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WFLD 2024 SÃO PAULO BRAZIL, NOV 11-13

THE 18th CONGRESS OF THE WORLD FEDERATION FOR LASER DENTISTRY

ABSTRACT BOOK

Promotion

WFLD
The World Federation for Laser Dentistry

Organization

vmcom

WFLD 2024
SÃO PAULO
BRAZIL, NOV 11-13

THE 18th CONGRESS OF THE WORLD
FEDERATION FOR LASER DENTISTRY

BE PART OF THE

EVOLUTION

WFLD 2024
SÃO PAULO
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Sponsored by

Platinum Category

LIGHT INSTRUMENTS
RISE ABOVE TECHNOLOGY

Gold Category

EMS
implantec
MORITA
MMO tecnologia para a saúde
ULTRADENT
Olsen
CLSP DISTRIBUIDORA
CROMATIC
dentoflex.inp sistema de implantes

Platinum Category

EEE DENTAL COMPONENTES

Bronze Category

CURAPROX
Arti-Dente
laser smile
YSSEI
plenum

Institutional Support

cfo CONSELHO FEDERAL DE ODONTOLOGIA
cro SP CONSELHO REGIONAL DE ODONTOLOGIA DE SÃO PAULO
abcd
apcd
ABLOS
ASOCOLSER ASOCIACIÓN COLOMBIANA DE LÁSER EN ODONTOLOGÍA
AAFH American Academy of Facial Harmony
LELO
dentistry journal
SÃO LEOPOLDO MANDIC
IFSC UNIVERSIDADE DE SÃO PAULO Instituto de Física de São Carlos
UNG UNIVERSIDADE
UNINOVE Universidade Nove de Julho
Uni CIEO VIGILADA MINEDUCACIÓN
USP
CENTRO DE CONVENÇÕES REBOUÇAS HCFMUSP

WFLD 2024
SÃO PAULO
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Previous **Hosts:**

WFLD 2024
SÃO PAULO
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WFLD **Board**

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Honorary Chairman: Samir Namour (Belgium)

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ABSTRACT BOOK

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ePoster "Prof. Dr. Jesus Djalma Pécora Award"
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"Prof. Dr. Valdir Gouveia Garcia Award"
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Talita Melo (Uninove)
Valéria Mendes (Ipen-USP)

Table of **Contents**

Welcome to the 18th WFLD Congress

As President of the WFLD, I would like to share my excitement with you as we all eagerly anticipate the 18th WFLD Congress to be held November 11 to 13, 2024, in Sao Paulo, Brazil.

The World Federation for Laser Dentistry, WFLD, is a non-profit organization committed to the advancement and practice of Laser Dentistry. It is the most reputable and established, leading international dental laser organization, supporting the scientific research, clinical application, and education of lasers in dentistry.

The WFLD began as the International Society for Laser Dentistry, ISLD. In 1988, the late Professor Hajime Yamamoto successfully organized the initial International Congress on Lasers in Dentistry in Tokyo, Japan; the first of what would continue as biennial ISLD congresses. In 2006, the ISLD was expanded to create five International Divisions and was renamed the WFLD, with the congresses continuously and successfully being held since.

The WFLD Congress will feature various scientific programs including many Invited Lectures and WEFD Advanced Course by some of the world's most renowned specialists in the field, General Oral and Poster Presentations, Workshops, and much more. These programs will raise the level of scientific research and broaden knowledge in Laser Dentistry, providing profound satisfaction for all participants.

I wish to express our heartfelt gratitude for this stimulating meeting program made possible through the considerable efforts of the congress chairpersons and hosts Professor Aldo Brugnera and Professor Jamil Shibli, as well as the local organizing committee.

In recognition of what it takes to make this "18th WFLD Congress 2024" truly successful, I would also like to extend my profound appreciation to all the speakers and participants who will be attending from around the world.

Akira Aoki, DDS, PhD
President, WFLD
Professor, Photoperiodontics
Department of Periodontology, Graduate School of Medical and Dental Sciences
Institute of Science Tokyo (Science Tokyo)

Dear Colleagues and Participants of WFLD 2024 Brazil,

Light is a physical phenomenon present in nearly all that we do. It is known to be essential for most life forms on Earth, serving as a vital energy source. However, we are only now beginning to harness its full potential. The fascination with light has been documented since ancient times: God said “Let there be light!; and there was light “ (Genesis 1:3).

Organizing the 18th World Congress of Laser Dentistry by the WFLD (World Federation for Lasers in Dentistry) has been challenging and stimulating, filled with uncertainties. Today, our team at WFLD Brazil 2024 is delighted and proud to announce that we have achieved our goal. You will participate in a high-caliber scientific event that promises to be a transformative experience for everyone involved. We extend our heartfelt gratitude to the many speakers who have graciously dedicated their time and effort, traveling from various continents, to contribute to this new era of laser application in Dentistry and Health.

Our objectives were clear: inviting speakers to share the latest research in Light. You will be amazed by the advancements in science over recent years, particularly in using lasers for treating infections through photobiomodulation and PDT, as well as innovative laser diagnostics and pathologies with new treatment parameters. The topics are compelling, grounded in scientific literature, and presented through relevant clinical cases. We have witnessed many innovations in high-power lasers, particularly with the introduction of new surgical diode lasers and third-generation Er lasers. The scientific program, meticulously prepared by Professor Jamil Shibli with great care and up-to-date insights, reflects these advancements. This congress celebrates collaboration between seasoned researchers and emerging young talents making their mark.

This is the essence of WFLD. Those unable to attend WFLD 2024 will miss our country’s largest and most significant laser congress ever held.

We would like to sincerely thank Professor Akira Aoki, President of WFLD, Professor Sami Namour, Honorary Chairman of WFLD 2024 Brazil, and the WFLD board for trusting us and Brazil. WFLD is the largest organization globally dedicated to promoting and scientifically disseminating lasers in dentistry, with a presence across five continents and more than 40 countries.

We also thank VM and their exceptional team for organizing all the details.

We are pleased to learn that the foremost laser companies in the world will be present at the commercial exhibition.

Most importantly, we thank you for your support. We look forward to welcoming you from November 11 to 13, 2024, as we embark on this quantum leap together.

We are wishing you an excellent congress!

Warm regards,

Aldo Brugnera Junior, DDS,Ms,PhD

Dear Colleagues,

It is our pleasure to cordially invite you to participate in the 18th WFLD Congress, to be held in São Paulo, Brazil.

Brazil, known for its innovation in technology and renowned hospitality, promises to provide an exceptional setting for this congress. The Brazilian organizing committee is preparing a dynamic scientific program focused on advancements in laser dentistry. This meeting will be an invaluable opportunity to deepen our expertise and stay abreast of the latest developments in our field.

We look forward to welcoming the most esteemed experts across various branches of dentistry, who will share their insights and help us enhance our skills and elevate our practice.

Furthermore, participants in the congress will have the exclusive opportunity to publish their scientific studies at no cost in the WFLD Special Issue, *"**Laser Dentistry, The Current Status and Developments**"* featured in the journal ***Dentistry***.

Join us for an unforgettable experience, blending scientific rigor with the warmth of Brazilian culture. We eagerly await your presence to make this congress a memorable and enriching occasion.

See you soon in São Paulo.

Warm regards,

Prof. Samir Nammour

Dear colleagues, we are delighted with the launch of WFLD 2024 in Sao Paulo, Brazil. The meeting was organized to offer high-end knowledge of laser application in dentistry, with several well-known names presenting their latest developments and advances in the field. The Scientific Committee was lucky to have such great leaders as Prof. Aldo Brugnera, Akira Aoki, and Samir Nammour to support the meeting organization. WFLD Brazil is already a great success, with more than 150 posters and oral presentations accepted and a superb program with laser application since periodontics and oral implantology, dental and facial esthetics until the photobiomodulation therapy session.

WFLD 2024 Brazil will also provide a unique environment for sharing your thoughts about light and increasing your network worldwide. Participants from all continents will attend the event.

Enjoy WFLD 2024 Brazil and the fantastic country that hosts this great event.

“um forte abraço”,

Prof. Jamil A. Shibli

GENERAL **INFORMATION**

REBOUÇAS CONVENTION CENTER
Av. Rebouças, 600 - Pinheiros, São Paulo

Entrance main - pedestrian: Av. Dr. Enéas de Carvalho Aguiar, 23 - 4th floor;

Parking lot entrance: Av. Rebouças, 600 (12-hour period, R$ 60.00)

How to get there by Metro
The Rebouças Convention Center is 300 meters from the Clínicas subway station, at the confluence of Paulista Avenue, Rebouças Avenue and Av. Dr. Arnaldo

Distances
15 km from Congonhas Airport, 28 km from Guarulhos International Airport

Official Timetable for Scientific Activities and ExpoWFLD

Registration: 7h30 am to 7h pm **Scientific Activities:** 8h am to 7h30 pm

ExpoWFLD: 8h am to 7h30 pm **Event:** November 11-13, from 8h am to 8h pm.

Simultaneous Translation: available for activities held in the Main Auditorium (translation headsets must be picked up upon presentation of a physical identity document).

Please note: return the phone to get your ID back.

Lunch
A lunch will be served in the exhibition room

GENERAL **INFORMATION**

Welcome reception
11th november monday, time 6:15 pm.
Location: Turquesa Auditorium

Coquetel
11th november monday, time 7 pm.
Location: ExpoWFLD

Gala Dinner
Invitations will be available for purchase on 11/11, at the concierge service, close to the Secretariat. Investment: R$450.

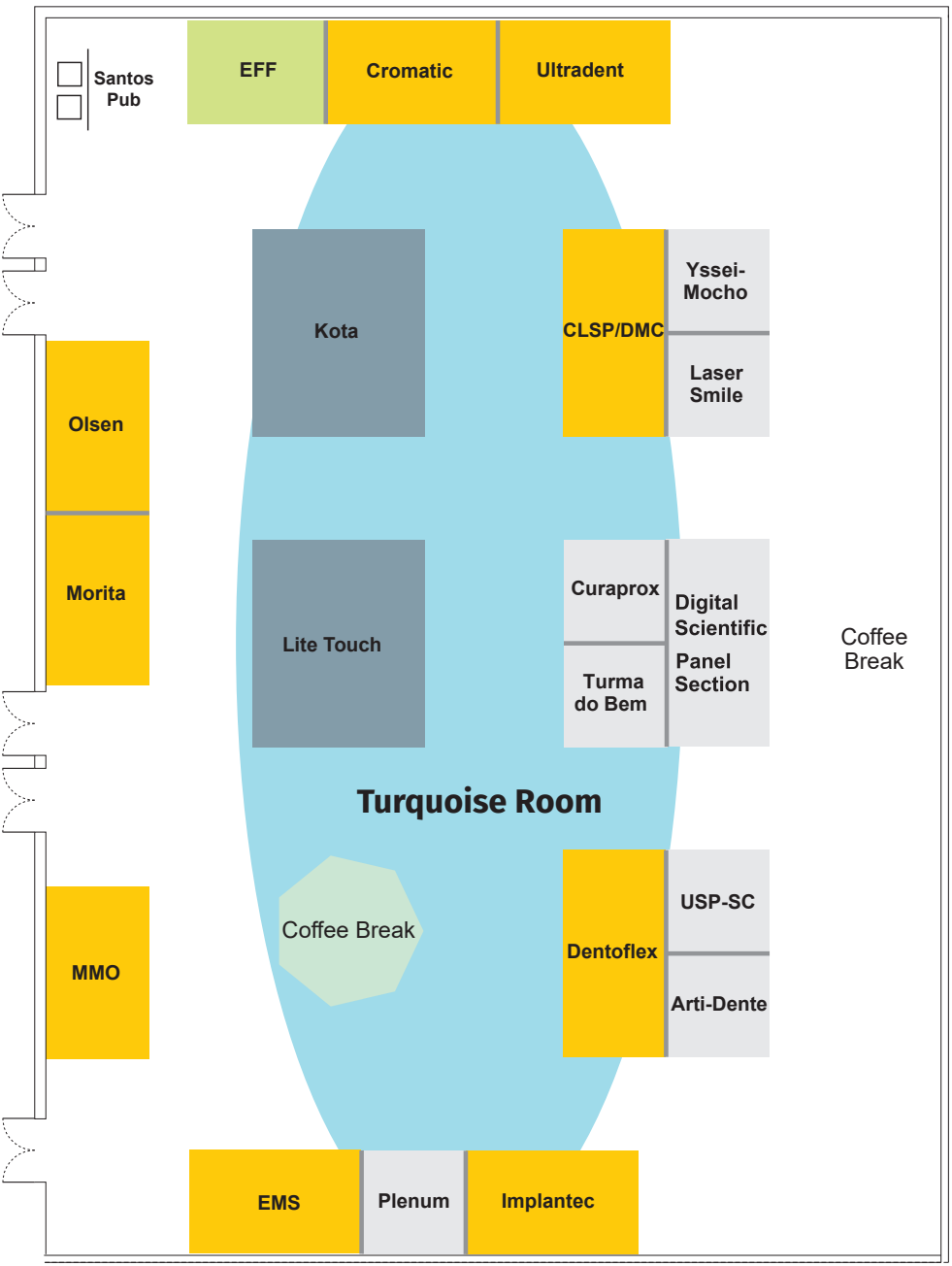
Renaissance Hotel
Alameda Santos, 2,233 - SP
Date and Time: 12/11, at 8:30 pm
Attire: smart casual

Official agency tourism

Must Tour:
contato@musttour.com.br
+55 (11) 3284-1666
+55 (11) 94734-3960

Certificates
They will be sent to the registered email 15 days after the event. Advanced Course participants will receive certificates at the end of the event.

Business exhibition



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SCIENTIFIC PROGRAM

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November

18th WFLD
Main Auditorium

Conferences scycle

Laser in periodontics, implantology and peri-implantitis
Chairman: Jamil Shibli
Session Chairs: Kinga Grzech-Lesniak and Letícia Theodoro

8:30-9:00 - **Akira Aoki**
Current status of Er:YAG laser in periodontal surgery

9:00-9:30 - **Samir Namour**
Laser progress in caries prevention

9:30-10:00 - **Kinga Grzech-Leśniak**
Laser and Periodontitis - Minimizing periodontitis complications through optimal management of the oral microbiome with lasers

10:00-10:30 - **Carmen Todea**
Prevalence of laser in Implantology: surgical laser versus photomodulation

10:30 - 11:10 - Coffee break

Session Chairs: Akira Aoki and Patrícia Freitas

11:10-11:40 - **Preetinder Singh**
LANAP® and LAPIP® - Minimally invasive periodontal and peri-implantitis treatment protocols: an update!

