Erchonia Medical hijacks Wikipedia

By Jan Tunér

The most used dictionary in the world is Wikipedia. When compared to traditional dictionaries, Wikipedia is more or less equal in reliability. The strength and the weakness of Wikipedia is than anybody can enter and change what is written. Generally this means updating and improving, but sometimes it has less noble motives. The Wikipedia presentation of Low Level Laser Therapy has been changed several times and used to be fairly correct. Recently, however, the Erchonia Medical company has used Wikipedia for advertising their products. In the article quoted below, "Erchonia" is mentioned eleven times! This is not only unethical but also against the rules of Wikipedia. But is part of the company tactics to spread pseudoscience, such as "635 nm 7 mW photons penetrate a human body". Read and make your own judgment! A surprising observation is that references 10, 11 and 18 are not related to LLLT and reference 1 is to the failed analysis of Brosseau. The author seems to have little expertise in the field. The article was copied (and slightly edited for reasons of space) on May 6th 2012.

At the end of the article there is an analysis about LLLT for TMD procedures. The author, seemingly not the Erchonia hijacker, only refers to one paper and makes a negative conclusion (*The paper is actually Emshoff R, Bösch R, Pümpel E, Schöning H, Strobl H. Low-level laser therapy for treatment of temporomandibular joint pain: a double-blind and placebo-controlled trial. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2008 Apr;105(4):452-6.*) No discussion of the other 30+ studies available. The most qualified analysis of the TMD literature has recently been presented by Petrucci et al. (*J Orofac Pain. 2011 Fall;25(4):298-307*). These authors come to the conclusion that there is no evidence for the efficacy of LLLT in TMD procedures, but declare that the reason is the great variety in wavelengths, dosages, treatment protocols, small groups, short evaluation periods. Similar to the evidence base of endodontics, according to SBU – Swedish Council on Health Technology Assessment!

The analysis of the author on Wikipedia comes to a reasonable conclusion, but the analysis in itself is very superficial and not worthy of Wikipedia.

Now it is time to read what is/was on Wikipedia on the day of entering.

Low-level laser therapy (LLLT) *is a medical and veterinary treatment that uses low-level lasers or light-emitting diodes to alter cellular function. LLLT is controversial in mainstream medicine with ongoing research to determine whether there is a demonstrable effect at all. Also disputed are the ideal location of treatment (specifically whether LLLT is more appropriately used over nerves versus joints[1]), dose, wavelength, timing, pulsing and duration.[2] The effects of LLLT appear to be limited to a specified set of wavelengths of laser,[3] and administering LLLT below the dose range does not appear to be effective.[4]*

Despite a lack of consensus over its ideal use, specific test and protocols for LLLT suggest it is effective in relieving short-term pain for rheumatoid arthritis,[1] osteoarthritis,[5] acute and chronic neck pain,[6] tendinopathy,[3][7] and possibly chronic joint disorders.[4] The evidence

for LLLT being useful in the treatment of low back pain,[8][9] dentistry[10][11] and wound healing is equivocal.[12]

History

In 1967 a few years after the first working laser was invented, Endre Mester in Semmelweis University in Budapest, Hungary experimented with the effects of lasers on skin cancer. While applying lasers to the backs of shaven mice, he noticed that the shaved hair grew back more quickly on the treated group than the untreated group.[13]

In 2002, Erchonia Medical became the first company to obtain FDA clearance for a low level laser. This clearance was for treating chronic neck and shoulder pain. [14]. Erchonia has obtained a total of five FDA approvals for its low level lasers: for pre-liposuction fat emulsification and post-surgical pain swelling and bruising – 2004 [15]; for moderate acne - 2005; for post breast augmentation pain - 2008 [16]; for non-invasive body contouring - 2010 [17]). Each of these FDA approvals were obtained pursuant to IRB-approved, randomized double-blind studies with placebo control.

The FDA uses two separate classifications to identify low level lasers that have been FDA-cleared. After Erchonia submitted its clinical studies to the FDA, the FDA created a new classification, NHN, to distinguish "non-heating" lasers manufactured by Erchonia, from the other classification of lasers, ILY, which covers all of the other lasers that generate heat.

