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Effect of (T.R.X) training to develop some bio-kinetic capacities of gym trainees aged 25-30 years

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Abstract

The research introduction and importance lies in using of (T.R.X) Training to develop specific bio-kinetics capacities among gym trainees aged 25-30 years, and the research problem was determined by how to use the (T.R.X) training in a directed and effective manner to develop the bio-kinetic capabilities and the physical skills of the trainees, whether that is based on specific scientific foundations or based on the experiences of experts and coaches. The research aims to prepare a (T.R.X) Training to develop specific bio-kinetics capabilities, and to know the effect of (T.R.X) Training to develop specific bio-kinetics capabilities among gym trainees aged 25-30 years. The researchers adopt an experimental approach, selecting a sample of 10 gym trainees over the course started from January 1, 2024, to April 20, 2024. After applying the pre-tests, training course and the post-tests, the results were processed statistically by using (SPSS).there are significant differences between the pre and post-tests for Explosive arm power (4.96), Explosive leg power (7.20), Speed-strength for arms (7.48), Speed-strength for legs (6.61), Agility (8.88), Flexibility (4.17), Coordination (Hand-eye coordination) (6.06), as the significance level was ≤ 0.05 for all the variables of study. The researchers concluded that the use of (T.R.X) training led to develop of specific bio-kinetics capabilities (agility, flexibility, and coordination) among gym trainees aged 25-30 years.

Keywords: T.R.X, training development, sports training, gym trainees, continuous workout

Introduction

Research Introduction and Its Significance

The effectiveness of sports training depends on continuous workout as a basic for achieving good results, and to develop, improve, and enhance trainees' performance to the highest possible level. The update training methods is attributed to general facts related to the field of sports training and utilization of scientific research outcomes. Therefore, the selection of training methods depends on accurate diagnosis and description of the required performance, and constructing the used exercises based on a precise analysis of performance needs and technical specifications for training development.

The concept of modern tools and techniques used during sports training is considered one of the key factors in developing training programs and successfully achieving their goals. The range of available tools and techniques has greatly expanded, diversified in forms and usage methods, making their availability necessary to ensure success in training programs and improve trainees' performance in gyms.

Moreover, the use of modern tools and techniques by coaches in trainings is a key factor contributing to enhancing the fitness level of trainees. With these tools, trainees can guide exercises more effectively and identify areas for improvement more accurately, which helps to achieve positive results more quickly.

Recently, new methods have emerged in the field of exercise known as T.R.X (Total Resistance exercises) suspension training as an effective tool for developing bio-kinetic capacities of gym trainees. These exercises are considered optimal methods for achieving comprehensive and sustainable fitness goals, using body weight against gravity to build strength, develop balance, coordination, flexibility, enhance muscle endurance and agility, and improve strength endurance.

The effectiveness of (T.R.X) training depends on engaging abdominal, back, and pelvic muscles by using a variety of exercises.

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The main advantage of these methods is their usability for all ages and genders, thanks to their adjustability to suit individual differences among participants.

Therefore, the importance of research lies in the use of (T.R.X) training to develop the skills and capacities of trainees, as it can effectively and sustainably contribute to improving physical fitness levels and enhancing athletic performance.

Research Problem

The research problem lies in how to enhance the bio-kinetic capacities of gym trainees using T.R.X (Total Resistance exercises) training, by employing advanced and effective training methods. The research problem can be formulated through several questions:

- How to use these exercises to develop the bio-kinetic capacities and physical skills of trainees, whether based on specific scientific foundations or on the experiences of experts and coaches.
- What is the availability of training programs compatible with the needs of trainees and the conditions of exercising in gym settings? Whether through exercises targeting specific physical structures or exercises aiding in the development of various athletic skills?

In order to find suitable solutions to this problem, the researchers conduct an experiment involving the use of (T.R.X) training as a developmental tool for gym trainees, aiming to understand the impact of these exercises on enhancing the physical and skill performance of trainees and directing efforts towards developing training practices in this field.

Research's Objectives

- Prepare T.R.X training course for gym trainees aged 25-30 years.
- Knowing the effect of T.R.X training on enhancing specific bio-kinetic capacities of gym trainees aged 25-30 years.

Research's Hypothesis

There are statistically significant differences between pre-test and post-test measurements in some bio-kinetic capacities of gym trainees aged 25-30 years.

Research Scope

Subject: Female gym trainees aged (25-30) years.

