

Treatment of Lumpy and Dimpled Skin Using a Next-Generation Laser Technology



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INTRODUCTION

Lumpy and dimpled skin is a condition that will affect virtually all women at some time in their lives. It is characterized by a texturing of the skin similar in appearance to an orange peel or cottage cheese (Figure 1). This skin texturing appears most often in areas such as the thighs, abdomen, and buttocks. Unlike other conditions, which can be affected by diet, exercise, and lifestyle changes, this condition appears to be genetic in origin. Lumpy and dimpled skin can appear on any person, whether or not they have fat accumulation in the area. For many women, treating this condition may improve their quality of life.



Figure 1 - Mild to Moderate Presentation

Pathophysiology

The uneven skin texture, more commonly seen in women than men, is believed to be in part due to the hormonal influence of estrogen. The fibrous septa connecting the deep fascia and reticular dermis are arranged differently in women (Figure 2) and men (Figure 3). In men, the septa present in a crisscrossing manner between the reticular dermis and deep fascia, creating a net-like pattern that is fairly consistent across the entire surface.

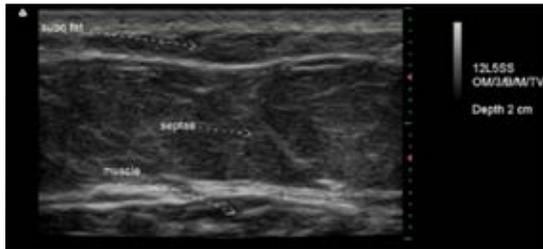


Figure 2 – Female with uneven skin surface

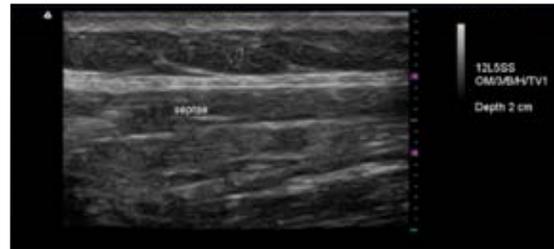


Figure 3 – Male with even skin surface

In women, the septa present less uniformly and less regularly. The septa also present more vertically oriented between the reticular dermis and deep fascia. There is usually a very small amount of fat between the fascia and dermis in men, while in women, this layer is much thicker. The combination of these features causes the surface of the skin to be pulled down more in some places and allows herniation of fat in other places.

There are three distinct components of lumpy and dimpled skin. Dimples are caused by the septa pulling too tightly. Bulges are caused by the excess of fat located between the superficial fascia and dermis. The third component is loose skin which contributes to and exacerbates the uneven texture of the skin.

Previous Treatments

All previous treatments for lumpy and dimpled skin have failed to safely, effectively, and permanently treat the condition. These treatments include creams intended to tighten the skin, injections to lyse subdermal tissue, laser-assisted lipolysis to remove excess fat, surgical methods for destroying all the septa, or temporarily stretching the skin out using a vacuum.

These treatment options are lacking in two ways. First, these treatments fail to address all three of the underlying issues. Second, the treatments lack specificity. Without the ability to target specific septa to sever, or specific pockets of fat to reduce, the overall appearance of the skin is rarely improved to a significant degree.

Using laser technology, it is possible to significantly address all three of the underlying issues, ensuring better outcomes. Using newer, more sophisticated technology, light can be applied in specifically tailored ways to address each issue in a way that is safe, effective, and highly accurate.

Laser Wavelengths

The first generation of laser devices for the treatment of uneven skin was a Nd:YAG laser operating at 1440 nm delivered minimally invasive via a laser fiber. This was an interesting idea in theory, but in practice many issues became evident. The 1440 nm laser light has a very short absorption length in tissue at only 300 microns (Figure 4). With all the energy of the laser being supplied into a very small volume of tissue, 1440 nm light is always ablative except at the lowest of power levels.

Problems occurring from the use of an ablative wavelength include excessive bruising due to the bursting of vascular tissue (Figure 5), pain during treatment, extremely long treatment times due to the necessity of using low power, and less visually appealing results.

CelluSmooth is a second generation laser device for treating lumpy and dimpled skin designed with a 1319 nm laser. The 1319 nm laser light is absorbed 20 times less in tissue than the 1440 nm laser light, making 1319 nm light non-ablative except at a much higher peak-power setting. This allows the 1319 nm laser to be either non-ablative or ablative, depending on the component of the pathology being addressed. This creates a much safer, faster, and more efficacious procedure.

