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RESEARCH ARTICLE

THE MUSCLE FORCE GAIN IN MUSCULATION INITIANTS

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ABSTRACT

The present study aims to research on strength training in bodybuilding, neuromuscular adaptations and changes in neuromuscular control in the initial phase of strength training. Strength training is a trend in gyms, more and more people want a more appropriate body in the fitness and healthy parameters. Strength training has its variations, which stipulate strength training, but in order to obtain strength gain, these variables need to be controlled so that the anaerobic system becomes preponderant, through the stimuli caused by the incisive and chronic training sessions , particularly in the beginning. The neuromuscular system adjusts itself by increasing the levels of strength when it comes to the beginner student and improving their intramuscular and intermuscular coordination, improving their performance and generating morphological modifications in their body. It is concluded that the importance of nerve adaptations to strength training for beginners and neuromuscular adaptation is responsible for the increase in strength and through better synchronization of motor units, better intramuscular and intermuscular coordination.

Key words: Bodybuilding; Strength training; neuromuscular adaptations; Gain of force.

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INTRODUCTION

Many studies have demonstrated the importance of muscle strength in daily activities and physical activities at different ages. Many of the benefits are in improving functional abilities, morphological, neuromuscular, physiological changes and increased muscle strength. Previous stimuli to increase maximal strength can be achieved through strength training, in which the repeated development of the force by the skeletal muscles at levels above those found in daily activities, brings together more motor units, consequently greater muscular tension. The increase in force is equivalent to the amount of overload, as measured by the relative strength developed and by the number of muscle actions performed during strength training according to HELLEBRANT; HOUTZ, (1956) apud Major; Alves, (2003). For strength gain, bodybuilding requires the accompaniment of a well-trained Physical Education professional, since the load ratios and intensity of training considerably alter the results obtained in relation to the practice of a training with loads.

Literature Review

History of Musculation: The history of bodybuilding does not have a specific beginning inscribed by history.

The first recorded record of lifting weights comes from classical Greece. They found stones that weighed more than 130 kilos. There are records of stone throwing games through engravings on walls of ancient Egypt's funerary chapels showing that 4,500 years ago men were already lifting weights as a form of physical exercise. On the stones were records that were used by Milon of Crotona, a six-time Olympic champion athlete. He used to run races with calves on the back, the more the calf grew, the stronger it became and the stronger it became. At the end of the nineteenth century the well-known "bodybuilding", along with "weightlifting", his attention was focused on circus companies and theaters, where they were presented "the strongest men in the world." Bodybuilding is a workload strategy that directly interferes with the person's functional capacity and muscular structure, and can be used for a variety of purposes, such as: recreational, by means of the breaking of tension coming from the daily life; sports application used as a training aid; therapeutic application in postural corrections and recovery of muscular problems such as atrophies and hypotonies, also in the aesthetic field through the harmonious development of the body, with muscular symmetries and proportions (TUBINO and MOREIRA, 2003). According to Guedes Jr (1997), bodybuilding can be established as: "the execution of biomechanical movements located in defined muscle segments with the use of external or body overload", and because it is indicated as an anaerobic activity of high intensity and short have as their main source of energy, carbohydrates.

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Power Training: According to (FLECK; KRAEMER, 1999) Strength training, also known as weight training or workout training, has become one of the most well-known forms of exercise for both athlete conditioning and fitness of people who are not athletes. Individuals participating in a strength training program expect the program to bring benefits such as: increased strength, increased muscle size, improved athletic performance, increased muscle mass, and reduced body fat. Inside a weight room you can work by varying the intensity of the training through different types of forces. For Guedes Jr (1997) and Fleck (1999), the main types of forces are:

ü Pure Strength - works with 85% to 95% of maximum strength, with between 1 and 5 repetitions. Where maximum strength is the ability to exert force in only one repetition (Fleck; Kramer, 1999);

- Din Dynamic force - works with 70% to 85% of maximum force.
- Used for gaining muscle volume, it uses between 6 and 12 repetitions.
- ü Explosive force - works with 30% to 60% of maximum force. Used for speed gain, it uses between 8 and 15 repetitions.

Localizada Localized muscle resistance (RML) - works with 40% to 60% of maximal strength. Used to improve local aerobic and anaerobic resistance, it uses between 15 and 50 replicates.

ü Endurance - works with 25% to 40% of maximum strength. Used to improve aerobic endurance at muscle level, it uses more than 50 repetitions.

ü Isometry - works with 50% to 70% of maximum force. Used to improve strength at an angle.

Each program must be stipulated to meet the goals and training needs of each person. The teacher, the personal trainer and the coach should all study and understand the level of fitness of the practitioner. It should be borne in mind, however, that a practitioner's level of conditioning (eg strength for 1RM) should not be assessed until it is known that the subject can withstand the test phases and that the data obtained are significant (Kraemer and Fry, 1995). One of the most serious mistakes that happen in planning a session is putting too much stress on the person before they can bear it. In order to create an effective strength training program, the specific objectives of the program must be defined. Factors such as age, physical maturity, training history and psychological and physical tolerance should be considered in any process of goal development and individual program planning.

ü Repetition: A repetition is a complete movement of an exercise. It usually consists of two stages: the concentric action of the muscle, or lifting of the load and the eccentric action of the muscle, or the return of the load to the initial position (FLECK and KRAEMER, 2006).

Series: It is a group of repetitions developed continuously, without interruptions. Although a series can be completed with any number of repetitions, the series are generally one to 15 repetitions. (FLECK and KRAEMER, 2006).