Clinical applications

LLLT has primarily been shown useful in the short-term treatment of acute pain caused by rheumatoid arthritis,[1] osteoarthritis,[5] tendinopathy,[3][7] and possibly chronic joint disorders.[4] LLLT has also been useful in the treatment of both acute and chronic neck pain.[6] A Cochrane Library review concluded that low level laser therapy (LLLT) has insufficient evidence for treatment of nonspecific low back pain,[8] a finding echoed in a later review of treatments for chronic low back pain.[9] Though it has been suggested for decades that LLLT could be useful in speeding wound healing, the appropriate parameters (dose, type of laser, materials, wavelength, etc.) have not been identified.[12] Similarly, the use of lasers to treat chronic periodontitis[10] and to speed healing of infections around dental implants[11] is suggested, but there is insufficient evidence to indicate a use superior to traditional practices [18].

***TREATING NECK PAIN WITH LLLT** The noted British medical journal, The Lancet, published an article online entitled: "Efficacy of low-level laser therapy in the management of neck pain: a systematic review and meta-analysis of randomised placebo or active-treatment controlled trials", which was written by Dr Roberta T Chow MBBS, Prof Mark I Johnson PhD, Prof Rodrigo AB Lopes-Martins PhD and Prof Jan M Bjordal. [19]. These researchers performed a systematic review and meta-analysis of randomised controlled trials to assess the efficacy of LLLT in neck pain. The authors' interpretation of their review was: "We show that LLLT reduces pain immediately after treatment in acute neck pain and up to 22 weeks after completion of treatment in patients with chronic neck pain."*

***WOUND HEALING** The American Journal of Cosmetic Surgery published an article describing the efficacy of using an Erchonia laser to treat a large, infected wound, entitled:*

"Treatment of Large Skin Necrosis Following a Modified Avelar Abdominoplasty With the Erchonia EML 635 nm Laser and Platelet-Rich Plasma" written by Quita Lopez, MD. [20]

POST-OPERATIVE WOUND HEALING *The American Journal of Cosmetic Surgery published an article entitled "Low-Level Laser Therapy Effectiveness for Reducing Pain After Breast Augmentation", authored by Robert F. Jackson, MD; Gregory Roche, DO; and Todd Mangione, DO. This article describes the randomized, placebo-controlled studies that Erchonia Medical used to obtain its FDA clearance for reducing pain after breast augmentation in 2008. These authors concluded that "Low-level laser therapy is effective at significantly decreasing postoperative pain and the amount of pain medication needed after breast augmentation at 1 day and 1 week respectfully.* [21]

Stephen Barrett, writing for Quackwatch, concluded there was evidence to support LLLT use for temporary pain relief, but "there's no reason to believe that they will influence the course of any ailment or are more effective than other forms of heat delivery."[22]

Insurance company Cigna has reviewed the evidence for LLLT and concluded that it is still considered an experimental treatment therefore does not provide coverage for it.[23]

Mechanism

It is unclear how LLLT works. LLLT may reduce pain related to inflammation by lowering, in a dose-dependent manner, levels of prostaglandin E2, prostaglandin-endoperoxide synthase 2, interleukin 1-beta, tumor necrosis factor-alpha, the cellular influx of neutrophil granulocytes, oxidative stress, edema, and bleeding. The appropriate dose appears to be between 0.3 and 19 joules per square centimetre.[24] *Another mechanism may be related to stimulation of mitochondrion to increase the production of adenosine triphosphate resulting in an increase in reactive oxygen species, which influences redox signalling, affecting intracellular homeostasis or the proliferation of cells.*[25] *The final enzyme in the production of ATP by the mitochondria, cytochrome c oxidase, does appear to accept energy from laser-level lights, making it a possible candidate for mediating the properties of laser therapy.*[26]

The effects of LLLT appear to be limited to a specified set of wavelengths of laser,[3] *and though more research is required to determine the ideal wavelengths, durations of treatment, dose and location of treatment (specifically whether LLLT is more appropriately used over nerves versus joints).*[1] *Administering LLLT below the dose range does not appear to be effective.*[4] *The factors of wavelength, effective dose, dose-rate effects, beam penetration, the role of coherence, and pulses (peak power and repetition rates) are still poorly understood in the clinical setting. The typical laser average power is in the range of 1-500 mW; some high-peak-power, short-pulse-width devices are in the range of 1-100 W with typical pulse-widths of 200 ns. The typical average beam irradiance then is 10 mW/cm^2 - 5 W/cm^2. The typical wavelength is in the range 600-1000 nm (red to near infrared), but some research has been done and products outside of this range are available.*[2]

Criticisms

Using LLLT for Temporomandibular Joint Pain

The TMJ connects the mandible to the skull. Having a TMJ disorder affects muscles, nerves, tendons, ligaments, bones, connective tissue and the teeth. Symptoms of a TMJ disorder include earaches, headaches, clicking or popping during mouth movements, neck and shoulder pain, etc. As this is a painful and chronic disorder, many people suffering from TMJ disorder look to the medical community to help manage the pain.

