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Comparative Study Between The Heavy Duty Training Method And The Classical Training Method

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Abstract

Purpose: The study aims to compare the effectiveness of the Heavy Duty training method with the classical method in the development of muscle strength and hypertrophy, focusing on the biceps brachii and triceps surae muscle groups.

Methods: The research was conducted over a period of 6 months at Panoramic Gym in Arad, involving a sample of 45 volunteers randomly divided into two groups: an experimental group (E.G.) and a control group (C.G.). The E.G. followed the Heavy Duty training method, while the C.G. followed the classical method. Strength tests (pull-ups and calf raises) and anthropometric measurements (arm and calf circumference) were used. Data were analyzed using arithmetic mean and standard deviation.

Results: The E.G. recorded a 19.9% increase in pull-ups and 9.7% in calf raises, while the C.G. showed increases of 16.5% and 4.9%, respectively. Arm circumference increased by 3.3% in the E.G. and 2.7% in the C.G., and calf circumference by 1.9% vs. 1.5%.

Conclusions: The Heavy Duty method generated superior progress in muscle strength and hypertrophy compared to the classical method, demonstrating greater efficiency in stimulating physiological adaptations through short and intense workouts, suitable for advanced athletes.

Keywords: heavy duty, bodybuilding, momentary muscular failure, hypertrophy, post-exercise recovery

Introduction

The Heavy Duty Training Method

The Heavy Duty training method is a high-intensity training system created and developed by Mike Mentzer. He realized that in order to achieve muscular hypertrophy, it is necessary to adopt a particularly high training intensity. He was among the first bodybuilders to understand that if an athlete correctly regulates training volume and frequency, they can make consistent progress in a relatively short time.

The intensity of effort at a given moment represents the percentage indicating the share of that effort relative to the maximum momentary muscular effort possible (Mentzer & Little, 2002).

High-intensity training is the only one capable of stimulating the body to use its resources sufficiently to trigger an adaptive response. Repetitive activities that require no more resources than are available will do nothing to stimulate growth. Ending a set before reaching exhaustion, just because an arbitrary number of repetitions was planned, will not sufficiently stimulate the muscles to achieve proper hypertrophy.

Performing a set until 100% of the maximum momentary muscular effort is required is the most important factor in the process of strength and muscle hypertrophy development (Mentzer, 1996).

Executing a set to momentary muscular failure ensures the surpassing of the so-called "critical level," below which hypertrophy will not be stimulated, and above which the hypertrophy process is triggered (Herlo, 2005).

Regarding post-exercise recovery and muscular hypertrophy, we are dealing with two distinct physiological processes, both of which require a certain amount of time to occur. When training is prolonged or rest periods between sessions are too short, hypertrophy will suffer.

Sports training practice shows that 2–3 sets per exercise (excluding warm-up sets) are sufficient to stimulate hypertrophy when using the Heavy Duty method. This training method is intended exclusively for athletes at an advanced training stage.

The Classical Training Method

The classical bodybuilding training method states that to stimulate muscular hypertrophy, an intensity of 60–85% of the current muscular capacity is sufficient.

Bodybuilding-specific training is characterized by anaerobic lactic effort, relying on glycogen as an energy substrate. The energy needed for the effort is produced through the glycogen–lactic acid energy system (Lupea, 2000).

Effort duration typically ranges from 40 to 60 seconds (the length of a set), followed by rest periods of 60 to 150 seconds. The rest duration between sets is closely related to the goal of the training: if the aim is hypertrophy, the rest period tends toward the upper limit; if the goal is muscle definition, the rest is shorter, following Weider's quality training principle (Herlo, 2005).

Classical bodybuilding training involves a series of highly specialized training concepts known in literature as "Weider Principles". These principles stem from general training principles and are adapted derivatives (Voicu, 1995).

It is important to note that a set should not end simply because it was planned that way, but only when momentary muscular failure is reached—when no further repetition can be performed (Chirazi & Ciorbă, 2006).

If a set is arbitrarily stopped at a given moment, the effectiveness of the training is practically compromised.

