

# ACNE THERAPY

## Experience with Palomar LuxV™ Intense Pulsed Light Therapy

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Acne is a disease that affects almost 100% of the population, from ages 8 to 80. The symptoms range from rare, mild disease to severe, disfiguring disease, resulting in scarring. The more severe the disease, the higher the incidence of depression, even to the extent of suicidal thoughts.

The clinical presentation ranges from comedonal disease (whiteheads and blackheads or “little bumps”), to red papules and large cysts (“big bumps”). Scarring is associated with cysts and “big bumps,” as well as scratching, picking, or popping of lesions. The scarring can be extremely disfiguring. Adolescents with acne suffer greatly from their disease, affecting their social and academic growth.

The cause is essentially unknown. Most authorities agree that there is a genetic blueprint for the duration and severity of acne, which varies greatly from patient to patient. There is no ethnic predilection, but males are generally more severely affected since testosterone is an aggravating factor.

The transition into puberty causes an increase in the size of sebaceous (oil) glands, as well as increased oil secretion. These changes, as well as a change in the keratinization of the hair follicle, cause occlusion, which results in comedone (whitehead and blackhead) formation. This occlusion allows the proliferation of *Propionibacterium Acnes* bacteria. This bacteria is felt to be the cause of larger acne lesions due to the immune system response to the bacteria, inflammatory enzymes produced by the bacteria, or both.

Some feel the depth of the occlusion in the hair follicle determines the size of the resultant acne lesion, with a deeper occlusion resulting in a larger lesion. External factors vary from patient to patient. Stress is a universal aggravating factor. With the exception of dairy products in women, dietary triggers are more individual than universal (otherwise there would be no acne as no one would eat the offending trigger). Cosmetics generally do not play a role; however, thick theatrical make-up, as well as general cosmetics while sweating can aggravate the disease. Hair spray, hair oil, and mousse can aggravate the condition as can hats, sweat bands, and long

hair (bangs as well as shoulder length). Some feel acne improves in the summer, either due to lack of stress or increased sun exposure.

The treatment of acne is as varied as the clinical presentations. There are some absolute rules, however. First, acne is not a disease of dirt. Over-washing the face, especially scrubbing with a rough cloth, will worsen the disease, as that activity drives the bacteria deeper into the hair follicle. A gentle cleanser, using a face cloth or fingers is all that is needed. Over-scrubbing makes the face more sensitive to (and less likely to respond successfully to) the topical products, especially the retinoids.

Topical retinoids are absolutely essential for the successful treatment of acne (second absolute rule). Retinoids act to remove and prevent micro comedones, as well as pigmentation. Currently there are three prescription types (tretinoin, tazaratene, and adapalene), and numerous over-the-counter types of retinoid creams. Over-the-counter (OTC) retinoids may not deliver the consistent levels of retinoid needed to be effective. This is because most, if not all OTC retinoids have to be converted to tretinoin to be effective. This conversion is never 100%, thus the end concentration of tretinoin, or other active compounds is difficult to quantify. I classify the three retinoids as follows.

Adapalene, the mildest, takes the longest to work (up to 12 weeks) and has the least documented cosmetic benefit (lightening of dark spots, wrinkles).

Tretinoin is mid range, especially the .04% micro gel or .05% cream (works in 6-8 weeks). I prefer the micro gel as it is less irritating than the .05% cream. The microgel is also sun resistant and benzoyl peroxide does not affect its activity. The micro gel formulations are less irritating than the creams, which are less irritating than the gel formulations. I prefer to use them at bedtime, by themselves

Tazaratene is the strongest, working in 4-6 weeks. It has a cosmetic effect similar to tretinoin (including cosmetic effects), but can be very irritating, especially the gel formulations.

Tretinoin cream (not micro gel) is inactivated by sunlight and must be used at bed time. It is also inactivated by benzoyl peroxide preparations (again, not micro gel). Tazarotene must not be used during pregnancy. Tretinoin has not shown itself to be hazardous during pregnancy, but some prefer not to use it. Adapalene is best avoided during pregnancy until retrospective data demonstrate a risk equivalent to tretinoin.

Topical retinoids act on keratinization of the hair follicle, helping to prevent occlusion. There is good evidence to suggest that the use of retinoids for one year after clearing reduces the recurrence of acne in patients that have completed isotretinoin (Accutane®). I recommend a topical antibiotic in the morning. I prefer Cleocin® lotion since it does not irritate the skin. I will also use a 10% benzoyl peroxide for “spots.”

