



ISSN: 2456-4419

Impact Factor: (RJIF): 5.18

Yoga 2018; 3(1): 105-108

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www.theyogicjournal.com

Received: 20-11-2017

Accepted: 21-12-2017

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## Effect of maximum strength and muscle hypertrophy periodize training on muscle hypertrophy in bodybuilders

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### Abstract

The purpose of this study was to examine the effect of Maximum Strength and muscle hypertrophy periodize training on muscle hypertrophy in Bodybuilders. The experimental model of the Maximum Strength and muscle hypertrophy training was realized five times in week, over a period of ten week and the one hour duration of exercise. To attain the objective of the study, seven male bodybuilders from Punjab (India) who were participate in state bodybuilding competitions past one year were selected randomly. The age of the subjects lies between 20 to 25 years. To estimate the effect of Maximum Strength and muscle hypertrophy periodize training on muscle hypertrophy tool of measurement body mass index and skin fold measurements test was used. To find out the significant difference between Pre-test and Post-test the t-test was used. T-test calculated on significant error at level of significance 0.05. It was found that more effective training periodization for muscle hypertrophy in bodybuilder.

**Keywords:** Bodybuilding, maximum strength, hypertrophy, training

### Introduction

Today most of people going to gyms and health clubs, in these people more are young persons. Young boys and girls want to become a muscular physique, but most boys will want to become a bodybuilders. Bodybuilding is a famous sport in these days all over India. Bodybuilding is the use of progressive resistance exercise to control and develop human musculature. An individual who engages in this activity is referred to as a bodybuilder. In competitive amateur and professional bodybuilding competitions, in competitions bodybuilders appear in lineups doing specified poses. Later perform individual posing routines for a panel of judges who rank competitors based on criteria such as symmetry, muscularity and conditioning. Bodybuilders prepare for competition through a combination of fat loss, more muscles, oils and tanning colors which makes their muscular definition more distinct. In bodybuilding most known bodybuilders include Atlas, Steve, Reg Park, Arnold Schwarzenegger, Lou Ferrigno and Prem Chand Degra (India).

Muscle hypertrophy, or muscle cell enlargement, is a topic of great debate and interest in all fields of health, fitness and sports. How the body responds to muscular overload to elicit muscle growth is still under much scientific investigation. Many types of training educe muscle hypertrophy. This is evidenced by the fact that athletes in numerous sports exhibit wonderful muscular development even though they follow different training protocols. With this in mind, it makes sense to examine contemporary understandings of muscle hypertrophy and highlight some effective training approaches. Skeletal muscle hypertrophy is defined as an increase in muscle mass, which in the men and women comes as a result of an increase in the size, as opposed to the number, of preexisting skeletal muscle fibers. In minimum time increase muscle hypertrophy it is mandatory coach or bodybuilder choose right periodization model for individual training, but no any strict rule or method for choose right periodization module for bodybuilders, so in these days bodybuilders face this problem. Periodization is simply a term applied to planning training sessions and arranging those sessions in an orderly manner. Specifically periodization is planning training programs in successive small units ranging from one week to a full year. Each segment of training like skill, speed, strength,

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stamina, endurance, flexibility and fitness etc can be programmed into a periodized training module; training program is usually planned with two specific periods the preparation period and the competition period. These two periods are further subdivided into the general preparation phase, followed by the specific preparation phase, then the pre-competitive phase followed by the competitive phase. Complete training program can span from three months to twelve months. The twelve months program is called the yearly training plan. The training plan is usually developed from the first week of training of the new season until the last competition of the season with the start and end point established within the year, the total time is then divided into micro cycles. The micro cycles are grouped in meso cycles and the meso cycles grouped in macro cycles. These are then assembled into phases to complete the training plan.

