The Impact of Virtual Reality Training Curriculum on Some Physical Abilities of Young Table Tennis Players

Haifaa Dawood Hammoud[1] ✉ , Liqaa Abdullah Ali[2] ✉ iD

1&2 Physical Education and Sport Sciences College for Women / University of Baghdad

Abstract

The significance of this research lies in understanding the impact of virtual reality exercises and their role in developing certain physical abilities in young table tennis players within the training process. This understanding is based on the principles that every coach must consider in training and competitions. This includes selecting the type of exercises, the implementation method, or the effects of using different exercises. Through this, players can reach higher athletic levels and achieve good results. The objectives of the study include developing a training program for virtual and real-world exercises that are tailored to the abilities of the table tennis player sample. Additionally, the study aims to identify the impact of the program, designed according to virtual and real-world settings, on certain physical abilities of table tennis players . The research problem arose as the researchers observed training units specific to table tennis and found a lack of reliance on modern training methods that could significantly and visibly advance the development of the sport and its players. In particular, methods that utilize modern training tools and aids, as well as electronic technologies employed by the modern world, were underutilized. Among these modern technologies is the use of exercises that incorporate virtual training reality, in addition to the real one, and the integration between them. The study seeks to understand the extent of the impact of this reality, used in a scientific and precise manner, on the physical abilities of the players. Therefore, the researchers decided to address this training gap scientifically and precisely by developing a training program based on scientific exercises that include both virtual and real-world aspects. The impact of these exercises within this modern training approach, which is adopted by the contemporary world, on the physical abilities of emerging table tennis players was examined. The aim was to serve table tennis coaches and academies in our country with this program. The researchers employed the experimental method to suit the study's problem, and the research population was identified as young table tennis players for the 2022-2023 sports season. The study sample consisted of 20 players, divided into two groups: 10 players in the experimental group and 10 players in the control group. Following this, the main experiment was conducted to obtain and statistically analyze the study's results. The researchers concluded that the use of virtual reality exercises contributed positively to improving the physical abilities of the experimental group. The experimental group, which utilized the program designed with virtual reality technology, outperformed the control group, which used traditional methods (verbal explanation and practical demonstration), in terms of physical abilities variables, and this achieves one of the sustainable development goals of the United Nations in Iraq which is (Quality Education). In light of these conclusions, the researchers recommend the necessity of using virtual reality due to its proven positive impact on the physical performance level of the research sample, as demonstrated by the results of this study. They also emphasize the importance of considering the differences in physical characteristics among children when teaching various physical abilities.

Keywords	Virtual Reality Exercises, Physical Abilities, Young Table Tennis Players.

Introduction:

The sporting development witnessed across various events and activities is the culmination of diverse research, studies, and scientific efforts that have significantly contributed to the broad and multifaceted advancement of the sports movement. Sports training in different sports should adhere to the correct scientific methods specific to each event and game. The success of training depends on the trainers' ability to consider individual characteristics and choose the best modern training methods and approaches. Haider mentions, "Training programs must adopt modern and advanced training methods using the best techniques, including electronic devices, auxiliary tools, and developmental tools" (7), due to their significant current impact on development. This approach facilitates the creation of training programs and curricula, aiming to elevate players in various events and sports to higher levels of training. Due to the significant development achieved in the present, the formation of training programs and curricula aims to elevate players in various events and sports to higher levels of training. Table tennis is currently considered one of the most beautiful and enjoyable sports, having become a popular individual sport and it stands as one of the sports rich in entertainment for both players and spectators, especially when played by skilled individuals. Their performance, marked by beauty and fluidity, makes it appear easy and simple to onlookers despite its challenging nature and the extensive physical, motor, skill-based, functional, tactical, and psychological demands it places on participants. Table tennis has undergone significant development, a progress that did not happen by chance or in a vacuum but was achieved through sound scientific planning and the use of modern scientific methods, techniques, and technologies. Tahir and Al-Selmi mention, "Table tennis is a sport that is directly influenced by physical, motor, skill-based, and functional abilities" (20). Haider notes, "The correct and scientific exercises play a

