What You Need to Know About Lasers

written by
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The Confusion

A lot of healthcare professionals get confused. That confusion is often compounded by statements made by companies that prevent you from asking the right questions to make an informed decision. The following information is intended to shed some light on what you need to know... and what questions you need to ask.

The Benefits of Apollo

- The Most Advanced Pain Relieving Laser
- More Power than a Class 4
- Patients Feel Their Treatment
- 2 Minute Treatment Times

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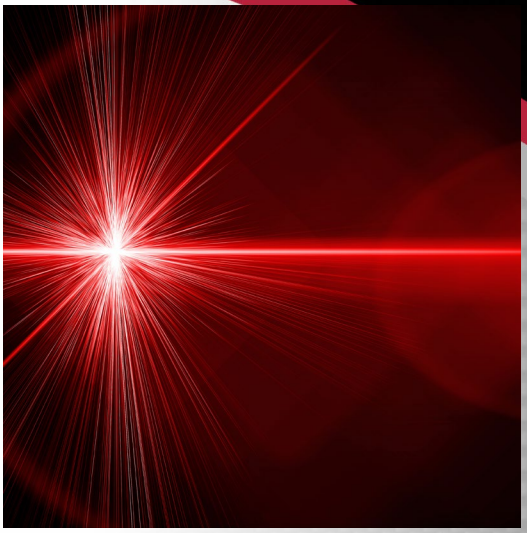
Pulsed Power is not average output power

Pulsed Power is irrelevant as it is a laser's average output power which you need to know in order to assess a laser's true capabilities. Simply put, treatment times are inversely related to the average Output Power of a laser. All other things being equal, the more average output power a laser produces – the faster it can deliver the appropriate dose of energy required to complete a treatment. Don't confuse a laser's Super Pulsed Power with its Average Output Power. If a supplier can't or won't tell you their Laser's Average Output Power (preferably broken down by individual laser diode output) – ask them – "Why not?" Many lasers that advertise 25,000 -50,000 mW actually produce an average output of less than 100 mW



How Many Joules Do I Need?

"For a given wavelength of light, energy density is the most important factor in determining the tissue reaction."[1] Research indicates that Energy Densities in the range 0.5 to 4 Joules/cm^2 are most effective in triggering a photobiological response in tissue.[2]

Laser Diodes vs. SLD & LED. The Light Spectrum.

When it comes to wavelengths, the therapeutic "window" for laser therapy is from just below 700nm to 1000nm. Please note that while laser diodes and LEDs are both capable of producing wavelengths in this therapy range, most published research is based on laser diodes. Research has also indicated that while multi-spectra LEDs may be effective for large areas, these devices different diodes produce different wavelengths which can lead to a degradation of the effectiveness of laser therapy. A laser, like the Apollo, produces deeper and more effective penetration than LEDs or multi-wavelength lasers.

Beam Area

Average Output Power & Wavelengths are necessary information, but not enough to accurately define the parameters of the laser system. To do this, one must also know the area of the laser beam (cm^2) at the treatment surface. The smaller the beam area, the more likely a laser could be dangerous to the eyes. The Apollo not only has a lot of power, but it also has a large beam, making it cool and safe.

$$\text{Energy Density (Joules/cm}^2\text{)} = \frac{\text{Laser Output Power (Watts) x Time (seconds)}}{\text{Beam Area (cm}^2\text{)}}$$

Continuous, Pulsed & Super Pulsed

Again, don't be confused by these terminologies. As the words suggest; "Continuous" simply refers to a Laser capable of delivering a continuous beam of light energy, while the terms "Pulsed" and "Super Pulsed" simply mean the laser beam is repeatedly turned on and off in order to reduce thermal responses in surface tissue. These different delivery methods are used to achieve different therapeutic objectives but cannot and do not increase or "boost" a laser's output power. In fact some of the 50,000 mW super pulsed lasers put out 50-100 mW of average, continuous power.

Treatment Time Comparison for Major Brands

Using a dosage of 400 Joules to treat a 100cm^2 area for deep lying lumbar pain as an example.
Below are the estimated treatment times for some major brands, based on output power.

