THE PROCESS OF MUSCLE HYPERTROPHY UTILIZING A NOVEL BIO-ELECTRICAL MUSCLE STIMULATION DEVICE

Robin Nye, RN, BSN; Alysa Hoffmeister, BS

WHY TRUSCULPT® FLEX

After the age of 30, inactive individuals can lose as much as 3-8% muscle mass per decade.[1] This happens when the protein in muscle breaks down faster than it is being built through the process of protein synthesis. Strength and resistance training is traditionally the most effective method to avoid or reverse this process. A new approach to achieve similar results can be accomplished with truSculpt flex by Cutera, a bio-electrical muscle stimulation device.

truSculpt flex is a muscle-sculpting device that offers personalized treatments based on patient fitness level, shape, and goals. Only truSculpt flex with Multi-Directional Stimulation (MDS) deploys a unique method of electrical muscle stimulation to target specific muscle groups using three treatment mode options, covering the largest treatment area in the body sculpting industry. Low levels of energy achieve deep muscle contractions at high intensity via a proprietary handpiece design with truGel to optimize results and increase practice revenue.

HOW TRUSCULPT FLEX WORKS

During traditional strength training, the brain sends a signal to the nervous system and motor neurons to contract skeletal muscle voluntarily. During a truSculpt flex treatment, the process bypasses the brain, and instead, the device sends an electrical signal to the handpiece pairs or quads through a hydrogel pad which is the conductive medium that minimizes discomfort and maximizes safety and efficacy. The electric current deploys proprietary waveforms and carrier frequencies. The waveform targets skeletal muscles while the carrier frequency causes preferential deactivation of the alpha motor neurons that involuntarily contract the skeletal muscles under the handpieces. Since the action potential and subsequent depolarization of the neurons is a threshold (all-or-nothing) event, the entire muscle group under the handpiece pair is engaged for locomotion. The current delivery also incorporates a range of beat frequencies that tell the muscles the speed and intensity of the contractions which continually change throughout the treatment duration. The selectivity of the waveform for the muscle type and alpha motor neurons makes the device/treatment insensitive to the amount of subcutaneous adipose tissue overlying the skeletal muscle.

truSculpt flex includes 16 handpieces to allow up to 8 areas to be treated simultaneously. The device is pre-programmed with three treatment modes, Prep, Tone and Sculpt, that offer five different contraction sequences to simulate a traditional workout at an accelerated intensity and an increase to the basal metabolic rate. This simulation continually confuses and challenges the muscle at an intensity and duration that is beyond the level that can be achieved during regular exercise. A typical abdominal workout may include up to ten minutes of various movements to contract, hold and relax the abdominal muscles. Although the rectus abdominus and external obliques muscle are the primary target, they are being assisted by other muscle groups including but not limited to latissimus dorsi and splenius capitis. Conversely, truSculpt flex allows for selective targeting of motor neurons to contract specific skeletal muscles without the assistance of surrounding muscle groups for forty-five minutes. A fit adult could perform up to 100 crunches before reaching a point of exhaustion. During a forty-five-minute truSculpt flex treatment, a fit adult could perform the equivalent of up to 54,000 crunches.[2] Other muscle stimulation devices are limited to stimulating only one to two muscle groups at a time, simulating one to two workout routines, in a single linear direction, at a constant speed. Although the intensity can be increased, it is common to reach the maximum intensity and no longer be able to challenge the muscle.

MUSCLE HYPERTROPHY

During a truSculpt flex treatment, similar to strength training, muscle fibers undergo trauma or microscopic tears, and then cells attempt to repair the damage which results in increasing muscle size and strength. This repair process, known as hypertrophy, begins after each treatment and involves releasing hormones, such as testosterone, to activate cell recovery, form new blood capillaries, repair muscle fibers, and manage the gain in muscle mass. The amount of released growth hormones depends on the intensity of the activity, hormone levels (which is higher in men, individuals with genetically more muscle mass, or individuals who frequently workout), and the metabolism level which helps convert amino acids into protein to bulk up muscles.

Due to the aerobic nature of a truSculpt flex treatment, lactic acid build-up does not occur. Lactic acid or lactate is a byproduct of anaerobic exercise. When the body needs a quick energy source i.e., running a 100-yard dash, it does not have the ability to use oxygen to convert glucose into energy as quickly as it needs. In this instance, glucose is broken down without oxygen and the byproduct is lactic acid. This byproduct is then broken down in the liver and excreted naturally. However, delayed onset of muscle soreness, commonly known as DOMS, can occur. This soreness is derived from the micro-trauma to the muscle and inflammation, can last 24 to 72 hours, and subsides on its own.

PROTEIN SYNTHESIS

After a truSculpt flex session, protein synthesis occurs in the treated muscles for approximately 24 to 48 hours.[3] During a series of 4-6 truSculpt flex treatments; the body goes into a state of constant muscle protein synthesis. Muscle protein synthesis is how your body repairs and rebuilds damaged muscle fibers. Muscles grow or hypertrophy when the amount of protein synthesized in the muscle exceeds the amount that is broken down. Protein synthesis is stimulated by the presence of amino acids which are derived from external sources of proteins like eggs, milk, meat and some plant sources. It is widely known that to optimize muscle hypertrophy, it is ideal to eat 1.2 – 2.2 grams of protein per kilogram of body weight per day.[4]

Building muscle is not an instant process. There may be immediate swelling of the muscles after a truSculpt flex session, as well as changes at a microscopic level. However, observable results take time. Many factors are involved in the process of muscle hypertrophy and individuals will respond at different intervals. The body needs to repair, build and increase muscle size over several weeks. In traditional resistance training, it can take 4-16 weeks to see marked visible differences in the definition, size and strength of muscles. Just as an injury to bone takes time to heal, the hypertrophy of muscles and the process of healing and building takes time as well. Some individuals may see results sooner than others and there are many reasons for that. Age, sex, diet, previous exercise experience or current fitness level, physiological potential/genetics, amount of adipose tissue on top of the muscle, and proper rest are some of the factors that contribute to how rapidly the muscles will respond.

CONCLUSION

truSculpt flex offers a high level of intensity and an increase to the basal metabolic rate to provide accelerated muscle mass growth over traditional strength training and other muscle-sculpting technologies with limited fatigue or soreness. In addition, two common symptoms of aging, reduced muscle mass and declining metabolism are both treated with truSculpt flex which makes this treatment an excellent adjunct to any medical practice focused on decreasing the signs of aging, improving appearance, and body confidence.

[1] Melton LJ, III, Khosla S, Crowson CS et al. Epidemiology of sarcopenia. J Am Geriatric Soc. 2000; 625-630.
[2] Data on file
[3] Turner, M, Schneider M.D., MS. How long does it take to build muscle: Understanding Muscle Hypertrophy. 2019;
[4] Kim IY, Schutzler S Schrader A, Spencer HJ Azhar G, Ferrando AA, Wolfe RR. American Journal of Physiology Endocrinology and metabolism 2016;310(1):E73-80. Doi:10.1152/ajpendo.00365.2015

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