11:40-12:00 - **Letícia Theodoro**
Photodynamic therapy in the treatment of periodontal disease

12:00-12:20 - **Jamil Shibli**
Laser in peri-implantitis: a definitive solution

12:20 - 12:30 - **Q&A session**

12:30 - 14:00 - Lunch time

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Session Chairs: Samir Namour and Alessandra Cassoni

14:00-14:20 - **Patrícia Freitas**
Innovations in the use of laser in Orofacial Harmonization

14:20-14:40 - **Alessandra Cassoni**
High power laser and dental tissue interaction related to carie prevention

14:40-15:00 - **Javier Higuera**
Clinical reality of laser in Dentistry with biological principles and scientific evidence

15:00-15:30 - **Josep Arnabat**
How can we improve our endodontic treatment with Laser? Minimally invasive treatments with maximum effectiveness

15:30-16:00 - **Antoni España**
Er:YAG and Er,Cr:YSGG lasers in restorative dentistry

16:00 - 16:40 - Coffee break

Session Chairs: Josep Arnabat and Antoni España

16:40-17:00 - **Kenneth Luk**
Diode lasers, clinical application similarities and differences

17:10-17:40 - **Hiroshi Kadokura**
Laser irradiation can induce bone formation and bone resorption depending on the energy

17:40-18:10 - **Roy George**
Laser ablation of dental hard tissue using a novel 800nm femtosecond (30-fs) laser

18:15 - Opening Ceremony

18:30 - Cocktail

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Oral Presentation
Brown Room

11:00-11:10 - Alessandro Del Vecchio
11:15-11:25 - Beatriz Vilas
11:30-11:40- Fusong Yuan
11:45-11:55- Li Qian
12:00-12:10- Rita Antonelli
12:15-12:25- Zuzanna Grzech-Leśniak
12:30-12:40- Zuzanna Grzech-Leśniak
12:45-12:55- Ilaria Giovannacci
13:00-13:10- Sami El Toum
13:10-14:00 - Lunch time
14:00-14:10 - Peiya Lin
14:15-14:25 - Beatrice Spaggiari
14:30-14:40 - Ha Thai Dam
14:45-14:55 - Tanya Suwat
15:00-15:10 - Taichen Lin
15:15-15:25 - Frederic Cuisinier
15:30-15:40 - Allana R. Serrano
15:45-15:55 - Amanda P. Santana
16:00-16:10 - Júlia G. Cavalero
16:10-16:40 - Coffee break
16:40-16:50 - Marcia Vidor
16:55-17:05 - Ana Paula Tanko
17:10-17:20 - Mateus Windlin
17:25-17:35 - Vanessa M. Alonso
17:40-17:50 - Virgilio M. Roriz
17:55-18:05 - Denise Zezell
18:10-18:20 - Adriana C. Mazzoni

Corporate workshops
Coral Room

13:30 - 14:30 - **Emanuela Prado Ferraz - J. Morita**
The power of the Er-YAG laser as an adjuvant in implantology

14:45-15:45 - **Stephanie A. Garofalo - Ultradent**
Clinical applicability of high and low power superpulsed diode laser

16:00 - 17:00 - **Sergio Kahn - EMS**
A new era in biofilm control: Guided Biofilm Therapy

17:30 - 18:30 - **Mateus Windlin - Cromatic**
Thulium Laser in Orofacial Harmonization: innovations and clinical impacts

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Main Auditorium

Conferences cycle
Photobiomodulation and phototherapy
Coordinators: Antonio Pinheiro and Vanderlei Bagnato
Session Chairs: Chukuka Enwemeka and Marleny Gerbi

8:00-8:30 - **Vanderlei Bagnato**
New laser applications in oral health: control and reversal of antibiotic-resistant bactéria

8:30-9:00 - **Antonio Pinheiro**
Tissue responses to phototherapy

9:00-9:30 - **Praveen Arany**
Innovations in surgical and non-surgical applications for lasers in Dentistry

9:30-10:00 - **Chukuka Enwemeka**
The potential uses of blue light in oral disinfection

10:00-10:30 - **Sajee Sattayut**
Laser therapy for oral cancer prevention

10:30 - 11:10 - Coffee break

Session Chairs: Paolo Vescovi and Sandra Kalil Bussadori

11:10-11:40 - **Reza Fekrazad**
The role of photobiomodulation in nerve injury in Oral and Maxillofacial Surgery

11:40-12:10 - **Reem Hanna**
Harnessing light for healing: comparative in vitro study between the efficacy of 980 nm photobiomodulation delivered with flattop beam profile vs. Gaussian on osteoblast maturation

12:10-12:30 - **Fatima Zanin**
Hemolasertherapy: new trends in photobiomodulation and tissue engineering in gingival and bone regeneration

12:30-14:00h - Lunch time

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Main Auditorium

Session Chairs: Susana Teitelbaum and Alesandra Rastelli

14:00-14:20 - **Denise Zezell**
Can an Erbium laser always be used safely?

14:20-14:40 - **Tony Carreon**
The use of lasers in Aesthetic Dentistry, Implant Dentistry and Orofacial Harmonization: minimum invasion and tissue selectivity

14:40-15:00 - **Sandra Kalil Bussadori**
Antimicrobial photodynamic therapy for the treatment of halitosis - clinical protocols

15:00-15:30 - **Paolo Vescovi**
The use of laser and cross-linked hyaluronic acid (xHyA)

15:30-16:00 - **Hernán Giraldo**
Debonding of ceramic restorations with Laser. The current reality

16:00 - 16:40 - Coffee break

Session Chairs: Carmen Todea and Denise Zezell

16:40-17:00 - **Carlos de Paula Eduardo**
Dental aesthetics and lasers as adjuvants in treatments

17:00-17:20 - **Alberto Blay**
The power of Laser: transforming clinical and industrial practices over two decades

17:20-17:50 - **Marzena Dominiak and Tomasz Gedrange**
Usefulness lasers for personalized bone reconstruction in case of orthodontic treatment

17:50-18:20 - **Umberto Romeo**
Blue Diode Laser (445 nm) during oral soft tissue surgery: clinical and histological aspects

18:20-18:50 - **Blagovesta Yaneva**
Why to perform Er:YAG laser-assisted periodontal treatment?

18:50-19:20 - **Marina Vitale:** Pediatric Dentistry: what can we expect using laser device in Prevention and in minimal invasive Dentistry?

19:20 - Closure of activitie

20:30 - Gala Dinner

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Red Auditorium

Chairmen: Sergio Gonçalves and Rosely Cordon

8:10-8:20 - **Marcia Vidor**
Advantages of high-power lasers in the daily practice of esthetic dentistry

8:30-8:50 - **Eric Mayer**
New trends of Er:YAG on aesthetic restorative dentistry

8:50-9:10 - **Marcus Ferreira**
From babies to seniors patients - how the diode laser surgery can transform your dental practice?

9:10-9:30 - **Sergio Gonçalves**
Adhesion to dentin with Nd:YAG laser

9:30-9:50 - **Rosely Cordon**
Biophotonics as a path to integrative health and well-being - present and future

9:50-10:10 - **Ana Clara F. Pedroni**
Photonic associations with low and high power lasers in the management of osteonecrosis

10:10-10:30 - **Marisa Helena Carvalho**
High and low power laser in the management of osteonecrosis

10:30 - 11:10 - Coffee break

Chairmen: Sonia Groisman and Cristina Chavantes

11:10-11:30 - **Sonia Groisman**
Clinical use of laser in early caries detection and its prevention

11:30-11:50 - **Sérgio Araújo Andrade**
Widefield optical fluorescence in Dentistry: where we came from and where we need to go

11:50-12:10 - **Letícia Bezinelli**
The use of laser in the hospital environment: clinical and economic impact

12:10-12:30 - **Cristina Chavantes**
Unusual applications of Lasertherapy in medical specialties

12:30 - 14:00 - Lunch time

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Red Auditorium

Coordinators: Mateus Windlin and Aparecida Marques

14:20-14:40 - **Mateus Windlin**
Ther, morphological and optical analusis of tooth enamel afther removal of ceramic laminates with Er:YAG Laser

14:20-14:40 - **Alyne Simões**
Laser and PDT in managing orofacial complications of oncology patients: from basic research to clinical practice

14:40-15:00 - **Aparecida Marques**
The use of photodynamic therapy using Taylor Blue (DMMB) associated with photobiomodulation (FBM) in the treatment of osteoradionecrosis of the jaws: a clinical case report

15:00-15:20 - **Daiane T. Meneguzzo**
ILIB - Blood photobiomodulation

15:20-15:40 - **Valeria Mendes**
High-intensity pulsed lasers in non-ablative mode in the treatment of sleepdisordered breathing

15:40-16:00 - **Alessandro D. Steinman**
Empowering osseointegration

16:00 - 16:40 - Coffee break

Coordinators: João Paulo Tanganelli and Luciane Azevedo

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Red Auditorium

16:40-17:00 - **Rosane Lizarelli**
Brain photobiomodulation

17:00-17:20 - **Carla Andreotti Damante**
Photobiomodulation after periodontal surgeries: an essential therapy to optimize results

17:20-17:40 - **Aline Souza Gabriel**
Low power laser and photodynamic therapy in Restorative Dentistry

17:40-18:00 - **Gabriel Pallas**
Different techniques for applying lasers to patients with fibromyalgia in Dentistry

18:00-18:20 - **João Paulo Tanganelli**
Photobiomodulation in the regeneration of temporomandibular joints

18:20-18:40 - **Isabela Bueno**
Teeth whitening with Violet LED: a look at innovation and Science

18:40-19:00 - **Luciane Franco**
Photobiomodulation in facial paralysis

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Oral Presentation
Brown Room

8:30-8:40 - Vinícius Ganzaroli
8:45-8:55 - Luciene Ap. Linhares Rosa
9:00-9:10 - Ariane Venzon da N. Sardo
9:15-9:25 - Caio Bruno T. de Brito -
9:30-9:40 - Carolina G. Garcia
9:45-9:55 - Cláudia Regina C. Fussi
10:00-10:10 - Daniela A. de Moraes
10:15-10:25 - Erika da S. Mello
10:30-11 - Coffee break
11:00-11:10 - Fernando R. Carvalho
11:15-11:25 - Fernando R. Carvalho
11:30-11:40 - Giulianna Malotti
11:45-11:55 - Glaucia G. Abud Machado
12:00-12:10 - Isabella B. Polho
12:15-12:25 - Ismael L. Pinto
12:30-12:40 - Jainny Medeiros
12:45-12:55 - Valeria Mendes
13:00-13:10 - Izabela F. Delamura
13:10-14:00 – Lunch time
14:00-14:10 - Marilia M. Carvalho
14:15-14:25 - Marinês Sousa
14:30-14:40 - Michele S. Wiedermann
14:45-14:55 - Paula Sachet
15:00-15:10 - Pedro C. Soares
15:15-15:25 - Sandra B. Rezende
15:30-15:40 - Stéfany Barbosa
15:45-15:55 - Thayná Vianna da Rocha
16:00-16:10 - Andre Rodríguez
16:10-16:40 - Coffee break
16:40-16:50 - Anna Paula Lima T. da Silva
16:55-17:05 - Ana Maria Gois
17:10-17:20 - Ana Paula Tanko de Vasconcellos
17:25-17:35 - Maria Fernanda R. Vigliar
17:40-18:50 - Edilson Ervolino
17:55-18:05 - Beatriz M. Moura Dutra
18:10-18:20 - Beatriz M. Moura Dutra
16:25-18:35 - Roberta Iaria

Corporate workshops
Coral Room

10:30 - 11:30 - **Ana Cecília C. Aranha - Ultradent**
Getting to know the features of the Gemini EVO/Ultradent high-power diode laser. Demonstration and practice

14:30 - 15:30 - **Ana Clara Pedroni & Tony Carreon - Light Instruments**
Erbium 2940 and Diode 980 - when to select or combine for advanced results in clinical routine

16:00 - 17:00 - **Ricardo Navarro - MMO**
High-power diode lasers in the dental clinic: your professional Advantage

17:30 - 18:30 - **Ana Clara Pedroni & Marisa Carvalho - Light Instruments**
Overcoming the challenges of osteonecrosis with high and low power Erbium and Diode lasers and the power of super pulsed light in improving quality of life and facilitating procedures

WFLD 2024
SÃO PAULO
BRAZIL, NOV 11-13

SCIENTIFIC PROGRAM

13 November

18th WFLD
Main Auditorium

Chairmen: Ambrose Chan and Valdir Gouveia

8:30-9:00 - **Robert Convissar**
Nuralyte - A new paradigm in PBM pre-injection analgesia

9:00-9:30- **Ambrose Chan**
Photonics assists optimal endodontic care

9:30-10:00 - **Shigeyuki Nagai**
Clinical risk management in laser Dentistry

10:00-10:30 - **Marco Meleti**
Laser surgical management of oral leukoplakia

10:30 - 11:10 - Coffee break

Session Chairs: Umberto Romeo and Lara Motta

11:10-11:40 - **Katayoun Kalhori**
Current applications of biophotonics in Pediatric Dentistry

11:40-12:10 - **Do Thi Thao**
Oral vascular malformation classification and laser photocoagulation

12:10-12:30 - **Premiação de Oral Presentation e ePoster**

12:30 - 14:00 - Lunch time

SCIENTIFIC PROGRAM

13 November

18th WFLD
Main Auditorium

Session Chairs: Leonardo Faverani and Alyne Simões

14:00-14:20 - **Alessandra Rastelli**
Antimicrobial photodynamic therapy over oral pathogens

14:20-14:40 - **Valdir G. Garcia**
Photobiomodulation effects therapy on areas treated with biomaterial

14:40-15:00 - **Sonia Bordin-Aykroyd**
Laser and energy-based devices in orofacial esthetics

15:00-15:20 - **Lara Motta**
Clinical applications of photobiomodulation in long Covid

15:20-15:40 - **Lívia Tosi Trevelin**
The use of the Er:YAG laser in Restorative Dentistry

15:40-16:00 - **Marleny Gerbi**
Impact of Artificial Intelligence in the research of Laser photobiomodulation

16:00 - 16:40 - Coffee break

Session Chairs: Carlos P. Eduardo and Livia Trevelín

16:40-17:00 - **Leonardo Faverani**
Can photodynamic therapy improve clinical outcomes in osteonecrosis of the jaws? Looking for evidences

17:00-17:30 - **Susana Teitelbaum**
The impact of photobiomodulation therapy in oncolog ical patients

