Clinical Trial Protocol
Iranian Registry of Clinical Trials

09 Nov 2026

Comparison of the Efficacy and Adverse Effects of Fractional CO_2 Laser and Hyaluronic Acid Mesotherapy for Infraorbital Wrinkles Following Lower Blepharoplasty

Protocol summary

Study aim
This study aims to compare the efficacy and adverse effects of fractional carbon dioxide laser and hyaluronic acid mesotherapy in improving infraorbital wrinkles following lower blepharoplasty.

Design
Interventional clinical trial with two parallel groups, block randomization and single-blind design, planned sample size of 24 participants.

Settings and conduct
The study will be conducted at the dermatology clinic of Razi Hospital, Tehran University of Medical Sciences. Outcome assessors are blinded to group allocation.

Participants/Inclusion and exclusion criteria
Participants aged 30 to 65 years with measurable infraorbital wrinkles and at least one month after lower blepharoplasty; good general health. Exclusion: pregnancy or breastfeeding; allergy to study interventions; similar treatments in the past six months; active dermatologic or autoimmune disease; lack of compliance.

Intervention groups
Group 1: one session of fractional carbon dioxide laser with standard post-treatment care. Group 2: three sessions of hyaluronic acid injections at four-week intervals with standard care.

Main outcome variables
Severity of lower eyelid wrinkles using the standardized Lemperle scale at baseline, one, three and six months after intervention; recording and comparing adverse effects.

General information

Reason for update
Acronym
IRCT registration information

IRCT registration number: **IRCT20250325065152N2**
Registration date: **2025-09-24, 1404/07/02**
Registration timing: **registered_while_recruiting**

Last update: **2025-09-24, 1404/07/02**
Update count: **0**

Registration date
2025-09-24, 1404/07/02

Registrant information

Name
Taha شهبازی
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Iran (Islamic Republic of)
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Recruitment status
Recruitment complete
Funding source

Expected recruitment start date
2025-09-23, 1404/07/01
Expected recruitment end date
2026-09-22, 1405/06/31
Actual recruitment start date
empty
Actual recruitment end date
empty
Trial completion date
empty

Scientific title
Comparison of the Efficacy and Adverse Effects of Fractional CO_2 Laser and Hyaluronic Acid Mesotherapy for Infraorbital Wrinkles Following Lower Blepharoplasty

Public title
Comparison of the Efficacy and Adverse Effects of Fractional CO_2 Laser and Hyaluronic Acid Mesotherapy for Infraorbital Wrinkles Following Lower Blepharoplasty

Purpose
Treatment

Inclusion/Exclusion criteria

Inclusion criteria:
Patients aged 30 to 65 years who have undergone lower blepharoplasty. Presence of visible and measurable wrinkles in the infraorbital area At least one month has passed since the lower blepharoplasty procedure. Good general health status with well-controlled systemic diseases and no active dermatological conditions. Provision of written informed consent acknowledging awareness of the benefits, risks, and potential side effects of the treatment.

Exclusion criteria:
Pregnancy or breastfeeding history of allergy to fractional CO_2 laser or mesotherapy agents Previous injectable, laser, or other skin rejuvenation treatments in the infraorbital area within the past six months; any cosmetic intervention that may influence the outcome assessment. Presence of skin infections, severe acne, or inflammatory skin diseases in the periorbital region; autoimmune disorders or uncontrolled diabetes. Lack of patient compliance with treatment sessions or follow-up visits; psychological or behavioral conditions affecting accurate information sharing or adherence to the study protocol.