Bodybuilder most use strength training for muscle hypertrophy, strength is the ability to overcome resistance or to act against resistance. Strength types are maximum strength, explosive strength and strength endurance. Strength endurance is the ability to overcome or to act against maximal resistance. Explosive strength is a combination of strength and speed ability mean ability to overcome resistance with high speed. Strength endurance is ability to overcome resistance or to act against resistance under conditions of fatigue. Bodybuilders use different type of training add in their training plan for example first two week strength endurance and after that four week muscle hypertrophy, some bodybuilder use first explosive strength and some are use maximum strength. So the research problem is right combination periodization module for bodybuilders for fast muscle hypertrophy. While at the gym, you will see a variety of people doing a variety of strength and endurance exercises. When teaching a strength class, always incorporate some exercises that will build muscle strength and some that involve muscle endurance to round out the participants training. People do this because as they said above, out in the real world, you never know whether you'll need strength or endurance to complete everyday tasks. And, ignore the myth that using heavy weight will bulk you up. Men genetically can develop more muscle mass through heavy lifting. However, women, for the most part, do not have the type of testosterone to create that huge muscle bound look. Remember, more muscle is a good thing. The more muscle you have, the more calories your body will burn throughout the day and the more capable you are to perform any activity that comes your way. "Maximum Strength is the specific form of strength displayed in activities which require a relatively maximum force of muscle tension with minimal decrease in efficiency". Sports that involve Maximum strength are numerous in nature from the boxer to the shot putter to the wrestler on the mat. Even these examples are differentiated by the abilities expressed, dynamic or static, general or local Maximum strength. All forms of competition, however, necessitate maximal output over the duration of the event. It is not always the strongest athlete who wins in all cases, rather the one that can sustain the most power over the full term of the activity. Therefore, development of all the various types of muscle fibers benefits the athlete. Predominantly the fast twitch muscle fibers create maximum power output in the explosive sports such as sprinting and weightlifting. Slow twitch fibers are the prime fiber cells used in long distance aerobic events. Combining, and training, these two types of fibers at all speeds and angles produces strength endurance. There are muscle fibers that are not what you would call exclusively fast twitch or exclusively

slow twitch. They are a combination of the two not fully fast twitch or fully slow twitch. But, strengthening these muscle fibers will enable a greater expression of strength endurance to occur. Another aspect to this particular strength continuum is dynamic and static strength endurance which can be improved by following proper training schedules. The athletic movements and the muscular tension displayed during these movements differentiate between these two forms of strength endurance. Endurance is thus a matter of dividing muscle tension into large or moderate magnitudes and the length of time for each. "Dynamic strength-endurance is typically associated with cyclic exercises in which considerable tension is repeated without interruption during each cycle of movement. It is also apparent in acyclic events requiring maximum power repetitions with short rest periods between such as jumping or throwing activities. Static strength-endurance implies isometric tension of varying magnitude and duration or in holding a certain posture. "Static strength endurance is associated with relatively long or short term sustained muscular tension, its duration in each case being determined by its magnitude. These can be further broken down into General strength endurance and Local strength endurance. Both of which depend upon how many muscle groups are involved in the activity. For example general strength endurance is built around the utilization of large muscle groups to power the activity such as the case with rowing, where for example the quads, gastrocnemius, biceps, triceps, deltoids and the Latissimusdorsi muscles predominate the scene. In local strength endurance, a particular muscle group is targeted for improvement based upon its use during the sport. An example would be the upper body muscles of the chest and upper back, deltoids, and the triceps for a bench press using body weight for repetitions contest.

### Statement of the Problem

To find out a solution for fast and effective module for muscle hypertrophy state the research problem is Effect of Maximum Strength and Muscle Hypertrophy Training Periodize on Muscle Hypertrophy in Bodybuilders

### Literature Review

Matveyev (1950) linear periodization is the traditional and earliest form of periodization. This was originally proposed and involves a steady progression from high-volume, low-relative load training at the start of the program through to low-volume, high-relative load training at the end. A variant of linear periodization is reverse linear periodization in which the opposite sequence is followed. It is worth noting that volume and relative load are the most commonly manipulated training variables but essentially there is no reason why other variables cannot also be periodized, such as frequency, range-of-motion and proximity to failure, rest period and exercise selection. For example, escalating density training is essentially a form of linear periodization in which a training variable is altered progressively over time.