Duration: From January 1st 2024, April 20th 2024.

Place: (Best Body) gym in Baghdad, Iraq.

Research Methodology and Field Procedures

Research Methodology

The researchers utilized an experimental approach due to its suitability for the nature of the study, employing a single-group experimental design and following pre-test and post-test for this group.

Research Population and Sample

The research community is represented by (13) female gym participants at (BEST BODY) gym in Baghdad for the year 2024, aged 25-30 years. The sample was deliberately chosen, resulting in a research sample of 10 participants after excluding 3 participants due to their involvement in the exploratory experiment. Thus, the sample percentage reached 76.92% of the original research community. To determine the sample distribution, the researchers utilized the skewness coefficient as shown in Table 1.

Table 1: Homogeneity and equivalence of the research sample using skewness coefficient in the study variables

Number unit	Variable	Unit of Measurement	Mean	± Standard Deviation	Median	Skewness
1	Height	cm	165.30	2.79	165.50	0.232
2	Body mass	kg	78.50	3.44	79	0.246
3	Age	years	28.50	1.90	29.508	0.911
4	Explosive arm power	m	2.62	0.51	3	0.64
5	Explosive leg power	cm	64.37	1.84	64	0.53
6	Speed-strength for arms	Count	8.37	1.40	8.50	0.48
7	Speed-strength for legs	Count	10.87	1.35	10.50	0.29
8	Agility	Second	21.75	1.28	21.50	0.61
9	Flexibility	cm	21.01	1.48	20.87	0.61
10	Coordination (Hand-eye coordination)	Count	6.88	0.99	7	0.86

Data collection methods and tools used in the research

The researchers utilized the following methods, tools, and devices:

1. Arabic and foreign references.
2. Tests and measurements.
3. Personal interviews (Refer to Appendix 1).
4. Survey experiment.
5. Observation and experimentation.
6. Assistant work team (Refer to Appendix 2).
7. Whistles, quantity (2).
8. Length and weight measuring device.
9. Stop watch, type (Omega), quantity (1).
10. Elastic bands and ropes.
11. Medicine ball.
12. Adhesive tape.
13. 30 m measuring tape.
14. Laptop device, type (HP Pavilion DV6).

Field Research Procedures

Variables and Tests used in the research

After conducting a survey of some sources related to the study, the researchers selected a number of variables to achieve the research objectives.

The variables under study	The tests related to the variables are as follows:
Explosive power of the arms	Medicine ball push test with 3 kg for hands (Mohammed Hassan Alawi and Mohammed Nasr Al-Din Radwan: 2001) (1)
Explosive power of the legs	Explosive power test for legs (Mohammed Hassan Alawi and Mohammed Nasr Al-Din Radwan: 2001) (2)
Speed-strength of the arms	Arm flexion and extension from prone position (Mohammed Sabri Hassanein: 1987) (3)

Speed-strength of the legs	Leg flexion and extension for full range in 15 seconds (Dgson, 1996) (4)
Agility	Curved running using the Barrow method (Mohammed Hassan Alawi and Mohammed Nasr Al-Din Radwan: 1982) (5)
Flexibility	Trunk flexion forward from modified long sitting position (William D. McArdle: 2001) (6)
Coordination	Measurement of leg and eye coordination (Ali Saloum Jawad: 2000) (7)

The Exploratory Experiment

The researchers conducted an exploratory experiment with 3 trainees from the gym on Tuesday, January 9, 2024, at 5:00 PM at the "Best Body" gym. The aim of the experiment was to ensure the validity of the devices used. It was found that all devices were operational. Additionally, the researchers aimed to identify any obstacles encountered during the main experiment. Some obstacles were identified and addressed during the main experiment. The exploratory experiment also aimed to assess the suitability of the tests for the gym trainees, their response to the tests, the duration required to perform the tests, the timing of training units, rest periods, and appropriate intensities. Furthermore, it aimed to anticipate and address potential errors, identify obstacles that may arise during the execution of the tests and the training program, and define the responsibilities of the assisting team.

Pre-test: The pre-tests were conducted on 15-16 /1/ 2024.

Main Experiment: From 21/1/2024 to 14/3/2024.

The researchers prepared TRX training to enhance the bio-kinetics capabilities of trainees in gyms. The training course was implemented from 21/1/2024 to 14/3/2024 as follows:

- **Program duration:** 8 weeks.
- **Number of units per week:** 3 training units.
- **Total number of training units during the program:** 24 units.
- **Warm-up and cool-down time per unit:** 15 minutes

for warm-up and 5 minutes for cool-down.