17:30-17:50 - **Aldo Brugnera Júnior**
Laser innovations in precision Dentistry

WFLD 2024
SÃO PAULO
BRAZIL, NOV 11-13

SCIENTIFIC PROGRAM

13 November

WFLD Advanced Laser Course in Dentistry

Red Auditorium

Chairmen: Aldo Brugnera Júnior and Samir Namour

8:30-10:30 - **Paolo Vescovi, Samir Namour and Umberto Romeo**
Advances in Oral Surgery with Er:YAG, CO2, Nd:YAG and Diode laser

10:30 - 11:00 - Coffee break

11:00-12:40 - **Akira Aoki, Carmen Darinca Todea and Kinga Grzech-Leśniak**
Advantages of surgical and nonsurgical laser in Periodontics and Implant Dentistry

12:40 - 14:00 - Lunch time

Coordinators: Akira Aoki, Eric Mayer and Sajee Sattayut

14:00-14:40 - **Ambrose Chan and Roy George**
Photonics in Endodontics and increased success in clinical cases

14:40-16:00 - **Hernán Giraldo, Eric Mayer and Aldo Brugnera Júnior**
Laser in Aesthetic Dentistry and veneer removal

16:00 - 16:30 - Coffee break

16:30-18:30 - **Praveen Arany, Sajee Sattayut and Sonia Bordin-Aykroyd**
Scientific basis of photobiomodulation, clinical application in photodynamic therapy and Orofacial Harmonization

18:30 - Final test

WFLD 2024
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SCIENTIFIC PROGRAM

13 November

Course Laser in HOF
Coral Room

Chairwomen: Sonia Aykroyd and Patrícia Freitas

8:30-9:10 - **Sonia Bordin-Aykroyd**
HOFI - Integrated Orofacial Harmonization and the evolving concept of beauty

9:10-9:50 - **Philip Charles Hallawell**
Image ID in Orofacial Harmonization

9:50-10:30 - **Mario Brito da Silva Filho**
Endolaser for weight loss and facial rejuvenation

10:30 - 11:10 - Coffee break

11:10-11:50 - **Sergio Escobar**
The importance of lip compartments and lip harmonization

11:50-12:30 - **Sérgio Araújo Andrade**
The importance of diagnosis in preventing complications in Orofacial Harmonization

12:30 - 14:00 - Lunch time

14:00-15:00 - **Luciane Hiramatsu Azevedo**
Use of high-power lasers in the perioral zone

15:00-16:00 - **Luana Campos**
New technologies for facial rejuvenation and fat reduction

16:00 - 16:30 - Coffee break

16:30-17:30 - **Patrícia Freitas**
Lasers in the management of complications and adverse events in Orofacial Harmonization

17:30-18:30 - **Ana Paula Tanko de Vasconcellos**
Laser interaction in facial morpho functional approach

Speakers

Akira Aoki

DDS, PhD; Professor of Periodontology – dept. of Hard Tissue Engineering Graduate School of Medical and Dental Sciences - Tokyo Medical and Dental University.

Advantages of surgical and nonsurgical laser in Periodontics and Implant Dentistry

Current status of Er:YAG laser in periodontal surgery

The objective of this presentation is to demonstrate cases on conventional flap surgery and regenerative therapy, minimally invasive approach, flapless surgery.

Alberto Blay

Specialist in Implantology; Master in Laser – IPEN-USP; Board Member - Hospital Israelita Albert Einstein.

The power of Laser: transforming clinical and industrial practices over two decades

The use of laser as an innovative technology in the clinic and industry will be presented.

Aldo Brugnera Junior

DDS, MS, PhD; Lecturer & Member - European Master in Oral Laser Applications (EMDOLA), University of Liège; Visiting Professor and Research Collaborator - IFSC-USP.

Laser innovations in precision Dentistry
The objective of this presentation is to demonstrate innovative uses of lasers in aesthetic dentistry.

Laser in Aesthetic Dentistry and veneer removal

Alejandro D. Steinman

Professor - Universidad de Buenos Aires, Argentina; Especialista em Prótese - Ministerio de Salud, Argentina; MsC em Laser - RWTH Aachen University, Alemanha; Laser Safety Officer - Union Europea; Professor titular em Prótese e diretor da Pós-graduação de Odontologia em Laser - Universidad Católica Argentina.

Empowering osseointegration

Alessandra Cassoni

MSc in Operative Dentistry; PhD - USP; Professor of Restorative Dentistry and Prosthodontics, Graduate Division - São Judas University.

High power laser and dental tissue interaction related to carie prevention

High-power laser such as erbium and CO2 interact with dental tissue increasing caries resistance of enamel walls, and reduced caries lesion depth development. Under SEM the morphology of the cavities presents absence of smear layer and opened dentin tubules.

Alessandra Rastelli

DDS - UEPG; PhD in Restorative Dentistry, associate professor, head of the Biophotonics and Bionanomaterials Laboratory - Unesp; Visiting Scientist, Wellman Center for Photomedicine, Massachusetts General Hospital, Harvard Medical School, University of Harvard, Boston, USA.

Antimicrobial photodynamic therapy over oral pathogens

Antimicrobial photodynamic therapy has been claimed as a promising therapeutic strategy to inactivate oral microorganisms. The goal of this talk is to summarize the results of the research on aPDT in dentistry from the in vitro studies to the clinical application.

Speakers

Aline Souza Gabriel

Associate professor - dept. of Restorative Dentistry, School of Dentistry of Ribeirão Preto - University of São Paulo; Laser therapy researcher in Dentistry and Endodontics.

Low power laser and photodynamic therapy in Restorative Dentistry

This presentation will address the mechanism of action of low-power lasers and photosensitizers on dentin, emphasizing their applicability in Dentistry and Endodontics.

Alyne Simões

Associate Professor - dept. of Biomaterials and Oral Biology – USP; Postdoctoral Researcher in Tissue Repair at University of Illinois at Chicago, USA; Coordinator of the Dental Care Group for Cancer Patients at Special Laboratory of Lasers in Dentistry (LELO-USP).

Laser and PDT in managing orofacial complications of oncology patients: from basic research to clinical practice

Photobiomodulation therapy (PBMT), with low power laser or LED, is no longer a promising therapy, but it has become one important advance in managing orofacial complications of oncology patients. The benefits associated with PBMT include its analgesic, inflammation-modulating, and repairing effects. In addition, when a specific light wavelength is associated with a photosensitizer and oxygen, the so-called antimicrobial photodynamic therapy; it may present antimicrobial effect, being indicated to treat infected orofacial lesions.

Ambrose Chan

Honorary Research Fellow, Faculty of Medicine and Health, the University of Sydney; Honorary Assistant Professor, Faculty of Dentistry, the University of Hong Kong.

Photonics assists optimal endodontic care

Photonics has superseded Electronics and revolutionized Medicine in the 21st century. The application of bio-photonic has enhanced visualization, diagnosis and treatment in all disciplines of Medicine including Dentistry. A highlight of such versatile technologies in assisting the delivery of an optimal endodontic care will be presented.

Photonics in Endodontics and increased success in clinical cases

Ana Clara F. Pedroni

PhD in Lasers in Dentistry – Fousp (Sandwich PhD at Harvard School of Dental Medicine, Division of Bone and Mineral Research); Master in Dentistry; Specialist in Implantology; Qualified in Lasertherapy – LELO-Fousp; Founder of Cursos LaserON, LaserON Academy and Clínica SmileON; Scientific coordinator and volunteer dentist - NGO Instituto Sorrir Para Vida.

Photonic associations with low and high power lasers in the management of osteonecrosis

The protocol for the management of medical osteonecrosis of the jaw (MRONJ) will be presented, developed by the team at Instituto Sorrir Para Vida, an NGO specialized in the care of oncology patients, where combinations of photonic therapies with low and high power lasers are used.

Speakers

Ana Paula Tanko de Vasconcellos

Specialist in Dentistry - USP and in Orthodontics - Brazilian Army Military Medicine Academy (HMASP); Specialist in Orofacial Harmonization and qualification in Lasertherapy - Faculty of Dentistry of APCD (FAOA); MSc in Health Teaching - Israeli Faculty of Health Sciences, Albert Einstein Hospital (FICSAE).

Laser interaction in facial morpho functional approach
The facial morphofunctional approach in dentistry benefits from a-PDT in complications, and local and systemic laser therapy, to obtain positive aesthetic results.

Antoni España

MD, DDS, MSc, PhD; Associate Professor of Oral and Maxillofacial Surgery - University of Barcelona; Director of Master Degree in Oral Laser Applications, and Spanish Coordinator - European Master Degree in Oral Laser Applications (EMDOLA).

Er:YAG and Er,Cr:YSGG lasers in restorative dentistry

The differences in cavity preparation with Er:YAG and Er,Cr:YSGG lasers, their advantages and disadvantages, as well as clinical cases will be presented.

Antonio Pinheiro

MSc e PhD in Clinical Dentistry - University of Birmingham, UK; Professor - Universidade Federal da Bahia (UFBA); Researcher 1B of CNPq; Editor of the Journal Photochemistry and Photobiology B.

Tissue responses to phototherapy

Photobiomodulation (PBM) accelerates healing and repair by increasing cell viability by stimulating the mitochondrial and cell membrane photoreceptors' synthesis of ATP. Phototherapy increases the proliferation rate of fibroblasts, osteoblasts, and other cells, improving healing and repair. It also increases angiogenesis and reduces edema and pain.

Aparecida Marques

MSc in Dental Clinic; PhD in Laser in Dentistry; Professor at the Biophotonics Center – UFBA; Specialist in Endodontics.

The use of photodynamic therapy using Taylor Blue (DMMB) associated with photobiomodulation (FBM) in the treatment of osteoradionecrosis of the jaws: a clinical case report

The lecture will present clinical cases using the antimicrobial photodynamic therapy with Taylor Blue photosensitizer (DMMB) associated with laser photobiomodulation (FBML) in the treatment of osteoradionecrosis in the jaw.

Blagovesta Yaneva

Doctor and associate professor at the Dept. of Periodontology and Oral Mucosa Diseases at Medical University of Plovdiv.

Why to perform Er:YAG laser-assisted periodontal treatment?
By synthesizing current research findings, this presentation underscores the reasons supporting the integration of Er:YAG laser technology into the armamentarium of periodontal therapy, contributing to improved clinical outcomes and patient well-being.

Carla Andreotti Damante

Associate professor of Periodontics and coordinator of the Dentistry course - FOB-USP; Specialist in Periodontics; Qualified in Laser therapy.

Photobiomodulation after periodontal surgeries: an essential therapy to optimize results

Periodontal surgeries must be accompanied by post-operative photobiomodulation to improve clinical results and patients' quality of life. Photobiomodulation should be considered an indispensable step in periodontal surgical treatments.

Speakers

Carlos de Paula Eduardo

Professor - Fousp; Coordinator of the Laboratório Especial de Laser em Odontologia (LELO - Fousp).

Dental aesthetics and lasers as adjuvants in treatments

The importance of using high and low power lasers as supporting protocols for dental aesthetics will be highlighted, both in direct and indirect procedures to reestablish correct dental anatomy.

Carmen Darinca Todea

Professor - dept. of Oral Rehabilitation and Dental Emergencies, "Victor Babes" University of Medicine and Pharmacy, Timisoara.

Prevalence of Laser in Implantology: surgical Laser versus photomodulation

The lecture will present the most important applications of using surgical laser but at the same time those application of therapeutic lasers for photobiomodulation. It will be demonstrated that laser photobiomodulation therapy is effective in short periods on bone density and bone regeneration.

Advantages of surgical and nonsurgical laser in Periodontics and Implant Dentistry

Chukuka Enwemeka

MSc, BSc, PhD; Past provost and Senior Vice President - San Diego State University, USA; Past Distinguished Professor and Dean – College of Health Sciences, University of Wisconsin, USA; Past Professor and Dean – School of Health Professions, New York Institute of Technology, Old Westbury, New York.

The potential uses of blue light in oral disinfection

This presentation will summarize recent studies on the effect of blue light on various microorganisms, including common bacteria and viruses. It will discuss the potential uses of blue light for oral health.

Cristina Chavantes

Mecial Doctor; Postgraduate – Faculty of Medicine at Chiba University, Japan; PhD - Freie Universitaet Berlin, Germany; Professor of Medicine and Biophotonics Applied to Health Sciences - Universidade Nove de Julho; Professor responsible for the Laser Discipline in Biomedicine - FMUSP; Research Group Leader at CNPq on Low Intensity Lasers in the Health Area (FMUSP/IFUSP).

Unusual applications of Lasertherapy in medical specialties

Situations not yet performed with Lasertherapy, as well as the unusual application of this therapy in which several patients may benefit from this treatment.

Daiane T. Meneguzzo

MSc, PhD - USP; Qualified in Laser therapy - CFO; Coordinator of Qualification courses in Laser therapy - São Leopoldo Mandic.

ILIB - Blood photobiomodulation

The objective of this conference is to address Photobiomodulation in its blood modality (ILIB) showing the mechanisms of action and results in favor of health.

Denise Zezell

OSA/OPTICA Fellow; Professor at Nuclear and Energy Research Institute; PhD in Physics – Unicamp; Coordinator of the National Institute of Science and Technology in Radiation in Health Science (INCT/CNPq INTERAS).

Can an Erbium laser always be used safely?
Er:YAG and Er,Cr:YSGG lasers have excellent applications for both soft and hard tissues, as well as for veneer removal. Ceramic and cement optical absorption, laser irradiation conditions (repetition rate, pulse width, energy density per pulse, spray, etc.) will be discussed aiming to avoid damage to the pulp and periodontium.

Speakers

Do Thi Thao

Vice Dean - Faculty of Odonto-Stomatology; Head of Oral Diagnosis - Can Tho University of Medicine and Pharmacy, Vietnam; Secretary of WFLD Asia Pacific Division.

Oral vascular malformation classification and laser photocoagulation

In this presentation, the classification of vascular malformations will be described and review laser photocoagulation in the treatment of oral vascular malformations are presented along with reports of clinical cases of vascular malformations that have been treated with laser photocoagulation.

Eric Mayer

MSc, PhD in Restorative Dentistry - USP and Unibo, Italy; Professor Doctor at the dept. of Restorative Dentistry - Fousp.

New trends of Er:YAG on aesthetic restorative dentistry

In this presentation will presented Er:YAG laser, resin composite veneer and aesthetic restorations.

Laser in Aesthetic Dentistry and veneer removal

Fatima Zanin

DDS, MSc, PhD; Director of the Biophotonics Center - Instituto Brugnera Zanin; Professor of the Specialization in Public Health - UFRJ.

Hemolasertherapy: new trends in photobiomodulation and tissue engineering in gingival and bone regeneration

This conference will demonstrate how the photobiomodulation laser stimulates stem cells to close the Black Space, with gingival and bone growth and the use of the Er:Yag laser for bone decontamination.