ü Maximum repetition (RM): It is the maximum number of repetitions per series that can be executed with a certain load, using the correct technique. Thus, a series with a given MRI means that even voluntary momentary fatigue is made. 1 RM is the heaviest load that can be used for the complete repetition of an exercise. 10 RM is a lighter load, which allows completion of 10, but not 11 repetitions with the correct technique of exercise (FLECK and KRAEMER, 2006).

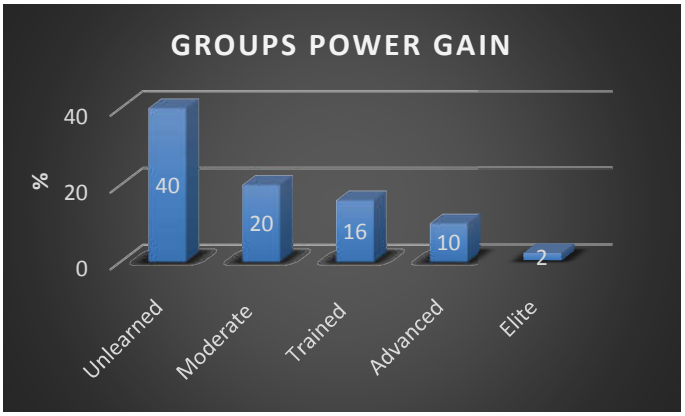
ü Muscular strength: Muscular strength is the maximum amount of force that a muscle or muscle strength group can generate in a specific pattern of movement at a given movement speed (Knuttgen and Kraemer, 1987). In an exercise such as a bench press, 1 MRI is a measure of muscle strength at a relatively slow movement speed.

ü Rest periods: Recovery between sets of an exercise, between workouts and between training sessions is an important factor in the success of the program. Rest periods allowed between sets and between exercises during a training session are largely determined by the goals of the training program. The rest periods between series and exercises, the load used and the number of repetitions performed per series, all affect the planning and the objectives of a program. In general, if the goal is to increase maximal muscle strength capacity, relatively long rest periods can be determined.

Intensity: The intensity of an exercise can be stimulated as the percentage of 1 RM or any RM load for exercise. The minimum intensity that can be used to perform a series until momentary voluntary fatigue in healthy youngsters in order to generate increases in strength is 60 to 65% of 1RM (McDonagh and Davies, 1984; Rhea *et al.,* 2003 apud Fleck *et al.,* 2006).

Initial gains in strength training: According to (Ide *et al.,* 2014), the increase in neuromuscular activation due to the increase in effort intensity, even in the untrained subject, makes it clear that the stimuli of the strength training sessions must be either intense or bulky to trigger adaptive responses in both the neural pathways and in the morphology, architecture and metabolism of the musculature. Enoka (1988) reports that strength gain can be obtained without alteration in muscle size, but neural adaptations will still occur (Apud *et al.,* 2003). The increase in muscle strength occurs before the process of muscular hypertrophy, in relation to motor learning (Morris *et al.,* 2001). Moritanie DeVries (1979) performed tests with elbow flexion exercises and noticed relevant changes in relation to the trained arm in the cross-sectional area as well as the level of neural activity, being an important factor for strength gain. The untrained arm showed strength gains along with increased neural activity. The conclusion of the study found that the neural factors contributed most of the strength gains in the initial phase of the training, and later hypertrophic factors also contributed (Apud *et al.,* 2003). A survey by Gordon *et al.* (1996), (Apud Maior andAlves, 2003) where they studied 54 women aged between 18 and 35 years, presenting approximately the same physical characteristics. Women underwent strength training (knee extension) for 10 weeks, and also underwent test and examination, performed MRI before and after training, which identified increases in neural activation and muscle hypertrophy. The increase in hypertrophy in this study may be due to the stabilization of the neural adaptation processed at the beginning of the training, giving continuity to the hypertrophic factors. In a study by Sale cited by Powers (2005) he confirmed that adaptations and strength gains are between 8-20 weeks of training and that the

initial gain of strength occurs through neural adaptations to coordination and recruitment of fibers muscles (Apud Silva and Navarro 2007). According to ACSM (2002) based on a series of reviews of scientific studies, it is reported that strength gains are more relevant during the early stages than in the intermediate and advanced stages of strength training.



Graphic - The table shows the strength gains according to the progressivity of the training.

Synchronization of Motor Units: Neural adaptation is significant for the synchronization of motor units. Due to the increase in the number of shots of action potencies coming from motor units of multiple synergistic muscle groups in the same unit of time. This synchronization improves intramuscular and intermuscular coordination, allowing a greater capacity to generate greater force, causing an increase in amplitude in the electromyographic signal, through this synchronization. Attributed to raising the incidence of triggered action potentials in the same space of time. Its major role is played in increasing rate of force development during rapid contractions, or as a mechanism of activation of multiple muscle groups synergists. On the other hand, the determinant for the improvement of the rate of development of force seems to be the increase in the frequency of firing of action potentials. (IDE *et al.,* 2014).

Conclusion

In this literature review study we tried to demonstrate the initial strength gains in untrained individuals and we perceive the importance of nerve adaptations to strength training for beginners.

It is known that neuromuscular adaptation is responsible for increased strength and through better synchronization of motor units, better intramuscular and intermuscular coordination. In the study demonstrated in this work we identified that the strength gains are more considerable during the initial phases than in the intermediate and advanced phases of strength training. And physical education professionals have the knowledge how neural adaptations occur, previously grounding in practice through theoretical knowledge.

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