LLLT has been suggested to be a noninvasive method of managing TMJ pain. However, the clinical efficacy of this treatment has been receiving mixed reviews from the scientific community. Some researchers have found that compared to the placebo, there are no significant differences. On the other hand, other researchers have found that there is a difference. Rudiger Emshoff from the Innsbruck Medical University in Austria conducted a double-blind study to determine whether LLLT helped with pain management. In this study he randomly assigned 26 subjects to each group- one that received the LLLT treatment and one that received the sham treatment. The researcher conducting these treatments was unaware which subject was receiving which treatment. Results showed that all subjects did report feeling better after the 8 weeks of treatment; however, there was no significant difference between groups.

Other studies that have delved into this topic seem to have inconclusive evidence. Some that claim that LLLT does work did not employ the use of double-blind procedures. Others have claimed that LLLT allows for better TMJ function, but it does not look at pain management. Some studies proving the effectiveness of LLLT were only conducted for three weeks as opposed to a longer period of time, as Emshoff explored in his study. Furthermore, there are no studies that have followed up on subjects once they were no longer partaking in the study. Therefore it is impossible to know whether LLLT has any lasting effects with regard to pain management.

LLLT for TMJ pain management is not clinically proven to work. Further research in this field should be conducted before it is used in mainstream physiotherapy.

References

1. ^ [a](#) [b](#) [c](#) [d](#) *Brosseau, L.; Welch, V.; Wells, G. A.; De Bie, R.; Gam, A.; Harman, K.; Morin, M.; Shea, B. et al (2005). Brosseau, Lucie. ed. "Low level laser therapy (Classes I, II and III) for treating rheumatoid arthritis". Cochrane Database of Systematic Reviews (4): CD002049. doi:10.1002/14651858.CD002049.pub2. PMID 16235295. edit*
2. ^ [a](#) [b](#) *Huang, Y.; Chen, A.; Carroll, J.; Hamblin, M. (2009). "Biphasic Dose Response in Low Level Lightherapy". Dose-Response **7** (4): 358. doi:10.2203/dose-response.09-027.Hamblin. PMC 2790317. PMID 20011653. edit*
3. ^ [a](#) [b](#) [c](#) [d](#) *Bjordal, J. M.; Lopes-Martins, R. A.; Joensen, J. .; Couppe, C. .; Ljunggren, A. E.; Stergioulas, A. .; Johnson, M. I. (2008). "A systematic review with procedural assessments and meta-analysis of Low Level Laser Therapy in lateral elbow tendinopathy (tennis elbow)". BMC Musculoskeletal Disorders **9**: 75. doi:10.1186/1471-2474-9-75. PMC 2442599. PMID 18510742. edit*
4. ^ [a](#) [b](#) [c](#) [d](#) *Bjordal, JM; Couppé, C; Chow, RT; Tunér, J; Ljunggren, EA (2003). "A systematic review of low level laser therapy with location-specific doses for pain from chronic joint disorders". The Australian journal of physiotherapy **49** (2): 107–16. PMID 12775206. edit*

