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# 3-Dimensional (3D) Skin Rejuvenation

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## THE 3D APPROACH TO SKIN REJUVENATION

Patients seeking skin rejuvenation these days can be younger or older, male or female, ‘skintelligent’ about their treatment options or not. They have different budgets, different expectations—and different problems with their skin. What they typically share, however, is that they have multiple skin issues, reflecting multiple levels of damage. We always begin with handing a patient a mirror and essentially reading the face together. We’ll note the various changes, some of which are superficial in nature, some of which have root causes that lie deeper in the dermis. We’ll find out what is most bothersome to the patient, and discuss various ways of proceeding. In the process, the patient is often pleasantly surprised that more than one issue can be addressed as part of a non-surgical treatment regimen, particularly with the 3D approach.

The 3D approach with Cutera light technology allows us to take three separate non-ablative procedures that each target different problems (and depths of skin involvement), and use them in various combinations to achieve a full (3D) effect. We are able to develop a treatment plan, tailored to each patient’s own needs and desires that optimizes the outcome while still incurring no downtime whatsoever.

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## IMPROVING TONE, TEXTURE AND TAUTNESS

Over time, alterations in the color and texture of the skin inevitably occur, due to cumulative sun exposure (hence the term ‘photo aging’). In addition, the collagen in the skin that keeps it taut begins to weaken, and with the pull of gravity the skin becomes lax. The Cutera 3D concept addresses each of these three types of changes.

**COLOR CHANGES.** The *Photo Genesis procedure* (using Cutera’s LP 560 ‘intelligent’ pulsed light) addresses an array of superficial pigment changes induced by the sun that occur in the epidermis and papillary dermis. Overexposure to UV light can cause brown solar lentigines (‘age spots’), sallowness, generalized redness, and/or specific tiny, diffuse telangiectasia. The *Photo Genesis procedure* mitigates and even eliminates these bothersome changes, resulting in a more uniform skin color. (It is also not uncommon for patients to present with mid-size vessels, in which case we utilize the vascular settings on the long-pulsed 1064nm Nd:YAG laser, as discussed in a previous paper.)<sup>1</sup>

**TEXTURE CHANGES.** The *Laser Genesis procedure* (using Cutera’s long-pulse Nd:YAG laser with its unique sub-millisecond pulse capability) addresses the diffuse textural changes associated with aging skin, which occur primarily in the papillary dermis. The laser energy stimulates dermal collagen re-growth and realignment<sup>2</sup> so that pore size is reduced, cobble-stoning is flattened, and fine lines are obviated. Therefore, a positive impact on the micro-topography of the skin can be achieved, in a manner that, until the advent of the *Laser Genesis procedure*, could not be accomplished nonablative.

**GRAVITY CHANGES.** The *Titan procedure* (using Cutera’s *Titan* 1100-1800 nm infrared handpiece) is an inspired way of treating lax skin. It utilizes infrared light to heat the water within the dermis to the point of collagen contraction. The collagen fiber support matrix not only tightens immediately, but is reinforced over time with integration of new fibroblasts. The clinical result is skin that not only looks, but feels firmer. Patients do not require anesthesia, and clinical outcomes, while modest compared to surgical skin re-draping, are well-received by patients opting for a non-surgical approach.

### THE 3D CONCEPT

Changes in the Skin	Depth of Involvement	Procedure
<p><i>Color Changes</i></p> <p>Red and brown dyschromia, including poikiloderma Generalized redness/blushing w/wo fine telangiectasia</p>	<p>Epidermis</p> <p>Papillary dermis</p>	<p><i>Photo Genesis</i> 560 nm 'Intelligent Pulsed Light' IPL</p>
<p><i>Texture Changes</i></p> <p>Large pores Cobblestone texture Fine lines Diffuse redness</p>	<p>Papillary Dermis</p>	<p><i>Laser Genesis</i> Long-pulsed 1064 nm Nd:YAG</p>
<p><i>Gravity Changes</i></p> <p>Cheek and mandibular 'jowls' Submental 'turkey neck' laxity Oral commissures Drooping eyelids and brow ptosis Generalized skin ptosis</p>	<p>Reticular dermis</p>	<p><i>Titan</i> 1100-1800 nm Infrared</p>

### COMBINING PROCEDURES FOR ADDED DIMENSION

Each of these three modalities can be used in combination with the others—on different occasions or during the same visit—to create a synergistic effect where the whole is greater than the sum of the parts. For instance, improving both texture and tone, or both tautness and texture, produces an overall effect that almost belies the non-ablative nature of the procedures. In fact, we often follow *Laser Genesis* with *Photo Genesis* during the same visit: patients enjoy the rapid, tangible improvement they see in color, in addition to the more gradual effects of collagen rebuilding. The additive effect may also be attributed to a combined response within the dermis if there is sequential targeting within one treatment session: for instance, the gradual bulk heating of the skin that occurs with a *Titan* treatment can be

“topped off” with *Laser Genesis*, such that each is optimized. Lastly, by combining multiple procedures within one visit, you can maximize results for the treatment series with a reduced number of visits.

