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# Painless Skin Contraction Produced Via A New Infrared Light Device

Javier Ruiz-Esparza, M.D.

*Associate Clinical Professor of Medicine (Dermatology), UCSD, School of Medicine, San Diego, CA  
Director, Encinitas Dermatology*

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## Background

Although non-ablative radiofrequency can produce skin tightening, significant pain from its application limits the patient population of possible candidates to those with sufficiently high pain tolerance and those willing to undergo significant pain during the procedure. Topical anesthetics are only modestly helpful in lessening this pain. Injectable anesthetics are not recommended due to the possibility of altering the local impedance of tissues, causing an unwanted burn. Producing painless skin tightening via non-ablative radiofrequency is not yet possible unless the patient is deeply sedated or receives systemic anesthesia.

A new non-ablative medical device: Titan (Cutera, Inc. Brisbane, CA) has been successful in producing skin contraction leading to lifting of eyebrows and/or improvement of lower face and neck skin laxity. This device has also been used successfully in other body areas such as abdomen, arms and thighs. Immediate changes have been noticed in the vast majority of patients. The degree of pain is quite low, to the point of needing no anesthesia.

## Methods

A new infrared light device which emits in the 1100 to 1800 nm wavelength range heats water in skin tissue. Pre, parallel and post cooling takes place via a temperature-regulated sapphire crystal window. After thorough facial and neck washing in the office, hydrophilic gel is applied on the skin surface immediately prior to treating the area. The skin requires no other pre-operative care.

For treatment of the face, the areas of need are first assessed while the patient is sitting up. Eyebrow elevation can be produced by treating the upper portion of the skin of the forehead and temples. This

application of energy may be selective to mid or to lateral forehead if only the mid or the lateral aspects of the forehead respectively, are to be elevated. For treatment of the lower face, the skin of the preauricular area in a strip of 2 to 3 cm will upon contraction pull back and soften the naso-labial fold distally. When skin flaccidity is present on the jowl area, then the application of energy should also be in this area, extending it to the skin under the mandibular line to correct the entire jowl lax skin.

The neck is treated directly in the submental skin and along the mastoid and posterior hairlines. The mid anterior and lateral neck are avoided.

For correction of laxity on the arms, the posterior arms, on the triceps areas are preferred since they are the least painful. The thighs and abdomen are generally treated directly on the areas of laxity.

The areas to be treated are marked with white eyebrow pencil. Protective metal goggles are needed for the patient and adequate operating goggles by the medical staff.

Settings of 30 J/cm<sup>2</sup> and between 200 to 250 pulses for the mentioned areas of the face and neck have, in my experience, given the best results. At these settings the procedure is painless for most patients.

Occasionally, I may need to lower the fluence to 25 J/cm<sup>2</sup> on certain areas such as the temples due to discomfort. If the patient can only tolerate lower fluences such as 25 J/cm<sup>2</sup> throughout, then the total number of pulses should be increased to about a total of 300.

I do not look for an “end point”. In my experience, too many pulses only produce transient edema and the illusion of immediate improvement. Additionally,

too much heat may result in a deleterious effect or complication.

Ice cubes should be readily available during treatment. I ask patients to let me know if any of the pulses feel “like a matchstick.” When this happens, I immediately provide an ice cube wrapped in gauze for the patient to apply on that area until the burning sensation stops. This can prevent tissue damage during a burn. I also ask if any area has residual lingering burning sensation after the treatment is completed. If so, ice is used in the same manner.

### **Comments**

Since non-invasive procedures have experienced an ever increasing demand from our patients, I have found this device to be an excellent addition to my practice. Titan can be combined with just about any other cosmetic procedure except for fillers. There is not enough experience or data yet on the results of treating an area that has been previously injected with fillers. If one is contemplating both, fillers should be injected after the skin tightening treatment is completed.

Alternatively one must avoid treating directly over areas that have been injected with filling substances in the past. Botox<sup>®</sup>, intense pulsed light, photodynamic therapy, laser resurfacing, chemical peels, etc. may be performed prior or after treatment with this device.

Patient satisfaction has been remarkable. However, the physician must make sure that the patient has realistic expectations from this procedure. Results are always subtle. They cannot be compared with plastic surgery for the good or for the bad. They are not remotely as dramatic or reliably produced as those obtained from surgery. But on the other hand there is no down time and no incisions or scars either. Additionally, the patient will look like himself after the procedure. The results have a remarkable “natural look” which, plastic surgery rarely can match. The patient will look “less tired,” with a “freshened look.” The skin contraction achieved is in the order of 1 to 3 millimeters. It may not sound dramatic, but the changes induced by such contraction are perceptible and significant when it comes to eyebrow lifting or fading of the naso-labial fold.

Our patients have been followed for up to 7 months. Whenever we observed immediate improvement, follow-up visits show that the improvement has been maintained and even increased. In fact, the degree of improvement has not diminished during follow-up in any of our patients.

It is essential to secure standardized pictures prior to treatment. Pre-operative pictures often need to be compared with post-operative ones to detect the changes, given that they are subtle and may go undetected by the patient. Pre and post operative pictures should match in color, positioning, lighting, etc in order to be of value. It is a good idea when taking post-operative pictures, to have the pre-operative photographs being displayed in a computer monitor for the photographer to match the positioning of the patient as closely as possible.

Regarding patient selection, I do not exclude prospective patients on the basis of skin type, age, sex or degree of photodamage. However obese patients are poor candidates in my experience.

Patients can go back to their normal activities right away. Erythema is sometimes seen in patients with skin type I, but it usually fades within an hour. Occasionally blisters develop. They are usually isolated single vesicles, probably the result of incomplete skin contact with the cooling sapphire crystal during pulses. When they do happen, the patient should avoid any picking or other manipulation. These vesicles usually resolve without marks.

The new Titan system from Cutera has a similar thermal profile in ex-vivo skin specimens detected by thermal photography. It also has significant advantages over non-ablative radiofrequency. For one thing it has a multi-second pulse which provides a gentle and sustained skin heating that clinically is much less painful and has similar if not better clinical results.

Patients who in my practice have had treatment with the ThermoCool<sup>®</sup> system in the past, have expressed their preference for Titan<sup>™</sup>. The safety profile is very good with adequate physician training and the results are as satisfactory as can be expected with any modern technology in this field



**Figure 1:** 48 yr old woman demonstrating result of eyebrow lifting following treatment with 33 pulses at 30 J/cm<sup>2</sup>. Pre-operative view (top), immediately after TITAN (middle) and two months later (bottom).



**Figure 2:** 74 yr old woman following one treatment of 144 pulses at 30 J/cm<sup>2</sup> to the cheeks and neck. Photos are before and immediately after. Note improvement in the marionette lines and cheeks.



**Figure 3:** Opposite side of the same patient as in figure 2. Photos are pre-treatment, and 3 months post treatment. No anesthesia was used.



Figure 4: 59 yr old woman treated at 30 J/cm<sup>2</sup> with 86 pulses on the cheek and 30 pulses in submental area. Photos are pre and immediate post treatment. No anesthesia. Small burn in the neck which later healed without a scar.



Figure 5. Pre and immediately following a painless procedure of 200 pulses at 20 J/cm<sup>2</sup>. No anesthesia was used.



Figure 6. 47 yr old woman treated for mild flaccidity of lower face. Before and 6 months after one treatment session of 100 pulses at 30 J/cm<sup>2</sup>. No anesthetic was needed.