Age
From **30 years** old to **65 years** old

Gender
Both

Phase
N/A

Groups that have been masked

- Outcome assessor

Sample size
Target sample size: **24**

Randomization (investigator's opinion)
Randomized

Randomization description
Participants were recruited through convenience sampling from patients attending the dermatology clinic of Razi Hospital, Tehran University of Medical Sciences. Eligible individuals were screened by a dermatologist according to the inclusion and exclusion criteria, and written informed consent was obtained before enrollment. Patient names were recorded sequentially in an Excel file, and allocation into the two intervention groups was performed using block randomization with blocks of four, ensuring that within each block, two patients were assigned to the fractional CO_2 laser group and two to the mesotherapy protocol group. Randomization was conducted through a simple lottery method by the principal investigator: for each block, four slips of paper (two marked as Group 1: Fractional CO_2 Laser, and two marked as Group 2: Mesotherapy Protocol) were placed in a container, and an individual not otherwise involved in the study drew the slips to determine group assignments, thereby maintaining impartial allocation.

Blinding (investigator's opinion)
Single blinded

Blinding description
This study is conducted with a single-blind design, in which only the outcome assessors remain unaware of the treatment group allocation. The patients and treatment providers are informed of the group assignments. To maintain assessor blinding, their access to treatment records or allocation-related information is restricted.

Placebo
Not used

Assignment
Parallel

Other design features

Secondary Ids

empty

Ethics committees

1

Ethics committee

Name of ethics committee
Ethics Committee of the School of Medicine, Tehran University of Medical Sciences

Street address
Room 604, 6th Floor, Central Building of Tehran University of Medical Sciences, Intersection of Quds Street, Keshavarz Boulevard, Tehran

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Tehran

Province
Tehran

Postal code
1461884513

Approval date
2025-04-27, 1404/02/07

Ethics committee reference number
IR.TUMS.MEDICINE.REC.1404.111

Health conditions studied

1

Description of health condition studied
Infraorbital Wrinkles Following Lower Blepharoplasty

ICD-10 code

ICD-10 code description

Primary outcomes

1

Description
The severity of lower eyelid wrinkles will be assessed using the standardized Lemperle Wrinkle Assessment Scale. This scale classifies the severity of each wrinkle

into six grades from zero to five: 0: no wrinkle or completely smooth skin; 1: very superficial wrinkle barely visible at rest; 2: superficial but clearly visible wrinkle without significant depth; 3: moderate wrinkle, clearly visible with moderate depth; 4: deep wrinkle with well-defined edges but without skin overhang; 5: very deep wrinkle with marked skin overhang.

Timepoint

Measurement of the severity of lower eyelid wrinkles will be performed before the intervention (baseline) and then at one month, three months, and six months after the intervention.

Method of measurement

At each visit, standardized digital photographs of the lower eyelids of both eyes will be taken under fixed lighting, distance, and angle conditions. Two trained resident blinded evaluators will independently score these photographs using the standard Lemperle Wrinkle Assessment Scale from zero (no wrinkle) to five (very deep wrinkle), and the mean of the two scores will be recorded as the final value.

Secondary outcomes

empty

Intervention groups

1

Description

Patients in this intervention group will be treated with a Fractional CO_2 Laser device (EdgeONE, 120-µm spot size). Before treatment, the lower eyelid area will be carefully cleansed and standard photographs will be taken; to minimize pain and discomfort, a 5% lidocaine topical anesthetic cream will be applied under occlusion for 30–45 minutes and then completely removed. For ocular protection, either an intraocular metal shield or standard protective goggles will be used. The treatment will be performed using the following parameters: Density 0.5% (approximately 49 dots/cm^2), Pulse Energy 15 mJ, Total Fluence 0.7 J/cm^2, Power 15 W, Stacking Times 1, Shot Interval 0.2 s, and a 15×15 random scan pattern. The entire treatment will be carried out in a single uniform pass, avoiding excessive overlap and maintaining at least a 1–2 mm distance from the lash line to prevent injury. After the laser session, cold compresses will be applied for 10–15 minutes, and a healing ointment plus a topical antibiotic will be prescribed for 2–3 days. From the third day onward, patients will be instructed to use a physical sunscreen and to avoid direct sunlight, saunas, and strenuous activity for two weeks; in the case of itching or prolonged erythema, a short course (3–5 days) of 1% hydrocortisone cream will be recommended. One treatment session will initially be performed, and response and adverse events will be evaluated at follow-up visits. The treatment schedule will run parallel to the second intervention group, with three sessions administered at four-week intervals.