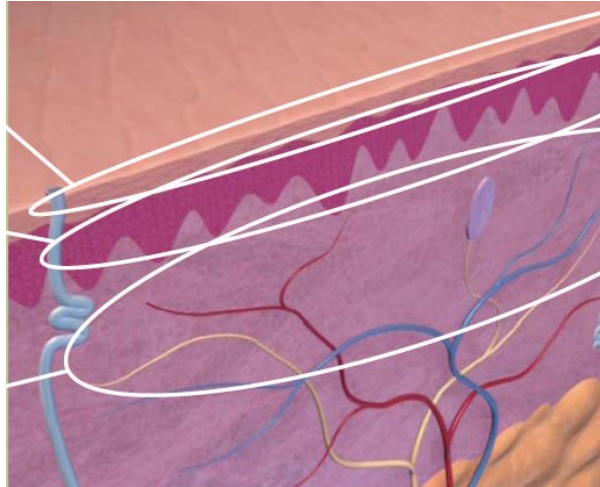
If utilizing more than one light modality in the same visit, we recommend starting with the deepest-reaching procedure and moving toward the most superficial. Thus, *Titan* would precede *Laser Genesis* or *Photo Genesis*, and *Laser Genesis* would precede *Photo Genesis*. In this way, treatment at one level does not inhibit subsequent targeting beneath it. A series of treatments is still scheduled to leverage the results of the prior treatment, and the visits are spaced two weeks apart so the skin can begin healing and remodeling in the interim.

## VARIABLE DEPTHS OF SKIN TARGETED WITH 3D

**Photo Genesis**  
560 – 1200 nm

**Laser Genesis**  
Long-pulsed 1064 nm

**Titan**  
Tailored infrared spectrum  
1100 – 1800 nm infrared



## SAMPLE 3D TREATMENT SCENARIOS

By way of illustration, we have discussed below three of many possible 3D treatment combinations that provide optimal non-ablative skin rejuvenation. There is no cookie cutter approach; the very benefit of 3D is the flexibility in how you can successfully

combine modalities for different patients. First we 'read' a patient's face, discuss their priorities and options, and then design a program tailored specifically for them.

### TREATMENT SCENARIO #1:

PATIENT AGE 30+ WITH SUPERFICIAL DYSCHROMIA AND FINE TELANGIECTASIA; ALSO COBBLESTONING, LARGE PORES AND/OR FEATHERY LINE IMPRINTS

Treatment Schedule: 4 visits (60 minutes each) 2 weeks apart

Visit	1	2	3	4
First procedure	<i>Laser Genesis</i>	<i>Laser Genesis</i>	<i>Laser Genesis</i>	<i>Laser Genesis</i>
Second procedure	<i>Photo Genesis</i>	<i>Photo Genesis</i>	<i>Photo Genesis</i>	<i>Photo Genesis</i>

### Treatments: *Laser Genesis* and *Photo Genesis*

*Laser Genesis* and *Photo Genesis* are an effective combination in a variety of patients. Both younger patients with large pores and older patients with large pores and/or fine wrinkling will benefit over time from the collagen realignment initiated by *Laser Genesis*. In addition, those same patients who also present with varying amounts of dyschromia, appreciate the rapid improvement they see with *Photo Genesis*.

General Parameters:

***Laser Genesis (long-pulsed 1064nm handpiece)***

We begin with *Laser Genesis* because it reaches deeper into the dermis and adds a better overall uniformity in texture. (It can also be done while waiting for the results of the *Photo Genesis* test treatment). In addition, *Laser Genesis* induces mild erythema which promotes increased absorption of the *Photo Genesis* wavelengths.

- fluence is typically set at 13J/cm<sup>2</sup>; pulse width .3ms
- typically 5,000 pulses around the mouth only; 8,000 pulses for the entire face (spot size is 5mm)
- settings remain the same in subsequent treatments

***Photo Genesis (560nm handpiece)***

When following with *Photo Genesis* in the same session, it is important to note that parameters and technique are no different when combining these modalities than when administering in separate sessions, because the energy dissipates at a rate that prevents any undue accumulation of heat.