In conclusion, for a bodybuilding workout to be maximally efficient, it is recommended that "its duration not exceed 60 minutes, that it be sufficiently intense to produce adaptive changes in muscle fibers, and that basic exercises be performed in strict form" (Herlo, 2005).

Methods

Application of the Heavy Duty Method in Specific Training

In bodybuilding-specific training using the Heavy Duty method, a high load is always used—one that allows for the maximum proposed number of repetitions.

Since the goal in this case is muscle mass increase, the number of repetitions is set around 7.

Targeted muscle group: Biceps brachii

Exercise: Barbell curls from standing

- 2 warm-up sets with low load (20–30% 1RM), performed progressively
- Set 1: 6–8 repetitions
- Set 2: 6–8 repetitions
- Set 3: only if necessary (if momentary muscular failure was not reached)

Targeted muscle group: Calves (triceps surae)

Exercise: Standing calf raises on the machine

- 2 warm-up sets with low load (20–30% 1RM), performed progressively
- Set 1: 6–8 repetitions
- Set 2: 6–8 repetitions
- Set 3: 6–8 repetitions

As shown in the training structure above, the Heavy Duty method involves reducing the number of sets per exercise and increasing the working intensity. The goal is to reach momentary muscular failure using a minimal number of sets. The underlying idea is that training should be short and intense, triggering adaptive processes without entering a catabolic state.

Application of the Classical Training Method

Targeted muscle group: Biceps brachii

Exercise: Barbell curls from standing: 5 sets x 6–8 repetitions

Exercise: Alternating dumbbell curls from standing: 5 sets x 6–8 repetitions

Targeted muscle group: Calves (triceps surae)

Exercise: Seated calf raises on the machine: 6 sets x 10–12 repetitions

Exercise: Standing calf raises with barbell on the neck: 6 sets x 10–12 repetitions

Experimental Design

The study was conducted at the Panoramic Gym in Arad over a period of 6 months, structured as a longitudinal experiment.

The experiment involved 45 participants, all subscribers at Panoramic Gym. Subjects were randomly selected on a voluntary basis and divided into two groups: the experimental group (E.G.) and the control group (C.G.).

E.G.: 23 subjects trained using the Heavy Duty method

C.G.: 22 subjects trained using the classical method

The independent variable (I.V.) for the E.G. was the exercise structure aimed at developing the biceps brachii and triceps surae using the Heavy Duty method:

For biceps brachii: barbell curls from standing

For triceps surae: standing calf raises on the machine

Statistical indicators used in the analysis included:

Arithmetic mean ($\bar{x}$)

Standard deviation (σ)

Results

The subjects involved in the experiment were tested to determine the strength of the biceps brachii and triceps surae muscles. Anthropometric measurements were also taken at the arm and calf level to determine the circumferences of the respective areas.

At the end of the testing process, regarding the strength of the biceps brachii and triceps surae muscles, we obtained the following results:

The results obtained by the subjects in the experimental group (E.G.) in the initial testing – arithmetic average:

- Pull-ups on the fixed bar: 12.86 repetitions
- Heel raises on the machine: 18.73 repetitions
- Arm circumference: 34.21 cm
- Calf circumference: 37.52 cm

Thus, we observe that the E.G. subjects achieved an average of 12.86 repetitions in the pull-up test, with an average arm circumference of 34.21 cm. Regarding lower leg strength, the subjects performed an average of 18.73 repetitions, with an average calf circumference of 37.52 cm.

The results obtained by the subjects in the control group (C.G.) in the initial testing – arithmetic average:

- Pull-ups on the fixed bar: 11.81 repetitions
- Heel raises on the machine: 16.5 repetitions
- Arm circumference: 33.68 cm
- Calf circumference: 35.9 cm

Based on these values, we observe that the C.G. subjects achieved an average of 11.81 pull-up repetitions, with an average arm circumference of 33.68 cm. Regarding calf muscle strength, the subjects performed an average of 16.5 repetitions, with an average calf circumference of 35.9 cm.

