday, September 19, 2024 AD.

All measurements were carried out as was done in the pre-measurement.

Statistical treatments

Arithmetic mean - standard deviation - skewness coefficient - correlation coefficient (t) - value (t) - percentage of improvement %

Presentation, discussion and interpretation of the results:

Table (3)
The significance of the difference between the means of the pre- and post-measurements for the experimental group - Under research - in physical variables n=12

Variables		m. unit	Pre-measurement		Dimensional measurement		The difference between the two averages	T
			M	Variation	M	Variation		
Physical	Special interactive agility	S	16.89	0.34	14.53	0.52	2.36	17.20
	Acceleration	S	3.00	1.03	2.36	0.49	0.64	12.11
	Movement speed of the legs	S	13.95	0.63	11.14	1.01	2.81	24.71
	Muscular ability of the legs	M	1.65	1.16	1.97	0.07	- .32	6.14

The tabular value of t is 0.05 and the degree of freedom (11) = 1.796

It is clear from Table (3) that the difference between the means of the two measurements (pre-post) for the research group is statistically significant because all the calculated T-values are greater than the tabulated T-value.

Table (3) indicates that there are statistically significant differences between the pre- and post-measurements in the physical variables (specific reactive agility, acceleration, movement speed of the legs, muscular ability of the legs) - under investigation - in which the values of the difference between the pre- and post-means ranged between 0.32, which is the lowest value. It was in favor of the muscular ability of the legs among the junior squash player - the research sample - and in contrast to it, the calculated T value was also 6.14, which is higher than its tabular value, so it is statistically significantThe highest value for the difference also appears in favor of the motor speed test for the legs, with a value of 2.81, and it is also the highest value for the calculated T, reaching 24.71, and it is also statistically significant, and all of this is in favor of the post-measurement for the experimental research group - the research sample - Therefore, the researcher attributes this development in some of the physical abilities - under research - to the positive effect of the French variation exercises, as those exercises showed a noticeable development in the values of those physical abilities (specific reactive agility, acceleration, movement speed of the legs, muscular ability of the legs) - under consideration Research - in post measurements rather than pre measurements, as a result of the good application of the French method contrast exercises programTaking into account his scientific method of application and rationing of loads according to the age stage of the research sample.

Joseba Andoni, et al confirm. (2018 AD) that French variation exercises are considered one of the best exercises that contribute to improving some special physical abilities, as these exercises work to stimulate muscle spindles, which results in high tension in the working motor units and stimulates other receptors that work to increase the number of active motor units, which are The reason for the increase in the resulting force. (11:94)

Amr Saber (2008 AD) (5) also points out that the combination of weight training (resistance training) and plyometric training are complementary to each other, as resistance training helps stimulate many muscle fibers and develop both speed and strength and thus ability, but this is not enough to achieve maximum ability. muscular, Weight training does not develop the athlete's ability to switch from short contraction to lengthening contraction, and here comes the role of plyometric exercises to complement this path and help the athlete improve the speed of switching from short contraction to lengthening contraction, because it helps activate the muscle fibers that were activated by the exercises. Traditional weights and then shows their complementarity by combining to achieve the best results.

Table (4)

The rate of change between the post-measurement and the pre-measurement of the experimental sample In physical variables - under research –

	Variables	m. unit	Pre-measurement	Dimensional measurement	The difference between the two averages	change %
Physical	Special interactive agility	S	16.89	14.53	2.36	16.24
	Acceleration	S	3.00	2.36	0.64	27.12
	Movement speed of the legs	S	13.95	11.14	2.81	25.23
	Muscular ability of the legs	M	1.65	1.97	- .32	19.40

Here, the percentages of change in percentages between the observed development between the pre- and post-measurement of the physical abilities tests - under research - are clear. It ranked first with a change rate of 27.12% in favor of acceleration, followed in second place by 25.23% in favor of motor speed for the legs, followed in third place with a change rate of 19.40%. In favor of the muscular ability test for the legs, then in fourth and last place was the special interactive agility test with a change rate of 16.24%.

This is consistent with the results of the study of “Khaled Hussein Ezzat” (2022 AD) (1), the study of “Mahmoud Abdel Majeed Salam” (2021 AD) (6), the study of “Yaqut Zidane Ali” (2021 AD) (9), the study of “Heba Abd Al-Moneim Muhammad

(2020 AD) (8), study by Juliano Spinet and others. al (2019 AD) (12), a study by "Matthew Welch, et al" (2018 AD) (13), on the emergence of the effects of French variation training on some physical abilities.

Through Table (3) and Table (4), the first hypothesis of the research is verified, which states that: - French variation training has a positive effect on the development of some special physical abilities (special reactive agility, acceleration, movement speed of the legs, muscular ability of the legs). For junior squash - research sample -.

Table(5)

The significance of the difference between the means of the pre- and post-measurements for the experimental group –Under research - in skill variables

n=12

Variables		m. unit	Pre-measurement		Dimensional measurement		The difference between the two averages	T
			M	Variation	M	Variation		
SKILL	Accuracy of performing the straight backhand shot	degree	6.20	1.02	7.80	0.82	-1.6	13.70
	The power of performing a straight backhand shot	M	2.13	0.42	2.54	1.32	- .41	7.31
	Speed of performing a straight backhand shot	number	4.90	0.26	6.10	0.59	1.20-	11.90

The tabular value of t is 0.05 and the degree of freedom (11) = 1.796

It is clear from Table (5) that the difference between the means of the two measurements (pre-post) for the research group is statistically significant because all the calculated T-values are greater than the tabulated T-value.