Gabriel Pallas

Creator of the Laser Movement Group; Qualified in laser and oncological laser training - APCD-FAOA, São Paulo, Brazil; Advanced course in dental and medical laser, and neuro photobiomodulation - ALLASER, Brazil.

Different techniques for applying lasers to patients with fibromyalgia in Dentistry

To present the use of low-intensity laser at local and systemic levels - ultrasound and laser combined, to reduce pathological spasms and improve patients' quality of life.

Hernán Giraldo

DDS, MSc, PhD; Director of Oral Rehabilitation Program - UniCIEO - Bogotá, Colombia; President - Asociación Colombiana de Láser en Odontología (ASOCOLASER).

Debonding of ceramic restorations with Laser. The current reality

The current reality of the use of erbium lasers for the debonding of non-metallic restorations (feldspath, LDS, zirconium) will be shown, with clinical and scientific evidence.

Laser in Aesthetic Dentistry and veneer removal

Hiroshi Kadokura

DDS, PhD; Specialist of Endodontics, Laser Dentistry and Operative Dentistry.

Laser irradiation can induce bone formation and bone resorption depending on the energy

This lecture presents the effects of low reactive level of laser therapy (LLLT) on bone metabolism. This suggests that our results can be important data for development of bone regeneration therapy using the lasers.

Speakers

Isabela Bueno

Specialist in Dental Radiology and Imaging - HRAC- USP, Bauru; Specialist in Restorative Dentistry and Orofacial Harmonization - Funorte Bauru I; Qualified in Laser Therapy and Ozone Therapy; Professor of specialization and technical courses - V&G Dental Institute.

Teeth whitening with Violet LED: a look at innovation and science

The objective of this lecture is to present the innovation in dental whitening using violet LED, highlighting its effectiveness, safety and clinical results. Violet LED represents an evolution in whitening techniques, offering dentists a safer alternative with fewer adverse effects compared to other technologies.

Jamil Shibli

DDS; MSc, PhD - Periodontics; Professor of the Postgraduate Program in Dentistry (Periodontics and Implantology) - Guarulhos University; Associate Professor - dept. of CTBMF and Periodontics - FORP-USP.

Laser in peri-implantitis: a definitive solution
This conference will address the use of the Er:YAG and Er,Cr:YSGG laser, both in the detoxification of peri-implant surfaces, and the secondary effect of photobiomodulation to improve the reparative and/or regenerative process. Longitudinal evaluations based on the rationale for using high-power lasers will be discussed and evaluated.

Javier Higuera Fontelo

PhD; Specialist in Endodontics; Postgraduated in Oral Implantology; Associate Professor and Founder of Laser Department, School of Dentistry, Kennedy University and Founder of Laser Department of University of Buenos Aires; Chairman for Argentina and Vice Regent for South America of Academy of Dentistry International (ADI).

Clinical reality of laser in Dentistry with biological principles and scientific evidence

Will be presented a large number of clinical resolutions carried out since 1995 in different areas of dentistry with scientific evidence and biological bases and as the 980nm Diode Laser is a versatile clinical tool that allows personalized care of complex patients but requires a deep understanding of its interaction with tissues to achieve the desired results.

João Paulo Tanganeli

Post-Doc in Biophotonics; PhD in Dentistry - Laser concentration area; Master in Morphology; Coordinator of the Post-Graduate Program in Temporomandibular Dysfunction and Orofacial Pain - FAOA; Director of the Orofacial Pain Department - APCD.

Photobiomodulation in the regeneration of temporomandibular joints

An updated review of the current evidence on photobiomodulation in joint regeneration will be presented.

Josep Arnabat

Associate Professor of Barcelona University; Director of Master Laser in Dentistry (EMDOLA).

How can we improve our endodontic treatment with Laser? Minimally invasive treatments with maximum effectiveness
In this lecture we will review the advantages of laser application in endodontics. Different types of lasers can be used in endodontics; the most frequently used are Nd:YAG, diode lasers (with different wavelengths) and Er:YAG and Er, Cr:YSGG lasers. Each of them will have different applications.

Speakers

Katayoun Kalhori

DDS, MSc; Oral and Maxillofacial Pathologist; Responsible for international affairs of Iranian Medical Laser Association (IMLA); Board member and Scientific Advisory Committee - WALT.

Current applications of biophotonics in Pediatric Dentistry

Pediatric dentistry is very different and easy when laser is available. Laser can be very helpful in every step you make in a pedodontics office, from prophylactic procedures and diagnosis to orthodontics and surgical treatment. We can also add to this list the serious challenge in the office.

Kenneth Luk

PhD; Bachelor of Dental Surgery - University of Liverpool; Diploma in General Dental Practice - Royal College of Surgeons England; MSc - Lasers in Dentistry - University of RWTH Aachen, Germany.

Diode lasers, clinical application similarities and differences

The similarities and differences amongst diode lasers in clinical applications (diagnostics, surgery and photobiomodulation) will be discussed.

Kinga Grzech-Leśniak

DMD, MSc, PhD; Associate Professor - Wroclaw Medical University and Virginia Commonwealth University School of Dentistry (VCU), USA.

Laser and Periodontitis - Minimizing periodontitis complications through optimal management of the oral microbiome with lasers

During the lecture we will consider the novelty of using laser therapy in combination with antiseptics as an alternative treatment protocol. Using evidence-based laser guidelines would enable dentists to provide more efficient non-surgical periodontal care. Understand of the varied use of Laser during periodontal treatment.

Advantages of surgical and nonsurgical laser in Periodontics and Implant Dentistry

Lara Motta

MSc, PhD; Professor and Researcher of the Postgraduate Program in Biophotonic Medicine - Universidade Nove de Julho.

Clinical applications of photobiomodulation in long Covid

The impact of Covid-19 sequelae compromises the quality of life of the population and the photobiomodulation has shown positive results in treating the symptoms of long Covid.

Leonardo Faverani

DDS, MSc, PhD; Professor at the Graduate and Postgraduate courses (MSc and PhD degrees) of CTBMF and Implantology – FOA-Unesp.

Can photodynamic therapy improve clinical outcomes in osteonecrosis of the jaws? Looking for evidences

Discussion on the development of drug-related osteonecrosis of the jaw (MRONJ) and how adjuvant therapies are necessary for its prevention and treatment; present how photodynamic therapy can help achieve better clinical results in MRONJ.

Letícia Bezinelli

Dentist at Hospital Israelita Albert Einstein; Coordinator of Undergraduate and Postgraduate courses in Dentistry at Einstein; PhD in Dental Sciences - Fousp; Specialist in Hospital Dentistry and Dentistry for patients with special needs; MBA in health management.

The use of laser in the hospital environment: clinical and economic impact

Demonstrate the applicability of lasers in hospital settings, in various medical specialties, such as: onco-hematology, ICU, pediatrics, organ transplants. Address the clinical benefits and show how protocols can be cost-effective.

Speakers

Letícia Theodoro

MSc – IPEN/USP; PhD - Unesp; Associate professor of Periodontics and permanent professor of the Postgraduate Program in Dentistry – FOA-Unesp; Professorship in Periodontics - Unesp; Qualified in Laser therapy - CFO.

Photodynamic therapy in the treatment of periodontal disease
Photodynamic therapy has been used as an adjunctive therapy to periodontal treatment, with the aim of promoting control and reduction of microorganisms associated with periodontal diseases. This presentation will address the main scientific evidence of this therapy when used in periodontal treatment and future perspectives.

Lívia Tosi Trevelin

DDS, MSc, PhD in Restorative Dentistry and Qualified in Laser - Fousp; PhD - University of Illinois, Chicago.

The use of the Er:YAG laser in Restorative Dentistry

The use of the Er:YAG laser is an innovative technology that allows cavity preparation in a conservative manner in addition to the selective removal of decayed tissue, removal of laminated facets, among others, providing an effective and comfortable treatment for the patient. Therefore, some clinical cases of this technology will be presented and the importance of choosing the appropriate irradiation parameters.

Luana Campos

Professor of the Postgraduate course - Santo Amaro University (Unisa); PhD in Biomaterials and Oral Biology – Fousp; Sandwich Doctorate in Dentistry - University of Connecticut - UCONN Health Center, USA; Post-doctorate in Biomaterials and Oral Biology from FOUSP and ACCamargo Cancer Center; Specialist in Dentistry for Patients with Special Needs - Fousp.

New technologies for facial rejuvenation and fat reduction

Present and discuss new high-power laser technologies used in fat reduction and facial rejuvenation, discussing the benefits of these light sources (diodes and thulium laser) in Orofacial Harmonization.

Luciane Franco

PhD in Laser and Master in Biomaterials – USP; Researcher at Bireme; Member of the Board of ABLOS; Specialist in Orofacial Harmonization.

Photobiomodulation in facial paralysis
The objective is to measure the recovery of facial asymmetries, visualized through digital facial analysis after Photobiomodulation (PBM) treatment on the paralyzed hemiface.

Luciane Hiramatsu Azevedo

Professor of the Lasers Qualification course in Dentistry - Fundecto-Fousp; MSc - Nuclear Technology - IPEN; PhD in Oral Diagnosis - Fousp; Specialist in Pediatric Dentistry and Stomatology; Dentist at the Special Laser Laboratory in Dentistry - LELO-Fousp.

Use of high-power lasers in the perioral zone
To present the use of high-power lasers in the intraoral region aimed at HOF, such as gingivoplasty and gingivectomies, melanic depigmentation and the use of the erbium laser in non-ablative mode to induce neocollagenesis and consequently reduce perioral rhytids.

Marcia M. Vidor

MSc - Laser in Dentistry – Fousp; Qualified in Laser – IALD; Laser Mentoring Extension – Fundecto-Fousp; Specialist in Restorative Dentistry – UFRGS.

Advantages of high-power lasers in the daily practice of esthetic dentistry

Lasers have revolutionized many aspects of esthetic dentistry due to their precision, efficiency, and versatility. Understanding how lasers interact with different tissues is necessary to select the right device and wavelength for each procedure.By realizing the advantages of different laser types, esthetic dentists can enhance treatment possibilities and the quality of care they provide to their patients.

Advantages of high-power lasers in the daily practice of esthetic dentistry
Lasers have revolutionized many aspects of esthetic dentistry due to their precision, efficiency, and versatility. Understanding how lasers interact with different tissues is necessary to select the right device and wavelength for each procedure.By realizing the advantages of different laser types, esthetic dentists can enhance treatment possibilities and the quality of care they provide to their patients.

Speakers

Marco Meleti

Professor of Oral Surgery - University of Parma, Italy; PhD in Oral Science - Vrije Universiteit van Amsterdam/ ACTA; President of the European Association of Oral Medicine; Vice-president of the Italian Society for Laser in Dentistry; Director of the Post-graduate Course of Laser in Stomatology - University of Parma, Italy.

Laser surgical management of oral leukoplakia

The present lecture will present all surgical approaches for management of Oral Leukoplakia, based on lasers use.

Marcus Ferreira

PhD in Bioengineering and specialist in Prosthodontics - UFMG; MSc in Lasers in Dentistry – IPEN-USP; Adjunct Professor at Universidade Federal de Minas Gerais (UFMG).

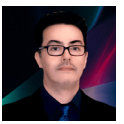
From babies to seniors patients - how the diode laser surgery can transform your dental practice?

One of the roles of technology is to reduce the distance between the general practitioner and the specialist. Several cases will be presented showing safe parameters of how the diode laser can diversify of procedures performed in the dental clinic.

Marina Consuelo Vitale

M.D., D.D.S, PhD
Department of Clinical, Surgical, Diagnostic and Paediatric Sciences, Section of Dentistry, Unit of Orthodontics and Paediatric Dentistry, University of Pavia, Pavia, Italy

Pediatric Dentistry: what can we expect using laser device in Prevention and in minimal invasive Dentistry?



Mario Brito da Silva Filho

Master of Medical Sciences; Oral and Aesthetic Rehabilitator; Specialist in Orofacial Harmonization.

Endolaser for weight loss and facial rejuvenation

Endolaser therapy is a procedure that uses laser energy to stimulate metabolism and promote facial rejuvenation. In weight loss, the laser is directed to areas of subcutaneous fat, causing lysis of fat cells and the subsequent release of free fatty acids, which are metabolized by the body. In facial rejuvenation, the laser penetrates the skin, stimulating the production of collagen and elastin, resulting in an improvement in skin texture, reduction of wrinkles and expression lines. Studies demonstrate its effectiveness both in localized weight loss and in improving skin quality, with minimal adverse effects.

Marisa Carvalho

DDS; President and Founder - Instituto Sorrir Para Vida; Qualification in Lasertherapy – LELO-USP; Case publications on Osteonecrosis.

High and low power laser in the management of osteonecrosis

To present a series of cancer patients with osteonecrosis and osteoradionecrosis with photonic therapies. Photobiomodulation and photodynamic therapy techniques will be presented, associated with the use of high-power lasers. The cases discussed had successful treatment, with complete resolution of the initial lesions. Patients continue to undergo periodic follow-ups to monitor their oral health.

Marleny Gerbi

Specialist in Implantology; MSc - Stomatology; PhD - Laser in Dentistry; Associate Professor - UPE; Leader of the Biophotonics in Health Sciences research group at CNPq; General Coordinator - NIT-UPE.

Impact of Artificial Intelligence in the research of Laser photobiomodulation

The objective of this presentation is to analyze the impact of the use of Artifical Intelligence (AI) in research with laser photobiomodulation associated with research on mesenchymal stem cells from the umbilical cord.

Speakers

Marzena Dominiak

Head of the Chair - dept. of Dental Surgery and Vice-rector for the development strategy of the Medical University of Wrocław.

Usefulness lasers for personalized bone reconstruction in case of orthodontic treatment

During the lecture will be presented usefulness of lasers on different steps of this procedure as improvement functioning muscle in case of snoring, lingual frenum correction, filling removal or surface modification just before connective tissue graft, bioestimulation during soft tissue healing.

Mateus Windlin

MSc - Technologies and Radiation in Health Sciences – IPEN/USP; Qualified and postgraduate in Laser therapy.

Thermal, morphological and optical analysis of tooth enamel after removal of ceramic laminates with Er:YAG Laser

The removal of ceramic laminates using an Er:YAG laser has become common clinical practice in offices. Understanding the thermal, optical and morphological effects is essential for the best execution of this type of treatment.

Paolo Vescovi

DDS, MSc, PhD, Specialist in Oral Surgery; President Elect - WFLD; Director Master Laser in Odontostomatologia - European Master Degree in Oral Laser Applications (EMDOLA); Head - dept. of Pathology and Oral Laser Surgery - Center for Dentistry, Dept. of Medicine and Surgery - University of Parma, Italy.

