

A discussion – **Laser** *versus* **IPL** *versus* **VPL™** (Variable Pulsed Light)

There is a lot of confusion in the Aesthetics Industry today.

Two years ago, laser experts said IPL was no comparison to laser. They said it was underpowered and not very effective for any treatments other than hair removal IF the skin was considerably lighter than the hair. They were partially correct. Most early generation IPL's were fixed pulsed, underpowered devices trying to compete with the much more powerful laser.

One year ago, the top laser companies all introduced a combination Laser / IPL machine. The laser expert's story changed. Now, IPL was great for photo-rejuvenation; however, laser was still the choice for vascular treatments and hair removal.

This year, 4 of the top laser manufacturers introduced stand-alone IPL's. Interestingly, the IPL's they introduced are fixed pulse and underpowered - the same old technology the 'experts' said was ineffective just 2 years ago. IPL works or the laser industry would not be putting it into the product line-up, BUT, if **you** want to continue selling lasers, would **you** put an IPL into your product line that could rival the effectiveness of your core business machines?

Our industry is 'rolling-over' and it's happening right before our eyes.

Intense Pulsed Light (IPL) and Laser are both light based treatments.

Both generate heat that targets in (in order):

- **Melanin** - absorbs heat energy the fastest
 - **Oxyhemoglobin** - absorbs heat energy less fast than melanin
 - **Water** - the last chromophore to absorb the heat energy

BOTH work by delivering heat energy (from the light):

- to a depth determined by the different wavelengths of light
- increasing the power of the light increases the amount of heat delivered at the selected depth

There is a common mis-conception that more power equals greater depth – that is simply false! EFFECTIVE TREATMENTS ARE A FUNCTION OF DELIVERING THE PROPER AMOUNT OF POWER (HEAT) TO THE PROPER DEPTH (WAVELENGTH) – SAFELY.

But that's not all.....

Most IPL's deliver a set number of pulses of light with each shot (pull of the trigger). With all systems you can increase the power (heat at target depth); however, most IPL's are grossly underpowered. Typically, if an IPL cannot deliver more than 35 J/cm² output, it cannot do effective vascular (and some hair) treatments. Also, if you cannot change the number of pulses with each shot you will be severely limited to the range (and effectiveness) of the treatments that you can perform **successfully**.

There are 18 IPL's in the US market (maybe more). So how do you decide which one to buy?

First, let's separate IPL's into two categories: **salon** and **professional** models.

Salon model IPL's typically have an energy output of less than 35 J/cm² simply because they cannot create enough heat at target depth to affect Oxyhemoglobin, the second target chromophore.

Professional model IPL's can exceed 35 J/cm² of energy output.

If you are interested in a professional model IPL, that's good. You've now eliminated all but six machines in the US market.

After you've decided on a professional model (over 35 joules), you will then need the ability to selectively target 3 different chromophores in different skin types. Light heat energy affects 3 chromophores in this order - melanin (in the skin and in hair), Oxyhemoglobin, and water. Most IPL's deliver a 'fixed' number of pulses in each treatment 'shot'. While that works O.K. for some treatments, it doesn't work for many others, and it certainly doesn't work well on all skin types. The ability to change the number of pulses of light, and more importantly the space (or delay) between those pulses, gives you the ability to ***specifically target***. The space (or delay) between pulses provides a cooling of the skins surface between each pulse. If you deliver multiple pulses, the delay or thermo-cool becomes more significant with each pulse. Now, apply a lot of pulses with a long delay and you can generate a lot of heat at target depth without the risk of side effects normally associated with traditional IPL and laser treatments.

Some examples would be:

- a vein on a type II skin (2 pulses, short delay)
- light brown hair removal on type III skin (5 pulses, medium delay)
- dark hair removal on type V skin (12 pulses, long delay!).

That is Variable Pulsed Light - **VPL** - the ability to change the power, the number of pulses, the length of each pulse, AND (most importantly) the delay between the pulses!

Let's look at 2 examples:

To do an effective vein treatment, IPL coagulates the pooled blood (remember, Oxyhemoglobin is the 2nd target chromophore) in visible veins. By solidifying the blood, the body then removes it through natural absorption. Here's the catch - the temperature of the Oxyhemoglobin has to increase quickly enough to cause coagulation. Remember, most IPL's deliver a fixed set of 4 or more pulses in each shot. That long application of the heat energy is why they generally fail. In order for an IPL to do an effective vein treatment, we need to deliver a high amount of heat energy in a very short period of time - say 2 pulses with very short space between the pulses.

On the other hand, in order to generate enough heat to attempt hair removal on a type V skin using only two pulses, we would likely cause Hypo pigmentation. BUT, if you could spread out the number of pulses delivered in each 'shot' to say 8, or 10, or even 12, you would then be applying the heat over a much longer period of time. For Type V skin that would be good. BUT, there's more. If you increase the space (delay) between each pulse, the skins surface actually cools slightly between each pulse. Now, when we apply the proper amount of heat to a Type V Hair Reduction, with multiple pulses, and long spaces between the pulses, we have the ability to generate enough heat to destroy the half follicle, yet minimize the potential for Hypo pigmentation.

That is 2 extreme examples of **VPL™** - Variable Pulsed Light. Effective **VPL™** use is simply targeting different chromophores selectively in different skin types, making treatments with **VPL** much more effective than traditional IPL.

Remember, if it's not **VPL™, it's just an IPL**