The above is the basic topical therapy for mild acne. This will effect “small bumps” (whiteheads, blackheads, and very few small papules). As papules increase in size and number I will add a systemic antibiotic, usually low dose doxycycline 50 mg/day (up to 200 mg/day) or tetracycline 250 mg/day (up to 1000 mg/day). If symptoms worsen (inflammatory cysts), I will use minocycline 75 mg/day, up to 200 mg/day. I prefer low dose doxycycline to begin with because there seems to be more anti-inflammatory effect than tetracycline, and doxycycline is much more affordable than minocycline.

The chronic use of antibiotics in acne seems to be related more to anti-inflammatory effect than antibiotic effect. One must remember that doxycycline and tetracycline are photosensitizing, especially at higher doses. Minocycline is much less so. Minocycline has a longer list of side effects, some of which are serious. Tetracycline must be taken on an empty stomach, while the others can be taken with food (low iron), but it is best to avoid other medications. Minocycline should be discontinued after 18 months of continuous therapy, especially at 200 mg/day since the incidence of serious side effects increases at that time. Never take these right before bedtime as they can cause gastric irritation.

If these “simple” systemic therapies fail, the next systemic therapy is isotretinoin, considered the last line of therapy for severe nodulocystic acne, unresponsive to the above therapies. The long list of side effects and great expense make this the last choice of therapies.

For those patients with rosacea, I will use Klaron/Cleocin lotion, alternating with a mild topical steroid (hydrocortisone). I avoid retinoids in the early treatment of rosacea due to irritant effect.

All of the above therapies have been available with little change for the past 10+ years. A new option for the treatment of acne, the Palomar LuxV™ Intense Pulsed Light (IPL) Handpiece, is beginning to revolutionize the treatment of acne. It has certainly changed my approach to the treatment of the disease.

I use this system to treat all types of acne (mild to conglobate), and all skin types (I-VI). It is perfect for those who do not want to take antibiotics, are attempting to become or are pregnant, or who can't or won't take isotretinoin. It can be used in the treatment of rosacea as well as acne vulgaris. It almost always allows me to lessen the amount of antibiotics I have to use, if not stop them completely. I have personally witnessed lesions treated by this system fade in an hour. I have been told the same by patients and parents. In my opinion, the only treatment that works faster is systemic steroids.

At the time of this writing, my office has administered more than 4,500 treatments, the bulk over the last 18 months. The LuxV is compatible with every topical and systemic acne therapy, both prescription and over the counter. The only side effect is heat, which can result in a “curling iron burn,” or even superficial blistering. This is seen in type III-VI skin, especially when there is sun exposure, causing darkening or tanning.

It can also occur with insufficient cooling of the handpiece when used with the Palomar EsteLux® and MediLux™ Systems (especially EsteLux), and incomplete compression of the handpiece on the skin while administering the treatments. One must be very cognizant of sun exposure as a little sun will change the pigment in the skin enough to prevent you from increasing the power settings, and may require a lowering of the settings. I have not seen any scarring or permanent dyschromia from these side effects.

The Palomar DermaType™ Skinphotometer is an excellent tool to prevent burning. We take the approach that all teenagers go out in the sun during the summer and therefore we proceed more slowly than during the winter months. Otherwise we generally start at the lower power settings depending upon skin type and increase as tolerated. Patient response is important to determine if the power is too high and can burn.

In general, we treat in 2 week intervals, with an average of five sessions during the initial treatment period. After that we evaluate the response and extend the intervals by two weeks: four weeks, then six weeks, then eight weeks, etc. Once 10-12 week intervals are established, we let the

patient call us when needed. We begin to taper and discontinue oral therapy if the clinical response allows near the end of the first group of treatments. If we cannot extend the therapeutic interval we consider maximizing oral therapy up to and including accutane. Most patients are able to use minimal or no antibiotics (50 mg /day) with 1-3 treatments/year as maintenance.

We continue topical therapy with a retinoid for up to one year after sessions have concluded. There are no issues with birth control pill effectiveness as is sometimes implicated with oral antibiotics. There seem to be no contraindications for women who are pregnant or are attempting pregnancy.

I will now break down specific therapeutic recommendations by system.

### **LuxV with EsteLux System**

When using the EsteLux, cooling both the handpiece (with coolant spray) and target skin (with ice bags or the Palomar Cool Roller) is essential to prevent burning. This is more critical in type III-IV skin, especially during summer months when the skin darkens. I would not attempt to treat skin types V-VI with this unit as the power settings and cooling are too limiting to have an effect and the risk of burning is high.

We usually start with button #1 (during winter months we can sometimes start with button #2). The first pass should cover the entire face. These settings use longer pulse durations (100 & 60 ms), which allow more energy to be delivered over a longer period of time. In the EsteLux and MediLux, the fluences are fixed at these pulse durations.

