

Circumference Measurements on Body Contest Athletes in Indonesia

Gani Kardani*, Hendra Rustiawan

Program Studi Pendidikan Jasmani

Universitas Galuh

Ciamis, Indonesia

*ganikardani01@gmail.com

Abstract—The purpose of this study was to determine the increase in muscle thickness (volume) before the bulking phase to the maximum bulking phase so that the expected muscle thickness corresponds to the criteria in the body contest event. The kind of research was quantitative descriptive using survey methods and test and measurement techniques. The test instrument used was circumference measurements which consist of neck, shoulder, chest, upper arm, and abdominal. Data analysis techniques used percentage analysis. The population in this study was Parahyangan Fitness Club Ciamis. The participants of this study were 10 athletes. The result of the average measurement circumference measurements for neck was 5.64%, shoulder was 4.85%, chest was 7.70%, upper arm was 13.38%, and abdominal was 5.84%. Therefore, it can be concluded that there were the increase in all muscles measured, especially on the arm circumference which has a considerable increase because in every exercise program arms had the active part of the exercise and usually it was done in the last part of the exercise after the other muscle parts had been trained.

Keywords: *body contest, bulking, circumference measurements, percentage, volume*

I. INTRODUCTION

Started from April 2019 then until now at Ciamis Parahyangan Fitness Club was been done a strength training program with the aim of increasing muscle thickness commonly called "Bulking". The explained was that bulk was a term used by bodybuilding athletes to increased their weight to exceed ideal body weight [1]. The stages for body contest athletes were not fare from those of bodybuilding athletes, only the difference between the thickness of the muscles and the upper body is assessed, especially those that have a large value between the muscles of the body that was assessed the abdominal muscle.

Bulk was a term used by bodybuilding athletes and body contests to increased weight and ideal body weight. It was a phase to increased muscle mass or muscle thickness and weight as much as possible so that this phase was not only the thickness of the muscle but the percentage of fat increased so that the definition of muscle was not visible [2]. In this bulked program, 2 factors must be considered, namely: 1. Worked with the maximum possible load even though only parts of the muscle were trained (not all body muscles were trained at the

same time and day) because this bulked program aims to increased muscle volume, 2. In this bulked program, gave a long break between sets. Exercising was the muscles of the body every week could provide adequate rested to the muscles so that the muscle recovery was sufficient and ready to practice again [3].

II. BULKED PHASE

The principle of bulked practiced must be specificity, overload, and progression. The purpose of specificity was a form of exercised that was stimulated to be responded specifically based on each athlete's own body such as energy needs, the shape and model of the exercised, the technique of movement in the group of muscles being moved, and the period of the exercise. The purpose of overload was to perform maximum load force so that the muscles will contract optimally and physiologically the muscles will adapt to increase. Progressed was an exercised that started from a light load to a heavy load, but still adapted to the ability of the muscles themselves and not to imposed a burden that was too heavy because each individual hasn't different abilities [1,4]

Besides the training, eating patterns must also be considered for bulked programs which included two phases: phase-1 body weight under ideal body weight or you could sayed the thin body. His diet consists of food intake containing 80% carbohydrates, food intake containing 20% protein. As for the weight training menu around 90%, and cardio training as much as 10% [5].

In the second phase, it could be said to be semi bulked. Normal lean body weight, intake of foods containing carbohydrates around 50% and the intake of foods containing protein around 50%, the cardio training program was around 40%, while the weight training range was 60% [5].

The bulked program will certainly not be separated from the intake of good nutrition. All athletes in the Parahyangan Fitness Ciamis body contest have consumed the recommended nutrition by phase 1. Other than that, recommended additional food intake was a supplement with the aim that the bulked program could be carried out to the maximum. The supplements used to gainer, muscle gainer, or mass gain from one of the reputable supplement products in Indonesia and were always active as a bodybuilding athlete sponsor and body

contest as well as acting as the sole sponsor in the bodybuilding and body contest event.

