

Subdermal Induced Heat (S.I.H.) Technology - a new option for skin tightening and fat reduction of double chin

Arna Shab¹, Manuela Lisandru¹, Catharina Shab¹

¹ MD, Private Practice for Dermatology and Aesthetic Medicine, Frankfurt/Main, Germany

Abstract

The treatment of the double chin due to submental fat and skin laxity is attracting increasing interest as the potential approaches expand. Recently, mono- and bipolar radiofrequency devices have been introduced as new treatments for skin rejuvenation.

Initial studies have demonstrated changes in collagen content. Subdermal Induced Heat Technology is also known as endodermal Radiofrequency and is one of the most effective uses of this treatment method. We describe a method in patients treated with submental fat due to monopolar radiofrequency treatment. Due to lack of alternative a radio frequency treatment was used. Possible contraindications should be considered and a written Declaration of consent should be received on all possible side effects and risk factors. According to current knowledge, the experience of the doctor with the use of radiofrequency equipment is the most important in determining this result. Therefore, the use of radiofrequency therapy requires extensive training.

Keywords

skin tightening, fat reduction, double chin, radiofrequency, long-term patient satisfaction, Subdermal Induced Heat (S.I.H.) Technology

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Correspondence

Arna Shab, MD

Address: Hanauer Landstrasse 151 - 153, Germany - 60314 Frankfurt/Main

Phone: + 49 (0) 69 48 00 94 40

E-mail: arna.shab@med-aesthet.de

Introduction

The demand for minimally invasive or non-invasive treatments in aesthetic medicine is rising rapidly. In particular the demand for minimally invasive treatments for skin rejuvenation as well as moderate fat reduction is in focus. There are currently several platforms (with multiple methods) that have a local skin tightening, fat reduction and more promise. For body contouring and body tightening we have been using different devices for years. We were looking for one effective method to reduce the smallest fat deposits e.g. for the double chin. When selecting the equipment, it was important we avoided costly consumables and be well looked after through service and training in the equipment. However, the effectiveness of the therapies represents the foundation for long-term patient satisfaction, a success factor that should not be underestimated. Therefore, we report on a treatment system that covers both indications and is also versatile, so the user has a variable tool available^{1,2}. Non-invasive radiofrequency (RF) is one of the commonly used procedures, especially for the treatment of skin laxity³. This therapeutic method is conditioned by a selective and controlled increase in tissue temperature of high frequency. The temperature and depth of heating depend on the level of energy used and on the impedance of the biological tissues⁴. The aim is to induce thermal damage to stimulate changes in collagen composition and to produce collagen neogenesis in deep layers of skin and subcutaneous tissue⁵⁻⁷.

Anatomy of double chin - submental fat

A double chin is a layer of subcutaneous fat (submental fat) around the neck that sags down and creates a wrinkle, creating the appearance of a second chin. Looking at the submental region the deep layers are formed by muscle and fascia, and a subcutaneous layer of fat lies over these deep structures. This superficial layer of fat is divided by the platysma, a caudal continuation of the superficial muscular aponeurotic system (SMAS) (*Figure 1*).

The borders of the compartments are formed by fascial septae that travel from the deep fascia or periosteum and insert into the dermis. These compartments provide a new method of viewing the aging face and neck as resulting from variable changes in volume and position in the various compartments (*Figure 2*).

The submental fat compartment plays an important role in the appearance of the youthful and aesthetic neck, as well as in the overall attractiveness of the face. Bitner et al developed a classification scheme for assessing the degree of “turkey gobbler” deformity in the submental region based on changes with the skin, fat, platysma, and underlying bone. This classification method serves as an invaluable tool in evaluation and subsequent intervention⁸⁻¹⁰.



Figure 1 - Frontal view on preplatysma fat



Figure 2 - Sideview on preplatysma fat

Subdermal Induced Heat (S.I.H.) Technology - endodermal Radiofrequency Physical basics

The treatment with the S.I.H.T System is technically a monopolar, controlled heating of tissue layers of different depths with high-frequency current, whose voltage, current intensity and frequency modulation can be regulated depending on the application via a clear platform and monitoring with a thermal camera. It is equipped with an external plaque, which is far from the treatment area in skin contact. S.I.H.T System or RF, generally indicates an electric signal or a high frequency electromagnetic wave which propagates in space or in a coaxial cable. The system is related to radio frequency or high-frequency devices. By choosing the depth of treatment, either the dermis or the subcutaneous fatty tissue can be treated. The effects in these different tissues are very different. In the treated fat layers, apoptosis is induced, i.e. the medium-term degradation of fat cells. On the other hand, the system in the dermis has an effect on the function of cellular activity as well as on the extracellular matrix in order to tighten up by restructuring collagenous fibers and stimulating the fibroblasts. In contrast to other devices, the heat does not occur through all skin layers but from below directly at the dermis. In this way, no heat loss occurs at the destination (treatment point) because the probe applies the desired temperature to the target location^{11,12}. RF treatments for skin tightening are common, as they heat the dermis and subcutaneous tissues, thereby stimulating dermal collagen remodeling. It is well documented that dermal heating induces an immediate change in collagen structure followed by a long-term stimulation of neocollagenesis¹³. These thermal effects can improve wrinkle appearance, skin laxity and contour of both face and body¹⁴.

