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Low-level laser therapy for fat layer reduction: a comprehensive review

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Abstract

Background and objective: Low-level laser (light) therapy (LLLT) is a noninvasive, nonthermal approach to disorders requiring reduction of pain and inflammation and stimulation of healing and tissue regeneration. Within the last decade, LLLT started being investigated as an adjuvant to liposuction, for noninvasive body contouring, reduction of cellulite, and improvement of blood lipid profile. LLLT may also aid autologous fat transfer procedures by enhancing the viability of adipocytes. However the underlying mechanism of actions for such effects still seems to be unclear. It is important, therefore, to understand the potential efficacy and proposed mechanism of actions of this new procedure for fat reduction.

Materials and methods: A review of the literature associated with applications of LLLT related to fat layer reduction was performed to evaluate the findings from pre-clinical and clinical studies with respect to the mechanism of action, efficacy, and safety.

Results: The studies as of today suggest that LLLT has a potential to be used in fat and cellulite reduction as well as in improvement of blood lipid profile without any significant side effects. One of the main proposed mechanism of actions is based upon production of transient pores in adipocytes, allowing lipids to leak out. Another is through activation of the complement cascade which could cause induction of adipocyte apoptosis and subsequent release of lipids.

Conclusion: Although the present studies have demonstrated safety and efficacy of LLLT in fat layer reduction, studies demonstrating the efficacy of LLLT as a stand-alone procedure are still inadequate. Moreover, further studies are necessary to identify the mechanism of action.

Keywords: LLLT; body contouring; cellulite; cholesterol; fat; lipoplasty; liposuction.

Figures

Fig. 1 Illustration of liposuction with a...

Fig. 2 Possible mechanism of action of...

Fig. 3 Examples of LLLT devices. This...

Fig. 4 Scanning electron microscopy (SEM) images...

Fig. 5 Scanning electron microscopy (SEM) images...

Fig. 6 A schematic illustration of lipolysis...

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