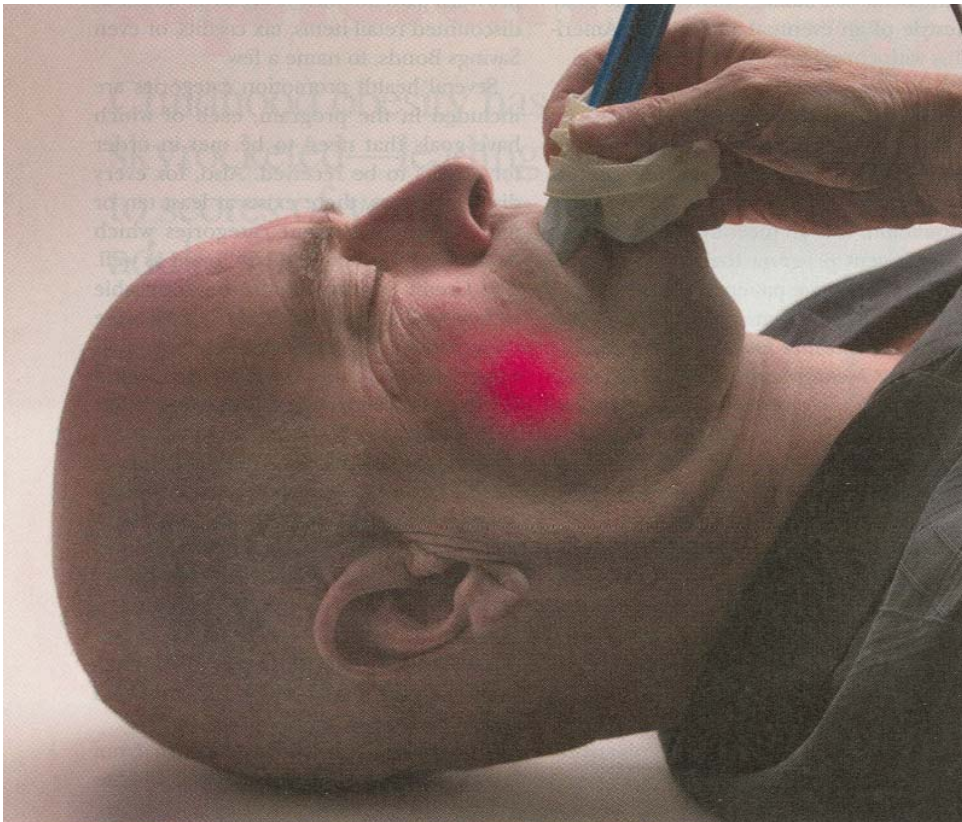


Enhancing Manual Therapy with Low Level Lasers

By Cathy Ulrich, P.T., Certified Advanced Rolfer®



As practitioners, it's probably fair to say that all of us have patients that visit again and again for treatment of the same symptoms. And while it is quite satisfying to provide them with much-needed relief, it's even more compelling to contemplate new modalities that can enhance and further promote their healing on a long-term basis. I made the decision to incorporate low level lasers into my manual therapy practice after extensive literature research. The following case study outlines my experience in integrating low-level therapeutic lasers with manual therapy along with my theories about why it works so well.

Sandy had been my patient for some time. An active professional in her early 50s, she suffered from chronic neck pain. Her x-rays showed greater-than-normal degenerative changes throughout her C-spine.

I saw Sandy on a monthly basis for soft tissue work and joint mobilization to maintain a tolerable level of comfort, so when I got my new Q1000 laser system, I asked her if she'd be interested in trying it.

After discussing contraindications¹ and current FDA policies for therapeutic lasers, I set to work. Sandy typically presented with fixed open facets on the left at C3-6, and my manual treatment would hold for about a month before her pain returned. When I tested her cervical mobility with lateral translation, I found the same pattern as usual.

The Q1000 system includes multiple laser devices but my research indicated that the 808nm infrared enhancer was probably the best choice for joint dysfunctions since infrared light may penetrate deeper and work more effectively on hard tissues². I found the C3-4 fixed facet and applied

the laser for one minute before my usual Grade II mobilization. To my surprise, when I retested the fixation, it was gone! Unable to believe what I was feeling, I tested C4-5. The restriction was there, as usual. I applied the laser as before, retested, and it was gone again.

In the span of three minutes, I cleared Sandy's cervical dysfunctions – something that typically took me at least twenty minutes to do before. When Sandy sat up, her AROM was remarkably improved and she had zero pain.