The bulked program ahead of the body contest event to have a perfect or ideal body based on the criteria that exist in each body contest event could be applied first in the bulked phase which was known being carried out by the athletes of the Parahyangan Fitness Ciamis body contest athletes. This program has benefits to the body that was having calories that will be used as energy and passed on to the muscles, so it has the power to build or increase muscle volume (muscle building) [1].

The training program in the bulking phase has it characteristics from other programs, because if the training program was wrong then the bulked program would not worked well. The training program that must be done based on the most appropriate physical condition component was a strength training program. The understanding was the ability of a person tried to increased muscle strength or muscle groups to the maximum [6]. So that strength training was much appropriated for athletes in the body contest during the bulked phase this exercised was a program in increased muscle strength especially to increased muscle volume or thickness. However, it was important to remember that strengths were of two types of strengths, namely relative strength, namely the ability to maximize muscle strength without increased body weight, and absolute strength, namely the ability to increased strength maximally and increased muscle thickness or volume [7]. The application of strength training programs has many benefits for muscles such as increased strength and endurance of muscles, increased the strength of ligaments and tendons, and protects injured muscle or joint areas [4].

This bulked program practiced a lot using weights or what was commonly called a fitness equipment, this bulked program practiced a lot used weights or what was commonly called a fitness equipment, and tend to be static movements only parts of the muscle that were being trained dynamic movements that was the contraction of muscle lengthening and shortening (concentric and eccentric) to produced maximum movement [8]. Usually, this movement was called isotonic contraction (isotonic contraction).

In other words, in this bulked program, it was appropriated for the body contest athletes to practiced using weight tools to increased muscle size maximally when the body contest event was still long (off-season) and to found out how much the result of increased muscle size, therefore the authors took measurements of the circumference of the body/muscle called circumference measurements.

III. METHODS

This type of research used to quantitative descriptive research intended to get data based on the results of reality on the real field of the object of research. This research method was a survey method with test and measurement techniques [9-11]. The population used was the Parahyangan Fitness Club. The participants used was 10 body contests athletes. The test used in this studied was circumference measurements [12,13]. Parts of the body to be measured were the neck, shoulders,

chest, upper arms, and abdomen. After all the data collected is then analysed using descriptive percentages.

The circumference measurements [9]. for the athlete body contest Club Parahyangan Fitness Ciamis has been carried out before stepping on the bulked program, so that the results could be known between before bulking, after bulking (bulking max), and cutting programs. This research was only limited to programs before and when bulking (bulking max).

Before that, the writer would discussed circumference measurements. Although this measurement was not one of the determinants of success got the ideal body based on criteria in the event body contest, because there were still many assessment factors aside from these measurements, but at least the athletes could found out how much changes from before bulking to have muscle thickness at the peak of bulking (bulking max).

Circumference measurements were a tool for measuring body circumference to found out body composition in this case a change in body or muscle after experienced to exercised, especially weight training. The instrument used was very simple namely the tape measured used by clothes tailors and these measurements were included in anthropometric measurements (anthropometric measurements) [14]. This measurement was used only on large muscles in body parts such as the shoulders, chest, arms, stomach, neck, calves, and legs [10]. Adapted to the needs of the event body contest that was considered to be the large muscles in the upper body, especially the abdominal muscles which have a special value [15].

The circumference measurements must be tight in the area of the body being measured [9]. The body parts that will be measured consist of neck circumference (neck), chest circumference (chest), shoulder circumference (shoulder) waist circumference (waist), hip circumference (hips), the circumference of the upper limbs (thigh), the circumference of the calf (calf) upper arm circumference [9]. However, this studded limited the measurement of upper body circumference only because the event body contest only provided an assessment of the upper body (upper body), measurements for the circumference of the calf and circumference of the upper limbs were not carried out. So that measurements of upper body circumference were easy to understand, the author would include 6 images of circumference measurements below.