fundamental role in the development and progression of a table tennis player, working to improve the player's physical, motor, skill-based, and tactical levels" (5). Understanding this relationship is fundamental to developing appropriate training programs that help us reach higher athletic levels. It is also impossible to determine the level of sports training achieved by players without utilizing physical, motor, and skill-based tests specific to the sport. These abilities include the explosive power of the arms and legs, speed, and motor response. Given the foregoing, the importance of the research becomes apparent in the necessity to understand the impact of virtual reality exercises and their role in developing certain physical abilities in young table tennis players during the training process. This understanding relies on the principles that every coach must consider during training and competitions, whether in choosing the type of exercises, the method of their implementation, or the effects resulting from the use of various exercises. Through these, a player can reach higher athletic levels and achieve good results. The research problem emphasizes that the more successful a coach is in selecting the optimal and appropriate scientific training method. The more effective the coach's selection of the optimal and suitable scientific training method, the more successful the training process will be, leading to significant positive outcomes. Through the researchers' observation of the training units specific to table tennis, it was found that there is a lack of reliance on modern training methods that could significantly and contribute to the development of the sport and its players. Particularly, methods that utilize modern training tools and aids, as well as the electronic technologies employed in the contemporary world, were underused. Among these modern technologies is the use of exercises that integrate a virtual training reality, in addition to the real one, and the combination of both, to understand the extent of the impact of this reality, utilized in a scientific and precise manner, on the physical

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abilities of the players. Therefore, the researchers decided to address this training gap in a precise scientific manner by developing a training program based on scientific exercises that encompass both virtual and real-world realities. This program aims to explore the impact of these exercises within this modern training approach, which is adopted by the contemporary world, on the physical abilities of emerging table tennis players. The objective is to implement this program for the benefit of table tennis coaches and academies in our country. The research aims to develop a training program for exercises in both virtual and real-world settings that aligns with the abilities of the table tennis player sample. It seeks to understand the impact of this program, designed for both virtual and real-world environments, on certain physical abilities of table tennis players. The research hypotheses propose that there are statistically significant differences between the pre-test and post-test results of both the experimental and control groups, favouring the post-test results in some physical abilities of emerging table tennis players. Significant statistical differences were found between the post-test results of the experimental and control groups in favour of the experimental group in some physical abilities of young table tennis players. The domains of research are the human domain (young table tennis players), the temporal domain (from 15/02/2023 to 10/09/2023), and the spatial domain (table tennis courts in the Ministry of Youth and Sports).

Method and Procedures:
The researchers utilized the experimental method because it is suitable for addressing the problem under investigation, achieving the research objectives, and testing its hypotheses. The method is the approach that researchers follow in studying any subject from any field of science to reach general principles and deduce knowledge based on those principles. Haider mentions, "The experimental research method addresses those studies that verify information, objectives, hypotheses, and scientists' predictions" (6). The researchers also utilized an experimental design with two equivalent groups, pre-test and post-test, and Tareq confirms, "The difference between the pre-test and post-test results is attributed to the experimental variable" (12). The research population was defined as players from the sports talent school for table tennis in the youth category. Inaam mentions, "Choosing the sample is one of the fundamental pillars of scientific research because it represents the original population on which the researcher centers his work" (3). The total number of players was (20), with ages ranging from (14-16) years. The research population was divided into control and experimental groups randomly (by drawing lots), with each group consisting of (10) players, forming 50% of the research population. To attribute differences to the experimental factor, the researchers will process the pre-test results of both the control and experimental groups using appropriate statistical methods to verify the equivalence and homogeneity of the groups. This ensures that both groups start from a common baseline, facilitating accurate and valid results. The researchers conducted a homogeneity test on the sample based on variables (age, mass, height, training age), and the skewness coefficient was calculated as shown in the following table.

Table .1 It illustrates the homogeneity of the variables (chronological age, training age, total body height, mass).