- **Total warm-up time during the program:** 360 minutes.
- **Total cool-down time:** 120 minutes.
- **Average duration of TRX training per unit:** 50-70 minutes.
- **Total duration of TRX training during the program:** 1,440 minutes.
- **Unit duration:** 90 minutes.
- **Total course duration:** 2,160 minutes.
- **Training method used:** Periodization and repetition.
- **Post-test:** The post-tests were conducted under the same conditions as the pre-tests on 17-18 /3/2024.
- **2-5 Statistical Methods Used in the Research:** The researchers utilized the Statistical Package for the Social Sciences (SPSS) version (V24) to process the results, including mean values, standard deviation, median, skewness coefficient, and the t-test.

Results and Discussion

Discussion and Analysis of results for bio-kinetics capabilities between pre-test and post-test for the experimental group.

In this study, the researchers presented the results of the experimental group, including the functional efficiency and cardiac output variables, and analyzed and discussed them scientifically based on scholarly sources.

Table 2: Illustrates the means, standard deviations of the research group, as well as the differences in means and standard deviations, the calculated t-value, and the significance of the differences between the pre-test and post-test results for the bio-kinetics capabilities of the experimental research group.

Variable	Pre-test (Before)		Post-test (After)		Post	Pre Post	T value	Level of significance	Significance
	M	SD	M	SD					
Explosive arm power	2.62	0.51	3.75	0.46	1.12	0.64	4.96	0.002	Significance
Explosive leg power	64.37	1.84	66.50	1.41	2.12	0.83	7.20	0.000	Significant
Speed-strength for arms	8.37	1.40	10.37	1.68	2	0.755	7.48	0.000	Significance
Speed-strength for legs	10.87	1.35	14.12	1.45	3.25	1.38	6.61	0.000	Significant
Agility	21.75	1.28	20.12	1.24	1.62	0.51	8.88	0.000	Significance
Flexibility	21.01	1.48	21.31	1.64	0.30	0.20	4.17	0.004	Significant
Coordination (Hand-eye coordination)	6.88	0.99	9.63	1.06	2.75	1.28	6.06	0.001	Significance

(*) Degrees of freedom (10-1 = 9)

(*) Significance at the level of (0.05) if the level of error ≥ 0.05

Based on Table 2, it is evident that there are statistically significant differences between the pre-test and post-test results in the bio-kinetics capabilities. The researchers attribute this to the impact of using (T.R.X) training on arms and legs muscles, leading to an improvement in bio-kinetics capabilities. They attribute these changes and the significant improvement in bio-kinetics capabilities to the well-planned (T.R.X) training program, which regulated training loads in a scientifically appropriate manner tailored to the age and training stage of the sample of the study. The researchers emphasize the importance of training with progressive loads, targeting various muscle groups, especially those of the arms and legs. Additionally, selecting body angles with respect to the ground aids in increasing resistance capacity, thereby increasing the workload on the muscles and consequently enhancing muscular efficiency. This contributed to the development of the bio-kinetics variables

under investigation, consistent with the findings of studies such as that conducted by Abdulaziz Jasim Ashkani (2016) [8]. The researchers believe that the observed improvement in explosive strength and explosive speed is attributed to the systematic and scientific use of TRX exercises, when participants benefited from a shift away from traditional training methods. The organized implementation of TRX exercises effectively contributed to enhancing bio-kinetics capabilities. TRX exercises are characterized by their ability to develop muscle strength without the need for additional weights or other forms of resistance, relying solely on body weight as natural resistance. The application of TRX exercises included a variety of exercises aimed at developing muscle strength in all its forms, including squat jumps, whether using both legs and a single leg. This was affirmed by Victor Dulcena, who stated that "TRX exercises are a treasure in the field of sports training, as they represent

an advanced form of resistance training aimed at developing muscle strength in all its forms without the use of heavy weights or other forms of resistance. They only use body weight as natural resistance during performance."^[9]

Furthermore, the development of bio-kinetics capabilities is attributed to exercises performed with instability, which challenge muscle function, thereby increasing muscle strength and enhancing stability. This development is positively influenced by balance and stability training, contributing to improved bio-kinetics capabilities and proper muscle function. When exercise movements are coordinated and focused, muscle structure operates more efficiently, ultimately leading to improved bio-kinetics capabilities and ongoing development.