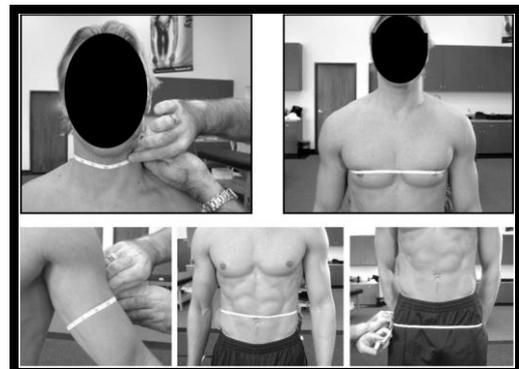


Fig. 1. Circumference measurements [12].

This research requires a list of ideal body circumference to be submitted as a benchmark for official standard/standard so that the target for the body contest event could be known during the bulked phase until the cut phase and would be compared between circumference measurements from body athletes contest with norms/criteria for measuring body circumference ideal for athletes Bodybuilding [12].

IV. RESULTS AND DISCUSSION

Based on the results of research in the field that on each circumference measurements consisted of neck circumference, shoulder circumference, chest circumference, upper arm circumference, and abdominal circumference based on data on the phase before bulking and the bulking phase could be seen in the followed table:

TABLE I. THE RESULTED CIRCUMFERENCE MEASUREMENTS DATA

No	Object	Before Bulking					After Bulking				
		N	S	C	UA	AB	N	S	C	UA	AB
1	A	25	95	76	22	65	27	98	79	26	67
2	B	36	113	88	32	85	38	115	95	34	89
3	C	26	93	74	22	63	28	100	84	28	59
4	D	27	95	72	23	64	29	102	76	28	74
5	E	34	110	84	29	82	36	114	86	32	84
6	F	34	111	85	30	75	35	116	96	34	88
7	G	24	96	76	25	65	26	107	88	27	67
8	H	36	114	89	34	74	37	116	93	36	81
9	I	24	93	74	21	63	25	96	77	25	65
10	J	35	110	87	31	83	37	116	93	35	87

N = Neck, S = Shoulder, C = Chest, UA = Upper arm, AB = Abdomen

TABLE II. STATISTICAL DATA RESEARCH BEFORE THE BULKED PHASE

	N	Mean	Median	Standard Deviation	Variance	Low Score	High Score
Neck	10	30.10	30.50	5.27	27.87	24	36
Shoulder	10	103	103	9.18	84.44	93	114
Chest	10	80.50	80	6.67	44.50	72	89
Upper Arm	10	26.90	27.00	4.81	23.21	21	34
Abdomen	10	71.90	69.50	8.98	80.76	63	85

It can be explained the first, circumference measurements on the neck. The number of participants was 10 athletes, the mean (mean) was 30.10 cm, for the middle valued (median) was 30.50 cm, the standard deviation (standard deviation) was 5.27 cm, the variance valued was 27.87 cm, for the lowest (minimum) valued was 24 cm while the highest valued (maximum) was 36 cm.

Second, circumference measurements on the shoulder. The number of participants was 10 athletes, the mean (mean) was 103 cm, for the middle valued (median) was 103 cm, the standard deviation (standard deviation) was 9.18 cm, the variance value was 84.44 cm, for the lowest (minimum) value was 93 cm while the highest value (maximum) was 114 cm.

Third, circumference measurements on the chest. The number of participants was 10 athletes, the mean (mean) was 80.50 cm, for the middle valued (median) was 80 cm, the standard deviation valued (standard deviation) was 6.67 cm, the variance valued was 44.50 cm, for the lowest (minimum) valued was 72 cm while the highest valued (maximum) was 89 cm.

Fourth, circumference measurements on the upper arm. The number of participants was 10 athletes, the mean (mean) was

26.90 cm, for the mean (median) was 27.00 cm, the standard deviation (standard deviation) was 4.81 cm, the variance valued was 23.21 cm, for the lowest valued (minimum) was 21 cm while the highest valued (maximum) was 34 cm.

Fifth, circumference measurements in the stomach. The number of participants was 10 athletes, the mean (mean) was 71.90 cm, for the middle valued (median) was 69.50 cm, the standard deviation (standard deviation) was 8.98 cm, the variance valued was 80.76 cm, for the lowest valued (minimum) was 63 cm while the highest valued (maximum) was 85 cm. Next was a description of the data on the bulked phase which could be seen in Table 3 below.

