Abstract

The main purpose of any athlete working out in a gym is to increase the muscular mass. In order to reach this objective there is a must to induce some chemical reactions in skeleton muscles, as a reply to physiological fatigue. The final effect consists in muscular hypertrophy.

Key Words: Hypertrophy, muscle mass, weight progressive and variations.


1. Introduction

The main objective of everyone who enters the gym is undoubtedly improving their muscle mass volume. To achieve this goal it is imperative that chemical changes occur in muscle structure. Unfortunately, for many bodybuilders, weight gain occurs after increasing the amount of fluid substance (plasma) at the expense of muscle fiber contractions elements (myosin filaments). In other words, the increase in mass is due to retention of fluid substance instead of a real increase muscle fiber. This is the reason why some body builders’ strength is not always proportional to their muscle volume.
2. **Hypertrophy exercises**

Training for hypertrophy requires the use of sub maximal loads to induce maximum tension within muscles. The objective of training with sub maximal loads is to contract the muscles in an effort in which all muscle fibers participate. In this type of training to increase the number of muscle fibers involved repetitions are made until exhaustion (when some fibers begin to get tired, others start running, and so on, until exhaustion occurs).

In order to receive optimal results, the athlete must perform the maximum number of possible repetitions within each set separately. At the end of such a set, local muscle fatigue does not have to allow the execution of any extra repetition. If the sets are not made until exhaustion, muscle hypertrophy will not achieve the desired level because the number of repetitions are not sufficient to produce the kind of stimulus needed for muscle mass gain.

The key element in training for hypertrophy is the cumulative effect of fatigue caused on all sets, not the fatigue caused per set. This cumulative fatigue stimulates chemical reactions and protein metabolism, which results in muscle hypertrophy.

In hypertrophy training the body's energy system is specific anaerobic system (ATP / CP), so the program must be designed in such a way as to consume all these energy sources. More than that, it is necessary that rest between sets to be lower (30-45 seconds), because if the body has a limited period of rest then the muscles will have less time to rebuild their energy reserves.

If a set until exhaustion depletes the reserves of ATP / CP and rest between sets does not allow a full recovery, the body is forced to adapt by increasing power transmission capacity, which in turn brings about stimulating muscle growth.

Variations of training for muscle hypertrophy - because the repetitions until exhaustion is the main element of muscle growth must recall the techniques below which shows this method of training, noting that each has the same goal - adding another two or three repetition after reaching the stage of exhaustion. The result is, of course, pumping muscle and hypertrophy.

1. **Assisted reps** - are those repetition added to the end of the set in order of exhaustion of the neuro-muscular system, in which one partner provides the necessary support for the execution of another 2-3 repetition.

2. **Repetitions with resistance** – are repetitions that after finishing the set the partner helps on the concentric side of movement and opposes resistance on the eccentric half of the execution. During these 2-3 repetitions the eccentric part contracts 2 times more powerful than usual, which exceeds the standard level.
3. **Supersets** - are alternately executed sets for opposing muscle groups (e.g., biceps-triceps).

4. **Supersets for the same muscle group** - this form of superset recommend execution of a set for a muscle group, followed by a break of 20-30 seconds and then resume another set for the same muscle group.

5. **Cheated repetitions** - athletes resort to this technique when they do not have enough resources to properly execute the movement. Usually at the end of the set they use other body part to be able to add further 2-3 repetition per set.

**Objectives for the hypertrophy period:**
- Muscle growth by manipulating, mobilization energy resource ATP / CP.
- Refining muscle groups density.
- Improved symmetry between muscle groups, especially between arms-legs, back-chest, leg flexors-extensors.

Length of training for muscle mass - depends on several factors among which the most important are: the category of sport, level of athlete and experience, individual needs, planning training program.

However, substantial changes to occur in muscle volume, necessarily needs planning several periods of 6 weeks of training for hypertrophy. During this time you must apply training methods that give the best response for each sport, and you should note that the length of the rest interval should be small enough to reach exhaustion after each set. Regarding number of repetitions is considered training for hypertrophy is exhausting if it's done within 75 to 160 repetitions.

Such a muscle solicitation requires a long recovery period after exercise. Even if the source of ATP / CP is recovering very fast, liver glycogen needs 46-48 hours to recover to optimal parameters. In these circumstances it is clear that training for hypertrophy can be made only up to 3 times per week.

### 3. Model planning training for hypertrophy

**Table 1:** Model planning training for hypertrophy

<table>
<thead>
<tr>
<th>Category of bodybuilder</th>
<th>Beginner</th>
<th>Intermediate</th>
<th>Advanced</th>
<th>Expert</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Duration phase (in weeks)</td>
<td>6</td>
<td>3-6</td>
<td>3-6</td>
<td>12</td>
</tr>
<tr>
<td>---------------------------</td>
<td>------</td>
<td>------</td>
<td>------</td>
<td>------</td>
</tr>
<tr>
<td>Number of repetitions/set</td>
<td>6-12</td>
<td>9-12</td>
<td>9-12</td>
<td>9-12</td>
</tr>
<tr>
<td>Number of sets/exercise</td>
<td>2-3</td>
<td>4-5</td>
<td>4-5</td>
<td>3-7</td>
</tr>
<tr>
<td>Rest interval (in sec.)</td>
<td>60-120</td>
<td>45-60</td>
<td>45-60</td>
<td>30-45</td>
</tr>
<tr>
<td>Number of exercises/week</td>
<td>2-3</td>
<td>3-5</td>
<td>4-5</td>
<td>5-6</td>
</tr>
<tr>
<td>Aerobic workouts/week</td>
<td>1</td>
<td>1</td>
<td>1-2</td>
<td>2-3</td>
</tr>
</tbody>
</table>

4. Conclusions

Working constantly for hypertrophy depletes energy reserves of the body and accelerates protein catabolism contractions (myosin). Undesired outcome of such overtraining can lead to muscle loss instead of increasing. Therefore it is absolutely necessary alternating the intensity each week, so the body to respond well to each training period.

REFERENCES:

Manescu, D.C., 2009, *Emphasizing Physical and Muscular Development*, Publisher ASE, Bucharest