Advances in Oral Surgery with Er:YAG, CO2, Nd:YAG and Diode laser

The use of laser and cross-linked hyaluronic acid (xHyA)

This lecture will present a new regenerative approach for jaw bone and mucosa in oral surgery

Patrícia Freitas

Professor – dept. of Restorative Dentistry, Fousp; Co-responsible - Laboratório Especial de Laser em Odontologia (LELO-Fousp); Specialist in Restorative Dentistry and Orofacial Harmonization.

Innovations in the use of laser in Orofacial Harmonization

Technological advancement in the field of Orofacial Harmonization has been driven by the use of lasers. Lasers offer a variety of innovative applications, from intraoral surgical procedures to facial rejuvenation through minimally invasive procedures on the skin and surrounding tissues. The lecture will address the most current information about the use of this technology in HOF.

Lasers in the management of complications and adverse events in Orofacial Harmonization

Present and discuss the possibilities of using low-power lasers, through photobiomodulation and antimicrobial photodynamic therapies, in the management of complications and complications in Orofacial Harmonization.

Philip Charles Hallawell

Visual art educator and artist; Image ID educator; Director - Philip Hallawell Visagism Center.

Image ID in Orofacial Harmonization

Philip Hallawell, the creator of Image ID and the concept of Visagismo, will present on Image ID in Orofacial Harmonization, focusing specifically on the role of neurolinguistics in enhancing personalized aesthetics. His presentation will explore Image ID theory, which emphasizes the connection between a person's visual identity and their sense of self, using neurolinguistic principles to decode how individuals perceive and express their personal image. By applying this theory within the framework of HOFI, Prof. Hallawell will demonstrate how customized visual identities can be created, ensuring that the patient's external appearance reflects their internal identity. This personalized approach harmonizes the physical aspects of orofacial aesthetics with the psychological dimensions of self-perception, resulting in a uniquely tailored, harmonious image that aligns with both the patient's sense of self and aesthetic goals.

Speakers

Praveen Arany

Oral pathologist and biomedical engineer; Associate Professor - University at Buffalo, USA.

Innovations in surgical and non-surgical applications for lasers in Dentistry

Innovations in surgical and non-surgical applications of lasers in Dentistry will be presented, in addition to laboratory and clinical experience at the University at Buffalo, USA.

Scientific basis of photobiomodulation, clinical application in photodynamic therapy and Orofacial Harmonization

Preetinder Singh

Professor - Wagro University, Greece and UCAM, Spain; Senior professor & International faculty – Universal School of Health, Florida – USA.

LANAP® and LAPIP® - Minimally invasive periodontal and peri-implantitis treatment protocols: an update!!!

LANAP - Laser-Assisted New Attachment Procedure, which incorporates free running pulsed Nd:YAG laser, promotes the elusive goal of regeneration of the attachment apparatus facilitating true regeneration. LAPIP - Laser-Assisted Peri-Implantitis Procedure as a modification of LANAP which could be used in diseased implants. Laser, removes inflamed pocket tissue, disrupt biofilms, and decontaminate the root/implant surface.

Reem Hanna

PhD in Photomedicine; Specialist and consultant Oral Surgeon at London NHS Hospitals; Honorary Associate Professor and Academic Coordinator and Lead of Fellowship Courses in Laser Dentistry at UCL - Eastman Dental Institute in London; Faculty member and teacher on Academic Master Degree Programme in Laser Dentistry at Department of Surgical Sciences and Integrated Diagnostics, University of Genoa (UniGe).

Harnessing light for healing: comparative in vitro study between the efficacy of 980 nm photobiomodulation delivered with flattop beam profile vs. Gaussian on osteoblast maturation

The objective of the presentation is to appreciate the effectiveness of photobiomodulation delivered with two beam profiles on bone regeneration.

Reza Fekrazad

Periodontist, DDS, MSc, FLD, FICD; Founder and Head of Radiation Science Research Center, Aja University of Medical Sciences -Tehran, Iran, International Network for Photo Medicine and Photo Dynamic Therapy (INPMPDT), and Universal Scientific Education and Research, Network (USERN), Tehran, Iran.

The role of photobiomodulation in nerve injury in Oral and Maxillofacial Surgery

Clinical evidence supports the efficacy of PBM in accelerating nerve regeneration, improving sensory and motor function, and reducing neuropathic pain in patients undergoing oral and maxillofacial surgical procedures. Despite promising results, challenges such as optimal treatment parameters, standardization of protocols, and patient selection criteria remain areas of ongoing research.

Speakers

Robert Convissar

Professor a.c. University of Genoa; D.D.S., F.A.G.D.; Director of Laser Dentistry New York Hospital Medical Center of Queens; Diplomate - American Board of Laser Surgery; Fellow - American Society of Laser Medicine and Surgery.

Nuralyte - A new paradigm in PBM pre-injection analgesia

This presentation will discuss the results of in-vivo human clinical trials. Wavelengths, parameters, time until onset of analgesia, duration and degree of analgesia and other important criteria will be discussed in detail.

Rosane Lizarelli

Master and Doctor of Science - USP; PhD in Biophotonics - USP; Researcher at the Institute of Physics of São Carlos - USP; Professor-Manager of the NILO School-Clinic (Advanced Postgraduate Unit of Facop); Scientific consultant for MMOptics - Laser Division.

Brain photobiomodulation

The irradiation pathways (localized, systemic and remote) that result in significant improvements in brain health and its systemic axes will be presented, as well as their indications and suggestions for safe and efficient clinical protocols, always with a scientific basis.

Rosely Cordon

Post-Doc in Methodology Evidence Map for Health - Fousp; PhD in Biobotany – Universidade Nove de Julho; MSc in Health Sciences - IPEN- USP; Postgraduate in Integrative Medicine and specialist in Quality Management and Accreditation Certifications - Instituto de Ensino e Pesquisa Albert Einstein and Feluma, MG.

Biophotonics as a path to integrative health and well-being - present and future

In the universe of integrative and complementary practices, locating biophotonics as an important area of action to achieve and maintain well-being, a condition desired by patients and hard sought after by professional researchers and clinics.

Roy George

MsC; PhD; Director of the DClinDent; Discipline Lead for Endodontics (UG&PG) at the School of Medicine and Dentistry Griffith University, Gold Coast, Australia; He was awarded an International Patent, for inventing a Novel Fiberoptics tip design for applications in Dentistry.

Photonics in Endodontics and increased success in clinical cases

Laser ablation of dental hard tissue using a novel 800nm femtosecond (30-fs) laser

During the conference will be presented the study demonstrating the viability of using 30-fs laser pulses at an 800-nm wavelength for hard tissue ablation in Dentistry.

Sajee Sattayut

Professor in Oral and Maxillofacial Surgery; Head of Lasers in Dentistry Research Group; Course director: Lasers in Dentistry, Khon Kaen University.

Scientific basis of photobiomodulation, clinical application in photodynamic therapy and Orofacial Harmonization

Laser therapy for oral cancer prevention

Laser therapies show promising potential for oral cancer prevention. Photobiomodulation therapy can decrease inflammation in oral tissues, while photodynamic therapy and less invasive laser surgery can treat potentially malignant oral disorders.

Samir Namour

Director of the post-graduate Laser Applications in Dental Medicine – dept. of Dental Science, Faculty of Medicine, University of Liège; General Director of the European inter-university Master on Oral Laser Applications (EMDOLA group).

Laser progress in caries prevention

The presence of fluoride in enamel reduces the solubility of Hydroxyapatite to acid attack. The aim of my presentation is to describe the progress in the research aiming to increase significantly the enamel retention of fluoride by means of low energy density of a Laser beam to potentially prevent the enamel caries.

Advances in Oral Surgery with Er:YAG, CO2, Nd:YAG and Diode laser

Speakers

Sandra Kalil Bussadori

MSc - Dental Materials; PhD - Pediatric Dentistry - Fousp; Post-doctorate in Pediatrics - Unifesp; Research Professor of the Postgraduate Course in Biophotonic Medicine concept 6 at Capes – Universidade Nove de Julho.

Antimicrobial photodynamic therapy for the treatment of halitosis - clinical protocols

In this lecture will be presented the clinical protocols, news scientific evidences and lasers, LED's and probiotics.

Sérgio Araújo Andrade

DDS, PhD - Biotechnology Applied to Health; MSc - Biotechnology and Entrepreneurship; Qualified in Laser therapy; Professor of Dentistry – Universidade de Itaúna; Researcher NQBIO/UFSJ and CePOF/IFSC-USP.

Widefield optical fluorescence in Dentistry: where we came from and where we need to go

The objective of this lecture is to demonstrate the use of fluorescence both within the limits of oral cancer and associated pathologies and to expand the range of indications for fluorescence, whether within Oral Oncology or in various dental specialties such as: Restorative Dentistry, Dental Prosthesis, Periodontics, Endodontics , Oral Pathology and Implantology. Furthermore, the importance of using wide-field fluorescence for Dentistry will be contextualized within the scenario of complementary exams used in dental and medical practice.

The importance of diagnosis in preventing complications in Orofacial Harmonization

The objective of this conference is to demonstrate the clinical sequence for diagnosing pathologies in the orofacial region and to demonstrate the use of wide-field optical fluorescence examination as a complementary examination in order to minimize or avoid complications either during or after the execution of orofacial harmonization procedures.

Sergio Escobar

Medical Doctor; Specialist in Dermatology; Director - Buenos Aires Aesthetic Sessions (BAAS).

The importance of lip compartments and lip harmonization

It will be presented the evolution of lip-filling techniques, focusing on the significance of understanding lip compartments for precise and effective treatments. His presentation will highlight the anatomy of the lips, emphasizing key compartments. By explaining how each compartment plays a role in achieving balance, symmetry, and natural-looking results, Dr. Escobar will demonstrate how modern lip augmentation techniques can be fine-tuned to enhance aesthetic outcomes. Through a detailed exploration of past, present, and emerging techniques, he will showcase how an in-depth understanding of lip anatomy is essential to providing patients with harmonized and personalized results, in line with the holistic principles of Integrated Orofacial Harmonization (HOFI). This approach emphasizes the importance of precision and technique in achieving facial aesthetics that are not only visually appealing but also functionally harmonious with the patient's unique anatomy.

Sergio Gonçalves

Professor - dept. of Restorative Dentistry, Unesp; President of the Brazilian Group of Dentistry Teachers; Editor-in-chief of the Brazilian Dental Science magazine; Coordinator of the Laser and Photobiomodulation Credit of the Postgraduate Program - CASB-ICT-UNESP.

Adhesion to dentin with Nd:YAG laser

Will be presented the clinical protocols, news scientific evidences and lasers and LED's and probiotics.

Speakers

Shigeyuki Nagai

DDS, PhD; Visiting lecturer – dept. of Periodontology, Tokyo Medical and Dental University Photoperiodontics; Vice Director of the Asia-Pacific Division - WFLD.

Clinical risk management in laser Dentistry
If the laser usage is not correct, the damage to the tissue has to be considered. It includes eye damage, skin burning, emphysema, access bleeding, gingival recession, accidental irradiation of healthy tissue, etc. It is important to understand how to avoid accidents during and after laser treatment. The possible accidents with the laser treatment and how to avoid the complications will be discussed.

Sonia Bordin-Aykroyd

PhD researcher in Photomedicine and Director of the North American Division – WFLD; Committee Member of the American Association for Dental Laser Standards and a Board-Certified Laser Practitioner by the CFO, Brazil.

Scientific basis of photobiomodulation, clinical application in photodynamic therapy and Orofacial Harmonization

HOFI - Integrated Orofacial Harmonization and the evolving concept of beauty
The presentation will introduce Integrated Orofacial Harmonization (HOFI) and the evolving concept of beauty, a pioneering approach in modern orofacial aesthetics that combines health, science, and art to redefine beauty. HOFI emphasizes the holistic integration of facial aesthetics with overall health and well-being, moving beyond isolated treatments. Developed by Dr. Bordin-Aykroyd, it brings together multiple disciplines - dentistry, dermatology, maxillofacial surgery, sleep medicine, myo-functional therapy, and neurolinguistics - into a unified, patient-centered care model. This interdisciplinary collaboration ensures that facial enhancement aligns with the dynamics of craniofacial anatomy, allowing for minimally invasive techniques that deliver natural, long-lasting results. In addition to discussing the holistic principles of HOFI, the presentation will explore how the perception of beauty has evolved across cultures and societies. Key elements such as symmetry, proportion, and balance are essential in creating harmonious facial aesthetics, and through HOFI's personalized diagnostics, including Image ID, practitioners can tailor treatments to individual patients, ensuring results that reflect both modern standards of beauty and personal preferences. By integrating these elements, Dr. Bordin-Aykroyd will explain how the convergence of beauty, health, and interdisciplinary care can enhance patient satisfaction and outcomes, ultimately transforming the field of orofacial aesthetics.

Laser and energy-based devices in orofacial esthetics

Discover the latest in laser and energy-based advancements shaping orofacial esthetics, enhancing personalized, precise cosmetic treatments. Learn how these innovations blend traditional methods with advanced esthetic solutions. Gain insights into their potential to elevate patient care and aesthetic outcomes.

Sonia Groisman

Senior Researcher at the DNA Laboratory of UERJ; Full Professor at UFRJ; Representative and Consultant of the Global Child Dental Foundation; Member of the Oral Health Working Group of the World Federation of Public Health Association; Member of the Brazilian Academy of Dentistry; Honorary Member of the Brazilian Military Academy of Dentistry.

Clinical use of laser in early caries detection and its prevention

It is a Literature Review, where clinical cases were based on Dental caries is the most prevalent chronic disease worldwide. The use of Laser combined with flour shows a somehow good result, but still, it is necessary more research using laser together with new preventive materials.

Speakers

Susana Teitelbaum

DMD, MSc in Laser, PhD; Director Dentist and Laser Therapist at Fundación Perez Scremini; Director of ITAV Advanced Technology Institute, Campus Uruguay.

The impact of photobiomodulation therapy in oncological patients

Cancer patients when treated for their neoplasms, whether with Surgery, Radiotherapy or Chemotherapy, experience adverse reactions that can often prevent, minimize or accelerate repair processes, with high benefits, improving their quality of life and results. In this presentation we will look at different types of injuries, syndromes and secondary disorders, as well as their short-term solution, which has a very beneficial impact on patients and their families.

Tomasz Gedrange

Professor - dept. of Dental Surgery - School of Dentistry, Wroclaw Medical University, Poland.

Usefulness lasers for personalized bone reconstruction in case of orthodontic treatment

During the lecture will be presented usefulness of lasers on different steps of this procedure ex. improvement functioning muscle in case of snoring, lingual frenum correction, filling removal or surface modification just before connective tissue graft, bioestimulation during soft tissue healing.