TABLE III. BULKED PHASE RESEARCH STATISTICS DATA

	N	Mean	Median	Standard Deviation	Variance	Low Score	High Score
Neck	10	31.80	32.00	5.22	27.28	25	38
Shoulder	10	108	111	8.31	69.11	96	116
Chest	10	86.70	87	7.54	59.90	76	96
Upper Arm	10	30.50	30.00	4.41	16.94	25	36
Abdomen	10	76.10	77.50	11.04	122.10	59	89

It can be explained the first, circumference measurements on the neck. The number of participants was 10 athletes, the mean (mean) was 31.80 cm, for the middle valued (median) was 32.00 cm, the standard deviation (standard deviation) was 5.22 cm, the variance valued was 27.28 cm, for the lowest (minimum) valued was 25.00 cm while the highest valued (maximum) is 38.00 cm.

Second, circumference measurements on the shoulder. The number of participants was 10 athletes, the mean (mean) was 108.0 cm, for the middle valued (median) was 110.5 cm, the standard deviation (standard deviation) was 8.31 cm, the variance valued was 69.11 cm, for the lowest (minimum) valued was 96 cm while the highest valued (maximum) was 116 cm.

Third, circumference measurements on the chest. The number of participants was 10 athletes, the mean (mean) was 86.70 cm, for the middle valued (median) was 87.00 cm, the standard deviation (standard deviation) was 7.54 cm, the variance valued was 56.90 cm, for the lowest valued (minimum) was 76.00 cm while the highest valued (maximum) was 96.00 cm.

Fourth, circumference measurements on the upper arm. The number of participants 10 athletes, the mean (mean) was 30.50 cm, for the middle valued (median) was 30.00 cm, the standard deviation (standard deviation) was 4.11 cm, the variance valued was 16.94 cm, the lowest (minimum) valued was 25.00 cm while the highest valued (maximum) was 36.00 cm.

Fifth, circumference measurements in the stomach. The number of participants was 10 athletes, the mean (mean) was 76.10 cm, for the middle valued (median) was 77.50 cm, the standard deviation (standard deviation) was 11.04 cm, the variance valued was 122.10 cm, for the lowest (minimum) valued was 59.00 cm while the highest valued (maximum) was 89.00 cm.

A. Percentage Increasing in Bulkied Phase

The next discussed was increased percentage in the bulkied phase. Where retrieval of data increased the difference between the bulkied phase and the pre-bulkied phase of each circumference measurement consisted of 5 large muscles (neck, shoulders, chest, upper arms, and abdomen) which could be seen in Table 4 below.

TABLE IV. PERCENTAGE OF MUSCLE INCREASE IN THE BULKING PHASE

Circumference Measurements	Mean pre-test	Mean post-test	Gain	Increase %
Neck	30.10	31.80	1.7	5.64
Shoulder	103	108	5	4.85
Chest	80.50	86.70	6.2	7.70
Upper Arm	26.90	30.50	3.6	13.38
Abdomen	71.90	76.10	4.2	5.84

Based on the resulted of table 4 showed that for circumference measurements in the neck the percentage increase was 5.64%, in the shoulder the increase was 4.85%, in the chest the increase was 7.70%, in the upper arm the increase was 13.38%, and in the abdomen, the increase was 5.84 %.

V. CONCLUSION

The program by the athlete body contest Club Parahyangan Fitness applied the principles of progressive, specific, and overload trained and applies a component of physical strength to the aim of got maximum muscle thickness (volume) during the bulkied phase. In this phase, the fat tended to increased, but with a well-structured exercised program schedule, the calories in the body were converted into energy to be used as energy when exercised.

Based on the measurement of body circumference at 5 measurement locations namely on neck circumference, shoulder circumference, chest circumference, upper arm circumference, and abdominal circumference obtained an average increased in the percentage of muscle volume was 7.48%. This means that during this increased bulkied phase there were several locations that have not been maximal body circumference measurements, namely on the shoulders, neck and chest. So that the overall results of the upper body are not balanced.

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