

Nonsurgical Skin Tightening

Moving Below the Neck: Breast Lifting, Arm Lifting



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KEY POINTS

- Modern technologies and new-generation fillers are heavily used to achieve nonsurgical skin tightening of the body.
- Energy from ultrasound, radiofrequency, laser, and shockwaves are the main sources integrated in skin-tightening devices.
- Combination approaches, maintenance regimes, and appropriate patient selection are key to successful results.

INTRODUCTION

Noninvasive skin-tightening procedures have overwhelmingly increased in popularity over the years due to technological innovations and scientific methodologies that are able to deliver clinical outcomes with minimal side effects and virtually no downtime. Skin-tightening treatments can be done not only in the face but in other areas of the body. Most commonly patients request improvement of laxity in the neck, décolletage, arms, abdomen, thighs, and knees. Several technologies have been enlisted in reduction of excess skin and these are frequently paired with noninvasive fat-reduction procedures. Ultrasound, lasers, radiofrequency (RF), and shockwaves spearhead the devices dermatologists use, although lately new-generation volumetric fillers have demonstrated favorable results for nonfacial skin tightening.

ENERGY-BASED DEVICES FOR SKIN TIGHTENING

Radiofrequency

RF devices have a leading role in improving skin laxity in all areas of the body. Their mechanism is based on delivering RF waves to the tissue layers, generating thermal energy that triggers a cascade of events including collagen contraction, coagulation, matrix remodeling, and ultimately increased dermal thickness. As RF energy is not absorbed by chromophores, devices can be used in all skin types. The first generation of devices had drawbacks for the patients, such as excess pain, but newer-generation devices have cooling systems or different electrode organization that delivers heat homogeneously for increased efficiency and patient comfort. Side effects after RF treatment included transient erythema or bruising, which is

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self-resolving. Depending on the number of electrodes, RF can be classified into unipolar, bipolar, multipolar, or fractional devices. Unipolar devices have a single electrode with a grounding pad, and achieve bulk heating with deep tissue penetration, whereas bipolar devices consist of 2 electrodes that emit a fast, alternating current. Combining RF energy with other sources of energy, such as laser/light, ultrasound, or pulsed electromagnetic fields, has been used in devices these past couple of years (Exilis, BLT, USA or Venus Legacy, Venus Concept, Toronto) to maximize the synergy, and thus clinical efficacy of devices on skin laxity. Other types of RF devices have several generators rather than electrodes (Endymed3DEEP, NYC, NY) that increase their capacity to penetrate deep tissue across a larger anatomic area. Fractional RF, such as microneedling RF or nanofractional RF, are also used for skin tightening, particularly in small delicate areas. These devices create thermal and mechanical micro-wounds that stimulate coagulation and remodeling, and although they can rejuvenate fine lines and wrinkles, they are more regularly used to treat striae, scarring, and textural concerns. A minimally invasive RF device that uses an internal probe to deliver RF energy to the target tissue, while continuously monitoring temperature, is the latest RF device to enter the skin-tightening field (ThermiRF; Thermi Aesthetics, Irving, TX). As opposed to the other devices that typically require a series of 3 to 6 treatments at monthly intervals to have measurable results, this temperature-controlled RF device treatment is done once, and results have been demonstrated to be durable.

Ultrasound

Microfocused ultrasound (MFU) devices are also popular for noninvasive skin tightening. As opposed to high-intensity ultrasound, mainly used for fat reduction, MFU devices deliver focused ultrasound waves to the dermal and subcutaneous layers (up to 5 mm), that induce thermal coagulation, triggering an inflammatory cascade that leads to fibroblast activation and collagen/elastin production. The main device used in the United States is Ulthera (Merz, Raleigh, NC) that combines MFU with high-resolution ultrasound imaging (MFU-V), to enable visualizing tissue planes to a depth of 8 mm and allow treatment control. Although this device has been used off-label in several anatomic areas, it has recently been approved by the Food and Drug Administration for treating the neck and chest. Typically, 1 to 2 treatments are necessary and side effects are minimal and self-resolving.

Lasers

Laser and light devices were the first technologies to be evaluated for skin tightening. Nonablative laser and broadband light devices with reduced downtime and adverse effects and wavelengths from 532 to 1927 nm have been mainstreamed in use over ablative treatments for improving laxity. Both broadband light and nonablative lasers deliver thermal energy in the lower levels of the dermis, stimulating a wound-healing response that leads to increased collagen production while leaving the epidermis intact. Clinical studies have shown that combination of 532 nm/1064 nm devices stimulate collagen production, an effect that lasts 6 to 12 months after treatment. The most commonly used broadband device for skin tightening is the Titan system by Cutera (Cutera, Inc, Brisbane, CA) that uses broad-spectrum infrared light to bulk heat the dermis up to 3 mm deep. This device has been shown to be safe and effective in all skin types, and results are evident after 1 to 2 monthly sessions. Skin tightening using laser/light devices has been applied predominantly in the facial area rather than the body, so in the authors' experience, it would not be a first-choice device to treat off-face laxity.

Shockwaves

Shockwave devices deliver high-pressure pulses to the tissue in ultra-short intervals that produce mechanical pressure waves promoting cavitation and localized increase in tissue temperature. The combination of acoustic energy with thermal stimulates the wound-healing response, and matrix remodeling resulting in collagen/elastic production and improvement of laxity. Shockwave device applicators can deliver either focal or radial waves, the former being more intense targeted to the tissue, whereas the latter can be more superficial and diverge over the treatment area. Treatment by shockwave devices is generally well tolerated, and even pleasant for some patients, and a self-resolving redness in the treated area is the only reported side effect thus far. Although not excessively used in aesthetic dermatology for noninvasive skin tightening, positive results have been demonstrated when using these devices to treat cellulite, as well as in combination with fat-reduction procedures, such as liposuction.

New-Generation Fillers

A new trend in noninvasive skin tightening for the body is the use of new-generation fillers. Although only calcium hydroxylapatite (CaHA) has been approved for off-face sites (the hands), several physicians have used poly-L-lactic acid (PLLA) in areas such as the abdomen,

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