We then perform a second pass at button #2 over the “trouble spots” (most involved). At the next treatment we use the highest power setting at last treatment for the first pass (all over), and increase the setting by one button, again over trouble spots (i.e. button #2 for the first pass and button #3 for the second pass after treatment with button #1 for the first pass and button #2 for the second pass).

At each subsequent treatment, the power is increased by one button at the second pass. Once button #3 or #4 is reached, we usually do not increase the settings for the first pass, but increase the settings for the second pass up to button #6, usually using #5. We saw our best results at buttons #4-6. We usually did only two passes, but more severe cases sometimes received a third pass (without changing power setting). Please note that this is for types I-II skin, III without tan. Dark type III patients had a

difficult time getting up to button #4. Type IV skin usually did not progress beyond button #1.

### **LuxV with MediLux System**

The MediLux System still requires cooling of the crystal (handpiece) and the skin. There is more available energy at the fixed settings with MediLux, allowing us to increase our starting settings with this next generation system.

We were able to start with button #2 and even #3 for most patients with I-II skin types. Skin type III without a tan could also be started with button #2. We could more rapidly advance the power settings due to the advanced cooling. The best results were seen with buttons #4-6. Darker skin types (IV-VI), could be treated, very carefully with a lot of cooling, but only with button #1, and rarely #2.

### **LuxV with StarLux System**

The StarLux System represents a tremendous advance over the other two systems. The flexibility of changing the fluence and pulse duration independently allows us to safely treat all skin types with higher fluences.

The StarLux uses integrated Active Contact Cooling to cool the handpiece, which protects skin and eliminates the need for the cryogen spray. We still chose to use some auxiliary cooling (Cool Roller or ice packs) to pre-cool the skin for added patient comfort and protection at higher settings.

We generally start with 100 ms pulse width and 10-12 J/cm<sup>2</sup> for a first pass, and 20 ms pulse width and 8-10 J/cm<sup>2</sup> second pass. At the second treatment, the first pass is done at 100ms and 13-15 J/cm<sup>2</sup>, with the second pass at 20 ms and 10-12 J/cm<sup>2</sup>. Once we reach 15 J/cm<sup>2</sup> at 100 ms, we increase at 1 J/cm<sup>2</sup> increments, as tolerated. The second pass is increased by 2 J/cm<sup>2</sup> until 15 J/cm<sup>2</sup> is reached, then 1 J/cm<sup>2</sup> increments are used.

We see our best results at 100 ms and 18-20 J/cm<sup>2</sup>, and 20 ms and 15-18 J/cm<sup>2</sup>. This is again for types I-II skin (no tans). For types IV-VI (and dark III), we rarely go over 13-15 J/cm<sup>2</sup> at 100 ms and 10-12 J/cm<sup>2</sup> at 20 ms. We found that increasing the pulse width allowed us to use slightly higher settings in skin type III (with a tan) through VI, but increased burning and even blistering in types IV-VI skin, especially on the forehead. We did not see much difference in efficacy, so we opted to lower the fluence (J/cm<sup>2</sup>) instead of increasing the pulse width. Despite the lower fluence (J/cm<sup>2</sup>), the darker skin types improved as well.

## Some General Facts

Most patients improve in the 5-6 treatment range. If you do not increase the power settings to buttons #4-6 (MediLux/Estelux), or 100 ms 18-20 j/cm<sup>2</sup>, 20 ms 15-18 J/cm<sup>2</sup> (StarLux) the patients do not improve, and there is some evidence they may worsen.

Conversely, if you advance too rapidly in someone with comedonal acne, they may worsen and develop more papules and cysts. If improvement is not seen, make sure you are pushing the settings. While we try not to burn, some stinging is inevitable. Since pain thresholds are so variable there are no set guidelines. Sometimes you have to push the patient a little bit to accept the higher settings. Also make sure the patient is still on the prescribed regimen. Many feel that if they show improvement, they can stop other therapy.

The treatment interval is important. We started out at 4-6 weeks, but discovered (mostly in teenagers) that they would improve and flare at about 2-3 weeks. When we reduced this interval to the 2-3 week time frame, the results improved. Less than that may be counter-productive in that too-much-too-fast may cause a flare as well (much like Accutane). At about the fifth treatment we try to extend the intervals, letting the patient call for an earlier treatment if a flare occurs. Adults usually require less treatments to settle down, but require more monthly- three month interval treatments than teens. There is some evidence in adults (primarily cystic acne) that a longer interval (one month) may be preferable to every two weeks as some patients tell us they worsen at two-week intervals.

A second pass is important. We saw our best results when we used a second pass with a different pulse duration and fluence. My belief is that the 100 ms pulse width penetrates deeper and produces more effect on cysts and sebaceous glands by utilizing a longer heating time; the 20 ms pulse width helps the superficial lesions by utilizing a higher peak power, but delivered more superficially.