Brand	Estimated Treatment Times	1000 Treatments / Year
K-Laser	33.33 seconds	92.6 hours
LiteCure	40 seconds	111.1 hours
Apollo	100 seconds (1 channel) / 50 seconds (2 channels)	277.7 hours / 138.8 hours
Vectra Genisys	384.6 seconds	1,068.4 hours
Theralase	666.66 seconds	1,851.9 hours
Rich-Mar / MedX / BioFlex	2,000 seconds (5.55 Hours)	5,555.55 hours
Erchonia	20,000 seconds (55.55 Hours)	55,555.5 hours (2,314.8 days at 24 hour days)
Class 1M Lasers Based on 1mW Output Power as per classification	400,000 seconds* (1,111.11 hours)	1,111,111.1 hours* (46,296.3 days at 24 hour days)

We have created this comparison based on the available information for each of these lasers. We have consistently used the highest power version (probe) of the unit for each brand and its price. We welcome the feedback and updated technical specifications from any manufacturer that believes their unit performs better than featured here.

Cost Comparison for Major Brands

Name/ Model	Approximate Price	Classification	Watts	Classification Description Details	Comments
K-Laser	$21,500	Class 4	12 Watts	High Power Laser Over 500mW Protective Eyewear & Full Safety Requirements must be followed.	Full Therapeutic Laser with Low Treatment Times
LiteCure	$20,000	Class 4	10 Watts		
Apollo	$6,000	Class 4	4 Watts		
Vectra Genisys	$5,300	Class 3B	1040mW	Medium Power Laser 5mW - 500mW Protective Eyewear & Full Safety Requirements must be followed.	Therapeutic Laser. Longer treatment times required due to lower output power. In units closer to the 5mW total output power range, treatment times will be dramatically increase.
Theralase	$15,000	Class 3B	600mW		
Rich-Mar LaserPrism	$4000* *w/electrotherapy unit	Class 3B	200mW		
BioFlex	$13,000 Therapist	Class 3B	200mW		
	$27,300 Professional	Class 3B	200mW		
Erchonia	$9,900	Class 3B	20mW		
Multi Radiance MR4	$5,800	Class1M*	Undetermined	Class 1M – Very low power laser. Less than 1mW. Protective eyewear not required. No risk to eyes or skin with exposure of more than 8 hours (except perhaps with optical instruments like binoculars) *Class 1M status provided by the manufacturer.	

1. Baxter, G.D. (1994) Therapeutic Lasers: Theory and Practice. Churchill Livingston: Edinburgh
2. Mester & Mester, (1989) Wound Healing. Laser Therapy 1: 7-15
3. Kuru, T. (1988) The Science of Low-Power Laser Therapy. Gordon & Breach Science Publishers, p. xv

The Apollo PowerMAX™ has 2 independent channels for 2 separate treatments!

Deliver up to 240 Joules per minute, per probe!

Apollo has over 20 years of collaborative research and data to solidify the effectiveness of this 8W or 10W laser.

Power is inversely proportional to the treatment time. This means more power, less treatment time. This saves time and money while enhancing the patient's experience.

Our new product line features both a portable laser as well as the PowerMAX desktop.

Apollo uses premium medical grade Class 4 (Class IIIb in Canada) laser diodes that provide extra long life and reliability.

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A Word from an Expert

"I have been blown away with the success of the Apollo laser with my patients – it's everything I expected and more. Most of my patients show dramatic improvements in just a few visits. As a Diplomat in acupuncture I also purchased the acupuncture probe along with my system, I have found tremendous benefit from the use of both Electro-acupuncture and of course needle, but this laser probe has been nothing short of amazing with results often time equal to or more effective than the traditional sources of treatment."