The results obtained by the E.G. in the final testing – arithmetic average:

- Pull-ups on the fixed bar: 15.43 repetitions
- Heel raises on the machine: 20.56 repetitions
- Arm circumference: 35.34 cm
- Calf circumference: 38.26 cm

Thus, we observe that the E.G. subjects achieved an average of 15.43 pull-up repetitions, with an average arm circumference of 35.34 cm. Regarding calf strength, the subjects performed an average of 20.56 repetitions, with an average calf circumference of 38.26 cm.

The results obtained by the C.G. in the final testing – arithmetic average:

- Pull-ups on the fixed bar: 13.77 repetitions
- Heel raises on the machine: 17.31 repetitions
- Arm circumference: 34.59 cm
- Calf circumference: 36.45 cm

Thus, we observe that the C.G. subjects achieved an average of 13.77 pull-up repetitions, with an average arm circumference of 34.59 cm. Regarding calf strength, the subjects performed an average of 17.31 repetitions, with an average calf circumference of 36.45 cm.

From the analysis of the data presented above, we can state the following:

- The E.G. results for the "pull-ups on the fixed bar (supine grip)" exercise increased by 19.9%, and for the "heel raises on the machine" exercise by 9.7%;
- The average arm circumference in the E.G. increased by 3.3%, and the average calf circumference by 1.9%.
- The control group's (C.G.) monitoring results are summarized as follows:
- The C.G. results for the "pull-ups on the fixed bar (supine grip)" exercise improved by 16.5%, while for the "heel raises on the machine" they increased by 4.9%;
- The average arm circumference in the C.G. increased by 2.7%, and at the calf level the increase was 1.5%.

In this context, we observe an increase in biceps brachii strength of 3.4% greater in the E.G. compared to the C.G., while for calf muscle strength, the increase was 4.8% greater in the E.G. than in the C.G.

Regarding the increase in the circumferences targeted in the experiment, there is an increase of 0.6% in arm circumference and 0.4% in calf circumference, in favor of the E.G. For a graphical representation of these results, refer to Annex No. 1.

Regarding the degree of dispersion in the studied groups, we observe that:

For the pull-ups on the fixed bar exercise:

- Initial testing in the E.G.: $\sigma = \pm 2.37$
- Final testing in the E.G.: $\sigma = \pm 2.04$

For the heel raises on the machine exercise:

- Initial testing in the E.G.: σ = ± 3.52
- Final testing in the E.G.: σ = ± 3.11

For the arm circumference:

- Initial testing in the E.G.: σ = ± 1.65
- Final testing in the E.G.: σ = ± 1.02

For the calf circumference:

- Initial testing in the E.G.: σ = ± 2.4
- Final testing in the E.G.: σ = ± 2.09

For the pull-ups on the fixed bar (supine grip) exercise:

- Initial testing in the C.G.: σ = ± 1.53
- Final testing in the C.G.: σ = ± 1.71

For the heel raises on the machine exercise:

- Initial testing in the C.G.: σ = ± 2.19
- Final testing in the C.G.: σ = ± 2.07

For the arm circumference:

- Initial testing in the C.G.: σ = ± 1.42
- Final testing in the C.G.: σ = ± 1.05

For the calf circumference:

- Initial testing in the C.G.: σ = ± 1.6
- Final testing in the C.G.: σ = ± 1.53

For a clearer view, the results presented above can be visualized in Table No. 1.

Table 1.

Standard Deviation and Arithmetic Mean for the Two Groups

Exercise/ Parameter		**E.G. Primary Testing**	**E.G. Final Testing**	**Difference**	**C.G. Primary Testing**	**C.G. Final Testing**	**Difference**
Arithmetic Mean	Pull-ups on fixed bar	12.86	15.43	2.57	11.81	13.77	1.96
	Heel raises on machine	18.73	20.56	1.83	16.5	17.31	0.81

Exercise/ Parameter		E.G. Primary Testing	E.G. Final Testing	Difference	C.G. Primary Testing	C.G. Final Testing	Difference
	Arm circumference (cm)	34.21	35.34	1.13	33.68	34.59	0.91
	Calf circumference (cm)	37.52	38.26	0.74	35.9	36.45	0.55
Standard Deviation	Pull-ups on fixed bar	± 2.37	± 2.04	± 0.33	± 1.53	± 1.71	± 0.18
	Heel raises on machine	± 3.52	± 3.11	± 0.41	± 2.19	± 2.07	± 0.12
	Arm circumference (cm)	± 1.65	± 1.02	± 0.63	± 1.42	± 1.05	± 0.37
	Calf circumference (cm)	± 2.4	± 2.09	± 0.31	± 1.6	± 1.53	± 0.07

Conclusions

Thus, it can be observed that both groups exhibited a low degree of dispersion, with standard deviation values being relatively small.