When placing the handpiece, be aware of hair-bearing skin, such as eyebrows, scalp line, beard, and moustache. There is some lateral spread of the light which will burn hair if too close. We usually placed it 2-3 mm away from hairy borders. Have men shave the day of treatment. Longer hair is more sensitive in the beard area. Always advise patients that there is possibility of reducing hair density if treating over hair-bearing area, but it is not likely.

Blackheads and whiteheads are the more difficult lesions to treat with this system. That is why it is critical to maintain a topical retinoid regimen (even if only 1-2

times per week). We are exploring lowering the pulse width to 10 ms which seems to benefit these patients.

Always cleanse before treating. Make sure all cosmetics, moisturizers and sunscreens are washed off before treating. They may interfere with the light absorption.

## No Sun

Always ask about sun exposure. Most patients say they have had no sun exposure, but the Palomar DermaType will tell you if the skin has darkened since the original base line reading. So will the patient by jumping off the table! Always assess skin type/color before each treatment session, especially during the summer.

The Palomar DermaType is the most accurate barometer of color. If the skin has darkened, we do not increase the power that day and we sometimes decrease the power. The forehead always has more color and is more sensitive than the rest of the face. We would often turn the power down a setting for the forehead. We also like to start treatments on the lower face first for that reason. The upper back/chest is much like the forehead in that it usually has more color and is more sensitive.

Even self-tanning creams are not allowed. Skin darkening for any reason will cause us to use lower power settings or burning may result. I would not stop treatments in the summer, but you may not be able to advance as quickly as you like. We will sometimes use this as motivation: "Your acne is going to take longer to go away and treatments hurt more with a tan." We have been able to effectively treat lifeguards during the summer with a little precaution.

Occasionally, some patients develop an urticarial response to treatment pulses, usually on the first few pulses and unrelated to power settings or location. The rest of treatments are uneventful. We usually give them a non-sedating antihistamine after therapy. We will pre-medicate with the same if it is a recurrent phenomenon. We will use an over-the-counter hydrocortisone (aquani-HC) to help with redness, dryness and burning (this will not make acne worse).

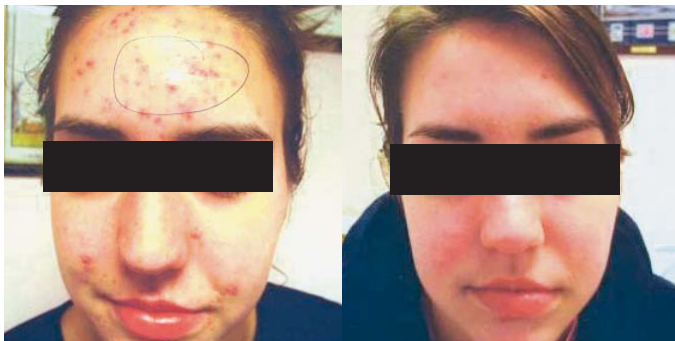
In the case of over-treatment resulting in redness or even burning, we will use Gentle Waves LED technology as well as clobetasol cream (class I steroid). If a burn or blister develops, we treat with clobetasol cream for a few days and/or mupirocin ointment. We use Gentle Waves for up to four days after the irritation develops. Once the skin has healed we may begin a bleaching cream to avoid hyper-pigmentation.

We know that using longer pulse duration greatly improves the safety of treatment, allowing higher fluence to be used. However, increasing the pulse duration beyond 100 ms with the StarLux has not been helpful, and rather, may make the patient more susceptible to burning. This is because the “on time” is too long. Most of our patients that burned with very long pulse duration did not complain of tenderness during treatment, but they felt it the next day, and some developed blisters.

As with any conventional acne therapy, not everyone responds to this treatment. When response is lagging, and the parameters are followed correctly, I push the oral therapy to standard levels (i.e. Minocycline 100 mg bid). Should that not work in combination, I consider Isotretinoin (Accutane). Even those patients who fail the IPL treatments seem to respond faster to isotretinoin, often showing remarkable improvement in the first 1-2 months.

We often continue the light treatments for the first month or two of isotretinoin therapy. This helps with the erythema and initial flair typically seen with Accutane. I have included some representative before and after photos to serve as examples. The first figure represents our typical patient, the second a patient with very severe acne who responded well.

Given the current climate with isotretinoin (Accutane) therapy side effects as well as requiring registration, the apprehension of patients about taking antibiotics for years with an apparent increased risk of upper respiratory tract infections, birth control pill interactions and pregnancy, Palomar LuxV Intense Pulsed Light treatment is an effective first line therapy with little risk.



After 6 treatments  
(10 months after 1st treatment)



After 9 treatments  
(15 months after 1st treatment)



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