Variables	Measurement Unit	Arithmetic Mean	Standard Deviation	Median	Skewness Coefficient
Chronological Age	Year	13.889	1.167	14	-0.285
Training Age	Year	4.556	1.333	5	-0.966

| Height | cm | 158 | 6.595 | 157 | 0.454 |
| Mass | kg | 51 | 5.244 | 50 | 0.190 |

Table .2 It displays the pre-test results (Arithmetic mean, standard deviation, calculated T-value, and significance of differences) between the experimental and control groups in the research tests.

Statistical Parameters / Name of the Test	Measurement Unit	Experimental group		Control groups		Calculated T-value	Significance Level	Significance
		Arithmetic Mean	Standard ± Deviation	Arithmetic Mean	Standard ± Deviation			
Explosive Power of the Legs	cm	30.200	4.756	28.400	4.971	0.827	0.419	Not significant
Explosive Power of the Arms	m	7.540	0.340	7.242	0.737	1.161	0.261	Not significant
Speed of Motor Response	Sec	4.602	0.160	4.658	0.214	0.662	0.517	Not significant

Degrees of freedom (n-2) (20-2=18) and significance level (0.05).

By applying the (T) test for independent samples to the data from the tests, the calculated (T) value was found to be less than the table (T) value, indicating that the differences between the two groups are not significant, meaning the two groups are equivalent.

Methods of data collection and tools used:
Data collection methods:
For the researcher to effectively address their problem, they must provide the tools and devices suitable for their research in a manner that ensures the success of their research. As mentioned by Mahmoud, "Research tools are the means through which the researcher can solve his problem regardless of those tools and data, samples, devices" (16). Therefore, the researchers used the following tools:
- Arabic and foreign sources, expert opinions and specialists (personal interviews), tests and measurements, observation.
Used Tools and Devices:
5 official Stiga tables, made in China, adhesive tape (black, yellow, red, green), 2 cardboard sheets, magic markers (red, black + ink pens), 4

camera stands, cards, 2 (HTC) virtual reality glasses made in the USA, a (Tbcs) wireless device made in the UK, a high-quality 8th generation (HP) laptop made in China, 2 electronically enhanced rackets with sensors made in the UK, thermal sensors, a special Nano device made in China, a global mobile router used for networks (Internet) made in China, 2 joysticks made in the USA, 2 (Sony) cameras made in Japan, a computer case made in China, and a (Lenovo) laptop made in the USA.

Field Research Procedures:
Procedures for Determining Physical Abilities and Their Tests:
Determining the Physical Abilities in Table Tennis:
After reviewing numerous sources, references, and scientific research, and conducting interviews with experts in the field of sports training, testing, and measurement, the researcher identified the most important physical and motor abilities and included them in a questionnaire presented to (12) experts to solicit their opinions on identifying the

most crucial physical abilities for table tennis players. After collecting and analyzing the questionnaires and calculating the relative importance of each ability based on the experts' opinions on a scale from (1-5), those with more than (75%) significance were considered, as Risan indicates that the researcher has the right to choose the percentage he deems appropriate when selecting many indicators (9), as shown in Table (3).

Table .3 It illustrates the relative importance of physical, motor, and skill abilities according to the viewpoint of experts and specialists.

Seq.	Abilities	Importance Level	Weighted arithmetic mean	Relative Importance	Acceptance Level
1	Explosive arm power	55	4.58	%91.60	Acceptable
2	Explosive leg power	52	4.33	%86.60	Acceptable
3	Maximum arm strength	40	3.33	%66.60	Unacceptable
4	Transitional speed	20	1.66	%33.20	Unacceptable
5	Reaction speed	20	1.66	%33.20	Unacceptable
6	Speed agility for legs	40	3.33	%66.60	Unacceptable
7	Speed agility for arms	40	3.33	%66.60	Unacceptable
8	Motor response speed	52	4.33	%86.60	Acceptable
9	Motor coordination	56	4.67	%93.40	Acceptable
10	Motor balance	19	1.58	%31.60	Unacceptable
11	Motor accuracy	18	1.5	%30	Unacceptable