Tony Carreon

DDS; Certificated in Laser; Postgraduate in Perio-implant Dentistry.

The use of lasers in Aesthetic Dentistry, Implant Dentistry and Orofacial Harmonization: minimum invasion and tissue selectivity

This dynamic lecture, with presentation of clinical cases, aims to share with colleagues the clinical and surgical applications of lasers in Aesthetic Dentistry, Implantology and HOF, in soft and hard tissues, focusing on the principles of minimal invasion and tissue selectivity.

Umberto Romeo

Specialist in Oral Surgery; Head – dept. of Oral and Maxillofacial Sciences; Director EMDOLA Master-Rome, Sapienza University of Rome, Italy.

Blue Diode Laser (445 nm) during oral soft tissue surgery: clinical and histological aspects

This lecture will be focus in the possibility to use the 445nm diode laser in complete safety during the surgery of oral soft tissue. He evaluate the histological effects at microscopy, presenting an ex-vivo study, and the clinical results through the presentation of various clinical cases.

Advances in Oral Surgery with Er:YAG, CO2, Nd:YAG and Diode laser

Valdir G. Garcia

Professor in Periodontics - Unesp; Leader of the Study and Research Group on Lasers in Dentistry (GEPLO - Unesp); Professor and researcher at the Stricto sensu Postgraduate Program - Faculty Ilapeo, Curitiba.

Photobiomodulation effects therapy on areas treated with biomaterial

Results of experimental and clinical studies of the effects of photobiomodulation in bone areas treated with different biomaterials will be presented. The results demonstrated the benefits of photobiomodulation in bone repair.

Speakers

Valeria Mendes

PhD student and MSc - Radiation Technology in Health Sciences - IPEN-CNEN/USP; Specialist in Dentistry for Patients with Special Care Needs - Fousp.

High-intensity pulsed lasers in non-ablative mode in the treatment of sleep-disordered breathing

Non-ablative treatment with Nd:YAG and Er:YAG lasers can reduce tissue sagging in the oropharynx region. This enlarges the lumen of the upper airways, facilitating the passage of airflow for breathing during sleep, proving to be an effective approach in the rehabilitation of patients with sleep-disordered breathing.

High-intensity pulsed lasers in non-ablative mode in the treatment of sleep-disordered breathing

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Vanderlei S. Bagnato

Bachelor's degree in Physics - USP, and Materials Engineering – UFSCar; PhD in Physics - Massachusetts Institute of Technology; Professor – USP; Director - IFSC-USP and Texas A&M University – College Station, USA.

New laser applications in oral health: control and reversal of antibiotic-resistant bacteria

In this presentation we will demonstrate and argue the combined use of antibiotics with photodynamic action as an alternative to facilitate the use of antibiotics and avoid the development of resistance. Cases of pharyngotonsillitis and infections of an endodontic and periodontal nature should be addressed. In particular, the challenges posed by the treatment of resistant pneumonia will be discussed.

Oral Presentation

Adriana Cátia Mazzoni (Brasil), Sandra Kalil Bussadori, Raquel Mesquita Ferrari, Aldo Brugnera Júnior, Lara Jansiski Motta

Category: Preclinical
Title: EFFECTS OF HEATING DIFFERENT SURGICAL INSTRUMENTS ON THE INCISION OF THE LINGUAL FRENULUM REGION IN PIGS - PRECLINICAL EX VIVO EXPERIMENTAL STUDY

Aim: This study aims to evaluate and compare the variation in heating in the ventral surface of the ex vivo pig tongue, caused by thermal surgical instruments during the surgical incision.

Material and methods: Tissue heating during incisions in ex vivo pig tongues was evaluated by measuring temperature with a thermographic camera FLIR C5 before, during, and one minute after the surgical cut, over the local fascia of each specimen. The incision was performed with 12 different surgical instruments, such as: Iris scissors; electrocautery with a nickel-chromium tip at 1200°C; electronic scalpel Be3000 (6W) power; high-power Diode lasers from the DMC (808nm) brand in pulsed (1.3 mW, 20 Hz,5s) and continuous (1.5 W a 2W, 100 J) modes, and D Storm(980nm) in continuous (2W), pulsed(7W), and super-pulsed (4 W 8Hz 25 s) modes; the Erbium laser Lite touch (2300nm) with and without air and water (2W,20Hz) and the high power Diode laser Blue, Thera Blu DMC (450nm) continuous (1.5W) and pulsed (1.5W,20Hz,20s).

Results: The devices showed a wide temperature variation among them. It was observed that with the use of scissors, there was no significant difference between the pre- and post-incision temperatures. All instruments exhibited acceptable cooling, nearly returning to the initial temperature within one minute after the incision

Conclusion: This translational study identified the heating effects on tissue caused by each surgical instrument. This information can help the operating surgeon choose the instrument that will provide the best result according to the needs of each case.

Alessandro Del Vecchio (Italy)
Category: In vitro
Title: THE EFFECTS OF RED AND NIR PBM ON HUMAN BONE MARROW MESENCHYMAL STEM CELLS (hBMMSCs) PROLIFERATION. PRELIMINARY REPORT

Aim: The recruitment and adequate proliferation of osteoprogenitor cells capable to differentiate into matrix-producing osteoblasts are the basis of post-surgical healing and regeneration of jawbone. Recent studies have postulated the efficiency of photobiomodulation to improve tissue regeneration and to accelerate wound healing. This study aimed to determine the effect of combined Red and NIR photobiomodulation on human osteoprogenitor cells ex vivo collected after mandibular bone surgery.

Material and methods: Bone marrow stromal cell cultures derived from 4 donors were set in different wells and induced toward osteogenic differentiation for 4 days in standard osteogenic assay. PBM irradiation was performed with double 650nm and 910nm diode laser (Lumix 2® Fisioline - Verduno – Italy) at 100mW in CW for 650nm laser, and 500mW in PW at 9kHz for 910nm, to release 4J/well. Some cells were irradiated once on the first day of culture (LT1), another group was irradiated each second day for two weeks (LT2), and a third group received the irradiation once on the 12th day of culture (LT3). A fourth group was not irradiated as control (C). Histologic evaluation measured Matrix Mineralization, Alkaline Phosphatase Cytochemistry (ALP) and qPCR gene expression of genes involved in osteogenic differentiation (CBFA1, SP7, ALPL, BGLAP), matrix deposition and remodeling (COL1A1, COL3A1, COL10A1, MMP1, MMP8, MMP13), osteoclastogenesis (TNFSF11, TNFRSF11B, CSF1) and inflammation (IL6, IL6R, IL1B). The expression level of each gene was normalized to GAPDH expression.

Results: Genes analysis revealed no effects of PBM on osteogenic differentiation, but a significant reduction of COL1A1 and MMP13, genes involved in bone matrix homeostasis, was observed. PBM markedly downregulated the expression of RANKL, IL6 and IL1B that are involved in osteoclastogenesis and inflammation. No significant difference emerged between different administration protocols.

Oral Presentation

Conclusion: According to these preliminary results, Red and NIR laser PBM did not modulate the osteogenic phenotype of mandibular osteoprogenitors but highly reduced the expression of matrix-related genes and their pro-osteoclastogenic and pro-inflammatory profile, furthermore the single-shot administration showed the same efficiency of the repeated irradiation protocol.

Allana Rodrigues Serrano, Jéssica Meirinhos Miranda, Caio Lima Pires, Maria Eduarda de Moura Silva Albuquerque, Maria Regina Almeida de Menezes, Nathalia Seimi Deama, Marleny Elizabeth Márquez de Martínez Gerbi (Brazil),
Category: In vitro
Title: EFFICACY OF LASER PHOTOBIOMODULATION ON CELL PROLIFERATION AND ODONTOGENIC DIFFERENTIATION OF HUMAN UMBILICAL CORD MESENCHYMAL STEM CELLS AND SUGARCANE BIOPOLYMER SCAFFOLDS: IN VITRO STUDY

Aim: To investigate the in vitro efficacy of photobiomodulation therapy (LLLT) on human umbilical cord mesenchymal stem cells (UC-MSCs) proliferation and differentiation.

Material and methods: Cells from the umbilical cord were collected and cultured until the third passage, being phenotyped by flow cytometry to confirm their nature. The cells were then plated and divided into 6 groups: G1 (CONTROL); G2 (LLLT) (660nm; 10mW; 2.5J/cm^2; 0.1 J; spot 0.08cm^2); G3 (BMP-2); G4 (BMP-7); G5 (BMP-2+LLLT); and G6 (BMP-7+LLLT). The laser device used was the InGaAIP (MMOptics, Equipamentos Ltd, São Carlos, SP, Brazil). Each application lasted 10 seconds per well, with 2 sessions conducted, resulting in a cumulative dose of 0.5 J. The MTT assay was performed at 24h, 48h, and 72h to generate cell proliferation curves. Morphological analysis for cell differentiation occurred at 7, 14, and 21 days, using Alizarin Red to identify mineralized tissue formation, observed by inverted phase contrast microscopy. Histological images were analyzed qualitatively and quantitatively using ImageJ software to calculate the total area of mineralized tissue in the wells (px^2).

Results: The irradiated groups showed significantly higher cell proliferation over 72 hours compared to the control, BMP-2, and BMP-7 groups. The BMP-7+LLLT and BMP-2 groups were statistically significant in odontogenic differentiation compared to the control and other experimental groups.

Conclusion: The irradiated groups, especially LLLT combined with BMP-7, demonstrated efficacy in the proliferation and differentiation of UC-MSCs according to the parameters established in this study.

Amanda Paino Santana, Leticia Helena Theodoro, Erica Dorigatti de Avila, Wirley Gonçalves Assunção (Brazil)
Category: In vitro
Title: BuTB AS A NOVEL PHOTOSENSITIZER FOR aPDT TO FIGHT POLYMICROBIAL BIOFILM FORMATION ON TITANIUM IMPLANT MATERIAL

Aim: Antimicrobial photodynamic therapy adjunctive to mechanical debridement is a promising strategy for the treatment of peri-implantitis. In this in vitro study, we aim to establish the minimum concentration of a new photosensitizer, butyl toluidine blue (BuTB), at which an earlier polymicrobial biofilm growth is completely inhibited without causing toxicity to human cells.

Material and methods: To this end, titanium discs were used to simulate implant abutment surfaces and saliva from patients diagnosed with peri-implantitis was used as a polymicrobial biofilm model. The characterization of the BuTB molecule was determined by Fourier-transform infrared spectroscopy (FTIR) and absorption/transmission spectrophotometry through the ultraviolet-visible-near infrared region (UV-vis). The laser used to activate BuTB was the Indium-Gallium-Aluminum-Phosphorus (InGaAlP) with a wavelength of 660 nm (Photon Lase III, DMC Equipments Ltda, São Carlos, São Paulo, Brazil) in the following treatment protocol: power: 75 mW; application mode: continuous; energy: 4.5 J; output fiber area: 0.0283 cm^2; energy density: 160 J/cm^2; exposure time: 60 s and power density of 2.67 W/cm^2.

Results: The antibacterial capacity of BuTB was confirmed with a low BuTB concentration of 0.05 mg/mL, with more than 3 log reduction of bacterial growth in comparison to untreated Ti discs ($p<0.05$), independent on the pre-irradiation time (1 and 5 minutes). Importantly, quantitative and qualitative assessments demonstrated that 1 minute of pre-irradiation time at 0.05 mg/mL cells

did not affect the mitochondrial enzymatic activity of keratinocytes and fibroblast cells cultured in a monolayer. However, a cytotoxic effect was observed when both cells were exposed to 5 minutes of pre-irradiation time at the same concentration of BuTB.

Conclusion: These findings provide insight into the effect of BuTB on polymicrobial biofilm formation and cell behavior and establish new parameters to make aPDT more applicable to in vivo experiments.

Ana Maria Gois, Carolina Gianini, Heitor Franco-Santos, Vitor Hugo Panhoca, Lívia Lins (Brazil)
Category: Clinical human studies
Title: PHOTOBIOMODULATION AS A POTENTIAL TREATMENT FOR PARKINSON'S DISEASE: A PILOT STUDY

Aim: Evaluate the effect of photobiomodulation (PBM), using near-infrared light (NIR), on clinical symptoms of Parkinson's Disease (PD) patients.

Material and methods: Our sample included 48 PD patients at Hoehn and Yahr stages II-III, who were divided into 4 groups: G1–intranasal and transpalatine PBM; G2 –intranasal PBM; G3- transpalatine PBM; G4- Placebo. All the participants received PBM therapy for 10 min (infrared, 810 nm), output power of 100 mW(energy of 60 J in each location for 12 weeks, 2 days per week. The PBM device was placed to deliver light in the intranasal (into both nostrils) and transpalatine (soft palate) regions. The placebo device appeared identical but delivered no light. The adverse event and the Unified Parkinson Disease Rating Scale (UPDRS) scores were recorded before and at the end of 12 weeks of therapy.

Results: We noted that the total score of the UPDRS decreased significantly at the end of the PBM therapy compared to the baseline in all groups except the G4 participants. G2 patients had lower UPDRS total score compared to G3 patients ($p = 0.03$) and G4 ($p = 0.001$) at the end of treatment. Moreover, no adverse events were reported by any participant.

Conclusion: Our findings suggest that PBM is safe and has potential to improve the PD symptoms, laying the foundations to guide the development of a future clinical trial.

Ana Paula Tanko de Vasconcellos (Brazil)
Category: Clinical human studies
Title: ANTIMICROBIAL PHOTODYNAMIC THERAPY (a-PDT) IN POSTOPERATIVE COMPLICATIONS OF BICHECTOMY SURGERIES

Aim: 1) To appreciate the effects of a-PDT in the treatment of infections caused by microorganisms. 2) To understand the benefits of the local action of a-PDT in postoperative complications of bichectomy surgeries. 3) To evaluate the positive impact of a-PDT on the speed of tissue repair.

Material and methods: The benefits of the practical applicability of a-PDT in the treatment of postoperative infections in patients undergoing bichectomy surgery will be demonstrated through the presentation of clinical cases performed by the author for the treatment of postoperative complications, with the implementation of surgical treatment. combined with antimicrobial photodynamic therapy (Therapy EC™, DMC, 100mW, 660nm, 54J; Chimiolux™, DMC, methylene blue 0.01%), and lasers (red laser 100mW, 660nm and infrared laser 100mW, 808nm).

Results: After a single application of photodynamic therapy and systemic prescription of antibiotics, there was an improvement in the infectious condition in the cheek region of the patients, proving the efficacy and efficiency of this therapy in integumentary tissue.

Conclusion: The beneficial effects provided by a-PDT on biological tissues are excellent allies for clinical practice in the treatment of infectious complications in facial surgeries.