- treat a test site first with 2 different fluences; wait a full 20 minutes
  - look for darkening of pigment and minimal change in background color
  - if background redness is evident, reduce the fluence

- beginning fluences can generally range from 8-16J/cm<sup>2</sup> according to the area treated, skin type, the amount of actinic damage
  - the darker or more bronzed the skin, the lower the fluence
  - the darker or more extensive the dyschromia, the lower the fluence
  - the face can tolerate the highest fluence, the chest lower fluence, and the neck the lowest
- in subsequent visits, increase by 2J/cm<sup>2</sup> per visit as tolerated up to 20 J/cm<sup>2</sup> \*; as chromophore decreases, less energy is absorbed
- the number of pulses averages 60-70 for the face and neck (spot size 10 x 30 mm)
- when moving from one area of the body to another (e.g., face to neck or neck to chest) gradually increase or decrease to appropriate fluence levels to avoid a line of demarcation

\*in exceptional cases with patients of Northern European descent with very fair skin and limited sun damage, fluences as high as 26 J/cm<sup>2</sup> have been used.



*Laser Genesis* followed by *Photo Genesis* for tone.

**TREATMENT SCENARIO #2:**

AGE 40+ FOR WHOM SKIN LAXITY AND CREPE-PAPER SKIN OR A LACK OF COLLAGEN ‘CUSHION’ ARE THE MOST BOTHERSOME

Treatment Schedule: 5 treatment sessions (30-90 minutes each) 2 weeks apart					
Visit	1	2	3	4	5
First procedure	<i>Titan</i>	<i>Laser Genesis</i>	<i>Titan</i>	<i>Laser Genesis</i>	<i>Titan</i>
Second procedure	<i>Laser Genesis</i>	—	<i>Laser Genesis</i>	—	<i>Laser Genesis</i>

Treatments: *Titan* and *Laser Genesis*

This scenario represents a situation in which the patient is interested in skin tightening first and foremost and in improving the overall resiliency of his/her skin. Because typically only one to three *Titan* treatments are necessary, and usually a greater number of *Laser Genesis* sessions, we can combine them in a manner that not only affords maximum effect but minimal visits for the patient. We maintain a one-month interval between *Titan* treatments, however, to allow establishment of a base of new collagen.

General Parameters:

***Titan***

We begin with *Titan* because its wavelengths penetrate deepest into the dermis.

- fluence is typically set to 30-34J/cm<sup>2</sup> for the lower two-thirds of the face and neck, and we can increase it or decrease it as tolerated; it is set to 20-32J/cm<sup>2</sup> on the forehead and temples
- generally 250-300 pulses are delivered for a full-face and neck treatment
  - 25 pulses per cheek x 4 passes
  - 20-40 pulses for temples and forehead x 1 pass
  - 10 pulses submentally in a horseshoe pattern x 4 passes

- pulses are carefully placed immediately adjacent to one another with no overlap, taking care to avoid bony prominences or areas of thin skin
- passes are administered in a concentric pattern such that we start broad and move toward more specific target areas, utilizing the vector technique and/or applying directly to the area of laxity

***Laser Genesis (long-pulsed 1064nm handpiece)***

This is a scenario in which we would adjust the parameters for the second procedure in a single visit. We are ‘piggybacking’ onto the heat generated by the immediately preceding *Titan* procedure, so we reduce the number of pulses by 50%. A full face may receive 4,000 pulses; the amount of time to administer would be reduced accordingly.



*Titan* followed by *Laser Genesis* for tightening and texture.

### TREATMENT SCENARIO #3:

AGE 50+ WITH COLOR CHANGES, TEXTURAL CHANGES AND SKIN LAXITY

Treatment Schedule: 6 treatment sessions (60 minutes each) 2 weeks apart						
Visit	1	2	3	4	5	6
First procedure	<i>Laser Genesis</i>	<i>Laser Genesis</i>	<i>Titan</i>	<i>Laser Genesis</i>	<i>Titan</i>	<i>Laser Genesis</i>
Second procedure	<i>Photo Genesis</i>	<i>Photo Genesis</i>	—	<i>Photo Genesis</i>	—	<i>Photo Genesis</i>

#### Treatments: *Titan*, *Laser Genesis*, and *Photo Genesis*

This scenario is the same as in Sample Treatment Protocol #1 but has supplemented the 4 visits for Laser Genesis/Photo Genesis with 2 different sessions for Titan alone to address laxity. It is clinically viable to integrate the Titan treatment into the other visits (preceding the Laser Genesis procedure), and there would still be no downtime. Three procedures, however, would add to the time of the visit.