Tests used in the research
Explosive Arm Power:
Medicine Ball Throw Test: Throwing a (800 grams) medicine ball for maximum distance. (Ali, and Ferdig). (21)
Explosive Leg Power:
Modified Static Vertical Jump Test (Sargent): (Essam). (13)
Nelson Test:
Nelson's Test for Motor Response Speed of the Legs: (Mustafa). (18)
The pilot experiment:
The researchers conducted the first pilot experiment on Tuesday 30/05/2023, at 10:00 a.m. in the Table Tennis Union Hall in Baghdad Governorate. The tests were conducted on a sample of (5) table tennis players to test all the equipment, identify obstacles and difficulties faced by the players and the researchers, assess their validity, and familiarize the players with the equipment. All the tests were administered to the pilot experiment sample of (5) players, and the experiment was repeated after (7) days under the same conditions to ensure the consistency of the results obtained in the initial experiment.
The purpose of the first pilot experiment, as mentioned by Haider (8), was to:
- Determine the time required for each test and the total time needed for all tests.
- Prepare the necessary equipment, tools, and suitable location for the tests.
- Assess the competency of the assisting team and train them on conducting the tests.
- Identify the problems and obstacles that occur during the experiment.

The Main Experiment:
Pre-Tests:
Thus, the pre-tests for the research sample were conducted on Sunday 11/06/2023, at 10 a.m. Sumaya and Widad mention, "Pre-tests are one of the methods used in evaluation, measurement, and diagnosis" (11). The conditions related to the tests, such as location, time, and the method of

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conducting the tests, were standardized. Equivalence between the two groups in the pre-tests was established to start from a common baseline, as shown in the equivalence table for physical abilities.

The Training Program:

The researchers prepared exercises using mixed reality technology after selecting virtual software and using modern tools and devices that simulate mixed virtual reality, based on scientific principles. These programmatically designed exercises aimed primarily at developing the physical abilities for table tennis as follows:

- The implementation of the training program started on Friday, June 16, 2023, and continued until Sunday, August 13, 2023.
- The total number of training units was (24).
- The number of weekly training units was (3), on Fridays, Sundays, and Tuesdays.
- The duration of a single exercise ranged from (15 seconds) to (60 seconds).
- Rest periods varied from (15 seconds) to (120 seconds).
- The duration of the training units ranged from (57 minutes) to (116 minutes).
- The total duration of the training program was (1966 minutes).
- The researchers based the training program on scientific principles regarding training intensity, repetitions for the exercises, the sequence of exercises in the program, and the regulation of the training load.
- The researchers also determined the work-to-rest ratio between groups and between exercises.

- The training method used was phased interval training, with an intensity ranging from (70 – 95%).
- Individual differences among the players were taken into account.
- The suitability of the exercises used for the virtual reality program under the players' levels was considered.

Post-Tests:

After implementing the proposed exercises in mixed reality on the experimental group, the researchers, with the assistance of the support team, conducted the post-tests on both the control and experimental groups in the sports hall of the Table Tennis Federation, on Tuesday 18/08/2023. The same conditions in terms of time and location as in the pre-tests were maintained.

Statistical Methods

1. The researchers utilized the Statistical Package for the Social Sciences (SPSS) version 24.
2. Relative importance values and percentages were automatically calculated.
3. Arithmetic mean and standard deviation were computed.
4. The paired-sample t-test was employed for correlated samples.
5. The independent-sample t-test was used for uncorrelated samples.

Results:

Presentation and Discussion of Pre-test and Post-test Results for the Experimental and Control Groups in Physical Variables:

Presentation of Pre-test and Post-test Results for the Experimental Group in Research Variables:

Table .4 It illustrates the Pre-test and Post-test Results for the Experimental Group in Research Variables

Statistical Parameters / Variables	Measurement Unit	Pre-Test		Post-Test		Calculated T-value	Significance Level	Significance
		Arithmetic Mean	± Standard Deviation	Arithmetic Mean	Standard ± Deviation			

Explosive Power of the Legs	cm	30.200	4.756	44.100	1.663	8.102	*0.000	significant
Explosive Power of the Arms	m	7.540	0.340	10.641	0.695	11.143	*0.000	significant
Speed of Motor Response	Sec	4.602	0.160	3.366	0.279	15.380	*0.000	significant

If the significance level (Sig) is greater than (0.05) at degrees of freedom 10-1 = 9.

