

Contraindications for Use of Therapeutic Laser

Of the relatively few contraindications for the use of therapeutic laser, many are relative rather than absolute and a skilled clinician, together with careful patient selection, should minimize any risks.

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While I have written a number of articles over the past years discussing the benefits of utilizing therapeutic laser for a variety of conditions, I would like to take the opportunity to discuss contraindications in greater depth. While laser therapy has relatively few contraindications associated with it when compared with some other therapeutic modalities, some cautions are worth noting. Likewise, it is also worth noting that some contraindications are assumed when they are not—or are relative rather than absolute.

Pacemakers

According to Tuner and Hode, the use of therapeutic laser over internal pacemakers (illustrated in Figure 1) is mistakenly considered to be contraindicated. They are encased in metal and cannot be influ-



FIGURE 1. An example of an internal artificial cardiac pacemaker.

enced by photons.¹ The only exception is any light therapy device that also uses electrical stimulation—such as the Laser-Stim™ from Multi Radiance Medical.

Pregnancy

Pregnancy is an alleged contraindication largely because extreme caution has historically been exercised with any modality during pregnancy—especially during the first trimester. It would be prudent to avoid large doses over the pregnant uterus. However, there is no evidence to support the idea of there being any risk in treating distant regions of the body relative to the uterus.²

While Avila observed cell damage in chicken embryos after irradiation with a HeNe laser through an opening in the egg, it is important to keep in mind that the dosage represented a very high dose of laser irradiation for the size and weight of the chicken egg compared with a human fetus inside a pregnant abdomen of an adult female. Nevertheless, it would be wise to note that if any complication occurred subsequent to the use of a therapeutic laser, it would automatically be suspect and leave the clinician with the burden of proof.³

Epileptic Seizures

It is known that pulsing visible red light in the 5–10 Hz range can trigger epileptic seizures. Many light therapy devices utilize flashing visible light so it should be used with extreme caution in epileptics. There is nothing in the scientific literature on the subject of pulsing *invisible* light

therapy such as infrared—except for one study by Simunovic. He observed a patient that could only tolerate frequencies below 800 Hz with a GaAs laser.⁴

Thyroid Gland

The thyroid gland is considered to be a delicate structure. It may be prudent to avoid treating over the thyroid with therapeutic laser. Rat studies have demonstrated the development of thyroid disorders in rats treated with large doses of light radiation.

Hernandez found that GaAs laser therapy reduced mRNA levels of thyroglobulin, changes in the cytoskeleton of thyroid cells and a reduction in thyroid hormone plasma levels. This was associated with an increase in thyroid-stimulating hormone (TSH).⁵

Mikhailov performed an interesting study in which he utilized an 890 nm infrared laser in treating 42 patients with autoimmune thyroiditis. Each patient received 10 treatments at 2.4J/cm². The thymus projection, vascular junction, and thyroid itself were irradiated. A control group of similar size was given 100mg of L-thyroxin. The clinical effect in all laser-treated patients was a decreased feeling of squeezing in the field of the thyroid, as well as a decrease in facial edema. The thyroid gland became palpably soft and decreased in size as observed on ultrasound. The number of winter colds decreased. The immunoregulatory index (Th/Is) normalized decreasing from 7.5 to 4.2%. These effects were still observable in 78% of the patients after four months.⁶

Children

There is concern over the treatment of children with therapeutic laser, especially over bone growth plates. Cheetham irradiated healthy growth plates in young rats. One knee of each animal in the experimental group was irradiated three times/week at 5J/cm². The animals were examined histologically after 6 to 12 treatments. There were no observable differences between the treated group and the control group.⁷

Renstrom successfully treated 30 children with Osgood Schlatter disease (aged 11 to 15). Their knees and lower legs were treated with a 60 mW GaAs laser at 30 Hz and 0.1J/cm² dosage.⁸

Paolini also successfully treated 15 children with Osgood-Schlatter disease with 30 sessions of GaAs laser. These patients were compared with 15 patients who underwent conventional care including surgery. The laser group obtained the best results.⁹

Cancer

Tuner and Hode caution that cancer should not be treated by anyone but an oncologist or other appropriate specialist because of legal regulations, especially in the United States.¹⁰

Laser therapy is commonly considered to be contraindicated in patients undergoing radiation therapy yet recent scientific research paints a more positive view. Tamachi studied the effect of therapeutic laser on cytoxin, 5-flourouracil (5-FU) uptake in various experiments on rats. The rats received 6J/cm² of HeNe laser. They demonstrated a greater uptake of cytoxin, 5-FU than a group that only received cytoxin, 5-FU. The laser irradiation caused blood vessel to dilate allowing more chemotherapy to accumulate in the lesion. This may allow lower doses of anti-cancer drugs.¹¹

Podalskaya has used an HeNe laser on post-radiation reactions and injuries on lips and oral mucosa. This treatment has had better results than any previous treatment approaches.¹²

Soldo studied the effect of GaAs laser irradiation on murine sarcoma. There was an anti-tumor effect on small tumors probably due to increased immune defense.¹³

Funk investigated cytokine production after HeNe laser irradiation to cultures of human PMN cells. The cells were irradiated for various periods at selected inten-

sities then stimulated with various mitogens. When these cells were stimulated after irradiation at 18.9J/cm², significantly higher levels of all cytokines were observed. Cells that received 37.8J/cm² of laser irradiation showed significantly decreased cytokine levels.¹⁴

Diabetes

There has been debate about whether or not diabetes is a contraindication for therapeutic laser. Several studies have shown positive results in diabetic patients.

Radelli performed an experiment on rats utilizing a 904nm GaAs laser. There was no observable affect on insulin-glycemic balance.¹⁵

Schindl carried out thermographic studies on patients with microangiopathic disorders. Blood flow began to improve within 15 minutes after the initiation of laser therapy and persisted for 45 minutes after ending the treatment session. A maximum temperature increase of 2.5 degrees was observed.¹⁶

Kotani compared wound healing rates on three groups of rats: 1) normal rats, 2) rats with experimentally-induced diabetes mellitus, and 3) rats receiving doxorubicin (Adriamycin®). Adriamycin inhibits the proliferation of fibroblasts and is used as an anti-cancer drug. A dose of 5.4J/cm² from a HeNe laser was applied daily. Wound healing was faster in the diabetic group that received laser treatment when compared with the untreated group. The Adriamycin group healed similarly to the non-laser therapy group.¹⁷

Conclusion

There are relatively few contraindications for the use of therapeutic laser and many of them are relative rather than absolute. A high degree of clinical knowledge and careful patient selection when considering laser therapy should minimize the risks. ■

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