Effectiveness of low level laser therapy in treating various conditions

A rapid review

By

WorkSafeBC Evidence-Based Practice Group

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Effectiveness of low level laser therapy in treating various conditions

Background

Recently, the Evidence-Based Practice Group (EBPG) received a query regarding the effectiveness of chiropractic laser treatment. Following a search employing Google (http://www.google.ca/search?sourceid=navclient&ie=UTF-8&rlz=1T4ADBS_enCA284CA284&q=laser+chiropractic+treatment+british+columbia) and examination of several websites based in British Columbia, the EBPG found that the laser treatment offered by these chiropractic offices involves the application of low level laser (referred to by some practices as cold laser). Low level laser therapy (LLLT) is offered by various chiropractic offices to treat many conditions including:

- athletic injuries
- lower back pain
- knee and foot pain
- shoulder injuries
- carpal tunnel syndrome
- arthritis and muscle spasms
- relief of muscle and joint pain
- skin infections including cold sores, warts, and verruca
- relief of stiffness, promoting muscle relaxation
- wound treatment including ulcers, pressure sores, and burns
- soft tissue injuries including sprains and strains, tendonitis, and haematoma
- joint disorders including arthritis and tenosynovitis
- chronic pain including trigeminal neuralgia as well as chronic neck and back pain

Given the many conditions for which treatment by LLLT is being promoted, the EBPG conducted a rapid systematic review to investigate the effectiveness of LLLT on treating conditions as published in the literature.
Methods

- Systematic literature searches were performed on November 1, 2008. These searches were done on commercial databases, including the Cochrane Database of Systematic Reviews, ACP Journal Club, the York University (UK) Database of Abstracts of Reviews of Effects, the Cochrane Controlled Trial Registry, the York University (UK) based Health Technology Assessment database, the York University (UK) based NHS Economic Evaluation database, Ovid MEDLINE In-Process & Other Non-Indexed Citations, Ovid MEDLINE, and Ovid MEDLINE Daily Update. These databases are available through the OvidSP interface.
- The searches employed the simple keywords of “low level laser therapy OR low level laser treatment”.
- The searches were limited to studies conducted in human subjects as well as to studies published in the English language (or where at least the abstract was in English).
- These searches yielded 38 published articles. Four review articles, one of which was a Cochrane review, were identified. Of these 38 articles, 24 were thought to be relevant and were retrieved in full for further appraisal.

Results

Our search identified the application of LLLT in treating various conditions including chronic leg ulcers, diabetic foot ulcers, venous ulceration, minor post surgical wounds, plantar fasciitis, delayed muscle soreness, lateral epicondylitis, low back pain, age-related macular degeneration, pain due to diabetic polyneuropathy, pain in temporo-mandibular disorder, benign fibrotic lumps in the breast post reduction mammoplasty, recurrent herpes labialis, rheumatoid arthritis, and plantar calcaneal enthesophytosis.

1. Review articles
   Of the four review articles, three were expert reviews (level of evidence 5 – see Appendix 1) on the various applications of LLLT and one was a Cochrane review (level of evidence 1) on the application of LLLT in treating plantar fasciitis. All of these reviews concluded that even though LLLT may be safe, its effectiveness in treating various disorders remains to be established. Crawford and Thomson explicitly concluded that there was no evidence on the effectiveness of LLLT in treating plantar fasciitis. It should be noted that Crawford and Thomson included the only randomized controlled trial (RCT) study available on the application of LLLT in treating plantar, by Basford et al.

2. Primary studies
   - Case series/reports (level of evidence 4)
     - In small case series/reports, LLLT has been applied in treating chronic leg ulcers, age-related macular degeneration, diabetic foot ulcers, venous ulceration, and benign fibrotic lumps in the breast post reduction mammoplasty.
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With the exception of the application of LLLT in treating age-related macular degeneration, these studies showed positive outcomes on the application of LLLT in treating chronic leg ulcers, diabetic foot ulcers, venous ulceration, and benign fibrotic lumps in the breast post reduction mammoplasty. However, it should be strongly noted that these were either case reports or small case series (two cases) that have not been repeated by other studies. In the case of venous leg ulcers, a subsequent controlled trial failed to provide evidence of its effectiveness.

Randomized/controlled trials (level of evidence 1)

In randomized/controlled trials, LLLT did not show any evidence of its effectiveness in delaying the onset of muscle soreness, or in treating plantar fasciitis, lateral epicondylitis, pain due to diabetic polyneuropathy, venous ulceration, minor post surgical wounds, pain due to temporo-mandibular disorder, or rheumatoid arthritis. It is likely that these flaws affected the results/conclusions presented in these studies.

Summary/conclusion

In the last 15 years, LLLT has been applied in treating various conditions including chronic leg ulcers, diabetic foot ulcers, venous ulceration, minor post surgical wounds, plantar fasciitis, delayed muscle soreness, lateral epicondylitis, low back pain, age related macular degeneration, pain due to diabetic polyneuropathy, pain in temporo-mandibular disorders, benign fibrotic lumps in the breast post reduction mammoplasty, recurrent herpes labialis, rheumatoid arthritis, and plantar calcaneal enthesophytosis.

At present, there is no evidence of the effectiveness of LLLT in delaying the onset of muscle soreness, or in treating plantar fasciitis, lateral epicondylitis, low back pain, recurrent herpes labialis, plantar calcaneal enthesophytosis, pain due to diabetic polyneuropathy, venous ulceration, minor post surgical wounds, pain due to temporo-mandibular disorder, or rheumatoid arthritis.

There is very low level evidence (case report or small case series) on its effectiveness in treating chronic leg ulcers, diabetic foot ulcers, and benign fibrotic lumps in the breast post reduction mammoplasty.
References


Appendix 1

WorkSafeBC - Evidence-Based Practice Group Levels of Evidence (adapted from 1,2,3,4)

<table>
<thead>
<tr>
<th></th>
<th>Evidence from at least 1 properly randomized controlled trial (RCT) or systematic review of RCTs.</th>
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<tbody>
<tr>
<td>2</td>
<td>Evidence from well-designed controlled trials without randomization or systematic reviews of observational studies.</td>
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<tr>
<td>3</td>
<td>Evidence from well-designed cohort or case-control analytic studies, preferably from more than 1 centre or research group.</td>
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<tr>
<td>4</td>
<td>Evidence from comparisons between times or places with or without the intervention. Dramatic results in uncontrolled experiments could also be included here.</td>
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<tr>
<td>5</td>
<td>Opinions of respected authorities, based on clinical experience, descriptive studies or reports of expert committees.</td>
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References