Following this research and based on the results obtained, we conclude that the use of the "Heavy Duty" training method yields higher efficiency in terms of muscle hypertrophy and strength development compared to the classic training method.

From the analysis of the previously presented data, the following observations can be made:

- The number of repetitions performed by the Experimental Group (E.G.) in the “pull-ups on a fixed bar, supinated grip” exercise increased by 19.9%, while in the “heel raises on the machine” exercise, the increase was 9.7%;
- The average arm circumference in the E.G. increased by 3.3%, while the calf circumference increased by 1.9%.
- The control results, obtained by the Control Group (C.G.), are summarized as follows:
- In the “pull-ups on a fixed bar, supinated grip” exercise, an increase of 16.5% was recorded, while in the “heel raises on the machine” exercise, the increase was only 4.9%;
- The average arm circumference in the C.G. increased by 2.7%, while the calf circumference increase was just 1.5%.

Therefore, it is evident that the strength of the biceps brachii increased by 3.4% more in the E.G. compared to the C.G., and in terms of calf muscle strength, the increase was 4.8% higher in the E.G.

Regarding the increase in the measured circumferences in the experiment, a 0.6% greater increase in arm circumference and a 0.4% greater increase in calf circumference were observed in favor of the E.G.

For a graphical representation of these results, see Annex No. 1.

