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The Effect Of A Proposed Training Programme On Increasing Muscle Mass In Bodybuilders

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Abstract

After the great spread of the sport of bodybuilding at the global level in general and African in particular, and as a specialist in this game as a fitness and bodybuilding trainer, we decided to study this topic using a proposed training programme to increase body muscle mass in bodybuilders, which is a goal for all athletes to be more agile and slender. To address this issue, a purposive sample of 18 practitioners was selected and divided into two samples of 9 practitioners each, a control group working with the traditional training programme and the other experimental group working with the proposed training programme.

We observed that the experimental sample witnessed a significant improvement and development compared to the control sample that worked with the traditional programme, and this is due to the effectiveness of the proposed training programme based on correct scientific foundations, taking into account all matters that the game is subject to, whether training and exercises, dietary programme, or matters related to rest and recovery.

The results of the post-tests between the control and experimental groups showed a positive development in favour of the experimental sample, according to the proposed training programme that used various modern training techniques.

Keywords: Proposed training programme - Increasing muscle mass.

Introduction

The sport of bodybuilding is becoming increasingly popular among young people, who have become regular visitors to the gym.

To gain a toned physique and a significant muscle mass characterised by density and clarity by following a rational training programme accompanied by a diet rich in carbohydrates to provide the body with the necessary energy in muscle contractions.

To provide the body with the necessary energy in muscle contractions, in addition to the need to eat proteins continuously in order to ensure good recovery to build and maintain muscle fibres that are mainly responsible for muscle hypertrophy, and this is what leads some bodybuilding practitioners

This leads some bodybuilders to take synthetic protein, claiming that it is the best way to improve and accelerate the recovery process (recovery) and beyond recovery and thus obtain better results in a short time compared to others who do not use synthetic protein.

With the increasing number of bodybuilding practitioners, especially young people, who often race against time in order to get a muscular body as soon as possible without taking into account the scientific methodology and phasing that protects the natural development of the body's muscles. It is worth noting that a significant number of bodybuilders disregard the trainer's advice regarding the need to programme the recovery process.

In the bodybuilding competition, contestants strike a variety of stances on stage and are judged according to their muscular mass, symmetry, and definition.**(cyrino, sobrinho, maesta, nordo, dos reis, and moreilli, 2008).**

Furthermore, resistance training (RT) for bodybuilders and trained subjects must be carefully designed to ensure a progressive overload through appropriate management of training loads (i.e., periodization), avoid non-functional overreaching or overtraining development over time, and guarantee a sustained stimulus.**(prestos, de lima, frollini ,donatto, and conte, 2009)**

Preparation for bodybuilding typically consists of two stages. A pre-contest phase, where the major goal is to decrease body fat levels while retaining muscle mass, and an off-season phase, where the main goal is hypertrophy. Therefore, optimizing muscle growth is essential for success in the sport, particularly in the first period. As such, exact attention to nutrient and energy intake, together with appropriate adjustment of resistance training variables, are critical off-season concerns. **(alex**, **joao pedro**, **brad**, **andero ,and edilson**, **2019)**

With an analytical look at the training reality and through the researcher's modest experience as a lover and practitioner of the sport of bodybuilding and his work as a personal trainer (personal trainer) in many bodybuilding gyms and following many bodybuilders and through his study, it became clear to him that there is an urgent training need to search for effective training methods and tools whose use leads to the achievement of maximum benefit and training gains (physical) whose impact is transmitted to the level of actual performance And that the diversity of training systems is one of the factors that help to improve the training process, especially training and training systems that depend on the performance of the individual compared to himself without being associated with others, and on this basis, the researcher believes that the use of his training programme can achieve many benefits and training gains for the muscle mass of the bodybuilder, and therefore the researcher came to the following question:

- Does the proposed training programme affect the increase in muscle mass of bodybuilders?

- Research hypotheses:

Hypothesis 1: There are no differences in muscle mass between the pre-test and post-test in the control group

Hypothesis 2 : There are differences in muscle mass between the pre-test and post-test in the experimental group due to the training programme.

- **Objective of the research:**

This research aims to design a proposed training programme to develop muscle mass in bodybuilding practitioners. The research also seeks to encourage researchers and trainers to work on using innovative techniques in bodybuilding, and to modernise training procedures using modern science as a sport with multiple aspects (competitive, aesthetic and recreational).