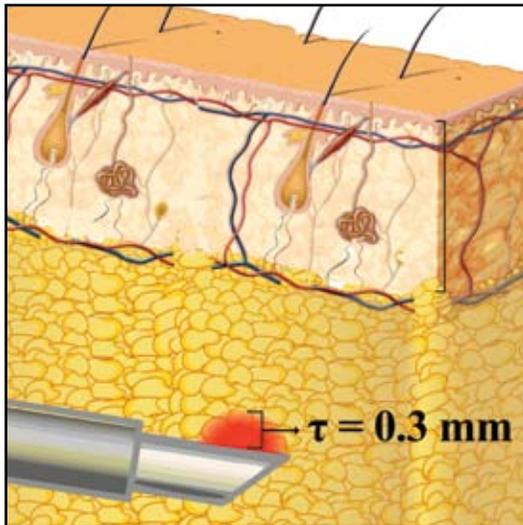


Figure 4 – 1440 nm Ablation



Figure 5 - Excessive Bleeding from 1440 nm Laser (from realself.com)

Patient Selection

While almost all women and some men suffer from lumpy and dimpled skin, not all will be ideal candidates for treatments. Patients can present with lumpy and dimpled skin independent of the levels of adipose tissue in the area.

The ideal candidate (Figure 1) presents with a tight tissue envelope and enough adipose tissue pressing against the skin. A patient with more volume can achieve more favorable results. Patients that are volume deficient with lax skin will not have enough adipose tissue in the area to press against the tissue and create a tight tissue envelope for proper treatment. This unevenness generally presents with saggy or drooping skin (Figure 6).

If the tissue can be relieved of the texturing by retracting skin around the site (Figure 7), the patient is probably not a good candidate for laser skin smoothing. Unfortunately, there does not appear to be a good solution for these patients. These patients may or may not benefit from a skin tightening procedure.



Figure 6 - Volume Deficient Skin



Figure 7 - Retracting Loose Skin

CelluSmooth™ Procedure

The CelluSmooth procedure, using the 1319 nm laser light delivered via fiber is simple and straight forward. The procedure is considered to be an office treatment as there is no need for general anesthesia. CelluSmooth can be performed comfortably under tumescent anesthesia with patients reporting little to no discomfort. For increased safety and efficacy, the procedure utilizes the TempASSURE™ accessory to ensure optimum temperatures are being obtained, but not exceeded.

CelluSmooth has three modes of operation for addressing each component of lumpy and dimpled skin and a power range of 10 – 30 watts. The three modes are Burst, Melt, and Tighten*. Burst mode uses the laser in an ablative mode at high energy pulses and a low frequency to sever septa to release and raise dimples. Melt mode uses an intermediate energy and frequency to melt bulges of fat to reduce bumps. Tighten mode uses low energy pulses at a high frequency to heat the skin for tightening* the entire skin envelope.

Before the procedure begins, all necessary equipment and medications should be setup and sterile. Recommended tumescent is one liter lactated Ringers to 50 cc 1% lidocaine plain, 1 ampule epinephrine 1/1000, and 10 cc bicarbonate 8.4%. Other tumescent mixtures have been successful, as has adding Marcaine for longer-lasting numbing.

Patients should be marked (Figure 8) for the procedure while standing, before being placed on the treatment table. Transverse lighting provided by a flashlight is used to emphasize the lumps and dimples. A red marker is used to identify dimples and becomes a target for severing septa subdermally at that location. Green is used to identify bulges which become targets for

melting. After the area has been marked for peaks and valleys, 5 cm x 5 cm squares are placed over the area to create a grid. There should be between 1 and 3 red marks per square.

After the patient is marked, she is placed on the treatment table in either a prone or supine position, depending on the area being treated. Once a sterile field has been established, 1-2 puncture incisions are made with an 18 gauge needle surrounding each treatment site. From 30 – 50 cc of tumescent are applied to each 5 cm x 5 cm square area. Once the patient is tumesced, the CelluSmooth procedure can start. (Figure 9)



Figure 8 - CelluSmooth Patient Marking



Figure 9 – CelluSmooth™ Treatment Screen

The first mode is Burst mode (Figure 10) and accounts for approximately 15% of the procedure. In Burst mode, the laser is applied one square at a time. The septa under each red mark are located by pushing the tip of the fiber against the septa. Because the red targeting light can be seen through the skin, it is easier to identify the septa closer to the surface. Approximately 150 – 180 joules of energy are required to sever each septum (5 - 6 seconds @ 30 watts). During this mode, focus should be placed directly on the septa while avoiding heating the surrounding tissue.

