

AT THE PRESENT TIME, COMMON THERAPIES for complex regional pain syndrome (CRPS) begin with anti-inflammatories and analgesics, along with physical therapy and psychotherapy. Often treatment progresses to adrenergic blocks, anticonvulsants, antiarrhythmics, and opioids. While helpful, these approaches often provide incomplete relief. Some patients ultimately require more invasive interventions such as sympathetic blocks, intrathecal drug delivery, and spinal cord stimulators. Because there is no cure for CRPS, the benefits of an effective, conservative treatment are obvious.¹



studies, for example, showed that infrared light from LLLT can stimulate healing, alter cellular metabolism, improve enzyme production, and stimulate tissue proliferation at intensities that do not produce significant heating.⁹

One of the problems in studying laser therapy is dose. For example, when the dose is too low, which is common in the older, very low-power lasers, treatment is ineffective.¹⁰ On the other hand, very hot, high-powered lasers risk eye damage and skin burns, and could potentially aggravate symptoms. In fact, a recent

study found that LLLT irradiation should be avoided over melanomas because the combination of hotter lasers and high doses significantly increased melanoma tumor growth *in vivo*.¹¹

What is Low-Level Laser Therapy?

Low-level laser therapy (LLLT) is also known as photobiomodulation, cold laser therapy, and laser biostimulation. It is a medical treatment that uses low-level lasers (LLL) or light-emitting diodes to stimulate or inhibit cellular function.² A large number of studies suggest that light, whether in the form of LLL radiation or from other light sources, benefits a variety of painful musculoskeletal and neurologic conditions.³ In addition, a number of studies have reported that infrared light is exceptionally effective in reducing pain associated with CRPS.^{4,5} One study using laser acupuncture demonstrated an increase in vagal activity and suppression of cardiac sympathetic nerves.⁶ Another study found that LLLT created an effect that appeared to normalize the autonomic nervous system. The effects on

Laser Therapy: New Treatment for CRPS

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sympathetic tone were thought to result from normalization of the SNS.⁷

Laser's effectiveness in pain management, combined with a lack of serious side effects has been proved.^{3,8} Laboratory

An intriguing study from the Mayo Clinic provided 2 main insights. First, 50% of patients with CRPS I noted a sensation of warmth in their symptomatic limb after treatment, but control subjects did not. More importantly, one-third of the treated subjects had a reduction in pain of more than 50%, which lasted for over 2 weeks.

This is a dramatic finding considering the recalcitrant nature of CRPS pain. Even though the study size was small, the fact that it was well controlled and double blinded makes the results more interesting. In contrast to some previous studies, this research documented no

measurable alteration in sympathovagal balance, vasomotor tone, or sudomotor function. Thus, the author concluded that irradiation must act through a somatic rather than an autonomic mechanism.¹

Promising Treatment Protocols

In my work with patients suffering from CRPS, I have learned that low-level lasers can be used in several ways to improve the symptoms of CRPS in patients with chronic pain.¹² The first protocol is to use the laser much like a stellate ganglion block. This was the procedure followed in the Mayo Clinic study noted above.

A second protocol is to use the laser over the sympathetic chain ganglia. The sympathetic chain ganglia are located just ventral and lateral to the transverse processes of the spine and extend from the upper neck down to the coccyx. There are usually 21 or 23 pairs of these ganglia: 3 in the cervical region, 12 in the thoracic region, 4 in the lumbar region, and 5 near the sacrum and coccyx. I have found that "painting" with the laser over the tract of these ganglia can provide similar and synergistic effects to treatment of the stellate ganglia.

My experience has taught me that it is prudent in patients with CRPS to treat the stellate and the sympathetic chain ganglia before treating the site of most intense pain. In my experience, initially treating the pain site pain is more likely to increase the symptoms than when starting by treating ganglia. In fact, if a clinician wants to be extremely cautious, I suggest treating the ganglia first. Then, if there is no increase in symptoms, treat the nonsymptomatic limb before treating the area with the most severe pain.

Always start with a low dose and titrate up, as long as there are no flare-ups. Thus, the therapy would involve:

1. Treating the stellate ganglia, followed by the sympathetic chain for 1 to 5 sessions.
2. Treating the unaffected limb for 1 to 5 sessions.
3. Treating the symptomatic area with the most intense pain for 1 to 5 sessions.

Summary

The literature is quite convincing that low-level laser therapy has the potential to be a useful adjunct to standard pain management programs for patients suffering from complex regional pain syndrome. However, more research will be needed to establish appropriate protocols and dosage.

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