Clinical Trial Protocol
Iranian Registry of Clinical Trials

10 Jun 2026

Comparison of Effectiveness of Hydroquinone 4% and Fractional CO2 Laser combination vs. Hydroquinone 4% Monotherapy in women from the age range of 20-50 years with melasma.

Protocol summary

Study aim

To evaluate the efficacy of fractional CO2 laser in combination with topical therapy in melasma treatment.

Design

A paralell group, single-blinded, blocked randomization clinical trial, design of 40 patients, enrolled between February 2015 and march 2016, and followed at three-week intervals and one and three months after the last laser session

Settings and conduct

Each side of the face was randomly allotted to either topical hydroquinone 4% or combination of topical hydroquinone 4% and Fractional CO2 laser. The patients received three sessions of laser therapy at 3-week intervals. They were asked to use hydroquinone 4% on both sides for 3 months after the last laser session during follow-up. The clinical improvement was measured by an impartial blinded physician.

Participants/Inclusion and exclusion criteria

Inclusion criteria: Female,age range of 20-50 years, Fitzpatrick skin types II-V, bilateral melasma Exclusion criteria: history of receiving laser therapy and topical therapeutic agents in the previous three months, Isotretinoin in the past six months, OCP, other bleaching creams, phenytoin, phototoxic and photoallergic drugs, pregnancy and lactating.

Intervention groups

For each patients One cheek is considered as the control (Hydroquinone group) and the other cheek as the experiment (laser and Hydroquinone group).

Main outcome variables

Darkness of hyperpigmentations Homogeneity of hyperpigmentations response to treatment due to the percentage improvement in the lesions patient's satisfaction with the treatment

General information

Reason for update

Acronym

IRCT registration information

IRCT registration number: **IRCT20171222037987N1**
Registration date: **2018-06-30, 1397/04/09**
Registration timing: **retrospective**

Last update: **2018-06-30, 1397/04/09**
Update count: **0**

Registration date

2018-06-30, 1397/04/09

Registrant information

Name

Farahnaz Fatemi Naeini

Name of organization / entity

Country

Iran (Islamic Republic of)

Phone

+98 31 3668 4781

Email address

fatemi@med.mui.ac.ir

Recruitment status

Recruitment complete

Funding source

Expected recruitment start date

2015-02-04, 1393/11/15

Expected recruitment end date

2015-10-06, 1394/07/14

Actual recruitment start date

2015-02-04, 1393/11/15

Actual recruitment end date

2016-03-10, 1394/12/20

Trial completion date

empty

Scientific title
Comparison of Effectiveness of Hydroquinone 4% and Fractional CO2 Laser combination vs. Hydroquinone 4% Monotherapy in women from the age range of 20-50 years with melasma.

Public title
Combination of Hydroquinone and Fractional CO2 Laser vs. Hydroquinone Monotherapy in Melasma Treatment: A Randomized Split-face Clinical Trial

Purpose
Treatment

Inclusion/Exclusion criteria

Inclusion criteria:
Female patients Age range of 20-50 years Fitzpatrick skin types II-V Bilateral melasma on cheeks

Exclusion criteria:
History of receiving laser therapy and topical therapeutic agents in the previous three months History of receiving Isotretinoin in the past six months History of receiving OCP, other bleaching creams, phenytoin, phototoxic and photoallergic drugs Pregnancy Lactating

Age
From **20 years** old to **50 years** old

Gender
Female

Phase
3

Groups that have been masked

- Investigator
- Outcome assessor
- Data analyser

Sample size
Target sample size: **40**
More than 1 sample in each individual
Number of samples in each individual: **2**
for each patient one cheek is considered as the control and the other cheek as the experiment
Actual sample size reached: **37**
More than 1 sample in each individual
Actual sample size in each individual: **2**
for each patient one cheek was considered as the control and the other cheek as the experiment

Randomization (investigator's opinion)
Randomized

Randomization description
For each patient one cheek was considered as the control (Hydroquinone group) and the other cheek as the experiment (laser and Hydroquinone group) according to blocked randomization which was generated by a third independent person who was not involved in the study. Participants were randomized in to group A (right cheek as the experiment) and group B (left cheek as the experiment) within then blocks of four each. Randomly generated treatment allocations were concealed in the forty envelopes which were sequentially numbered and opened only after each patient was consented to enter the trial.