Presentation and Discussion of Pre-test and Post-test Results for the Control Group in Research Variables:

Table .5 It illustrates the Pre-test and Post-test Results for the Control Group in Research Variables

Statistical Parameters / Variables	Measurement Unit	Pre-Test		Post-Test		Calculated T-value	Significance Level	Significance
		Arithmetic Mean	± Standard Deviation	Arithmetic Mean	± Standard Deviation			
Explosive Power of the Legs	cm	28.400	4.971	32.500	4.197	5.348	*0.000	significant
Explosive Power of the Arms	m	7.242	0.737	8.654	0.648	4.546	*0.001	significant
Speed of Motor Response	Sec	4.658	0.214	4.154	0.212	4.171	*0.002	significant

* If the significance level (Sig) is > (0.05) at degrees of freedom 10-1 = 9

Presentation and Discussion of Post-test Results for the Experimental and Control Groups in Research Variables:

Table .6 It illustrates the Post-test Results for the Experimental and Control Groups in Research Variables

Statistical Parameters / Variables	Measurement Unit	Experimental group		Control groups		Calculated T-value	Significance Level	Significance
		Arithmetic Mean	± Standard Deviation	Arithmetic Mean	± Standard Deviation			
Explosive Power of the Legs	cm	44.100	1.663	32.500	4.197	9.471	*0.000	significant
Explosive Power of the Arms	m	10.641	0.695	8.654	0.648	6.614	*0.000	significant
Speed of Motor Response	Sec	3.366	0.279	4.154	0.212	7.116	*0.000	significant

* If the significance level (Sig) is > (0.05) at degrees of freedom = 18

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Discussion:

It is evident from Tables (5,6) that there are statistically significant differences at the (0.05) level between the post-tests of both the experimental and control groups in physical abilities (explosive power of the legs, explosive power of the arms, speed of motor response) in favour of the experimental group. The researchers attribute these results to the effectiveness of the virtual reality exercises applied to the experimental group. These exercises provided the individuals of the experimental group with new approaches to acquiring information in a personalized manner, with a suitable sequence, and with the repetition and retrieval of this information in a way that matches their abilities. This is confirmed by (Agarid), who stated, "This approach, combined with the practical performance of what has been previously observed and the correction of performance errors through the ability to return to the program again, leads to an improvement and development of physical performance" (2). This is also consistent with the study by (Tamer), which mentions, "Performing virtual reality exercises within training units, with an emphasis on repeating those exercises, leads to the development of the variables under study" (4).

The researchers also attribute the change or development in the physical abilities of the young table tennis players to their exposure to the application of the program using virtual reality, which relies on principles and foundations for improving the level of sports performance correctly and systematically. This is confirmed by (Mohammed Hassan Alawi and Mohammed Nasr El-Din), who stated, "Successful sports performance largely depends on the expression of physical abilities that form the basis for most sports activities" (15). The results of this study align with those of (Marwa Ahmed Fadel), "Virtual reality is of great significance as it helped individuals to quickly understand and perceive what they wanted to learn, as well as to develop the level of physical performance." (17), and this

is also in agreement with the study by (Meheryar), "Virtual reality has a significant and effective impact on the perception of what is intended to be learned" (19). Thus, the second hypothesis is confirmed, which states that there are statistically significant differences in the post-tests between the experimental and control groups in the physical abilities under investigation, in favor of the experimental group. Furthermore, the researchers attribute the progress made by the experimental group to the experimental variable represented by virtual reality, which created a conducive training environment by engaging all senses of the experimental group members and stimulating their motivation towards training. This helped in fostering structured scientific thinking, making the learning and training process smoother. It enabled the player to feel a sense of self-worth and their role in the training process, leading to a better understanding and awareness of the facts and knowledge associated with the level of physical performance and correct learning. On the other hand, the traditional method of verbal explanation and practical performance does not enable some players to follow the explanation, thereby making it difficult for them to understand what is required of them. The results of this study are in agreement with the findings of the study by Ali and Ferdig, which confirmed that educational technology represents the most advanced method in the training process. The program consists of small, easy, and gradual steps, making it the most effective and efficient form of training for enabling a positive role of the player in training units, distinguished by positive reinforcement for the players. It also has a positive impact on physical level variables (21). Similarly, Qassem emphasized, "Exercises in virtual reality should be graduated in difficulty level from easy to difficult" (14).