Bell *et al.*, (1990) the purpose of this study was to investigate the effect of concurrent strength and endurance training on strength, endurance, endocrine status and muscle fiber properties. A total of forty five male and female subjects were randomly assigned to one of four groups strength training only, endurance training only, concurrent strength and endurance training, or a control group. Group S and E training three days a week and the SE group trained six days a week for twelve weeks. Tests were made before and after six and twelve weeks of training. A significant increase in capillary

per fiber ratio was noted after twelve weeks of training in group Strength Endurance. No changes were observed in testosterone, human growth hormone or sex hormone binding globulin concentrations for any group but there was a greater urinary cortisol concentration in the women of group Strength Endurance and decrease in the men of group endurance after twelve weeks of training. These finding would support the contention that combined strength and endurance training can suppress some of the adaptations to strength training and augment some aspects of ca-pillarization in skeletal muscle.

Brechueet *et al.*, (2002) found that both fat-free mass and muscular CSA at individual sites were very good predictors of power lifting ability. Hypertrophy is also important for elderly people, as low levels of muscle mass are strongly correlated with a loss of functional independence and mobility and an increased risk of disability and functional impairment.

Schoenfeld *et al.*, (2010) Regimented resistance training has been shown to promote marked increases in skeletal muscle mass. Although muscle hypertrophy can be attained through a wide range of resistance training programs, the principle of specificity, which states that adaptations are specific to the nature of the applied stimulus, dictates that some programs will promote greater hypertrophy than others. Research is lacking, however, as to the best combination of variables required to maximize hypertrophic gains. The purpose of this study was to investigate muscular adaptations to a volume-equated bodybuilding-type training program vs. a power lifting-type routine in well training subjects. Seventeen young men were randomly assigned to either a hypertrophy-type resistance training group that performed 3sets of 10 deletions maximum (RM) with 90seconds rest or a strength-type resistance training (ST) group that performed 7 sets of 3 RM with a 3 minute rest interval. After 8 weeks, no significant differences were noted in muscle thickness of the biceps brachii. Significant strength differences were found in favor of ST for the 1RM bench press and a trend was found for greater increases in the 1RM squat.

Schoenfeld (2013) It is generally assumed that the hypertrophic response to the magnitude of the mechanical loading (as expressed by relative load) is non-linear in so far as there appears to be a definite threshold below which no hypertrophy can occur and a threshold above which little or no further hypertrophy occur in response to increasing relative load. The existence of a threshold of relative load below which no meaningful stimulus for hypertrophy will occur has been assumed largely upon the empirical observation that people generally do not experience hypertrophy from carrying out activities of daily living unless such tasks represent a significant challenge to them, as they can do for frail, elderly populations.

### Need of Study

These days' bodybuilding competitions are held very frequently in a year so bodybuilders have to gain and maintain their body muscle mass in very short intervals.

- 1) Increase muscle mass in short period.
- 2) Injury prevention
- 3) Time and energy saving
- 4) Prevent from the intake of banned products.

### Objectives of Study

1. To study the effect of Maximum Strength Training module and muscle mass training on muscle hypertrophy of bodybuilders.
2. To study the effect of Maximum Strength and muscle

mass training on muscle hypertrophy of bodybuilders.

3. To find out best training module of muscle hypertrophy for bodybuilders

### Scope

These days' bodybuilding competitions are held very frequently in a year so bodybuilders have to gain and maintain their body muscle mass in very short intervals. This study will be helpful for bodybuilders to find out the best training periodization to increase muscle mass in short time period. In this way this study has the scope not only in bodybuilding but in other sports and games also which muscle hypertrophy (muscle mass) is required.

### Delimitation of Study

1. The study will be delimited to male bodybuilding players of Punjab.
2. The study will be delimited to 7 male bodybuilders.
3. All subjects must have get place in Punjab bodybuilding competitions of Punjabi Amateur Body building Association (PABBA) with age ranged 20 to 25 years.
4. The study will be delimited total 10 week training module.
5. Diet and environmental condition not control.

### Research Hypothesis

There will be no significant difference in Effects of Maximum Strength and Muscle Hypertrophy Training periodization on muscle hypertrophy in bodybuilders.

### Methodology

#### Research Design

This research is experimental in nature. So use experimental design for this study. All the seven subjects will be selected from Punjab those who participated in bodybuilding state competition. Seven male bodybuilders will be selected for this research. This group performed in ten week training and the data will collect by the pre- test and post-test of this experimental group.

