

3D Geometric Models Improve Safety and Efficacy of Laser Assisted Liposuction: A Prospective Study

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INTRODUCTION: With the available information, there are difficulties to establishing the appropriate dose of laser energy to obtain predictable results in laser-assisted liposuction.¹⁻³ The purpose of this study is to evaluate the safety and efficacy of 980 nm diode laser, by using geometrical formulas. These formulas allow a precise quantification of tissue volume, and as a consequence, an estimation of the required laser dose.

MATERIALS AND METHODS: This prospective study was conducted to evaluate 62 consecutive patients who underwent 980-nm diode laser-assisted liposuction (LAL) between November 2011 and November 2014. The average length of follow-up was 20 months. Four geometric patterns were used to determine the volume of fat before laser application. Ultrasonography was used to determine fat depth. Biopsies were conducted to determine immediate laser tissue reaction relative to laser dose. The aesthetic results and complications were recorded. Pearson's correlation coefficient was used to determine the relationship between the applied energy and tissue volume.

RESULTS: 349 anatomic regions were treated with 980-nm LAL. The applied energy was relative to the volume in each area ($R=0.8786$). 8 to 14 J / cm³ were the needed dose to produce effective hemostasis, and minimal lipolysis. The results were very satisfactory in most cases. Biopsy results revealed lipolysis, ballooning, membrane rupture, and collagen band breakage; these changes varied with the radiation dose. The complications were only edema and transient bruising.

CONCLUSION: The use of 3D geometrical models improved safety and efficacy of laser-assisted liposuction by permitting accurate determination of the tissue volume.

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