She emailed me the next day. "My neck continues to hold!" she said. "I read an article on the internet about lasers that agrees with your assessment. Looks like the timing of my next appointments are just right based on this article. I can't wait to see you next week." We had decided to add a couple of extra sessions to see if the laser would continue to clear her neck. It did.

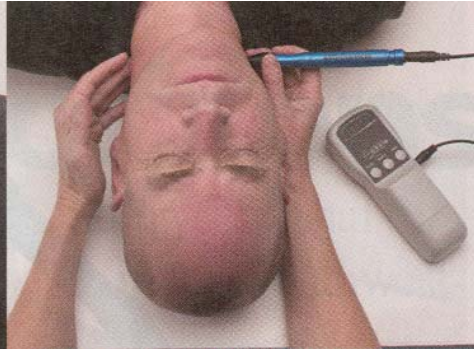
Documented Effects of Low Level Lasers

In their pioneering book on therapeutic lasers, Jan Tuner and Lars Hode outline more than 400 peer-reviewed clinical and laboratory studies on the use and effects of low level lasers³. These devices have been available to clinicians in Europe, Japan and China now for more than 30 years -- and research has been ongoing during this time period.

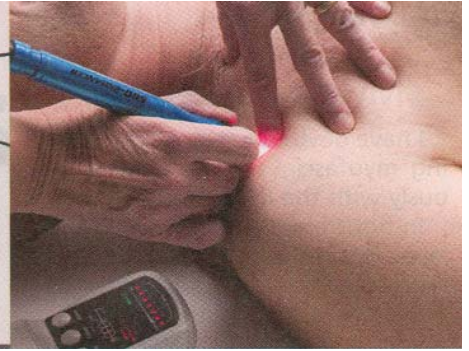
As reported by Tuner and Hode, primary effects of low level laser biostimulation include: increased ATP production in the mitochondria, normalized cell membrane polarity, and increased serotonin and beta-endorphin release. Secondary effects include: pain reduction, improved blood circulation, increased immune response, decreased C-fiber activity, and increased fibroblast activity with procollagen synthesis.



THE PULSED Q1000 RESONATOR CAN BE APPLIED AHEAD OF MANUAL TECHNIQUES, FREEING THE THERAPIST FOR OTHER TASKS.



APPLYING THE LASER PRIOR TO CERVICAL MOBILIZATION CAN FREE THE FACET SO THAT SLIGHT OVER PRESSURE IS ALL THAT IS NEEDED TO COMPLETE THE TREATMENT.



USING THE LASER IN TIGHT SPACES SUCH AS THE CORACOCLAVICULAR LIGAMENTS REDUCES PAIN AND SOFTENS TISSUES MINIMIZING THE NEED FOR DEEP, PAINFUL WORK.

Palpable Changes in Soft Tissue

As I continued to work with my new therapeutic laser, I realized that, while I was seeing many of the documented effects in my sessions, there was something else going on that seemed to be missing from the literature. I found the laser did more than studies reported. Soft tissues practically melted under my fingers – much like myofascial release techniques, only faster.

In my 23 years as a manual therapist, myofascial release practitioner and Rolfer®, I am used to seeing dramatic changes for patients. Range of motion and postures improve, scar tissue softens and pain diminishes as inflammation and connective tissue restrictions resolve, but these changes are often hard-won through my own physical efforts. Nonetheless, I've found a correlation between the symptomatic changes experienced by patients and my objective findings in regard to palpable soft tissue restrictions and their resolution.

When I found these same palpable changes appearing with the use of the Q1000 laser system, I decided to revisit my understanding of soft tissue properties to see if I could explain what the laser literature was missing.

The Living Matrix

Biophysicist James Oschman, Ph.D. has been writing about the connective tissue matrix now, for decades.

Deeply impressed with the work of Ida Rolf, he has devoted his own life's work to explaining how manual therapies, especially bodywork, often produce such dramatic changes. Like Rolf, Oschman has focused his studies on connective tissue structures.

Oschman describes connective tissue as a "living matrix," continuous throughout the body. It forms "a mechanical continuum, extending throughout the animal body, even into the innermost parts of each cell."⁴ Further, this continuous structure appears to have electrical properties. Composed of "long, thin, pliable molecules,"⁵ the connective tissue matrix has been described by Oschman and others "as a liquid crystal – capable of generating electric fields when it's compressed or stretched.

It's long been known that the body regulates its structural organization as a response to the forces of compression and tension placed on it. Wolf's Law of Bone (that we all learned in school and which dates to 1892) dictates that bone structures become more solid along lines of compression and conversely, Wolf's Law of Connective Tissue tells us that this living matrix builds along lines of tension. What makes Wolf's Law significant is that researchers in the late nineteenth century discovered *why* this happens.

