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Multifrequency low-level laser-assisted lipolysis outcomes. A dataset from 101 patients

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ABSTRACT

Obesity is a chronic and complex syndrome resulting from the interactions of genetic, environmental, metabolic, and psychological factors. This dataset collected clinical information from 101 patients with obesity who had undergone large-volume laser-assisted liposuction. Demographic, personal, and family history of disease were recorded, and weight and height were determined and subsequently used to calculate body mass index, % of total weight loss (%TWL), and % of excess body mass index loss (% EBMIL). Short-term incidence (<30 days) in post-operative complications was assessed according to the Clavien-Dindo System. The main outcomes analysed were the changes in body weight-related variables before and after the first three post-operative months and the incidence of early surgical complications. Due to the limited availability of structured, open-access datasets with information on traditional and laser-assisted lipolysis weight outcomes, this dataset is a valuable resource

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for researchers conducting comparative studies on liposuction procedures.

Specifications Table

Subject	Health and Medical Sciences
Specific subject area	Aesthetic Surgery
Type of data	Data were collected from an electronic medical record (EMR) during the clinical evaluation of the participants. An English original, unprocessed, structured raw tabular data in a MS Excel file is available in Harvard Dataverse.
Data collection	Data was collected between January 2019 and June 2021 during four evaluation times (General, Surgeon, Anaesthesiologist and Follow-up) consultations.In this regard, data were distributed in four domains: 1. General Patient's information 2. Basic anthropometric variables 3. Surgical complications record 4. Weight-related outcome variables 4.1. Initial Body mass index (BMI) of the cohort 4.2. Change in BMI (ΔBMI): ΔBMI = (Initial BMI) – (Postop BMI) 4.3. Percent of total weight loss (%TWL): %TWL = [(InitialWeight)-(PostopWeight)]/[(Initial Weight)] x 100. 4.4. Percent excess BMI loss or Percentage Excess of Weight Loss (%EBMIL or %EWL): %EBMIL = [ΔBMI/(InitialBMI – 25)] x 100. 4.5. The cumulative ΔBMI for each month and the monthly BMI reduction were also calculated.
Data source location	This dataset collects clinical information and outcomes from 101 obese patients who underwent large-volume multifrequency laser-assisted lipolysis in Clinica de Obesidad y Envejecimiento, Bogotá, Colombia.
Data accessibility	**Cubillos, G., Vasquez, N., Ortegón Pulido, A. M., & Bermúdez, V. (n.d.). Lipo-laser dataset in 101 patients (V2 ed.). Harvard Dataverse.** https://doi.org/10.7910/DVN/2E47FI Repository name: Harvard Dataverse Data identification number: https://doi.org/10.7910/DVN/2E47FI Direct URL to data: https://dataverse.harvard.edu/dataset.xhtml?persistentId=doi:10.7910/DVN/2E47FI
Related research article	Cubillos G, Pulido AM, Vásquez N, Bermúdez V. Large-volume lipolysis assisted by low-level multifrequency laser in obesity: Short-term weight trajectories and post-operative complications. Gaceta Médica de Caracas. 2024 Mar 9;132(1). DOI: 10.47307/GMC.2024.132.1.10

1. Value of the Data

- This dataset aims to study the outcomes of a new Multifrequency Low-level Laser-Assisted Lipolysis technique in patients with obesity. This new procedure's importance relies on traditional liposuction, which has not been considered a real alternative to bariatric surgery in obesity management because, in the past, traditional liposuction could not remove a sufficiently large fat volume.
- To the best of our knowledge, this is the first study exploring the outcomes of high-volume fat extraction with multifrequency low-level laser-assisted lipolysis in a large cohort of patients with obesity, quantifying standardised weight-related measurements during three months and low early surgical complication rates by Clavien-Dindo system.
- Since there are no structured datasets related to Low-level Multifrequency laser-assisted lipolysis nor traditional liposuction outcomes, researchers may benefit from the description,

methodology, and clinical data, helping to develop future comparative studies, systematic reviews, and meta-analyses.
- The comprehensive nature of this database allows researchers to conduct rigorous comparisons of their findings with those obtained from more traditional methods. This resource can facilitate the development of novel techniques and advance the field by providing a standardised framework for data analysis.
- Researchers in aesthetics surgery could further integrate this specific data into a bigger dataset to expand the knowledge of lase lipolysis as a new tool in weight management.

2. Background

Obesity is a chronic, progressive, and complex management disease [1], characterised by a global increase in body fat deposits by a complex genetic, environmental, metabolic, psychological, and endocrinological factor interaction, leading to the expression of a unique obese phenotype, which is known as classical polygenic obesity [2]. Currently, epidemiological, clinical, and experimental evidence strongly supports that obesity is a risk factor for chronic disease development, including metabolic syndrome, type 2 diabetes mellitus, hypertension, dyslipidemia, cardiovascular diseases, respiratory diseases, osteoarthritis, psychologic disorders, and certain types of cancer [3,4].