– Dr. William C. Davis

Apollo Portable Laser Features

- Custom carrying case
- External battery with NiMH Rechargeable Cells
- Battery charge circuitry: Fast charge 3 hours; Trickle charge overnight; Charge and test battery mode
- Battery life: Based on probe used:

  500mW probe: 60 - four minute treatments

  3000mW probe: 40 - one minute and 20 second treatments

Apollo 2-Channel PowerMAX™ Desktop Laser Features:

- Heavy-duty construction for office and clinic environments
- Cold laser with 2 independent channels and two timers so 2 treatments can occur at once
- Allows practitioners to treat two patients at the same time or treat one patient with 2 probes
- Same power and functionality as our popular portable system

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3000mW Cluster Probe:

(only available with Desktop version)

- Emitter Wavelength: 810nm
- Beam Divergence: 9° x 38°
- Total Power Output: 3000mW
- Polarization: Linear
- NOHD: 120 cm
- Total Energy Delivery per Minute: 180 Joules, 68.4 J/cm^2
- Treatment Time for 4 J/cm^2: 3.51 seconds
- No. of Emitters: 4
- Optical Output Power per Emitter: 750mW
- Aperture: 25mm
- Spot Size: 2.7 x 21mm, 0.567cm^2
- 1/e2 Power Density (Irradiance): 1.14W/cm^2

4000mW Cluster Probe:

(only available with Desktop version)

Emitter Wavelength: 810nm

- Beam Divergence: 9° x 38°
- Total Power Output: 3000mW
- Polarization: Linear
- NOHD: 80cm
- Total Energy Delivery per Minute: 180 Joules, 72 J/cm^2
- Treatment Time for 4 J/cm^2: 3.51 seconds
- No. of Emitters: 4
- Optical Output Power per Emitter: 750mW
- Aperture: 25mm
- Spot Size: 2.7 x 21mm, 0.567cm^2
- 1/e2 Power Density (Irradiance): 1.19W/cm2

5000mW Cluster Probe:

- Emitter Wavelength: 810nm
- Beam Divergence: 9° x 38°
- Total Power Output: 2000mW
- Polarization: Linear
- NOHD: 80cm
- Total Energy Delivery per Minute: 120 Joules, 72 J/cm^2
- Treatment Time for 4 J/cm^2: 5.24 seconds
- Emitter Type: GaAlAs Semiconductor Laser
- No. of Emitters: 4
- Optical Output Power per emitter: 500mW
- Aperture: 25mm
- Spot Size: 2.7 x 21mm, 0.567cm^2
- 1/e2 Power Density (Irradiance): 0.80W/cm2

500mW Single Diode Point Probe

(For hands and small areas):

- Emitter Wavelength: 810nm
- Beam Divergence: 9° x 38°
- Aperture: 9.5mm
- Spot Size: 1.7 x 9.5mm, 0.161cm2
- NOHD: 80cm
- Total Energy Delivery per Minute: 30 Joules, 160.8 J/cm^2
- Emitter Type: GaAlAs Semiconductor Laser
- No. of Emitters: 1
- Total Power Output: 500mW
- Polarization: Linear
- 1/e2 Power Density (Irradiance): 2.68 W/cm^2
- Treatment Time for 4 J/cm^2: 1.49 seconds

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All Apollo Laser Systems Feature:

- LCD display that provides probe status and treatment times
- User controlled treatment times selectable between 10 seconds and 2 minutes
- Built-in safety and fault detection software
- Built-in power test for assessing probe output
- Durable aerospace quality aluminum assembly
- 2-year warranty on main system and 1-year on battery and cables

All Apollo Laser Systems Include:

- Apollo Control Unit- Desktop or Portable
- Choice of laser probes: 5,000 mW, 4,000 mW, 3,000 mW, 500mW
- Power Adapter
- Probe Cable
- 1 pair of Safety Eye Wear
- Laser Carrying Case
- Book- Light & Laser Therapy: Clinical Procedures
- Laser tutorial DVD with systems overview

Billing for Laser Therapy

There's no question low-level laser therapy can help boost your practice by providing an added dimension of fast pain relief and rapid healing. And there's also no question that you can bill for laser therapy – but there are two issues that can make the billing process difficult.

First, clinicians have been losing billing rights with most insurance carriers – and when viewed over the past five to 10 years (and even longer), that erosion seems to be fairly steady.