- **The importance of the research:**

The importance of this research lies in the legalisation of modern training programmes using modern equipment (in bodybuilding) and supported by recent studies. Moreover, the implementation of this training programme, which mimics the dietary and training programmes, is based on correct scientific foundations away from randomness. It also increases the practitioner's muscular activity and development faster, allowing for proper and timely adaptation to the demands of muscular work and physical loads at different training levels. This is in order not to resort to prohibited substances such as steroids and hormones to achieve the desired results.

- METHODS

- Participants

We ran this study for eight weeks, using two weeks for measurements and evaluations and six weeks for the suggested training regimen. The aforementioned muscles' morphological and anthropometric measures were taken at weeks one and eight of the Off-Season period, under the guidance of knowledgeable trainers. The athletes did not engage in any other activity during the training phase in order to ascribe the results to the suggested training program and to acquire good, meaningful, and generalizable results.

The research population consisted of 18 athletes divided into two samples of 9 individuals each. A sample of 9 individuals underwent the proposed training programme and a control sample underwent its traditional training programme and we performed pre and post measurements of the two samples to know the effectiveness of each programme.

- RESULTS

- Analyse and discuss the results:

Table 01: Normal distribution test for the two groups

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Stats	Degree of freedom	Probability level	Stats	Degree of freedom	Probability level
Height	0,098	20	,200*	0,964	20	0,619
Weight	0,113	20	,200*	0,961	20	0,572
Biological age	0,093	20	,200*	0,977	20	0,897
Training age	270,2	20	380,0	9390,	20	2330,

Significance level at 0.05*

The Shapiro-Wilk test values for height, weight, biological age, and athletic age are shown in the above table. Each value has a probability level of (0.619, 0.572, 0.897, and 0.233), and as these values are more than 0.05, it can be concluded that the .data are normally distributed

We shall rely on the parametric tests because it is evident from .the table's results that the values are normally distributed

Table 02: Homogeneity test

		Arithmetic mean	Standard Deviation	T Student	Degree of freedom	Probability	Significance
Height	**The control sample**	173,10	9,71	-1.024	18	0.320	Not statistically significant
	Experimental sample	177,70	10,37				
Weight	**The control sample**	74,40	11,07	-1.664	18	0.113	Not statistically significant
	Experimental sample	83,10	12,28				
Biological age	**The control sample**	26,20	4,69	-0.207	18	0.838	Not statistically significant
	Experimental sample	26,60	3,92				
Training age	**The control sample**	3,20	1,62	-1.268	18	0.221	Not statistically significant
	Experimental sample	4,30	2,21				

The probability values of (height=0.320), (weight=0.113), (athletic age=0.221), and (biological age=0.838) in the following table are larger than 0.05, indicating that there are no statistically significant differences. Stated differently, there is a homogeneity of values between the experimental and control groups.

Table 03: Equivalence test

	K^2	Degree of freedom	Probability	Significance
Height	27.000	18	0790.	Not statistically significant
Weight	21.000	14	0.102	Not statistically significant

Biological age	19.500	14	0.147	Not statistically significant
Training age	6.386	07	0.496	Not statistically significant

The K2 value for the following variables is greater than 0.05, indicating that there is equivalency between the two groups: height = 27.000 with degree of freedom (18), weight = 21.000 with degree of freedom 14), biological age = 19.500 with degree of freedom 14), and sports age = 6.386 with degree of freedom 07, according to the above table pertaining to the K2 test.

Present and analyse the results of the first hypothesis:

- **There are no differences in muscle mass between the pre-test and post-test in the control group.**

Table No. 04: The t-value between the pre-test and post-test in chest circumference for the control group

		Arithmetic mean	Standard Deviation	T student	Degree of freedom	Probability level	Significance
Chest circumference	pre-test	101,70	7,09	0.382	9	0.711	Not statistically significant
	post-test	101,37	7,85				

The arithmetic mean and standard deviation of the pre-test and post-test chest circumference measurements are shown in the above table as (101.70±7.09) and (101.37±7.85), respectively. The value of t(0.382) at the degree of freedom 9 indicates that there are no statistically significant differences in the chest circumference measurements for the control group, with a significance level of 0.711 that is greater than 0.05.

