

Lasers in tissue repair: improving quality of life

Although most injuries heal rapidly, others, particularly chronic skin wounds, are notoriously difficult to heal, even with good management. Low level laser therapy (LLLT) and other forms of photobiomodulation can accelerate the healing of such injuries. Mary Dyson explains how ...



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According to Tuner and Hode "Laser therapy for wounds is ideal, since it promotes healing and reduces pain at the same time".¹ In the UK lasers are used mainly by physiotherapists for treating closed soft tissue injuries to, for example, tendons and ligaments. In the interests of patients with skin wounds, the modality should be more widely available. Its routine use could improve the quality of life for millions of people with chronic wounds with massive financial savings to healthcare providers.

Low level laser therapy (LLLT)

LLLT is a type of photobiomodulation – the use of photons to modulate biological activity.² The photons, which are produced by lasers, although light emitting diodes are sometimes used, can stimulate the healing of chronic wounds and of acute wounds if these are healing slowly.^{3,4}

To produce an effect, the photons must be absorbed. Different substances absorb light of different wavelengths, and the cells of injured skin are more sensitive than those of intact tissue.⁵ It is therefore possible to target specific cell types. Once cells have absorbed the photons a cascade of biochemical events occurs, whose ultimate result is accelerated wound healing.

Modern LLLT devices are patient friendly and easy to operate, and many are portable. As with all laser devices, both operator and patient should wear eye protection when the device is in use.

References

1. Tuner J Hode L. Medical indications: wound healing. In: Laser therapy: clinical practice and scientific background. Grangesberg: Prima Books; 2002. p.189-96.
2. Dyson M, Agaiby A, Ghali L. Lasers Med Sci 2002;17(4):A22.
3. Mester E, Mester AF, Mester A. Lasers Surg Med 1985;5:31-9.
4. Dyson M, Young SR. Lasers Med Sci



Figure 1
A lesion on the back of a leg
being treated with a cluster probe

How to apply LLLT to a wound

LLLT can be applied to an open wound by use of a probe. The probe can either be placed in contact with the dressing or held just above it. Mester et al recommended an energy density of 4J/cm².³ In addition to treating the wound bed, Baxter recommends treating the skin around the wound with a single probe at points about 1–2cm from the wound margin and about 2–3cm apart.⁶ Tuner and Hode recommend treating the open wound with a dosage of 0.5J/cm² and the skin next to the wound with 3–4J/cm².¹ Figure 1 shows a lesion on the back of the leg being treated with a cluster probe.

Mester et al surveyed the LLLT treatment of over 1,000 patients with chronic ulcers; they showed 50–100% healing, variation being related to the type of lesion and the clinical condition of the patient.³ It has been suggested that the induction of acute inflammation in the chronic wounds by, for example, debridement, should precede treatment with LLLT.^{7,8}

The healing of acute wounds can only be stimulated by LLLT if they are healing suboptimally. In such wounds granulation tissue production can be stimulated as can wound contraction.⁹

Conclusion

LLLT can help injuries heal. Acute inflammation is resolved more rapidly and the proliferative phase of healing begins earlier. Nurses who treat wounds should have access to LLLT equipment. It would be a cost-effective method of improving the quality of life of many patients. ♦

- 1986;1:125-30.
5. El Sayed SO, Dyson M. Lasers Surg Med 1990;10:559-68.
6. Baxter D. Low intensity laser therapy. In: Kitchen S, Bazin S, editors. Clayton's electrotherapy. London: WB Saunders; 1996. p.197-217.
7. Dyson M, Lyder C. In: Morison MJ, editor. The prevention and treatment of

pressure ulcers. Edinburgh: Mosby; 2001. p.177-93.

8. Bolton PA, Young SR, Dyson M. Laser Therapy 1990;2:101-6.

9. Young SR, Dyson M. In: Macleod DAD, Maughan C, Williams CR, Sharo JCM, Nutton R, editors. Intermittent high intensity exercise. London: Chapman and Hall; 1993. p.321-8.