

## The Basics of Laser (2)

What are the characteristics of laser?\*

- Monochromatic: has single wavelength depends on the media
- Collimated: the light travels with a synchronized direction with very minimum degree of deviation
- Coherent: electromagnetic wave has the same form and phase
- Brightness: laser seems bright due to the high energy emission in the optic cavity

What is the difference between conventional light source and laser? Conventional light source has diffuse distribution and is originally white because it consists of many color spectra (multiple wavelengths). Meanwhile, laser has single direction and single color or monochromatic (single wavelength)

What is the benefit of monochromatic characteristic? Laser energy will be absorbed by specific chromophore of the target organ

What are the basic radiometry terms that you must understand?

- Power output = radiant power = W (Watts) = J (Joule) / second
- Power density = irradiance = intensity = W/cm<sup>2</sup>
- Light energy = Joules = J
- Fluence = energy density = J/cm<sup>2</sup>

What are the types of laser pulse?

- Continuous wave: continuous power output while the shutter is being opened (pedal)
- Pulsed wave: interrupted light output (msec)
- Superpulsed wave: very short light output (msec)
- Ultrapulsed: very short light output (nsec)
- Q-laser: very short exposure time with extremely high energy

How can the laser interact with the tissues? Absorption of photon by the tissues is basically the main effect resulted by laser. Reflection, refraction, and transmission will have no effect in the absence of photon absorption.

What are the biological effects on the tissues? Cells' growth stimulation, increased cell regeneration, increased tissues' activities, anti-inflammatory effect, reduced swelling/edema, increased microcirculation, less fibrosis, stimulation of nerves' function, pain attenuation due to increased production of local endorphins, and increased ATP production in mitochondria

What does photothermal effect of laser mean? Photothermal effect of laser is thermal effect resulted by the photon which directly related to kinetic molecule excitation produced by total movement, rotation, and molecular action of the tissues. Photothermal effect may cause an increase in temperature, coagulation, protein denaturation, hemostasis, carbonization, and tissue evaporation.

## About the Author

Adolf Hitler used the theory of eugenics in his quest to create a master race, legitimizing the murder of thousands deemed unfit for the German.

Source: <http://www.products herbal.com>