Table 05: Student's t-value between pre-test and post-test in arm circumference for the control group

		Arithmetic mean	Standard Deviation	T student	Degree of freedom	Probability level	Significance
The arm	pre-test	33,70	2,75	-1.561	9	0.153	Not statistically significant
	post-test	34,05	2,70				

The arithmetic mean and standard deviation of the arm circumference pre-test was 33.70±2.75, and the post-test's was 34.05±2.70. The t value was (-1.561) at 9 degrees of freedom, with a significance level of 0.153, which is greater than 0.05, indicating that there are no statistically significant differences in arm circumference for the control group between the pre-test and post-test.

Table 06: Student's t-value between pre-test and post-test in the abdominal muscles of the control group

		Arithmetic mean	Standard Deviation	T student	Degree of freedom	Probability level	Significance
Abdominal muscle circumference	pre-test	82,80	4,76	-0.293	9	0.776	Not statistically significant
	post-test	82,90	4,64				

The abdominal muscle circumference pre-test and post-test mean and standard deviations are shown in the above table as (82.80±4.76) and (82.90±4.64), respectively. The t-value is (-0.293) at degree of freedom 9 and significance level is 0.776, which is greater than 0.05, indicating that there are no statistically significant differences in abdominal muscle circumference for the control group between the pre- and post-tests.

Table 07: Student's t value between pre-test and post-test in thigh circumference for the control group

		Arithmetic mean	Standard Deviation	T student	Degree of freedom	Probability level	Significance
Quadriceps circumference	pre-test	59,10	1,52	-2.018	9	0.074	Not statistically significant
	post-test	60,00	2,13				

The arithmetic mean and standard deviation of the pre-test and post-test thigh circumference measurements are shown in the above table as (59.10±1.52) and (60.00±2.13), respectively. The t value at a degree of freedom 9 is (-2.018), and the significance level is 0.074, greater than 0.05, indicating that there are no statistically significant differences in thigh circumference for the control group between the pre- and post-test measurements.

Table 08: Student's t-value between pre-test and post-test in the circumference of the calves of the control group

		Arithmetic mean	Standard Deviation	T student	Degree of freedom	Probability level	Significance
Calves circumference	pre-test	39,10	2,13	0.557	9	0.591	Not statistically significant
	post-test	39,00	2,05				

According to the above table, the arithmetic mean and standard deviation of the pre-test and post-test calf muscle circumferences were 39.10±2.13) and 39.00±2.05), respectively. The t-value was (0.557) at a degree of freedom 9 and the significance level was 0.591, which is greater than 0.05, indicating that there are no statistically significant differences between the pre-test and post-test calf muscle circumference for the control group.

Table 09: Student's t value between pre-test and post-test in weight for the control group

		Arithmetic mean	Standard Deviation	T student	Degree of freedom	Probability level	Significance
Weight	pre-test	74,40	11,07	-2.109	9	0.064	Not statistically significant
	post-test	75,65	10,49				

The arithmetic means and standard deviations for the pre-test and post-test weights reached (74.40±11.07 and 75.65±10.49, respectively) and the value of t (-2.109) at degree of freedom 9 are shown in the above table. The significance level of 0.064, which is greater than 0.05, indicates that there are no statistically significant differences in the weights of the control group between the pre-test and post-test.

- **Presentation and analysis of the results of the second hypothesis:**
- **There are differences in muscle mass between the pre-test and post-test in the experimental group due to the training programme.**

Table No. 10: Showing the t-value between the pre-test and post-test in chest circumference for the experimental group

	Arithmetic mean	Standard Deviation	T student	Degree of freedom	Probability level	Significance

Chest circumference	pre-test	105,80	7,39	-7.162	9	0.000	Statistically significant
	post-test	108,57	7,50				

The arithmetic means and standard deviations of the pre- and post-test chest circumference for the experimental group were 105.80±7.39 and 108.57±7.50, respectively, according to the above table. The t value was (-7.162) at a degree of freedom 9 and the significance level was 0.000, which is less than 0.05, indicating that there are statistically significant differences in favor of the post-test in the chest circumference for the experimental group.

