

The use of lasers in the treatment of gum disease

Submission date 25/03/2020	Recruitment status No longer recruiting	<input type="checkbox"/> Prospectively registered <input type="checkbox"/> Protocol
Registration date 26/03/2020	Overall study status Completed	<input type="checkbox"/> Statistical analysis plan <input checked="" type="checkbox"/> Results
Last Edited 06/04/2021	Condition category Oral Health	<input type="checkbox"/> Individual participant data

Plain English summary of protocol

Background and study aims

Gum disease is a very common condition where the gums become swollen, sore or infected. Typical treatment for periodontal disease is scaling and root planing (SRP). This is a nonsurgical method that includes cleaning the surfaces of teeth and their roots, which may be exposed due to gum recession.

Laser treatment is a tissue-preserving, regenerative, and bone-building procedure. In general dentistry, the dentist uses a laser to access an infected pocket to kill the infected tissue and bacteria. Once the infected tissue is removed and the root is exposed, the calculus is removed with an ultrasonic root cleaner instead of scraping with hand tools. Lastly, laser energy is used to warm the stem cell that contains blood in the pocket, which creates a seal of tissues against the tooth root. Laser treatment ensures that no tissue is subtracted or gum tissue is reduced to a lower level on purpose. It also stimulates stem cells in the tissues to form new connective tissues, bone, and collagen. The body's healing process then regenerates the lost ligaments and bone around the tooth.

The aim of the study was the combined application of Er:YAG and Nd:YAG laser irradiation to improve periodontal probing depths.

Who can participate?

Patients with severe periodontal (gum) disease.

What does the study involve?

The study involves a baseline examination, a laser treatment session and a reassessment after two months.

What are the possible benefits and risks of participating?

A possible benefit might be an improved periodontal condition. With the applied laser settings no side effects are expected.

Where is the study run from?

Medical University of Vienna (Austria)

When is the study starting and how long is it expected to run for?
January 2018 to January 2019

Who is funding the study?
Investigator initiated and funded

Who is the main contact?
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Contact information

Type(s)
Scientific

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Additional identifiers

Clinical Trials Information System (CTIS)
Nil known

ClinicalTrials.gov (NCT)
Nil known

Protocol serial number
MUW-LP-15

Study information

Scientific Title
Neodymium-doped yttrium aluminum garnet (Nd:YAG) laser and erbium-doped yttrium aluminum garnet (Er:YAG) laser in the treatment of periodontal disease

Study objectives
Er:YAG and Nd:YAG laser application as an adjunct to conventional periodontal treatment might result in healthier periodontal conditions

Ethics approval required

Old ethics approval format

Ethics approval(s)

Approved 10/11/2017, Ethics committee of the Medical University of Vienna (Borschkegasse 8b /6, 1090 Vienna, Austria; +43 1 40400 21470; ethik-kom@meduniwien.ac.at), ref: 1747/2017

Study design

Single-blind randomized controlled clinical trial

Primary study design

Interventional

Study type(s)

Treatment

Health condition(s) or problem(s) studied

Periodontal disease

Interventions

The periodontal patients in the test group had a laser intervention. Laser setting for the Nd:YAG laser was 2.5 W with an initiated fiber without water-cooling. Then a 60 seconds irradiation of the Er:YAG laser LightWalker was applied. The laser settings were 40 mJ, 40 Hz. Finally, 30 seconds stabilization of the forming blood clot was accomplished with a Nd:YAG laser 3.5 W.

In the control group all the steps were performed without activating the laser device.

Re-assessment was done eight weeks post-treatment.

A 1:1 randomization was performed. Before the start of the trial a 1:1 randomization list was prepared by flipping of a coin. After inclusion of the patient the allocation of the patient according to the randomization list was revealed to the treating clinician.

Intervention Type

Device

Phase

Phase IV

Drug/device/biological/vaccine name(s)

Er:YAG and Nd:YAG laser

Primary outcome(s)

Periodontal probing depth (mm) measured using dental probe at baseline and two months after the intervention

Key secondary outcome(s)

Clinical attachment level measured using a periodontal probe (periodontal probing depth + clinical recession) at baseline and two months after the intervention

Bleeding on probing measured using dental probe at baseline and two months after the intervention

Completion date

21/01/2019

Eligibility

Key inclusion criteria

Adults with least one site with a probing depth of ≥ 6 mm around eight weeks post-completion of initial supra- and subgingival periodontal debridement

Participant type(s)

Patient

Healthy volunteers allowed

No

Age group

Adult

Sex

All

Total final enrolment

22

Key exclusion criteria

Systemic diseases which could potentially influence outcome of the therapy (e.g. diabetes mellitus, pregnancy, immunosuppression, malignant diseases)

Date of first enrolment

08/01/2018

Date of final enrolment

08/01/2019

Locations

Countries of recruitment

Austria

Study participating centre

Medical University of Vienna

Spitalgasse 23

Vienna

Austria

1090

Sponsor information

Organisation

Medical University of Vienna

ROR

<https://ror.org/05n3x4p02>

Funder(s)

Funder type

Other

Funder Name

Investigator initiated and funded

Results and Publications

Individual participant data (IPD) sharing plan

The current data sharing plans for this study are unknown and will be available at a later date.

IPD sharing plan summary

Data sharing statement to be made available at a later date

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Results article			06/04/2021	Yes	No
Participant information sheet	Participant information sheet	11/11/2025	11/11/2025	No	Yes