Blinding (investigator's opinion)
Single blinded

Blinding description
the main investigators, data analysors and out come assessors were blinded. Severity of the melasma lesions was assessed objectively by the main investigator who was blinded to the treatment being given on each side and consultant dermatologist who was blinded to the type of treatments applied and aim of the study. Furthermore, response to treatment was evaluated subjectively by the main investigator and another consultant dermatologist who was blinded to the treatment being given on each side and the aim of the study.

Placebo
Not used

Assignment
Parallel

Other design features

Secondary Ids

empty

Ethics committees

1

Ethics committee

Name of ethics committee
Ethics committee of Isfahan University of Medical Sciences

Street address
Isfahan University of Medical sciences, Hezar Jerib Ave

City
Isfehan

Province
Isfehan

Postal code
8174673461

Approval date
2013-01-20, 1391/11/01

Ethics committee reference number
391095

Health conditions studied

1

Description of health condition studied
melasma

ICD-10 code
L81.1

ICD-10 code description
Chloasma

Primary outcomes

1

Description
Severity of the melasma lesions was assessed objectively based on Darkness (D) and Homogeneity (H) using a 7-point scale (0-6).

Timepoint
The darkness and homogeneity scores were obtained in the first visit and the 3 laser sessions at three-week intervals and the follow-up sessions at 1 and 3 months after the last laser session.
Method of measurement
darkness and homogeneity : 7-point scale(compare with the sample) patient's satisfaction with the treatment :visual analogue scale (VAS) by scoring between 0 and 10 response to treatment : physician global assessment

Secondary outcomes

1

Description
patient's satisfaction with the treatment.
Timepoint
3 months after the last laser session.
Method of measurement
visual analogue scale (VAS) by scoring between 0 and 10.

Intervention groups

1

Description
Intervention group: for each patient one side of the face was randomly allotted to topical hydroquinone 4% and Fractional CO2 laser (combination therapy group). Patients received three sessions of laser therapy at 3-week intervals with the Dios instrument. (Laser fluence of 5 J/cm2, Dot cycle of 6 and Pixel pitch of 2).
Category
Treatment - Drugs

2

Description
Control group: for each patient one side of the face was randomly allotted to topical hydroquinone 4% (monotherapy group). Hydroquinone 4% was applied during the study and maintained for 3 months after the last laser session.
Category
Treatment - Drugs

Recruitment centers

1

Recruitment center
Name of recruitment center
Alzahra Hospital
Full name of responsible person
Farahnaz Fatemi Naeini
Street address
Department of Dermatology, Alzahra Hospital , Soffeh Blvd, Isfahan
City
Isfehan
Province
Isfehan
Postal code
8174675731
Phone
+98 31 3620 2087
Email
fatemi@med.mui.ac.ir
Web page address
http://med.mui.ac.ir/?q=post/post

Sponsors / Funding sources

1

Sponsor
Name of organization / entity
Esfahan University of Medical Sciences
Full name of responsible person
Mansour Siavash
Street address
4th building, Isfahan University of Medical Sciences, Hezar Jerib Ave, Isfahan
City
Isfahan
Province
Isfehan
Postal code
7346181746
Phone
+98 31 3792 2252
Email
research@mui.ac.ir
Web page address
http://research.mui.ac.ir/
Grant name
Grant code / Reference number
Is the source of funding the same sponsor organization/entity?
Yes
Title of funding source
Esfahan 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
Esfahan University of Medical Sciences
Full name of responsible person
Farahnaz Fatemi Naeini
Position

Professor

Latest degree

Specialist

Other areas of specialty/work

Dermatology

Street address

Department of Dermatology, Alzahra Hospital, Soffe Blvd, Isfahan

City

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Province

Isfehan

Postal code

8174675731

Phone

+98 31 3620 2087

Email

fatemi@med.mui.ac.ir

Web page address

http://med.mui.ac.ir/?q=post/post

Person responsible for scientific inquiries

Contact

Name of organization / entity

Esfahan University of Medical Sciences

Full name of responsible person

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Position

Professor

Latest degree

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+98 31 3620 2087

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fatemi@med.mui.ac.ir

Person responsible for updating data

Contact

Name of organization / entity

Esfahan University of Medical Sciences

Full name of responsible person

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Position

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Sharing plan

Deidentified Individual Participant Data Set (IPD)

No - There is not a plan to make this available

Justification/reason for indecision/not sharing IPD

No further information

Study Protocol

No - There is not a plan to make this available

Statistical Analysis Plan

No - There is not a plan to make this available

Informed Consent Form

No - There is not a plan to make this available

Clinical Study Report

Undecided - It is not yet known if there will be 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