Table No. 11: Showing the t-value between the pre-test and post-test in arm circumference for the experimental group

		Arithmetic mean	Standard Deviation	T student	Degree of freedom	Probability level	Significance
The arm	pre-test	36,70	3,77	-8.573	9	0.000	Statistically significant
	post-test	38,10	3,78				

We can see from the above table that the pre-test's arithmetic mean and standard deviation for arm circumference was (36.70±3.77), while the post-test's arithmetic mean and standard deviation was (38.10±3.78). The t value at degree of freedom 9 was (-8.573), and the significance level was 0.000, which is less than 0.05, indicating that there are statistically significant differences in arm circumference between the pre-test and post-test for the experimental group that favor the post-test.

Table 12: T-value between pre-test and post-test in abdominal muscles for the experimental group

		Arithmetic mean	Standard Deviation	T student	Degree of freedom	Probabilit y level	Significance
Abdominal muscle circumference	pre-test	85,60	5,27	-1.772	9	0.010	Statistically significant
	post-test	86,35	5,69				

The arithmetic mean and standard deviation of the pre-test abdominal muscle circumference were 85.60±5.27), while the post-test's arithmetic mean and standard deviation was

86.35±5.69. The t value at degree of freedom 9 was (-1.772) with a significance level of 0.010, less than 0.05, indicating that there are statistically significant differences in abdominal muscle circumference between the pre-test and post-test for the experimental group in favor of the post-test.

Table 13: The t-value between the pre-test and post-test in thigh circumference for the experimental group

		Arithmetic mean	Standard Deviation	T student	Degree of freedom	Probability level	Significance
Quadriceps circumference	pre-test	60,50	2,37	-5.351	9	0.000	Statistically significant
	post-test	63,29	2,23				

The thigh circumference pre-test and post-test had arithmetic means and standard deviations of 60.50±2.37) and 63.29±2.23), respectively, according to the above table. The value of t (-5.351) at the degree of freedom 9 and the significance level of 0.000, which is less than 0.05, indicate that there are statistically significant differences in thigh circumference between the pre-test and post-test for the experimental group that favor the post-test.

Table No. 14: Showing the t-value between the pre-test and post-test in the circumference of the calves muscle for the experimental group

		Arithmetic mean	Standard Deviation	T student	Degree of freedom	Probability level	Significance
Calves circumference	pre-test	40,70	2,50	-2.449	9	0.037	Statistically significant
	post-test	41,30	1,92				

The arithmetic mean and standard deviation of the pre-test and post-test were 40.70±2.50 and 41.30±1.92, respectively, in the circumference of the calf muscle, as shown in the above table. The t value was (-2.449) at the degree of freedom 9, and the significance level was 0.037, which is less than 0.05, indicating that there are statistically significant differences between the pre-test and post-test in favor of the post-test for the experimental group.

Table 15: T-value between pre-test and post-test in weight for the experimental group

		Arithmetic mean	Standard Deviation	T student	Degree of freedom	Probability level	Significance
Weight	pre-test	83,10	12,28	-4.636	9	0.001	Statistically significant
	post-test	87,20	12,91				

The weight test results in a mean and standard deviation of 83.10±12.28 for the pre-test and 87.20±12.91 for the post-test, as shown in the above table. The t-value at degree of freedom 9 was -4.636, with a significance level of 0.001 (less than 0.05) indicating that there are statistically significant differences in the weight results between the pre-test and post-test for the experimental group that favor the post-test.

- **Discussing the results of the study**
- **Discussing the results of the first hypothesis: There are no statistically significant differences between the pre-test and post-test in the muscle mass of the control group**

Table 16: The Student's t-value between pre-test and post-test in muscle mass for the control group

		Arithmetic mean	Standard Deviation	T student	Degree of freedom	Probability level	Significance
Muscle mass	pre-test	63.28	3.24	-0.717	9	0.491	Not statistically significant
	post-test	63.46	3.37				

The arithmetic means and standard deviations of the pre-test and post-test muscle mass (total circumference) are shown in the above table. The t value at 9 degrees of freedom is (-0.717) with a significance level of 0.941, which is greater than 0.05, indicating that there are no statistically significant differences in the muscle mass (total circumference) for the control group between the pre-test and post-test. The individuals in the control group showed a little gain in muscle mass; this is because they continued to train in accordance with the previous program they were following.

