

TREATMENT NOTES

By Paul Schwen

Types of Conditions Responsive to Radiant Beam Energy in the 810nm and 980nm Wavelengths (laser therapy):

- Autoimmune Inflammatory Conditions
- Pathogenic Conditions (Diseases caused by viral, bacterial, fungal microbes, parasitic conditions)
- Demyelinating Inflammatory Condition
- Nerve Tissue Disorders
- Organ Disorders
- Genetic Diseases, Rare Disorders
- Vascular Disorders
- Connective tissue disorders including blood, bone, tendons & ligaments, chondyles, cardiac muscle tissues, etc.
- Muscle Tissue Disorders

For HIGHER dosage, INCREASE:

- Watts
- Time
- DECREASE treatment AREA (smaller treatment area means GREATER energy density)
- On PULSE mode, INCREASE T-ON, and/or DECREASE T-OFF

NOTE: greater energy density will result in increased thermal effect - to counteract this AND to allow greater energy density (dosage) cool the targeted tissue with ice or cold gell-packs before treating

With HIGH POWER (12Watts and higher), it is advisable to introduce icing before, during, and after treatment

for LOWER dosage, DECREASE:

- Watts
- Time
- INCREASE treatment AREA (larger treatment area means LOWER energy density)
- On PULSE mode, DECREASE T-ON, and/or INCREASE T-OFF

How to Calculate Energy Density, or Dosage

Continuous Wave (CW)

$$(P)\text{Power} \times (D)\text{Duration} / (A)\text{Area} = \text{J}/\text{CM}^2$$

For example, let's assume that the power is 10Watts, the duration of treatment is 600 seconds (10 minutes), and the treatment area is 100 cm², or about 5 ½" X 5½" which gives us the following equation:

$$10\text{W}(P) \times 600 (D) = 6,000(\text{J}) / 100(\text{A}) = 60\text{J}/\text{cm}^2$$

Pulse Mode

$$\text{J}/\text{CM}^2 \times \text{T-on} / \text{T-off ratio} - \text{J}/\text{CM}^2 = \text{average peak power}$$

For example, let's assume T-on is 25ms (microseconds) and T-off is 5ms - to determine the ratio (duty cycle) divide T-on by T-off, which gives us a ratio of 20% (5/25 - in other words, at a duty cycle of 20%),

which is multiplied by energy density ($60\text{J}/\text{cm}^2$) then subtracted from the same number ($60\text{J}/\text{cm}^2 \times 20\% = 12$), yielding the following equation: $60\text{J}/\text{cm}^2$ (energy density) -12 (movable boom density would be energy density minus duty cycle ratio)
Average Peak Power = $48\text{J}/\text{cm}^2$

F: Frequency

T-ON (ms)

T-OFF (ms)

pulse width= T-ON

$F=1/(T\text{-ON}/1000 + T\text{-OFF}/1000)$

for example:

Ton=500ms

Toff=500ms

$F=1/(T\text{on}/1000 + T\text{off}/1000)=1/(0.5+0.5)=1\text{Hz}$

Algorithm to determine the frequency T-OFF/T-ON): $1/(T\text{on}+T\text{off}) = \text{Frequency}$

For example, T-ON @ 0.01S and T-OFF @ 0.01S, beam diameter 0.025, frequency is $1/0.02=50\text{ Hz}$

Baseline Settings:

Watts – 5W

Time – 300S

Area – 100cm

Define Tissue Type & Pigmentation

Use heat and/or cold to influence treatment

Maximum frequency rate: 1666Hz