After the targeted septa in the area being treated are severed, Melt mode (Figure 11) is then used and accounts for another 15% of the procedure. As with Burst mode, the laser is applied to one square at a time. Energy should be applied to the entire area underneath the green marks, from the reticular dermis to the deep fascia while achieving a uniform distribution of energy. Similarly to Burst mode, approximately 150 - 180 joules of energy are applied.

Last is the Tighten mode (Figure 12) which accounts for approximately 70% of the procedure. One square at a time, the laser is applied as closely to the bottom of the dermis as possible. Generally between 800 and 1200 joules of energy are applied to the dermis in each square with the endpoint being a tissue temperature of 46 – 48 °C as seen by the TempASSURE.

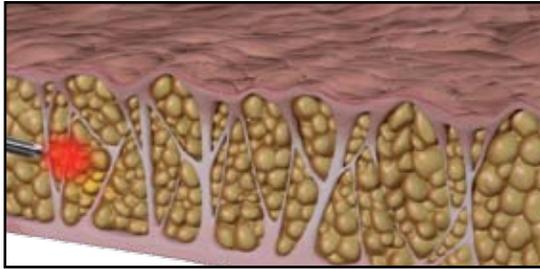


Figure 10 – Burst Mode

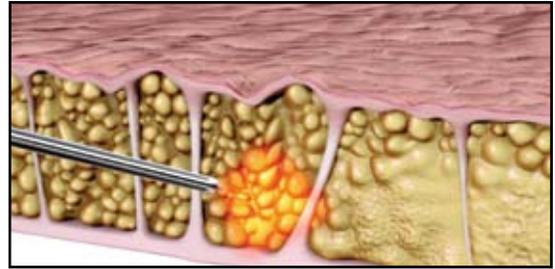


Figure 11 – Melt Mode

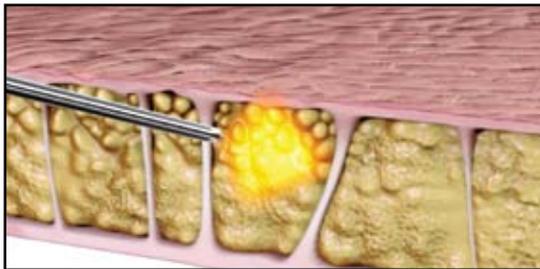


Figure 12 – Tighten Mode

Once the procedure is complete, the area is expressed by rolling with a towel or cylindrical object to assist in removal of fatty tissue and tumescent fluid. Often the surgical sites are left open after the procedure, but sutures or Steri-strips® can also be used. Post-treatment care includes the use of dressing/wound care and a compression garment. For the first week post-procedure, the patient should avoid activities that may increase heart rate and blood pressure. Normal activities can be resumed the following day.

RESULTS

The best results are seen approximately six months after treatment (Figures 13, 14, 15).



Figure 13 - Courtesy of Marc J. Salzman, MD, FACS



Figure 14 - Courtesy of Marc J. Salzman, MD, FACS



Figure 15 - Courtesy of Marc J. Salzman, MD, FACS

CONCLUSION

Lumpy and dimpled skin affects almost all women, and some men. There have been numerous treatments developed and tried in the past to relieve this condition, all of which have failed to permanently and adequately address underlying structural issues. There is a high demand for a procedure that treats lumpy and dimpled skin easily with little downtime.

The CelluSmooth procedure using the 1319 nm laser light and Temp*ASSURE* is a safe, and effective solution to lumpy and dimpled skin. By improving upon the previous generation of laser technology, it is possible to provide a treatment that offers better resolution of skin surface irregularities than previously seen with other modalities. This next generation provides a faster treatment time and possibly less bruising than first generation laser devices using low powered ablative wavelengths. With proper patient selection and treatment technique, excellent results can be obtained for this widespread condition.

* Through coagulation

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