From the observation of the previous tables related to the control group, which all tables showed that there were no statistically significant differences in the measured circumferences of the organs, as well as in the total weight of the athlete, we conclude that there are no statistically significant differences between the pre-test and post-test in the muscle mass of the control group, which is the hypothesis that we hypothesised, and therefore the hypothesis is fulfilled.

- **Discuss the results of the second hypothesis: There are statistically significant differences between the pre-test and post-test in muscle mass for the experimental group**

Table No. 17: Showing the Student's t-value between the pre-test and post-test in muscle mass for the experimental group

		Arithmetic mean	Standard Deviation	T student	Degree of freedom	Probability level	Significance
Muscle mass	pre test	65.86	3.38	-5.928	9	0.000	Statistically significant
	post-test	63.46	3.44				

The arithmetic mean and standard deviation of the pre-test and post-test in terms of muscle mass (total perimeters) for the experimental group were 65.86±3.38, and 67.52±3.44, respectively, from the above table. The value of t (-5.928) at a degree of freedom 9 and a significance level of 0.000, which is less than 0.05, indicate that there are no statistically significant differences in muscle mass (total perimeters) for the experimental group. This is because the suggested training program was implemented using scientific principles, accounting for training and sleep schedules as well as diet, and resulting in a considerable difference between the pre- and post-test results.

From the observations of the previous tables related to the experimental group, which all tables showed statistically significant differences in the measured organ circumferences, as well as in the total weight of the athlete, we conclude that there are statistically significant differences between the pre-test and post-test in the muscle mass of the experimental group, which is the hypothesis they imposed, and therefore the hypothesis is fulfilled .

- Conclusion:

Recently, some of the established principles of hypertrophy training have been called into question. Consequently, in order to optimize training efficacy, a deeper comprehension of important programming variables is needed. Coaches can create and implement evidence-based hypertrophy training that can improve athletic performance or hasten injury healing by following the training principles described in this review.

We looked at bodybuilders' training regimens. The examined research show that there is a pattern in the training organization that divides training into four distinct times periods: peak week, pre-contest, post-contest, and off-season. Our findings showed that the RT routines at these times consist of two to six sets of each exercise, with a repetition maximum (RM) of six to twelve, and four to five sets of exercises, with RM of twelve to fifteen, and rest intervals ranging from ninety seconds to three minutes**.(Hackett**, **Johnson** , **and chow, 2013)**

Based on the available data, it appears that there isn't a perfect load prescription to optimize muscle hypertrophy. When considering loading, there actually don't seem to be many restrictions as long as the effort is put in with a high degree of intensity. However, training volume is a crucial factor that needs to be taken into account.Excessive training volumes are required to optimise muscle growth. There are several ways to achieve this, and one of them is to train more frequently. According to available research, the best results are obtained from two to three training sessions per muscle group per week; but, in trained individuals, higher frequency (>3) may lead to even greater increases in muscular hypertrophy. **(howe, read, and Waldron, 2017)**

Researchers point out that muscle hypertrophy for most events has become one of the branches of sports training physiology (Muscle hypertrophy) and means increasing muscle mass and cross-section, and in fact the increase in muscle circumference is due to the increase in the width of the muscle fibres forming the muscle, where the growth of muscle size and hypertrophy occurs as a result of overloaded physical training, especially weight training, which has become necessary and essential when training players in collective events, including the game of basketball, which is one of the most important features of which is speed and strength when performing One of its most important features is speed and strength when performing, so the use of the amplification process for the muscles working in basketball contributes significantly to increasing the strength and speed of the players, not to mention increasing the spatial space for each player by increasing the size of the muscles, as modern trends when developing major training cycles (The Macrocycle) and after completing the transition period is planned to the process of muscle building through amplification and for most strength and speed events and this is clearly seen in bodybuilders.

Lastly, to provide the athlete with a fresh stimulus, program-level manipulations can be made to exercise sequence, repetition pace, and inter-set recovery intervals. These factors must to be taken into account in light of the objectives and desired result of each particular athlete.

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