Category

Treatment - Surgery

2

Description

Patients in this group will be treated with injections of non–cross-linked or low–cross-linked hyaluronic acid at a standard concentration. Prior to injection, the area will be carefully cleansed and disinfected, standard photographs will be taken, and if needed, topical anesthetic cream or mild lidocaine anesthesia will be administered. A single entry point will then be created in the lateral sulcus (approximately 1–1.5 cm lateral to the outer canthus) using a 25- or 23-gauge needle. A 27-gauge cannula of appropriate length (38–50 mm) will be introduced through the same entry point, and the product will be injected into the deep dermis and superficial subcutaneous layer over the orbicularis oculi muscle. Injections will be performed using a retrograde linear and micro-aliquot technique, with gentle aspiration before each injection to prevent intravascular placement. The injection volume per session will be 1 mL per side of the lower eyelid (2 mL total for both sides), with sessions repeated every four weeks for a total of three primary sessions. After injection, a very gentle massage will be applied to ensure even distribution, and a cold compress will be used for 10 minutes to minimize bruising and edema. Post-treatment care will include avoiding touching or applying makeup for 24 hours, sleeping with the head elevated on the first night, avoiding alcohol and strenuous activity on the same day, and promptly reporting any severe pain or skin discoloration. Patients will be monitored at follow-up visits for bruising, persistent edema, Tyndall effect, asymmetry, or excessive prominence, and if necessary, hyaluronidase administration will be available according to the center's protocol.

Category

Treatment - Devices

Recruitment centers

1

Recruitment center

Name of recruitment center

Razi hospital

Full name of responsible person

طاها شهبازی

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Vahdat-e-Islami Street – Vahdat-e-Islami Square – Razi Dead End – Razi Specialized Dermatology Hospital

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Sponsors / Funding sources

1

Sponsor
Name of organization / entity
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Full name of responsible person
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Fax
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Email
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Web page address
https://vcr.tums.ac.ir/
Grant name
Grant code / Reference number
Is the source of funding the same sponsor organization/entity?
Yes
Title of funding source
Tehran University of Medical Sciences
Proportion provided by this source
100
Public or private sector
Public
Domestic or foreign origin
Domestic
Category of foreign source of funding
empty
Country of origin
Type of organization providing the funding
Academic

Person responsible for general inquiries

Contact
Name of organization / entity
Tehran University of Medical Sciences
Full name of responsible person
Taha Shahbazi
Position
Resident
Latest degree
Medical doctor
Other areas of specialty/work
Dermatology
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Other areas of specialty/work
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Person responsible for updating data

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Other areas of specialty/work
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Sharing plan

Deidentified Individual Participant Data Set (IPD)

Yes - There is a plan to make this available

Study Protocol

Yes - There is a plan to make this available

Statistical Analysis Plan

Yes - There is a plan to make this available

Informed Consent Form

Yes - There is a plan to make this available

Clinical Study Report

Yes - There is a plan to make this available

Analytic Code

No - There is not a plan to make this available

Data Dictionary

No - There is not a plan to make this available

Title and more details about the data/document

Information on the main outcome will be published.

When the data will become available and for how long

Up to six months after results are published

To whom data/document is available

It will be available to researchers working in academic and scientific institutions as well as people working in industry.

Under which criteria data/document could be used

The applicant must have a letter of introduction from an academic or industrial institution to access the information. The letter of introduction must also clearly state the purpose of accessing the information and the possible outcome of it.

From where data/document is obtainable

The project's general accountability officer will be contacted for information. Information: Dr. Taha Shahbazi Address: Razi Hospital Contact number: 09123485423 Zip code: 1199663911 Email: shahbazi.taha@yahoo.com

What processes are involved for a request to access data/document

First, the applicant must provide a letter of introduction from the university or company to access the information via email. After reviewing the request, the information file will be emailed to them within two weeks.

Comments