Application

Patients with acute or chronic skin pathologies (e.g. impetigo, lymphadenopathy, pharyngitis) or direct involvement in or around the skin area to be treated were excluded. Pregnancy, lactation, heart pacemaker or step maker of any kind and dermal filler treatment (in or around the area to be treated) less than 3 months earlier were also excluded criteria.

A total number of 20 patients were treated. Female (14) and male (6) patients between the ages of 22 and 60 were treated. The selected patients did not have any dermal filler injection in their medical history in the treatment area. Two patients reported on pre-treatment with injection lipolysis at the target area.

Before treatment, it is recommended using a local disinfection and also applying a local anesthetic injection in the area of the entry point of the probe. Topical anesthesia cream, nerve block or tumescent anesthesia are not necessary in such a therapy. However, it can be used for a better patient comfort. The insertion of the probe itself is almost painless. This is a single-use manipol. Only the point of entry could be painful, so local anesthesia is necessary. One should try to make the treatment as painless as possible for the patient. Only the heat in the tissue leads to a (uncomforting) burning



Figure 3 - Left: before treatment; Right: 8 weeks after treatment



Figure 4 - Left: before treatment; Right: 8 weeks after treatment



Figure 5 - Left: before treatment; Right: 8 weeks after treatment

sensation. This burning sensation cannot be prevented by means of larger amounts of anesthetic. The treatment schedule was 3 cycles of 120 sec. each side with a treatment temperature of 70° Celsius.

A direct reintegration into social life is easily possible due the fast convalescence. For example, the treatment can also take place during lunch break or before important events, and patients can return to work or participate in events after the treatment on the same day. An additional benefit is the use for patients who have previously demonstrated intolerance, incompatibility to any other ingredients of products or patients who did not succeed in other therapies.

The only adverse events described were hematoma, redness, bruising, tingling, burn sensation and swelling. All adverse events lasted for a maximum of 5 days (Table III). The double chin thickness was determined using the skinfold calipers. The sense of satisfaction by the patients was evaluated with the use of a subjective analog scale from 1 to 10. The mean score of satisfaction of cosmetic result was 7-9 four weeks after treatment and 9 - 10 eight weeks after treatment, and the score remained relatively stable even after a few months (Table 1). Only an immediate result will not be visible.

The treatment was very well tolerated with only a few mild adverse reactions. Only a burning sensation was reported as a major side effect. However, this was well tolerated by all patients. The minimal side effects like erythema or bruising resolved spontaneously after a few days only. No major complications (e.g. infectious processes, necrosis, embolism, overcorrection, allergies) were observed.

Conclusion

Subdermal Induced Heat (S.I.H.) Technology is a safe, low-risk, easily applicable therapy option for practitioners and provides a particularly good alternative method for skin tightening and fat reduction. Especially for the submental area, it provides a very good option for treating the double chin. The local treatment with endodermal radiofrequency (S.I.H.T.) shows through clinical studies and analysis a high safety and efficiency. This innovative treatment is characterized by its high tolerability. Thus, a realistic satisfaction of the patient expectation can be achieved, with an excellent visible effect.

Immediately after treatment	--
1 month	7-9
2 months	9-10
4 months	8-9
6 months	6-8

Table 1 - Score of satisfaction of patients

Skin laxity
Smoothing of fine lines
Fat elimination of smaller fat deposits Skin tightening
Correction of scars
Body-contouring
Double-chin correction

Table 2 - Esthetic indications for S.I.H. Technology

CLINICAL ASSESSMENT POST-TREATMENT				
	During treatment	Immediate post-treatment	2-Week follow-up	4-Week follow-up
Erythema	17	17	0	0
Pain / Burn sensation	20	1	0	0
Tingling	8	5	0	0
Swelling	0	1	0	0
Bruising	2	2	0	0
Blanching	0	1	0	0
Combustion	0	0	0	0
Numbness	0	0	0	0

Table 3 - Clinical assessment observed after treatment

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