In the past four decades, obesity rates have risen dramatically in Westernised lifestyle countries, posing a major global public health threat due to its impact on morbidity, mortality, and national healthcare systems [5]. According to the most recent regional and national prevalence estimates presented in the World Obesity Atlas report [6], one in four individuals (almost 1.9 billion) are projected to be obese in 2035, and more than half of the global population (51 %, equivalent to over 4 billion people) will be overweight or obese. If current trends persist, the worldwide economic impact of weight excess could reach $4.32 trillion annually, equivalent to 3 % of the Global Gross Domestic Product (GDP) [6].

The medical treatment of this condition is complex and often unsuccessful, as lifestyle and pharmacologic interventions alone have proven ineffective in achieving long-term weight loss in most patients [7,8]. As a result, surgical procedures such as bariatric surgery, large-volume lipolysis, and giant-volume liposuction have become important choices for morbid obesity treatment and obesity with morphofunctional skin alterations [9,10].

3. Data Description

This dataset collects clinical information and outcomes from 101 patients who underwent large-volume multifrequency laser-assisted lipolysis [11]. Two publications based on this dataset have been published [9,10], and the data are organised in four different variable domains:

3.1. General patient's information

The first four columns contain general information obtained directly by asking each patient during the medical interview. The first column represents the patient's ID number, and the second column collects the patient's age. The surgery date (day, month, year) and sex are in columns 3 and 4, representing age (in years), respectively. Personal history of diseases is depicted in columns 5 to 8 Column as dichotomous or nominal list: Hypertension (No/Yes); Type 2 Diabetes (No/Yes); Hypothyroidism (No/Yes) and Others (nominal list).

3.2. Basic anthropometric variables

Columns 9 to 24 collect ponderal-related variables obtained during both the initial physical examination and the subsequent three-month examinations. Initial Weight (Column 9) was measured by a calibrated digital scale InBody 270 (InBody, Seoul, South Korea) with the patient barefoot and wearing light clothing. Weight was expressed in kilograms and rounded to one decimal point. Weight was assessed in columns 15 (Weight 1st month), column 18 (Weight 2nd month) and 21 (Weight 3rd month), representing the weight measures during the three-month evaluation window. Height (Column 10) was expressed in metres with two decimal points and measured by a stadiometer (Seca 274, Hamburg, Germany) with the participants standing. Body mass index at baseline (Baseline BMI, Column 11) was calculated using Quetelet's equation weight/(height)2. The same calculation was made in columns 16 (BMI 1st month), 19 (BMI 2nd month) and 22 (BMI 3rd month), which represent the BMI measures during the three-month evaluation window.

Even though there is no universally 'ideal' weight for humans, for this study, an optimal weight (Ideal Weight, Column 12) was calculated according to age and sex using the following equations: Women $<$ 40 yo = (Height)2 $\times$ 21; Women $\geq$ 40 yo = (Height)2 $\times$ 23; Men $<$ 40 yo = (Height)2 $\times$ 21; Men $\geq$ 40 yo = (Height)2 $\times$ 25. In column 12, the World Health Organization BMI ponderal classification was collected (Baseline obesity WHO, column 14) as underweight below 18.50 kg/m2, normal weight between 18.50 and 24.99 kg/m2, overweight between 25 and 29.99 kg/m2, obese class I (Obesity I) between 30 and 34.99 kg/m2, obese class II (Obesity II) between 35 and 39.99 kg/m2, and obese class III (Obesity III) equal and beyond 40 kg/m2. The same process was made in columns 17 (Obesity WHO 1), 20 (Obesity WHO 2) and 23 (Obesity WHO 3), which represent the WHO ponderal classification during the three-month evaluation window. Previous weight loss is a qualitative dichotomous variable with two levels (Yes/no) (Column 11). Weight loss in 3 months (Column 24) is the result of baseline weight minus weight at the third-month calculation, and Baseline weight excess (Column 25) is the result of Baseline weight minus the ideal weight.

3.3. Surgical complications record

Post-operative complications were defined as any deviations from the anticipated uneventful recovery course that were not inherent to the surgical procedure, excluding treatment failures. This study employed the Clavien-Dindo Classification System (CDCS) for a standardised and objective assessment of surgical complications [9]. In this regard, column 26 (complications) presents complications frequency in a dichotomous way, Yes or No; Column 27 (Complication grade) presents the complications grade according to the Clavien-Dindo system, while column 28 (Complication type) exhibits the exact complication name and Column 29 (Complication treatment) collects the complications management.