The second issue is that laser therapy doesn't yet have an assigned billing code that's accepted by the insurance industry. However, it's important to remember that many modalities did not have assigned codes – and didn't for many years – until insurance companies decided to accept them (HIV or Lyme disease treatment are two that come immediately to mind).

When to Bill

Billing is just one way to ensure low-level laser therapy is a profit center for your practice (more on that later). If you're interested in exploring billing, make sure to first examine your case locally and statewide. Are you in a state where Medicare easily reimburses, or is there excellent workers compensation insurance or personal injury insurance in your area? Nationally, it is getting more difficult to be reimbursed, but if your particular region or state offers favorable insurance rates, it can be very profitable to bill.

When billing, the key point is to resist temptation to bill in a gray area as fines or even jail time are a possibility for improper billing. For laser therapy, clinicaians can feel comfortable billing to the following codes:

- **97039, Physical Medicine and Rehabilitation:** This is the primary code I would recommend for billing for low-level laser therapy. Specify a 10- or 15- minute treatment, and also provide the explanatory notation of "FDA cleared laser therapy."
- **97139, Physical Medicine and Rehabilitation:** This is also a good code to use; however, note that this particular code specifies a "procedure," whereas 97039 specifies a "modality," which is a better descriptor. When using the code, make sure to provide the explanatory notation of "FDA cleared laser therapy" and a one-page description of the therapy.
- **97026, Infrared Modality:** This code describes laser therapy well. However, many insurance companies consider this code appropriate for infrared heat lamps. Reimbursement is low, but it is a legitimate code.
- **97140, Manual Therapy Techniques:** Use this code if you are using laser therapy for massage. In this case, you must be using a laser fitted with a head designed to be a massage tool, like the Apollo, you are not simply applying the laser in one place but are using it for massage; and your patient can

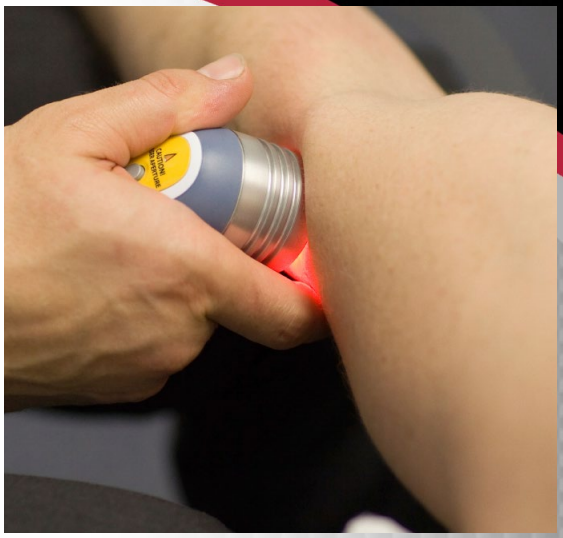
experience and perceive that you are providing a massage service.

If You Choose Not to Bill

The challenge with billing is that sometimes you will only be reimbursed for a portion of what you bill – while you are paying for full-time or contracting for part-time competent billing staff.

In response many clinicians are now choosing to offer low-level laser therapy on a cash-only basis. This can be another very effective way of bringing profit to your practice, even if your rates are low. Consider that clinicians are offering more manipulation and manual therapy today – and billing for it – but they are able to offer their expertise in these therapies at a more cost-effective cash rate, putting clinicians in the enviable position of offering quite modest fees but still being financially successful.

Because many patients do find that laser is helpful, yet are not able or willing to come in and pay the full fee, another option is to offer low-level laser therapy for rent at your practice. You can purchase a relatively inexpensive laser ($1000 to $3000) and rent it to patients at a flat fee, say $50/week. You will likely find that demand is high – so much so that most patients are unwilling to give the tool back at the end of the week! – and in a short period of time, you can recoup your costs and establish another profit center.



Low-level laser therapy is fast becoming a widely accepted modality as patients recognize and demand its benefits. No matter how you charge, it's clear that laser therapy is an essential part of today's successful practice.

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