Table (5) indicates that there are statistically significant differences between the pre-measurement and the post-measurement of the research group in the skill variables under study, as the calculated (t) value is greater than the tabulated (t) value at a level of significance (0.05) in the accuracy, strength, and speed of performing the backhand strike. The straight backhand strike, where the values of the differences between the means of the pre- and post-measurements ranged between 0.41 in favor of testing the strength of the straight backhand strike performance. The lowest value, followed in second

place, was for the difference of differences in favor of the speed of performing the straight backhand blow, with a difference of 1.20, then the highest value of the differences was in favor of the test of the accuracy of performing the straight backhand blow, with a difference of 1.6, while the values of T ranged between 7.31 in favor of the test of the strength of performing the straight backhand blow: 13.70 in favor. The backhand straight shot accuracy test also scored 11.90 in favor of the backhand straight shot speed test The mean differences were in favor of the post-measurement of the experimental research group in the skill variables - under research -.

The researcher attributes this progress in the skill level to the result of applying the proposed program using French variation exercises, which has special features in controlling the training load, which contributed to raising and developing the special physical variables - under research - which contributed to an improvement in the skill performance level of the straight backhand shot, which is one of the most important. Offensive strikes Which changes the course of the match, as the youngsters mastered it more accurately, powerfully, and quickly, and it helps in controlling the course of the match from a position of strength and control over the variables of play during the competition.

This is what was confirmed by Essam El-Din Abdel Khaleq (2005) that any skill performance is closely linked in its development and development to the physical and motor capabilities. The more work is done on developing the specific requirements of the skill performance (physical and motor), the greater the mastery of the skill performance, since in most situations we learn about The level of this skill performance depends on the extent to which the individual acquires those special physical and motor characteristics (4: 189)

Mounir Girgis (2004) believes that the most important pillar of training to develop the skill performance of players, whether they are beginners or an advanced level in specialized sports, is to develop the physical or motor requirements for motor skill to produce a physically and skillfully integrated player who does not appear tired and causes him to lose the ball frequently. It affects his tactical level, and then he ends the match as he started it by controlling the ball and thinking properly during the various stages of the match.(7:57)

Abdulaziz Al-Nimr and Nariman Al-Khatib (2005) also agree with this in that skill performance in various sporting activities depends on the amount of physical and motor level related to the skill performance requirements of the activity practiced. Maintaining a good level of strength and speed in particular leads the player to the ability to shoot from longer distances. It also enables the player to jump higher efficiently, run faster, and engage more powerfully. In short, it will enable the player to perform better skills. (3:8)

Table (6)
Rates of change between the post-measurement and the pre-measurement for the experimental sample In the variables of skill tests - under research –

	Variables	m. unit	Pre-measurement	Dimensional measurement	The difference between the two averages	change %
SKILL	Accuracy of performing the straight backhand shot	degree	6.20	7.80	-1.6	25.81
	The power of performing a straight backhand shot	M	2.13	2.54	-0.41	19.25
	Speed of performing a straight backhand shot	number	4.90	6.10	-1.20	24.49

Here, Table (6) indicates the rates of change between the post-measurement and the pre-measurement for the experimental research sample, where the percentage of change ranged between 19.25% in favor of the straight backhand strength test, which is the lowest percentage, followed in second place by the straight backhand speed test, at 24.49%. This is followed in third place with a change rate of 25.81% in favor of testing the accuracy of performing the straight backhand shot, which is the largest percentage.

This is consistent with the study of "Khaled Hussein Ezzat" (2022 AD) (1), the study of "Mahmoud Abdel Majeed Salam" (2021 AD) (6), the study of "Yaqut Zidane Ali" (2021 AD) (9), the study of "Heba Abdel Moneim." Muhammad (2020 AD) (8), study by Juliano Spinet, et al. (2019 AD) (12), the study "Matthew Welch, et al" (2018 AD) (13), Whether in the development of physical components and the emergence of their results at the skill level or as a direct result of the French variation training, which had a positive impact on the level of skill performance.

In light of the above, it is clear that the program applied to the research sample using French variation exercises has had a positive impact on the development of some of the special physical abilities - under research - in addition to the performance (accuracy, strength, and speed) of the straight backhand strike among the experimental research sample, and this is the goal of the research.

Through the results of Table (5) and Table (6), the validity of the second hypothesis of the research is verified, which states that: - French variation exercises have a positive effect on developing (accuracy, power, and

speed) the backhand straight shot for squash juniors - the research sample -.

Conclusions and recommendations:

First: Conclusions:

In light of the research objective, the procedures followed, the limits of the research sample, the statistical treatments, and the results of this research, the researcher can conclude the following:

1- The French variation training program, which was applied to the research sample, has a positive effect on the development of some special physical abilities (special reactive agility, acceleration, movement speed of the legs, muscular ability of the legs) - under research - for junior squash players, the research sample.

2- The French variation training program, which was applied to the research sample, positively affects the level of accuracy, strength and speed of performing the straight backhand skill - under research - among the junior squash players in the research sample.

Second: Recommendations:

Within the limits revealed by the results of this research and the sample to which the measurements were applied, the researcher recommends the following:

1- Applying French variation exercises within training programs for squash juniors under 15 years of age, due to their proven positive effect in developing some special physical abilities and the level of accuracy, strength and speed of skill performance of the straight back skill specific to the sport of squash.

2- The necessity of benefiting from French variation exercises because of their good effect in improving physical abilities as well as various motor skills in racket sports in general and squash in particular**.**

3- Paying attention to applying new training methods and using them within the training process with the aim of developing the level of training status for young people.

4- The need to apply the study to different age levels as well as to other sports.

The reviewer:

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