3.4. Weight-related outcome variables

The executive summary of The American Society for Metabolic and Bariatric Surgery (ASMBS) outcome reporting standards recommendation was employed to provide a uniform method of findings report throughout the medical literature [12]. In this regard, the following weight loss metrics were presented: 1. Initial BMI of the cohort; 2. Change in BMI (ΔBMI): ΔBMI = (Initial BMI) – (Postop BMI); 3. Percent of total weight loss (%TWL): %TWL = [(InitialWeight)-(PostopWeight)]/[(Initial Weight)] x 100; 4. Percent excess BMI loss or Percentage Excess of Weight Loss (%EBMIL or %EWL): %EBMIL = [ΔBMI/(InitialBMI – 25)] x 100; 5. The cumulative ΔBMI for each month and the monthly BMI reduction were also calculated.

4. Experimental Design, Materials and Methods

A non-experimental, analytical, prospective, clinical cohort study was conducted on 101 adult subjects of both sexes undergoing high-volume Multifrequency low-level laser-assisted lipolysis who sought care at a tertiary-level institution specialised in obesity management (Clínica de Obesidad y Envejecimiento SAS, Bogotá, Colombia). This study analysed the changes in weight-related variables trajectories during the first three post-operative months and the early complications (within 30 days) by the Clavien-Dindo classification system.

Statistical analysis was performed using SPSS (version 25.0; IBM, Chicago, Illinois), the R statistical computing environment [13], the flextable for R, and ggStatPlot for R [14]. All R statistical packages were executed in RStudio integrated development environment (IDE) [15]. Categorical variables were displayed in tables as absolute and relative frequencies. Proportion comparisons were assessed with Fisher's exact test, and its changes according to time were compared with Friedman's test and the Durbin-Conover post-hoc test for pairwise contrast. Quantitative variables were expressed as means $\pm$ SD or medians, as appropriate, following normality and homoscedasticity verification, and compared using Student's t-tests (for two groups) or one-way ANOVA (for comparisons involving more than two groups) along with the Bonferroni post-hoc test. Welch's t-test or the respective non-parametric tests, such as the Mann-Whitney U test or the Friedman test with the Durbin-Conover post-hoc test, were employed in cases where these assumptions were unmet. A p-value < 0.05 was considered statistically significant.

Limitations

To the best of our knowledge, this is the first study exploring the outcomes of high-volume fat extraction with multifrequency low-level laser-assisted lipolysis in a large cohort of patients with obesity, quantifying standardised weight-related measurements during three months and low early surgical complication rates by Clavien-Dindo system. Our results show that large, mega, and giant-volume laser-assisted lipolysis is an effective and safe technique for weight reduction. BMI, %TWL, and %EBMI. The main constraints of this work are the limited number of patients included in the study, the observational nature of its design and the short follow-up time; thus, the long-term effectiveness of weight reduction and skin tightening is unknown for this technique.

Ethics Statement

The authors assert this article is an original work not published in any other journal. Furthermore, this dataset article is not currently being considered for publication elsewhere. This article is the product of collaborative research and analysis by the authors, and each author has made substantial contributions to the article and shares responsibility for its content. We affirm our agreement with the statements above and declare that this submission adheres to the guidelines outlined in the Data in Brief Guide for Authors and Ethical Statement.

This study was conducted according to Colombian confidentiality and information privacy legal regulations, as outlined in Law 1581 of 2012 and Decree 1377 of 2013. All participants received a comprehensive pre-operative briefing detailing the surgical intervention's nature, purpose, and technical aspects, with a balanced potential benefits, risks, and complications overview with a clear yet technical language to address any questions or concerns in participants. Informed consent was obtained from all participants, in which patients authorised participation and anonymised clinical data for research purposes, ensuring the complete confidentiality of individual information. This study followed the Declaration of Helsinki of 1964 [16] and was approved by the Research Bioethics of Clinica de Obesidad y Envejecimiento SAS, Bogotá, Colombia (Code 2020-0113-RC4, November 20, 2020).

Data Availability

Lipo-laser dataset in 101 patients (Original data) (Harvard Dataverse).

CRediT Author Statement

Gabriel Cubillos-Valencia: Conceptualization, Validation, Investigation, Resources, Writing – original draft, Writing – review & editing, Funding acquisition; **Neidalis Vasquez:** Conceptualization, Validation, Investigation, Writing – original draft, Writing – review & editing; **Andrés-Miguel Ortegón-Pulido:** Validation, Investigation, Writing – original draft; **Diego Rivera-Porras:** Methodology, Validation, Formal analysis, Data curation, Writing – original draft, Writing – review & editing; **Valmore Bermúdez:** Conceptualization, Methodology, Validation, Formal analysis, Resources, Data curation, Writing – review & editing, Funding acquisition.

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Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships which have or could be perceived to have influenced the work reported in this article.

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