Ana Paula Tanko de Vasconcellos (Brazil)
Category: Clinical human studies
Title: ANTIMICROBIAL PHOTODYNAMIC THERAPY (A-PDT) IN POSTOPERATIVE COMPLICATIONS OF FACIAL LIFT THREADS

Aim: a-PDT is the treatment of infections caused by microorganisms, which can be viruses, fungi and bacteria, through the association of a light source, a photosensitizer compatible with the wavelength of this light, and the presence of oxygen, leading to apoptosis microbial. Objectives. 1) To appreciate the effects of a-PDT in the treatment of infections caused by microorganisms. 2) To understand the benefits of the local action of

a-PDT in postoperative complications of facial lift threads implantation. 3) To evaluate the positive impact of a-PDT on the speed of tissue repair. **Materia and methods:** The benefits of the practical applicability of a-PDT in the treatment of postoperative infections in patients undergoing facial lift threads implantation will be demonstrated through the presentation of clinical cases performed by the author for the treatment of postoperative complications, with the implementation of surgical treatment. combined with antimicrobial photodynamic therapy (*Therapy EC™, DMC*, 100mW, 660nm, 54J; *Chimiolux™, DMC*, methylene blue 0.01%), and lasers (red laser 100mW, 660nm and infrared laser 100mW, 808nm).

Results: After three sessions of application of photodynamic therapy and systemic prescription of antibiotics, there was an improvement in the infectious condition in the middle third of the patient's right face, proving the efficacy and efficiency of this therapy in integumentary tissue.

Conclusion: The beneficial effects provided by a-PDT on biological tissues are excellent allies for clinical practice in the treatment of infectious complications in orofacial harmonization procedures.

Ana Paula Tanko de Vasconcellos (Brazil)
Category: Clinical human studies
Title: BIOPHOTONICS ALLIED TO MICRONEEDLE TECHNIQUE AND SURFACE PEELING IN OROFACIAL HARMONIZATION

Aim: The orofacial harmonization is a specialty of Dentistry, which aims to promote the aesthetic and functional balance of the face, through surgical and minimally invasive procedures, using different materials and techniques, including biophotonic (LEDs and laser therapy), microneedle technique, and high-performance dermo cosmetics. Objectives: 1) To appreciate the effects of biophotonic using microneedle technique and high-performance dermo cosmetics. 2) To understand the benefits of the local action of laser photonic therapy in orofacial harmonization treatments. 3) To appreciate the impact of non-invasion PBM on biological tissues in the aesthetic zone like the orofacial field.

Material and methods: The benefits of this protocol will be demonstrated through the presentation of clinical cases performed by the author to promote improved health of the integumentary tissues of the face through biophotonic therapy with lights (*Elite Duo™, DMC*, !00mW ± 20%; blue LED, 450nm ± 10 nm; amber LED, 590nm ± 10 nm; red laser, 660nm ± 10 nm; infrared laser, 808nm± 10 nm) and high-performance nanotechnology dermo cosmetics (*TechPeel Premium™, VitaDerm*), in association with the microneedling technique with a dermaroller device (*Roller Gold™, Alur Medical*, 2mm) on the patient's skin.

Results: Biophotonic photobiomodulation with local application of lasers and LEDs in association with the microneedling technique and high-performance dermocosmetics, proved to be effective and efficient in the hydration and quality of skin integumentary tissues of the face.

Conclusion: The beneficial effects provided by photobiomodulation in biological tissues are excellent allies for the clinical practice of the specialty of orofacial harmonization in the search for aesthetic perfection.

Ana Paula Tanko de Vasconcellos (Brazil)
Category: Clinical human studies
Title: FULL-FACE MORPHO FUNCTIONAL APPROACH

Aim: The patient with morpho functional dentofacial disorders must have a multidisciplinary approach from all dental specialties, where photobiomodulation ends up being a great ally in promoting the health of the tissues that make up the face, to lead the patient to obtain facial normality over aesthetic and functional aspects. Objectives: 1) To appreciate the effects of photobiomodulation (PBM) in adjunct to other treatment modalities in achieving orofacial harmonization. 2) To understand the benefits of a multidisciplinary approach to patients with dentofacial disorders. 3) To appreciate the impact that morpho functional facial treatment has on the quality and self-esteem of patients.

Material and methods: The benefits of this protocol will be demonstrated through the presentation of clinical cases performed by the author to promote improved health of the integumentary tissues of the face through biophotonic therapy with lights (*Elite Duo™, DMC*, 100mW ± 20%; blue LED, 450nm ± 10 nm; amber

LED, 590nm ± 10 nm; red laser, 660nm ± 10 nm; infrared laser, 808nm± 10 nm), in combination with invasive procedures such as bichectomy and orthognathic surgery, and aesthetic-functional completion through minimally invasive orofacial harmonization procedures.

Results: The beneficial effects provided by photobiomodulation to improve the health of the tissues that make up the face, serving as preparation for surgical and minimally invasive treatments for the morpho functional completion of the full-face approach.

Conclusion: Only the multidisciplinary approach of dentistry specialties can promote full-face morpho functional normality in a complete way, directly impacting the improvement of patients' quality of life and self-esteem.

Andre Rodríguez, Andre Carvalho Rodriguez Carlos Eduardo Xavier Dos Santos Ribeiro Silva, Stella Regina Zamuner, Maria Cristina Chavantes (Brasil)
Category: Clinical human studies
Title: PHOTOBIOMODULATION AND PULSED ELETROMAGNETIC FIELD AS COADJUVANT IN BISPHOSPHONATE RELATED OSTEONECROSIS OF THE JAW'S TREATMENT: A PILOT STUDY

Aim: Evaluate the response of photobiomodulation and magnetotherapy, as adjuvants to the surgical treatment of osteonecrosis of the jaw, induced by bisphosphonates.Bisphosphonates are drugs that reduce bone resorption, while used for long periods, it can lead to serious adverse effects, by mutilating complications, decreasing quality of life.

Material and methods: A prospective, randomized and controlled clinical trial was carried out with 8 female patients, by jaws osteonecrosis. The patients were divided in three groups: Group I standard treatment (surgery) and placebo, Group II standard treatment + photobiomodulation and Group III standard treatment + pulsed eletromagnetic field. The evaluations were carried out through the oral mucosa healing according to visual clinical examination and comparing bone repair through density on computerized tomography. Laser applications were carried out in 4 stages: Immediate post-operative, post-12h, 72h and 07 days. The device used was (Laser DUO, MMoptics São Carlos, SP, Brazil; 808 nm; continous): in the following parameters; power 100 mW ; energy density 10 J/cm² per point; energy 3J; exposure time 30s applied to six points on the lesions. With a cumulative dose of 60 J/cm² per point and a total dose of 240 J/cm² per patient. Magnetotherapy were carried out in the same 4 times, with the Neospin Device (São Paulo, Brazil), frequency of 9 Hz and intensity of 500 Gauss, per area of the base with 19.6 cm², on to entire lesion extent, for 15 minutes.

Results: In the repair of gingival soft tissue. The placebo group showed dehiscence after 7 days in 100% of the cases, while the Laser Group demonstrated 33.3% partially closed sutures, whereas in the magneto group there was complete closure in 100% of the patients. When comparing bone repair by tomographic density analysis using the Hounsfield Unit in the pre-operative period of 60 days post-surgical. Indeed, the magnetotherapy group obtained the best result, with a 40% increasing in bone density compared to the other groups.

Conclusion: Photobiomodulation therapy and Magnetotherapy demonstrated highly effectiveness in the adjuvant treatment of the jaw's osteonecrosis, beside faster healing and stimulating the tissue repair process, by reducing phlogistic signs and, besides post-operative morbidity.

Anna Paula Lima Teixeira da Silva, Ana Flávia Andrade Sérgio, Fernando Antônio Lima Habib, Luiz Guilherme Pinheiro Soares, Iago Pinheiro Fortuna Nunes, Marco Antônio Mota Menezes Magnavita, Antonio Luiz Barbosa Pinheiro (Brazil)
Category: Clinical human studies
Title: ORAL MICROBIOLOGICAL CONTROL USING Er:YAG LASER IN ORTHODONTIC PATIENTS

Aim: The purpose of the present crossover clinical study was to evaluate the microbial elimination capacity of the Er:YAG laser with sub-ablative ED on the supragingival area of patients with fixed orthodontic appliances.

Material and methods: The sample consisted of 18 individuals undergoing orthodontic treatment at the FOUFBA Orthodontics Center. Irradiation with the Er:YAG laser 2940ηm, 40mW, 20Hz, DE= 5,1J/cm², t=30s) was performed on the cervical area of the lower right lateral incisor at 10mm from the tooth surface. Biofilm collections were

carried out before the intervention (Control) and after the laser application (Laser Group). The samples were inoculated into Petri dishes for visual counting of colony-forming units (CFU). After tabulation and logarithmic transformation of the data obtained, the ANOVA test (General Linear Model) was applied to verify the existence of a significant difference between the groups.

Results: The Laser Group showed a statistically significant decrease of CFU (ANOVA F=58.23; p<0.00) compared to the Control Group.

Conclusion: The proposed Er:YAG irradiation protocol using sub-ablative DE significantly reduced CFU in patients with fixed orthodontic appliances.

Ariane Venzon da Naia Sardo, Guilherme de Souza Cabral Muzy, Daniela Fátima Teixeira Silva, Denise Maria Zezell (Brazil)
Category: Clinical human studies
Title: REMISSION OF PERIORAL DERMATITIS IN 48 HOURS USING PDT: A CASE REPORT

Aim: The objective was to locally treat perioral dermatitis (POD) with photodynamic therapy (PDT) in a patient with complaints for more than 30 days.

Material and methods: A female patient, 32 years old, with bilateral POD lesions that extended from the chin skin to the alar base region, intensely erythematous, with scaly and bleeding spots, reporting a slight itching sensation, but with intense burning and significant social embarrassment. She was advised to stop using any cosmetic product, except her daily use liquid soap, and protect herself from sunlight with physical means. She was treated with two sessions of PDT with 10 ml of 0.1% aqueous methylene blue (MB). After 5 min of contact between the skin and the MB, a diode laser, continuous mode, with 660 nm, beam output area of 0.19 cm^2 and respective power of 50 mW (Laser Duo, MMO, Brazil), was used to irradiate 6 points on each side of the face, for 180 s and 9 J per point, resulting in 263 mW/cm^2 and 47 J/cm^2 per point. Each session lasted 2,160 s, with two sessions spaced 24 hours apart, totaling 94 J/cm^2 per point.

Results: After 48 h of the first session, the patient presented significant clinical remission of the erythema and evident improvement in the visual appearance of the skin, also reporting a complete absence of symptoms. After nine months, a new follow-up appointment was made and the patient did not report any recurrence and, clinically, the skin remained intact.

Conclusion: Unlike conventional treatment, which can last more than 30 days and is often associated with the use of topical formulations based on immunosuppressants and systemic antibiotics, PDT was effective in reducing signs and symptoms related to POD in 48 h and locally.

Beatrice Spaggiari, Ilaria Giovannacci, Marco Meleti, Paolo Vescovi (Italy)
Category: Clinical human studies
Title: NONSURGICAL LASER ASSISTED APPROACH OF RADICULAR CYSTS

Aim: Evaluate the possibility of enhancing the effects of irrigants with the support of lasers technologies in nonsurgical Endodontic treatment.

Material and methods: In this case series three different kind of lesions have been treated. Patients, females, were between 16 and 30 years old. All Endodontic therapies were performed in orthograde way, with manual instruments and Nichel-Titatium rotary instruments. Irrigation protocols were based on the use of 5% sodium hypochlorite (NaOCl) and 17% ethylenediamine tetraacetic acid (EDTA), according to literature, enhanced by different laser technologies. Patient 1 presented a radicular cyst of element 46: decontamination was associated with Nd:YAG laser activation of 5% NaOCl. The fiber (320 μm) was located inside the canal 1mm shorter than working length and activated in coronal direction. This procedure lasted 5s and was repeated 4 times (15Hz, 1.25W, LightWalker Fotona, power intensity1555 W/cm^2, total fluence 167.94 J/cm^2). Patient 2 presented a huge cystic lesion on element 11: in this case Nd:YAG laser was used as described before, but the fiber was located 5mm shorter than working length due to the risk of extrusion of NaOCl. Patient 3 present an endo-perio lesion on element 42, resulting from a previous ineffective treatment: irrigation was enhanced with the support of laser Er:YAG (2940nm, LightWalker Fotona). The special tip SWEEPS (radial 400 2mm) was placed at the entrance of the canal and 5 irradiations (2 with EDTA + 3 with NaOCl) of 30s each with a rest time

of 30s were performed (15Hz, 10mJ, 0,30 W).

Results: Patient 1 and 2 presented a complete resolution of the lesion at one-year follow-up. Patient 3 at four months control shows a promising lesion in healing.

Conclusion: The favorable outcome of these therapies supports all data in favor of laser-enhanced irrigation, but further studies will be necessary.

Beatriz Miranda Moura Dutra, Luciane H Azevedo, Gisele M Freitas, Marines Trevisan (Brazil)
Category: Preclinical
Title: THE TREATMENT OF ANKYLOGLOSSIA WITH HIGH-POWER DIODE LASER AT DIFFERENT AGES - CASES REPORTS

Aim: Present the treatment of ankyloglossia in three clinical cases with different ages: in a baby, a child, and in an adult, using high-power diode laser for lingual frenectomies.

Material and methods: The technique chosen for the treatment was the use of a high-power diode laser (Theralaser DMC equipment) 808 nm. After local anesthetic infiltration technique with lidocaine 1,100,000 with epinephrine 2%, a laser procedure was performed, calibrated at 1.2 W for baby case, 1,3 W for the child and 1,5 W for adult of power in continuous mode, without sutures and without complications. The low-power laser (EC-Therapy DMC) was applied 1 J red, 100 mW of power, 11.11 J/cm² of energy density, 1.11 W/cm² of power density, 10 seconds per point, distance between points of 1 cm, used immediate postoperative period to reduce pain, modulate inflammation and tissue repair in all clinical cases . Immediately after, the baby was taken to breastfeed and the mother reported a reduction in pain and irritation, absence of popping, choking and biting. The child and adult were advised to undergo speech therapy. The baby was followed for 4 years, the child for 8 months and the adult for 1 year and 6 months, all showed excellent results.

Results:. They were successful during the procedure and achieved complete tissue repair, with the beby being followed for 4 years, the child for 8 months, and the adult for 1 year and 6 months.

Conclusion: The high-power diode laser is an excellent option for the treatment of ankyloglossia at different ages.