Basset⁷ found that the electric fields identified during movement in the body directed "generative" cells such as osteoblasts, osteoclasts, fibroblasts,

and fibroblasts to build or absorb collagen and thereby respond to the pressures and tensions placed on them. Known as the *piezoelectric effect*, our liquid crystal connective tissue matrix produces electricity when deformed. This electric field directs our cells to respond to the stresses placed on it. It's a remarkably adaptive system.

Soft Tissue Techniques and the Liquid Crystal Matrix

Most practitioners who have learned soft tissue mobilization, myofascial release or even Swedish massage have probably experienced the feeling of a patient's tissue changing under her hands. We apply shear forces through tight or restricted areas and, if we're patient and don't force it, we'll feel that tissue begin to flow, soften, and become more pliable. We're taking advantage of a property known as *thixotropy* – that is the ability of an organic colloid gel to move from a gel to a solution state.

When energy through pressure or heat is applied to the semifluid gel ground substance of the connective tissue, this gel quickly transforms to a liquid. It will return to its gel state within a short period, but in the time between gel to sol to gel, collagen fibers reorganize, toxins trapped in the ground substance are released and the generative fibroblasts get to work organizing the collagen matrix in a more efficient way.

Laser Assisted Myofascial Release

The Q-1000 laser system is extremely portable. I have devised a way of performing myofascial release simultaneously with the 660 nm Enhancer. In tight places, I simply hold the laser in one hand while working with my fingers on the other to release areas such as the coracoclavicular ligaments.

For larger areas, I place the Q1000 in a holster strapped around my waist, attach a Velcro strap with the hook side out to the probe and then apply the probe to a strap on my own wrist with the Velcro loop side out (see photo). In this way I can apply the laser ahead of my knuckles.

Finally, the Q1000 has a pulsing light head with multiple frequencies available. I have created a Velcro cuff to go around the laser and a rice pack with a large Velcro strip that I drape over the body. By attaching the laser to the rice pack, I can apply the laser ahead of where I want to work and know that it's securely held in place.

It's important to reiterate here, that the compressive and tensile forces introduced by our hands during soft tissue work produce a piezoelectric effect through the liquid crystal, affecting its organization and stimulating the thixotropic properties of the gel. This effect is identical when the body simply moves, but we as therapists can be more specific, directing changes with our hands when structural imbalances or injuries create inefficiencies for our patients.

Light Therapy Affects Liquid Crystal

Another effect can occur within the liquid crystal that I believe is what happens when I shine my laser on tissue. Just like pressure can produce an electric field in a crystal, strong light can do the same thing. Light photons hitting a crystalline structure



set up an electric field and a *photoelectric effect* results.

The strong light that the laser produces (even though low level lasers don't specifically heat tissue) sets up an electric field that adds energy to the ground substance, converts the gel matrix to a solution and stimulates fibroblastic activity. I believe this is what I'm feeling when I do my soft tissue techniques simultaneously with my laser. And remember – one of the known effects of low level laser is an increase in fibroblast activity.

Dramatic Results With Therapeutic Lasers

I've used many modalities in my career in orthopedics, sports medicine, and finally Rolwing®. I gave up on most when I found that my hands were the best way to create lasting improvement for my patients. I've had to rethink this belief with the addition of the laser to my practice.

By itself, the laser reduces pain and aid healing, but in combination with my manual techniques, I've seen even more dramatic results. Joints normalize with slight overpressure, trigger points soften in seconds, and I've been able to work on highly armored body builders when no amount of pressure would have changed their tissues – even if I had walked on them.

My Q1000 laser is the perfect complement for my practice. I supply the skill, knowledge, and specific manual techniques. The laser provides the light energy. In addition to all of the known effects of laser biostimulation, I believe it adds one more – a powerful potential for change in the living crystal matrix. I work less, get more done, and save my own structure for the next person who comes through my door.

References

¹ Turchin, C, 2007. Light and Laser Therapy: Clinical Procedures. Self Published, Redwood City, CA

² Ibid.

³ Tuner, J and Hode, L. 2004. The Laser Therapy Handbook. Prima Books, Grangesberg, Sweden

⁴ Oschman, JL, 2000. Energy Medicine: The Scientific Basis. Churchill Livingstone, Edinburgh, Scotland

⁵ Ibid.

⁶ Bouligand Y 1978 Liquid crystals and their analogs in biological systems. In: Liebert L (ed) Liquid crystals. Solid States Physics 14 (supplement): 259-294

⁷ Basset, CAL 1968 Biologic significance of piezoelectricity. Calcified Tissue Research 1:252-272