Moreover, the researchers carefully designed exercises to enhance the bio-kinetics capabilities of the trainees, adopting a sequential arrangement of exercises while paying special attention to balancing intense work and sufficient rest between training units. The exercises were implemented using varying levels of intensity, with a focus on avoiding maximal fatigue to ensure the readiness of the trainees and their nervous system for optimal performance. This allows muscles the opportunity to replenish the energy needed for optimal performance, given the nature of the exercises that require intense muscular readiness. This aligns with the findings of Jamal Sabri Faraj (2018), who stated that athletes need between 36-48 hours of rest or low-intensity training before performing exercises with maximal intensity. This is necessary for replenishing the energy stores required for such exercises, which demand maximal or near-maximal intensity training, as well)^[10].

The researchers attribute the observed improvement in bio-kinetics capabilities (agility, flexibility, and coordination) to the T.R.X training program, which encompasses a series of exercises utilizing the body's own weight as resistance. These exercises are designed to strengthen all muscle groups in the body, including the abdominal and back muscles, which provide support to multiple areas of the body during performance. The abdominal and core muscles, responsible for maintaining spinal strength and flexibility and balancing the body during stability and movement, are particularly engaged in these exercises. These exercises not only achieve a balance between strength and flexibility or between active and inactive muscles but also enable individuals to move their bodies without falling. Moreover, the training program is grounded in scientific and practical principles, which have contributed to enhancing all coordination capacities. Essam Abdel Khaleq (2005)^[11]. Emphasizes that the principle of continuity in training is crucial for developing the training status and capabilities of trainees and for maintaining what has been acquired throughout the training process, thereby improving performance by enhancing the efficiency of active muscles. Burns Nick (2007)^[12] confirms that "TRX training is one form of resistance training using elastic ropes aimed at directing the resulting force towards performance and leading to multi-level and integrated movements." As for the development of agility, the researchers attribute it to the effectiveness of TRX exercises incorporated into the training curriculum and the consideration given to progressively imparting trainees with various movements. Furthermore, the researchers emphasized the importance of following a graduated approach to exercises based on scientific principles. One crucial aspect they focused on was prioritizing these abilities in the training unit, as they require

full readiness, and ensuring that the central nervous system is adequately prepared for these exercises. Simultaneously, the training loads should not remain consistently high or low in intensity but should follow a principle of fluctuation between high and low intensities in TRX exercises. Suspended exercises allow for a gradual increase in intensity from weak to maximum, aiming to enhance agility, flexibility, coordination, and muscle strength.

Conclusions and Recommendations

Conclusions

Based on the foregoing, the following conclusions have been reached

1. TRX exercises have led to the development of bio-kinetics capabilities (explosive power and speed-specific strength) for the arms and legs among trainees aged 25-30 years.
2. The use of TRX exercises has also resulted in enhancement of bio-kinetics capabilities (agility, flexibility, and coordination) among trainees aged 25-30 years.
3. TRX exercises have contributed to increasing excitement, motivation, and engagement among trainees without inducing boredom.
4. Applying of TRX exercises using interval and repetitive training methods is highly suitable for trainees aged 25-30 years.

Recommendations

Based on the above, the researchers recommend the following

1. It is imperative to prioritize TRX exercises due to their significance to develop bio-kinetics capabilities among trainees aged 25-30 years.
2. Use TRX exercises to explore other unexplored biomechanical capabilities among trainees in gymnasiums aged 25-30 years.

Conduct similar studies using TRX exercises for different age groups and both genders to ascertain their impact on various physical abilities and functional variables.

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Appendix (1)**Personal Interviews**

No.	Name	Specialization	Workplace
1.	Prof. Abdul Karim Fadel	Training-Fencing	University of Baghdad / Physical Education and Sports Sciences
2.	Prof. Fadel Dhaham Mansour	Training-Football	University of Wasit / Physical Education and Sports Sciences
3.	Assoc. Prof. Zeina Abdul Amir	Physical Fitness	University of Baghdad / Physical Education and Sports Sciences

Appendix (2)**Team Members**

No.	Name	Position
1.	Neeran Khalil	PhD in Physical Education and Sports Science
2.	Nadine Fareed	Master's in Physical Education and Sports Science
3.	Shatha Hadi Rahi	Bachelor's in Physical Education and Sports Science