In another perspective, the researchers see the development in the physical abilities under study as due to the exercises applied within the training program for the sample with appropriate repetitions and rest periods. These exercises were

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performed by the sample individuals using virtual reality technology, designed to develop physical abilities and correct performance, thereby achieving the desired optimal performance. Ashraf mentions, "Training is a series of repetitions and exercise periods between each repetition with intervals for rest, and these intervals extend according to the achievement of development" (1). Tamer, in his study, emphasizes "the contribution of repetitions in exercises to reducing random movements, and that exercises performed with repetitions lead to the disappearance of many unnecessary random movements in the performance" (4). This is also confirmed by Salem in his study, stating "if the repetitions are regular and coordinated with the intensity in terms of increasing the intensity and reducing the number of repetitions, this will inevitably achieve the desired goal of the training units" (10).

Conclusions:
Through the discussion and interpretation of the results, the following can be concluded:
1. The use of virtual reality exercises positively contributed to improving the physical abilities of the experimental group.
2. The experimental group, which used the program designed with virtual reality technology, outperformed the control group which used traditional methods (verbal explanation and practical demonstration) in terms of physical abilities variables.
3. The effectiveness of the program designed with virtual reality technology in developing the physical abilities of the research sample.

Recommendations:
In light of the conclusions of the study, the researchers recommend:
1. The necessity of using virtual reality due to the positive impact it has demonstrated on the physical performance level of the research sample.

2. The importance of considering the differences in physical characteristics among children when teaching various physical abilities.
3. Conducting more experimental studies and research on the use of technological devices in the field of learning at the level of sports education colleges and swimming units to improve educational, training, and physical processes most comprehensively and to keep pace with the developments occurring in advanced countries.

Author's declaration:
Conflicts of interest: None
We confirm that all tables and figures in this article are ours and written by the researchers themselves.
Ethical-Clearance: this manuscript approved by local ethical committee of physical education and sport sciences college for women on (January /2024)

Author's contributions:
All contributions of this study were done by the researchers (H.D. and L.A.) who get the main idea and work on writing and concluding also with number of experts, Muqdad Basheer Hasan (Al-Imara University College) in Statistics, Urska Dobersek in revision, Inaam Ghalib in translating, Khitam Mousa in proofreading
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Appendix (1) Training Unit Model
Training Unit(1)

Month: First
Week: First   Unit Objective: Developing the physical abilities under investigation
Location: Specialized Schools for Table Tennis Players   Total Intensity: 81%
Day and Date: Thursday, 3/3/2022   Total Duration: 105 m
Work to Rest Ratio: (1:1) (1:2)
Research Sample: (Young Table Tennis Players)
Number of Players: (10)

Unit Sections	Time	Exercises	Exercise Intensity	Exercise Duration	Repetitions\	Rest between Repetitions	Total Work	Total Rest	Number of Sets	Rest between Sets	Total Duration
The main section	105 m	(A1)	%75	120 Sec	6	120 Sec	720 Sec	Sec 600	2	360 Sec	1680 Sec
		(A2)	%80	90 Sec	8	180 Sec	720 Sec	Sec 630	2	360 Sec	1710 Sec
		(B3)	%90	60 Sec	10	120 Sec	600 Sec	Sec 540	2	300 Sec	1440 Sec
		(C5)	%80	90 Sec	7	180 Sec	630 Sec	Sec 540	2	315 Sec	1485 Sec

تأثير منهاج تدريبي بالعــالم الافتراضي في بعض القــدرات البدنية لدى ناشئي تنس الطــاولة

هيفاء داوود حمود [1] ، لقاء عبد الله علي [2]