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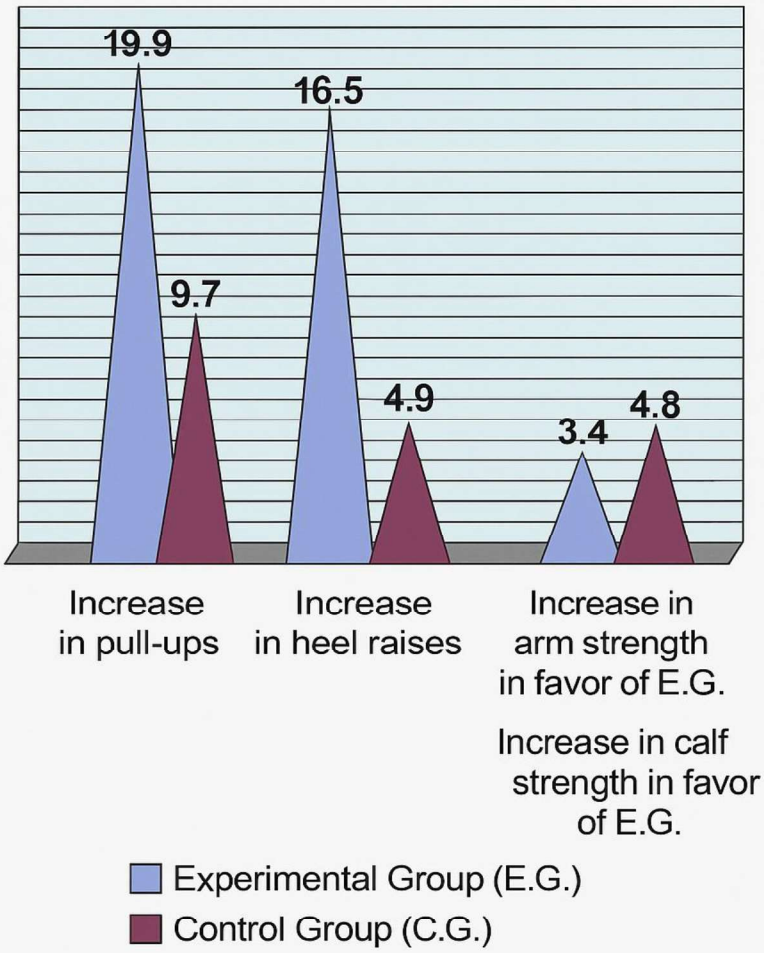
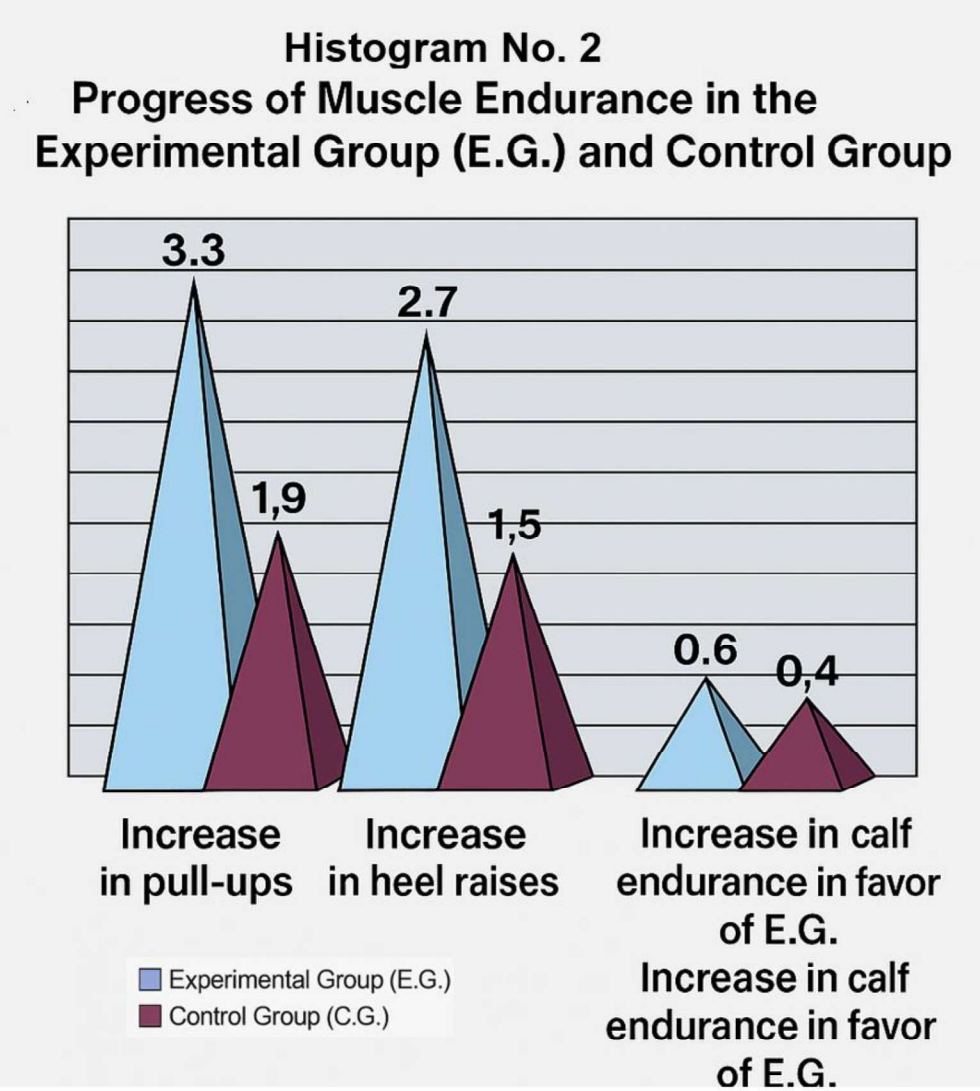
Annex

ANNEX No. 1
Histogram No. 1
Progress of Arm and Calf Mus cle Strength
in the Experimental Group (E.G.) and Control Group)




Histogram No. 2
Progress of Muscle Endurance in the Experimental Group (E.G.) and Control Group
3.3
1,9
2.7
1,5
0.6
0,4
Increase in pull-ups
Increase in heel raises
Increase in calf endurance in favor of E.G.
Experimental Group (E.G.)
Control Group (C.G.)
Increase in calf endurance in favor of E.G.