5. ^ a b Jamtvedt, G.; Dahm, K. T.; Christie, A.; Moe, R. H.; Haavardsholm, E.; Holm, I.; Hagen, K. B. (2007). "Physical Therapy Interventions for Patients with Osteoarthritis of the Knee: an Overview of Systematic Reviews". Physical Therapy **88** (1): 123–136. doi:10.2522/ptj.20070043. PMID 17986496. edit
6. ^ a b Chow, R.; Johnson, M.; Lopes-Martins, R.; Bjordal, J. (Nov 2009). "Efficacy of low-level laser therapy in the management of neck pain: a systematic review and meta-analysis of randomised placebo or active-treatment controlled trials.". Lancet **374** (9705): 1897–1908. doi:10.1016/S0140-6736(09)61522-1. PMID 19913903. edit
7. ^ a b Tumilty, S. .; Munn, J. .; McDonough, S. .; Hurley, D. A.; Basford, J. R.; Baxter, G. D. (2010). "Low Level Laser Treatment of Tendinopathy: A Systematic Review with Meta-analysis". Photomedicine and Laser Surgery **28** (1): 3. doi:10.1089/pho.2008.2470. PMID 19708800. edit
8. ^ a b Yousefi-Nooraie, R.; Schonstein, E.; Heidari, K.; Rashidian, A.; Pennick, V.; Akbari-Kamrani, M.; Irani, S.; Shakiba, B. et al (2008). Yousefi-Nooraie, Reza. ed. "Low level laser therapy for nonspecific low-back pain". Cochrane database of systematic reviews (Online) (2): CD005107. doi:10.1002/14651858.CD005107.pub4. PMID 18425909. edit
9. ^ a b Middelkoop, M.; Rubinstein, S. M.; Kuijpers, T.; Verhagen, A. P.; Ostelo, R.; Koes, B. W.; Tulder, M. W. (2010). "A systematic review on the effectiveness of physical and rehabilitation interventions for chronic non-specific low back pain". European Spine Journal **20** (1): 19–39. doi:10.1007/s00586-010-1518-3. PMC 3036018. PMID 20640863. edit
10. ^ a b Cobb, C. M. (2006). "Lasers in Periodontics: A Review of the Literature". Journal of Periodontology **77** (4): 545–564. doi:10.1902/jop.2006.050417. PMID 16584335. edit
11. ^ a b Sculean, A.; Schwarz, F.; Becker, J. (2005). "Anti-infective therapy with an Er:YAG laser: influence on peri-implant healing". Expert Review of Medical Devices **2** (3): 267. doi:10.1586/17434440.2.3.267. PMID 16288590. edit
12. ^ a b Da Silva, J. P.; Da Silva, M. A.; Almeida, A. P. F.; Junior, I. L.; Matos, A. P. (2010). "Laser Therapy in the Tissue Repair Process: A Literature Review". Photomedicine and Laser Surgery **28** (1): 17. doi:10.1089/pho.2008.2372. PMID 19764898. edit
13. ^ Mester, E.; Szende, B., and Tota, J.G. (1967). "Effect of laser on hair growth of mice". Kiserl Orvostud **19**: 628–631.
14. ^ http://www.erchonia.com/sites/default/files/k012580_0.pdf
15. ^ (http://www.erchonia.com/files/uploads/1/file/K041139_EML.pdf)
16. ^ (http://www.erchonia.com/sites/default/files/K072206.pdf)
17. ^ (http://www.erchonia.com/files/uploads/1/file/K08209%20Non-Invasive%20Body%20Contouring%20(Correction%20from%20FDA).pdf
18. ^ Karlsson, M. R.; Diogo Löfgren, C. I.; Jansson, H. M. (2008). "The Effect of Laser Therapy as an Adjunct to Non-Surgical Periodontal Treatment in Subjects with Chronic Periodontitis: A Systematic Review". Journal of Periodontology **79** (11): 2021–2028. doi:10.1902/jop.2008.080197. PMID 18980508. edit
19. ^ . The Lancet, Volume 374, Issue 9705, Pages 1897 - 1908, 5 December 2009 doi:10.1016/S0140-6736(09)61522-1
20. ^ American Journal of Cosmetic Surgery (Vol. 26, No. 1, 2009)
21. ^ American Journal of Cosmetic Surgery, (Vol. 26, No. 3, 2009)
22. ^ Barrett, S (2009-07-17). "A Skeptical Look at Low Level Laser Therapy". Quackwatch. Retrieved 2010-07-23.

23. ^ *"Cigna Medical Coverage Policy - Subject: Low Level Laser Therapy"* (pdf). *Cigna*. 2010-07-15. Retrieved 2010-08-06.
24. ^ *Bjordal, J. M.; Johnson, M. I.; Iversen, V.; Aimbire, F.; Lopes-Martins, R. A. B. (2006). "Low-Level Laser Therapy in Acute Pain: A Systematic Review of Possible Mechanisms of Action and Clinical Effects in Randomized Placebo-Controlled Trials". Photomedicine and Laser Surgery* ***24*** *(2): 158. doi:10.1089/pho.2006.24.158. PMID 16706694. edit*
25. ^ *Tafur, J. .; Mills, P. J. (2008). "Low-Intensity Light Therapy: Exploring the Role of Redox Mechanisms". Photomedicine and Laser Surgery* ***26*** *(4): 323. doi:10.1089/pho.2007.2184. PMC 2996814. PMID 18665762. edit*
26. ^ *Karu, T. I. (2008). "Mitochondrial Signaling in Mammalian Cells Activated by Red and Near-IR Radiation". Photochemistry and Photobiology* ***84*** *(5): 1091–1099.*