2&1 جامعة بغداد / كلية التربية البدنية و علوم الرياضة للبنات

فإنَّ أهمية البحث تتجلى في ضرورة معرفة تأثير تمرينات العالم الافتراضي الواقعي ودورهُ في تنمية بعض القُدرات البدنية لناشئ تنس الطاولة في العملية التدريبية اعتماداً على الأُسس التي يجب أن يضعها كُلُ مُدرب بالحسبان في العملية التدريبية والمُنافسات سواءً في اختيار نوع التمرينات وأسلوب تنفيذهُ أو في التأثيرات الناتجة عن استخدام التمرينات المُختلفة والتي من خلالها يُمكن الوصول باللاعب للمُستويات الرياضية العُليا وتحقيق نتائج جيدة. اما اهداف الدراسة وضع منهج تدريبي لِتمرينات العالم الافتراضي والواقعي يتلاءم وقُدرات عينة البحث من لاعبي تنس الطاولة وكذلك التعرف الى تأثير المنهج المعد وفقا للعالم الافتراضي والواقعي في بعض القُدرات البدنية للاعبي تنس الطاولة وكانت مشكلة البحث من خلال مُتابعة الباحثتان للوحدات التدريبية الخاصة بلعبة تنس الطاولة ، وجدت إنَّ هُنالك قلة الاعتماد على استعمال اساليب تدريبية حديثة، من المُمكن أن تحدث التطور الملموس والواضح في تطوير هذهِ اللعبة ولاعبيها، وعلى وجه الخصوص الاساليب التي تُستعمل فيها الادوات التدريبية الحديثة والمُساعدة، وكذلك التقنيات الالكترونية التي يستخدمها العالم الحديث، ومن هذهِ التقنيات الحديثة هي استخدام تمرينات تربط بواقع تدريبي افتراضي، فضلاً عن الواقعي والدمج بينهما، ومعرفة مدى تأثير هذا الواقع الذي يُستخدم بالصورة العلمية والدقيقة على قُدرات اللاعبين البدنية. لذا ارتأت الباحثتان معالجة هذه الثغرة التدريبية بشكل علمي دقيق من خلال وضع منهج تدريبي يعتمد على تمرينات علمية تتضمن في واقع افتراضي وواقعي، وتأثير هذهِ التمرينات ضمن هذا الاسلوب التدريبي الحديث والذي يعتمدهُ العالم الحديث، في القُدرات البدنية للاعبين تنس الطاولة الناشئين، ووضعهُ في خدمة مُدربي واكاديمي تنس الطاولة في بلدنا، واستعملت الباحثتان المنهج التجريبي لملائمته مشكلة الدراسة , وتحدد مجتمع البحث وهم اللاعبين الناشئين في لعبة تنس الطاولة للموسم الرياضي 2022-2023 ، وكانت عينة البحث (20) لاعب ، موزعين الى مجموعتين (10) لاعبين مجموعة تجريبية و (10) لاعبين مجموعة ضابطة بعدها تم اجراء التجربة الرئيسة للحصول على نتائج الدراسة ومعالجتها احصائياً اذ استنتجت الباحثتان ان استخدام تمرينات الواقع الافتراضي ساهمت بطريقة إيجابية في رفع المستوى القدرات البدنية للمجموعة التجريبية, تفوق المجموعة التجريبية التي استخدمت البرنامج المعدة بتقنية الواقع الافتراضي على المجموعة الضابطة التي استخدمت الطريقة التقليدية الشرح اللفظي والنموذج العملي) في متغيرات القدرات البدنية، وهذا ما يحقق احد اهداف التنمية المستدامة للامم المتحدة في العراق (التعليم الجيد). وعلى ضوء تلك الاستنتاجات توصي الباحثتان ضرورة استخدام الواقع الافتراضي لما أثبتته نتائج في هذا البحث من وجود تأثير إيجابي لها على مستوى الأداء البدني لعينة البحث، وأهمية مراعاة الفروق في الخصائص البدنية بين الاطفال عند تعليم القدرات البدنية المختلفة.

الكلمات المفتاحية	تمرينات العــالم الافتراضي ، القــدرات البدنية ، ناشئي تنس الطــاولة.