Clinical Trial Protocol
Iranian Registry of Clinical Trials

10 Jun 2026

The efficacy of low level laser irradiation in reducing pain and accelerating socket healing after undisturbed tooth extraction

Protocol summary

Study aim
The aim of this study is to determine the effect of low level laser therapy (LLLT) on reducing complications following tooth extraction.

Design
randomized clinical trial

Settings and conduct
Tooth extraction is performed in Department of Oral and Maxillofacial Surgery , and the patients are then referred to Laser Department of Mashhad University of Medical Sciences for laser therapy. The participants are randomly assigned to four groups using a random numbers table. Laser therapy is contemplated by an experienced operator. To provide double blind design of the study, neither the participants nor the subject who assesses the outcomes are aware of the group assignment.

Participants/Inclusion and exclusion criteria
Inclusion criteria 1- undergoing lower molar extraction. 2) age range between 18 and 50 years 3) no history of underlying systemic disorders, smoking, pregnancy or breast feeding in females Exclusion criteria 1) the occurrence of dry socket (alveolar osteitis) at follow-up appointments 2) the occurrence of trauma during the extraction process e.g. root fracture, 3) patients who had more than one tooth extraction at the same time.

Intervention groups
This randomized clinical trial consists of 40 subjects who undergo lower molar extraction. The patients are randomly assigned to 4 groups. Group 1 is irradiated with a 660 nm laser (200 mW, 30 seconds to each of the lingual, buccal and occlusal surfaces of the socket, 6 J/area). In group 2, an 810 nm laser will be applied similar to group 1. In group 3, a combination of 660 and 810 nm lasers is used. The patients in group 4 serve as placebo. LLLT is performed at 0.5-1 hour after extraction and 2 days later.

Main outcome variables
The participants are asked to record pain degree using a visual analogue scale (VAS) over 7 days. The amount of wound healing is evaluated on the third and seventh days.

General information

Reason for update

Acronym

IRCT registration information
IRCT registration number: **IRCT20091118002736N2**
Registration date: **2019-09-25, 1398/07/03**
Registration timing: **registered_while_recruiting**

Last update: **2019-09-25, 1398/07/03**
Update count: **0**

Registration date
2019-09-25, 1398/07/03

Registrant information

Name
Farzaneh Ahrari

Name of organization / entity

Country
Iran (Islamic Republic of)

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Recruitment status
Recruitment complete

Funding source

Expected recruitment start date
2019-09-24, 1398/07/02

Expected recruitment end date
2019-10-24, 1398/08/02

Actual recruitment start date
empty

Actual recruitment end date
empty

Trial completion date
empty

Scientific title
The efficacy of low level laser irradiation in reducing pain and accelerating socket healing after undisturbed tooth extraction

Public title
The efficacy of LLLT in reducing complications of tooth extraction

Purpose
Supportive

Inclusion/Exclusion criteria

Inclusion criteria:
no history of underlying systemic disorders, smoking, pregnancy or breast feeding in females no active treatment with antibiotics, steroidal and non-steroidal anti-inflammatory drugs no sign of periodontal problems in the target teeth.

Exclusion criteria:
the occurrence of dry socket (alveolar osteitis) at follow-up appointments the occurrence of trauma during the extraction process patients who had more than one tooth extraction at the same time.

Age
From **18 years** old to **50 years** old

Gender
Both

Phase
N/A

Groups that have been masked

- Participant
- Outcome assessor

Sample size
Target sample size: **10**

Randomization (investigator's opinion)
Randomized

Randomization description
Simple randomization The participants are randomly assigned to four groups using a random numbers table. The details of the allocated groups are recorded on cards contained in sequentially numbered, sealed, and opaque envelopes. These cards are prepared by an independent person who is not involved in the study protocol. Once the patient undergoes tooth extraction and agrees to participate in the trial, the allocation assignment is revealed by opening the envelope by this independent person.