#### Tool-Technique

For study purpose choose

#### Weight measure

**Purpose:** To measure the weight of the subject.

**Equipment:** Digital weight scale, paper and pen.

**Procedure:** Body weight is taken on a weighing machine with the subject clothed minimally. The accuracy of the machine is checked before the subject stand still in the center of the platform and the reading is recorded. A portable person weighing machine will be used in this present study. The zero of the scale will checked before taking each measurement.

**Score:** The weight of the subject will be measured in kilogram (kg).

#### Body Mass index

**Purpose:** To measure the Body Mass Index.

**Equipment:** Standard height scale, Digital weight scale, paper, pen.

**Procedure:** It will calculate manually by the formula  $BMI = \frac{\text{The Weight in Kilograms}}{\text{the Square of the Height}}$

in Meters (km/m<sup>2</sup>), for e.g. An adult weight 70 kg and height 1.75 m will have BMI=70(kg)/1.752(m<sup>2</sup>) = 22.9.”

**Score:** The above mention formula will be used to calculate the Body Mass Index.

**Skin fold Measurement**

Taking skin fold measurement is a common method for determining body fat composition. Accurate measurement technique is important. Here is the standard technique that is used. You should read this information in conjunction with the description of each of the standard measurement sites.

**Equipment:** skin fold, tape measure, paper and pen

**Procedure:** Estimation of body fat by skin fold thickness measurement. Measurement can use from seven different standard anatomical sites around the body. The right side is usually only measured (for consistency). The tester pinches

the skin at the appropriate site to raise a double layer of skin and the underlying adipose tissue, but not the muscle. The calipers are then applied 1cm below and at right angles to the pinch, and a reading in millimeters (mm) taken two seconds later. The mean of two measurements should be taken. If the two measurements differ greatly, a third should then be done, then the median value taken. Because of the increased errors involved, it is usually not appropriate to convert skin fold measures to percentage body fat (%BF). It is best to use the sum of several sites to monitor and compare body fat measures. In order to satisfy those who want to calculate a percentage body fat measure, there is a sample of equations for calculating this here. Below is a table of general guidelines (based on personal experience) for using total sum (in millimeters) of the seven main skin fold sites (triceps, bicep, subscap, supraspinale, abdominal, thigh and calf).

**Norms**

		Excellent	Good	Average	Below average	Poor
Normal	Male	60-80	81-90	91-110	111-150	150+
	Female	70-90	91-100	101-120	121-150	150+
Athletic	Male	40-60	61-80	81-100	101-130	130+
	Female	50-70	71-85	86-110	111-130	130+

**Measurements and Scaling**

It is the mathematical teaching or process of gathering, describing, organizing, analysis and interpreting numerical data. It is a basic tool of measurement and research. In the field of physical education statistics turned to be an essential tool. For the better interpretation of the results and the presentation of data, the following methods used, The data collection will statistically analyze by T-Test, the level of

difference between pre and post maximum training on muscle hypertrophy.

**Conclusion**

This study shows that there is no significant difference found between pre and post-test of BMI and Skin Fold and hypothesis is accepted. There is no significant difference between pre and post Maximum Strength and muscle hypertrophy training on muscle hypertrophy in Bodybuilders.

**Difference of BMI between pre-test and post-test of maximum training on muscle hypertrophy**

**Table 1**

		Mean	S.D	t- value
BMI	Pre-test	110.38	14.08	1.03
	Post-test	87.75	10.69	

**Table 1:** Shows a comparison of mean value between Pre-test and post-test of BMI. Mean value of BMI Pre-test 110.38 and post-test is 87.75. After applying t-test, there is a difference found between pre-test and post-test of BMI. The calculated value of pre-test and post-test of BMI is 1.03 is lower than the table value (1.725), we accept the hypothesis. There is no significant difference between pre and post maximum training on muscle hypertrophy.

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**Difference of Skin Fold between pre-test and post-test of maximum training on muscle hypertrophy**

**Table 2**

		Mean	S.D	t- value
Skin Fold	Pre-test	23.43	5.08	0.36
	Post-test	21.78	4.62	

**Table 2:** Shows a comparison of mean value between Pre-test and post-test of skin fold. Mean value of skin fold pre-test 23.43 and post-test 21.78. The calculated value of pre-test and post-test of skin fold 0.36 is lower than the table value (1.725), we accept the hypothesis. There is no significant