#### General Parameters:

##### ***Laser Genesis* (long-pulsed 1064nm handpiece)**

##### ***Photo Genesis* (560nm handpiece)**

- starting with the more superficially targeted *Laser Genesis/Photo Genesis* combination provides the patient some concrete benefit early in the regimen, while the deeper dermal changes of *Laser Genesis* and *Titan* are taking place
- punctuating the two *Titan* visits with a *Laser Genesis/Photo Genesis* in between provides a boost in effect as any edema resolves from the Titan treatment and the new collagen begins to form

##### ***Titan***

Waiting one month between *Titan* treatments allows ample time for new collagen to be laid down, upon which the second *Titan* treatment can build. Also, giving a *Laser Genesis/Photo Genesis* treatment in

the interim maintains continuity with the patient and provides additional signals of improvement.

- fluence is typically set to 30-34J/cm<sup>2</sup>, and we can increase it or decrease it as tolerated; it is set to 20-32J/cm<sup>2</sup> on the forehead and temples
- generally 250-300 pulses are delivered for a full-face and neck treatment
  - 25 pulses per cheek x 4 passes
  - 20-40 pulses for temples and forehead x 1 pass
  - 10 pulses submentally in a horseshoe pattern x 4 passes
- pulses are carefully placed immediately adjacent to one another with no overlap
- passes are administered in a concentric pattern such that we start broad and move toward more specific target areas, utilizing the vector technique and/or applying directly to the area of laxity



*Laser Genesis* followed by *Photo Genesis* for texture and tone.

## **OTHER COMPLEMENTARY PROCEDURES**

Additional procedures dovetail nicely with 3D treatments and may be incorporated into the treatment plan.

### **PRECEDING 3D SERIES**

- Submental liposuction 4-6 weeks after a single collagen-stimulating Titan treatment, and 4-6 weeks prior to a second Titan is helpful if the weight of subcutaneous fat is exacerbating gravity changes and the appearance of skin laxity.

### **CONCURRENT WITH 3D SERIES**

- If midsize vessels on the face, neck and chest are a detractor, the Cutera Nd:YAG laser (the same device as for *Laser Genesis* but with the vascular settings) can be utilized immediately prior to any of the 3D modalities. If vasculature is still evident, I will reduce the fluences delivered subsequently; if clearance of the vessels was complete there is no need to reduce fluences in the treatment that follows, since the level of chromophore has decreased.
- Small amounts of carefully placed Botox™ are helpful immediately prior to doing *Laser Genesis* for fine perioral lines or Titan for brow lifts.
- Patients with photodamage are typically prescribed a specially-compounded topical formulation (consisting of kojic acid, tretinoin, hydrocortisone and hydroquinone in an antioxidant base); for these patients we recommend suspending use of the

cream for one week following a *Titan*, *Laser Genesis* or *Photo Genesis* treatment.

- Microdermabrasion treatments may be given 2-4 times throughout a 3D treatment series, immediately prior to a *Laser Genesis* or *Photo Genesis* treatment, to slightly compromise the surface of the skin and enhance penetration of the light.

### **FOLLOWING 3D SERIES**

- Filler materials, which address the deeper, more discrete wrinkles and creases are typically administered in a separate office visit following *Titan* treatments, so as to minimize the possibility of increasing the rate at which the substance is metabolized due to a thermal effect.

## **3D'S CONTRIBUTION TO PATIENT SATISFACTION**

While skin rejuvenation procedures are becoming increasingly familiar to patients and potential patients, 3D is a distinctive approach we can offer. With 3D, we are starting with non-ablative procedures that are appealing in-and-of-themselves--by virtue of the skin problems they address (tone, texture and tautness) and the relative ease with which they are addressed (no surgery, anesthesia, or downtime). By combining them, though, in an artful and scientific way, we are able to achieve a visual impact that is actually greater than the sum of the parts—and hugely satisfying to our patients.

## **REFERENCES**

1. Groot D, Rao J, Johnston P, Nakatsui T: Algorithm for Using a Long-Pulsed Nd:YAG Laser in the Treatment of Deep Cutaneous Vascular Lesions. *Dermatol Surg* 2003;29:35-42.
2. Schmults CD, Phelps R, Goldberg DJ: Nonablative Facial Remodeling. *Arch Dermatol* 2004;140:1373-1376.