Blinding (investigator's opinion)
Double blinded

Blinding description
To provide double blind design of the study, neither the participants nor the subject who assesses the outcomes are aware of the group assignment. Regarding patient, blinding is so that in the probe is entered the mouth in all patients but the patient is not aware of the wavelength and does not know whether the probe is on or off. Regarding the assessor, the operator who delivers the pain questionnaires to the patient and the specialist who evaluates the degree of healing using photographs are not aware of the group assignment.

Placebo
Used

Assignment
Parallel

Other design features

Secondary Ids

empty

Ethics committees

1

Ethics committee

Name of ethics committee
The protocol of the present study was submitted to the ethical committee of Mashhad University of Me

Street address
Dental research center, School of Dentistry, Vakilabad Blvd, Mashhad, Iran

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Mashhad

Province
Razavi Khorasan

Postal code
9177873476

Approval date
2016-01-13, 1394/10/23

Ethics committee reference number
IR.MUMS.sd.REC.1394.83

Health conditions studied

1

Description of health condition studied
The patients who undergo molar extraction in the lower jaw.

ICD-10 code
K08.8

ICD-10 code description
Other specified disorders of teeth and supporting structures

Primary outcomes

1

Description
Pain degree

Timepoint
at bedtime for 7 days following tooth extraction

Method of measurement
Visual analogue scale (VAS) for pain

2

Description
wound healing score

Timepoint

days 3 and 7 after tooth extraction

Method of measurement

assessing photographs and scoring the degree of socket wound healing using a 10-cm visual analogue scale

Secondary outcomes

empty

Intervention groups

1

Description

Intervention group : 1- irradiation with a 660 nm laser: the patients in group 1 (low level red laser) received irradiation from an indium-gallium-aluminum-phosphide (InGaAlP) low level laser (Thor DD2 Control Unit, Thor, London, UK). The laser emits a wavelength of 660 nm and operates at the output power of 200 mW at approximately 10 mm distance to the target area. The target areas are the lingual, buccal and occlusal surfaces of the extraction socket. The irradiation is performed for 30 seconds to each target area, delivering 6 J of energy with energy density of 4.21 J/cm2 per area. Laser exposure is performed after 30 to 60 minutes of extraction (day 1) and 2 days later (day 3).

Category

Treatment - Other

2

Description

Intervention group 2: The subjects in group 2 (low level infrared laser) are irradiated with a gallium- aluminum-arsenide (GaAlAs) low power laser (Thor DD2 Control Unit). This laser emits a wavelength of 810 nm at the power of 200 mW. The target areas and the duration of irradiation are similar to that in group 1, but the surface area of the probe is different. Therefore, 6 J of energy is delivered to each surface with energy density of 21.4 J/cm2,.

Category

Treatment - Other

3

Description

Intervention group 3: In group 3 (combination laser therapy), a combination of InGaAlP and GaAlAs diode lasers is used with exposure time of 15 seconds each. The energy delivered to the target area by the red or infrared lasers is 3 J with energy density of 2.1 J/cm2 for red wavelength and 10.7 J/cm2 for infrared wavelength.

Category

Treatment - Other

4

Description

Control group: The patients in group 4 (placebo) are considered as the control in whom the treatment is the same as that in group 1 but with no laser radiation.

Category

Treatment - Other

Recruitment centers

1

Recruitment center

Name of recruitment center

Mashhad Dental School

Full name of responsible person

Majid Eshghpour

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Sponsors / Funding sources

1

Sponsor

Name of organization / entity

Mashhad University of Medical Sciences

Full name of responsible person

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Grant name

Grant code / Reference number

940469

Is the source of funding the same sponsor organization/entity?

Yes

Title of funding source

Mashhad 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

Mashhad University of Medical Sciences

Full name of responsible person

Farzaneh Ahrari

Position

Assistant Professor

Latest degree

Specialist

Other areas of specialty/work

Dentistry

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Sharing plan

Deidentified Individual Participant Data Set (IPD)

Undecided - It is not yet known if there will be a plan to make this available

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

No - There is not 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