TRUSCULPT FLEX: TECHNOLOGY AND DIFFERENTIATION IN THE MARKET

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ELECTRICAL MUSCLE STIMULATION

Electrical Muscle Stimulation (EMS) is the evocation of muscle contraction using electric impulses. EMS provides an electrical current at a specifically designed frequency to target motor nerves causing them to depolarize as shown in Figure 1 below.

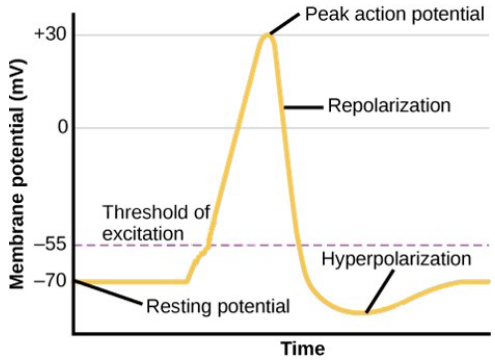


Figure 1[1]. The mechanism of triggering a nerve – Action potential

These nerves activate the muscle to contract based on the amount of resistance applied through the device. The brain goes through a similar process when actual weights are lifted.

Electrical impulses are generated by a device and are delivered through electrodes placed on the skin over the target muscles and mimic the action potential initiated by the nervous system, causing the muscles to contract.

The following table highlights the differences in the motor nerve stimulation by the Central Nervous System (CNS) and by external electrical stimuli.

Motor Unit Recruitment - Central Nervous System	**Motor Unit Recruitment and Contraction - Electrical Stimulation**
Active	Passive
Small motor units are recruited first then larger motor units for smooth and gradual tension	Large superficial fatigable motor units are recruited first, then smaller motor units
Asynchronous firing in off and on pattern - energy efficient and slower onset of fatigue	Synchronous firing - motor units stimulated continue to fire until stimulus removed, causing quick onset of fatigue
Action potential moved away from the nerve cell body	Action potential generated in two directions, away from the cell body and back toward the cell body

Table 1. Difference between a contraction elicited through normal CNS function as compared to that elicited via electrical stimulation means.

EMS devices stimulate muscles to contract and has been used for toning, reshaping, and maintaining muscle definition. The use of these devices has been extended for the improvement of physical appearance by increasing muscle tone and firmness. Aesthetic muscle stimulation devices can be divided into two categories: Direct Electrical Muscle Stimulation and High Intensity Focused Electromagnetic Muscle Stimulation (HIFEM).

WHAT IS TRUSCULPT FLEX?

The truSculpt flex is a bio-electric current stimulation device that incorporates direct electrical muscle stimulation which can contract a specific muscle or muscle group, well and above what would be tolerated with a traditional electrode pad.

The truSculpt flex leverages a lot of historical effects of traditional EMS as shown in Figure 2, but is innovative from the electrode design as it applies an even current distribution along the length of the muscle.

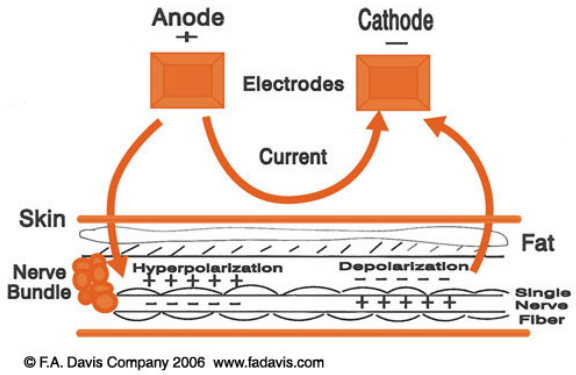


Figure 2[2]. Illustration of nerve depolarization using direct electrical stimulus

The truSculpt flex improves abdominal tone, for strengthening abdominal muscles, and for development of a firmer abdomen. In addition to strengthening, toning, and firming of the buttocks and thighs. The device consists of four core electrode cables which power sixteen handpieces. The handpieces are placed on the body to allow simultaneous treatment of up to eight areas. The truSculpt flex has multiple intensity settings and modes of treatment that contracts muscles rhythmically, stimulates metabolism and blood flow. The unique truSculpt flex handpiece and truGel delivers energy directly to the muscle. Moreover, truSculpt flex can make muscles twist and turn providing different types of torsional contractions by changing the polarity of the electrodes in real-time and deploying its proprietary three modes (Prep, Tone and Sculpt) of treatment.

COMPETING TECHNOLOGIES

Electromagnetic fields are composed of both electric and magnetic fields.[3] Electric fields are a result of electric charges while magnetic fields arise from movement of electric charges and are measured in Tesla (T).[3]

For High Intensity Focused Electromagnetic Muscle Stimulation (HIFEM) devices, a rapidly moving magnet in the handpiece generates an electric current in tissue that depolarizes motor nerves resulting in muscular contractions as seen in Figure 3 below.[3]

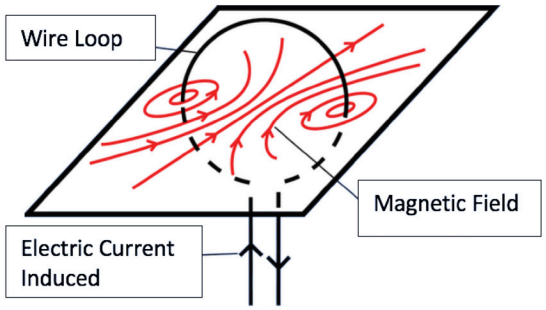


Figure 3. An illustration of rapidly moving magnet inducing electric current.[3]

TRUSCULPT FLEX VERSUS HIFEM

truSculpt flex differs from other devices that use electromagnetic or magnetic stimulation in that it provides equal distribution of electrical current directly into specific and targeted muscles. truSculpt flex delivers up to 30 mA of energy to stimulate motor neurons, and different types of torsional contractions can be achieved by changing polarity of the electrodes in real time.

The contractions achieved by HIFEM devices are limited to the proximity of the magnet to a specific muscle group and lack directionality resulting in single-axis contractions.

A summary of the differences between truSculpt flex technology and the competition are tabulated below in Table 2.

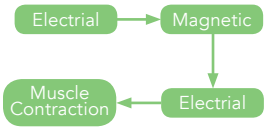
Direct Electrical Muscle Stimulation	**High Intensity Focused Electromagnetic Field (HIFEM) Stimulation**
Low electrode placement sensitivity for muscle targeting	High electrode placement sensitivity for muscle targeting
	
Offers multi-dimensional torsional muscle contractions	Offers single-axis linear muscle contractions
Safe - Absence of high magnetic fields	High magnetic field exposures (>>0.3μT) may potentially lead to cancer[4]
High Return on Investment as more areas can be treated per session	Less Return on Investment compared to truSculpt flex

Table 2. Difference between stimulation elicited through Direct Electrical Muscle Stimulation as compared to that elicited via High Intensity Focused Electromagnetic Field (HIFEM).

To summarize, truSculpt flex offers the most direct and safest technology to stimulate and tone skeletal muscles.

[1] https://www.khanacademy.org/science/biology/human-biology/neuron-nervous-system/a/depolarization-hyperpolarization-and-action-potentials
[2] https://media.lanecc.edu/users/thorpeb/pta101lab/FoundationsofEstim/FoundationsofEstim_print.html
[3] Macrene Alexiades. High Intensity Focused Electromagnetic Field (HIFEM) Devices in Dermatology. Journal of Drugs in Dermatology. 2019, 18(11), pg 1088.
[4] https://www.who.int/peh-emf/publications/facts/fs322/en/