Beatriz Miranda Moura Dutra, Gisele Moreira Freitas, Luciane H Azevedo, Marines Trevisan, Laura Ribon (Brazil)
Category: Preclinical
Title: Antimicrobial Photodynamic Therapy in foot-hand-mouth Oral Lesions - clinical case report

Aim: To present the treatment and evolution of oral lesions of foot-hand-mouth disease using Antimicrobial Photodynamic Therapy(aPDT) in a 2-year-old patient.

Material and methods: 2-year-old patient presenting extraoral and intraoral lesions causing eating discomfort and irritability. A session of Antimicrobial Photodynamic Therapy a-PDT was proposed using methylene blue at a concentration of 0.01% in gel (DMC) extraorally and intraorally the lollipop (doctive Blue) at a concentration of 0.01%. After 5 minutes of application of methylene blue, the low-power 6 J V laser (EC THERAPY DMC) was used. The extraoral part was divided into 4 quadrants, each of which received 5 laser application points (6J V) with an approximate distance of 1 cm between them, totaling 20 radiation points. In the intraoral part, several laser points (6 J V) were applied, approximately 1 cm apart, distributed over the cheek, gums, and tongue where the most lesions were concentrated.

Conclusion: Benefits of Antimicrobial Photodynamic Therapy were observed in the quality of life and positive evolution of the affected patient, with this therapeutic approach promoting rapid recovery, minimally invasive treatment and satisfactory results.

Beatriz Vilas, Martin Puch, Ramón Alvarez, Lourdes Zaffaroni (Uruguay)
Category: In vitro
Title: COMPARISON OF THE ANTIMICROBIAL EFFECT OF SODIUM HYPOCHLORITE, SUPEROXIDIZED WATER AND PHOTODYNAMIC THERAPY AGAINST ENTEROCOCCUS FAECALIS IN ENDODONTICS. IN VITRO STUDY

Oral Presentation

Aim: To compare the response of Enterococcus faecalis to three antimicrobial strategies: sodium hypochlorite, superoxidized water and photodynamic therapy

Material and methods: 100 lower human premolars were selected, with root canal lengths between 10 and 15 mm, curvature angle up to 25° and curvature radii between 5 and 8 mm. These were instrumented with Reciproc® 25 files. Two layers of nail polish were placed on the external surface to prevent bacterial microleakage. All teeth were then sterilized in an autoclave cycle. They were divided into 4 groups of 25 each, using a simple random sampling technique and then contaminated. The study was performed according to the methodology reported by Kuştarci et al. (2009). The identification of E. faecalis was ensured through biochemical techniques and by MALDI-TOF. A pure culture of E. faecalis, grown in brain heart infusion broth (BHI), was used to contaminate the root canals and stored for 24 hours at 37 degrees Celsius. Then, sodium hypochlorite, super oxidized water, and photodynamic therapy were applied and physiological serum was used as a control group. The bacterial evaluation was carried out in two moments. The first was carried out after the incubation time had passed, in order to confirm contamination. The second was after applying each antimicrobial. The collection was carried out with sterile paper cones in the root canals for 1 minute and they were transferred to eppendorf tubes containing 2 ml of BHI broth. The tubes were vortexed for 2 minutes and 10 µl of suspension was inoculated in the second part of the TSA plates. Two cultures were made for each sample collection, to strengthen the sample without modifying the number of specimens. The statistical analysis was carried out on 200 cultures (2 per tooth) of Enterococcus faecalis. From the Colony Forming Units (CFU) before and after each application, the percentage reduction was calculated. Non-parametric procedures were used to compare the effectiveness of these four treatments (Kruskal-Wallis test). Multiple comparisons were subsequently made using the Nemenyi test. The p-values were obtained by random permutations. All calculations were performed in the software R (R Core Team, 2023). Statistical significance was determined using a 5% level.

Results: There were 50 measurements of CFU in each of the 4 treatments. The percentage reduction had a median of 87.3% (quotient=0.127) with an interquartile range of 43.3%.
The physiological serum presented the lowest percentages of reduction. On the other hand, sodium hypochlorite and PDT seem to present similar reductions. Ultimately, the super oxidized water treatment presented the highest levels of reduction.
Both globally and separating by replicates, a significant value was obtained from the Kruskal-Wallis test. From the 6 p-values obtained in the multiple comparisons (Nemenyi test) it was determined that there was no significant evidence to differentiate the reduction of hypochlorite from the reduction obtained with PDT.

Conclusion: There is response of the E. faecalis bacteria to the use of the 3 antimicrobials evaluated. It is possible to affirm that comparing superoxidized water with PDT and sodium hypochlorite solution, it had a notable antimicrobial activity against the other 2 antiseptics, which demonstrated similar efficacy.

Caio Bruno Tolentino de Brito, Caio Camargo Calarga, Fabianne Soares Lima, Patricia Moreira de Freitas, Alyne Simões (Brazil)
Category: Clinical human studies
Title: PHOTOSENSITIVITY EPISODES RELATED TO SKIN COLOR IN DUAL-WAVELENGTH LOW POWER LASER THERAPY: A RETROSPECTIVE COHORT STUDY

Aim: This study investigates the relationship between self-reported skin color and the frequency of photosensitivity episodes in patients exposed to extraoral low-level laser therapy protocols with dual-wavelength irradiation at the Special Laboratory of Lasers in Dentistry of the University of São Paulo (LELO-USP), through a retrospective cohort study.

Material and methods: Approved by the Research Ethics Committee of the Faculty of Dentistry at USP, this study was conducted in two stages. In the first stage, data including skin color, sex, age, and medications were collected from records of patients treated with simultaneous irradiation protocols at LELO-USP from 2013 to 2023. Patients were categorized based on skin color: Group I (light skin tones: white and yellow) and Group II (dark skin tones: indigenous, mixed-

race, and black). In the second phase, statistical tests were applied to analyze the association and correlation between variables and the frequency of photosensitivity episodes, with a significance level set at 5%.

Results: The study involved 173 patients, divided into two groups: 129 in Group I and 44 in Group II. All participants had paresthesia or facial paralysis and were treated with photobiomodulation using DMC's Laser Therapy equipment. This device used a semiconductor diode to deliver two wavelengths (660 and 808 nm) with 100 mW output power each, achieving an irradiance of 3.57 W/cm². Treatment protocols were customized, with fluences ranging from 35.7 to 214.2 J/cm². Of the patients, 25 experienced photosensitivity: 5 burns and 20 warmings. Group I patients had a threefold higher risk of photosensitivity and nearly 12 times higher risk of burns compared to Group II. No significant differences were found in maximum irradiated doses between those with and without photosensitivity, and there was no association with age, sex, or medication use.

Conclusion: The correlation between self-reported skin color and the occurrence of photosensitivity after laser irradiation at two wavelengths has been confirmed. Further research is needed to explore the mechanisms of thermal damage related to melanin and higher irradiance protocols.
This research was supported by the Unified Scholarship Program of USP (Project No. #2023-3654).

Carolina Gonçalves Garcia (Brazil)
Category: Clinical human studies
Title: EVALUATION OF NEONATAL PAIN SYMPTOMATOLOGY AFTER LINGUAL FRENECTOMY WITH HIGH-POWER DIODE LASER AND IMMEDIATE IRRADIATION WITH LOW-POWER DIODE LASER

Aim: This study aims to compare surgical pain symptomatology in infants diagnosed with ankyloglossia after lingual frenectomy, with and without immediate low-power diode laser irradiation.

Material and methods: Following approval from the Research Ethics Committee the neonatal were diagnosed with ankyloglossia using the Tongue-tie and Breastfed Babies Assessment Tool and Tongue Frenulum Assessment Protocol in Babies. Those babies were divided into two groups: one receiving immediate irradiation with a low-power diode laser (n=23) and the other receiving a placebo laser (n=19). Lingual frenectomy was performed using high-power diode laser (1,5W, continue mode, in contact), and the surgical area was immediately irradiated with low-power diode laser (1J red - 660nm) or placebo laser. A form was handed out to parents for evaluation of the baby's pain for seven days, Neonatal Infant Pain Scale (NIPS).

Results: Data analysis revealed that neonatal who received immediate low-power diode laser irradiation experienced 1.21 times less pain than the neonatal who received placebo laser irradiation on the first day. On the second day, the laser group experienced 0.65 times less pain, and on the third day they experienced 1.25 times less pain compared to the placebo group.

Conclusion: The results indicate that immediate low-power diode laser irradiation post-lingual frenectomy significantly reduces pain in neonates compared to placebo irradiation. This finding suggests that photobiomodulation enhances postoperative comfort and pain management in neonates.

Cláudia Regina Campos Fussi, Daiane Thaís Meneguzzo, Cássia Fukuda Nakashima, Isabela Antunes Lucon Ranzani, Bárbara Gâmbaro Lassance da Silva e Souza (Brazil)
Category: Clinical human studies
Title: PHOTOBIOMODULATION IN THE RECOVERY OF TASTE AND SMELL POST COVID

Aim: This work aims to evaluate the benefits of both modalities of photobiomodulation (PBM) in the recovery of taste and smell post covid.

Material and methods: 67 patients were randomly divided into 2 groups, LG: PBM in the upper airways, tongue and salivary glands (Diode laser, concomitant irradiation of 810nm, 3J, 0,1W and 660nm, 3J, 0,1W, 30 sec per point) and LBG: Local PBM plus transdermal PBM over the region of radial artery in the wrist (660nm, 0,1W, 180J, 30min). 15 weekly sessions were held, on average 4 months of treatment per patient. The gustatory and olfactory perception was evaluated per session through questionnaires on olfactory function in everyday situations and products

including water, coffee, perfumes, cleaning products and other substances present in their daily lives and gustatory tests with different solutions and concentrations of Glucose, Urea, Sodium chloride and Citric acid.

Results: The results showed that there was an improvement in the taste and smell recovered in both treatment groups. In LG 34.5% had taste and smell recover above 80% and 17.2% had total recovery. In the LBG 65.8% had recovery above 80% and 34.2% had total recovery. There was no significant association between the groups and the patient's sex, covid symptoms, disease severity and hospitalization, age, taste and smell change time, time between the disease and the start of treatment, number of sessions and treatment time ($p>0.05$).

Conclusion: Regardless of the patient's covid history, photobiomodulation proved to be effective in recovering smell and taste, presenting better results when the local treatment modality is associated with blood photobiomodulation.

Daniela Maria Cerqueira Leite, Maria Laura Milanese,Praveen R. Arany, Denise Zezell (Brazil)
Category: In vitro
Title: EVALUATION OF THE EFFICIENCY OF DEBONDING CERAMIC LAMINATES WITH THE AID OF Er,Cr:YSGG LASER IN DIFFERENT AVERAGE POWER PARAMETERS

Aim: Due to frequent aesthetic rehabilitations in modern dentistry with the use of lithium disilicate laminates (LDL), and the unfortunate need to replace them, it is necessary to define a safe protocol for removal veneers. The study aims to assess the efficiency of debonding lithium disilicate ceramics using varying laser irradiation power levels, focusing on the resulting morphological, optical, and chemical changes in enamel across different treatment protocols.

Material and methods: Thirty human molars were sectioned, resulting in 60 enamel blocks of 4x4x3 mm, embedded in thermoactivated acrylic resin. After sanding and polishing, the samples were subjected to the KNOOP surface hardness test, to standardize mineral content, before SEM, OCT and FTIR analyses before cementation of the laminates. The 60 samples were divided into 2 groups (n = 30) according to the cement used and into 2 groups with two powers and control group without laser irradiation (n = 10). Group 1 was cemented with Variolink Esthetic LC (Ivoclair), group 2 with Relyx Ultimate (3M). The dimensions of the LDL laminates were 4x4 and 0.7 mm, shade A1. The Er,Cr:YSGG laser were WaterLase (Biolase, San Clemente, USA), $\lambda = 2.78$ µm, 140 µs pulse width and 20 Hz repetition rate, 0.6 sapphire laser tip mm MGG6-4 mm (with 60%-40% air in relation to distilled water) emitting 5W, 88,4 J/cm², and 5.5W, 97,26 J/cm² laser irradiation 1,8KW/cm² and 2KW/cm² . After laser irradiation, the samples were subjected to shear testing and evaluated by SEM and classified for adhesive failure by the ARI (Adhesive Remnant Index) test. After debonding, the initial and final SEM, OCT and FTIR were compared.

Results: The results showed that residual remains of cement were present in all samples, and no group achieved a score of 0 in the ARI. After laser irradiation, the adhesive failure pattern changed, as indicated by the ARI test and observed in the SEM. The FTIR shows that the intensity of the phosphate and carbonate bands decreased after laser detachment, and the presence of resin cement bands is evident. The interaction between the ceramic and the laser is low when compared to resin cements.

Conclusion: Er,Cr:YSGG laser debonding was effective for all groups, causing ablation of the resin cement without causing damage to the enamel structure. As observed, the failure pattern changed to cohesive (<50% cement on the enamel surface). The average power of 5.5 W was more efficient and significant for Variolink cement.

Edilson Ervolino, Vinicius Franzão Ganzaroli, Luan Felipe Toro, Valdir Gouveia Garcia, Mark Wainwright, Leticia Helena Theodoro(Brazil)
Category: Preclinical
Title: EFFECT OF ANTIMICROBIAL PHOTODYNAMIC THERAPY MEDIATED BY TOLUIDINE BUTYL BLUE ON THE PREVENTION OF MEDICATION-RELATED OSTEONECROSIS OF THE JAWS: PRECLINICAL STUDY IN SENESCENT FEMALE RATS

Aim: This study evaluated the effectiveness of antimicrobial photodynamic therapy (aPDT), mediated by butyl toluidine blue (BuTB) in the prevention of MRONJ after tooth extraction in rats.

Oral Presentation

Material and methods: Twenty-eight senescent female rats were distributed in groups: VEH and VEH-aPDT, treated with vehicle, ZOL and ZOL-aPDT, treated with 100 µg/Kg of zoledronate, both treatments every three days over seven weeks. After three weeks, the mandibular first molar was extracted. For the VEH and ZOL groups, no local treatment was performed, while with the VEH-aPDT and ZOL-aPDT groups, photodynamic treatment was carried out at 0, 2, and 4 days after extraction. For aPDT, 500µl of BuTB solution was deposited on the dental extraction site (0.5 mg/ml; 60 s), followed by irradiation with low-level laser (Thera lase, DMC Equipments Ltda; InGaAIP; 660 nm; 35 mW; 74.2 J/cm^2; 2.1 J; 60 s). After 28 postoperative days, euthanasia was performed. The hemimandibles were processed to: (1) histological analysis of tissue repair; (2) histometric analysis of the percentage of newly formed bone tissue (PNFBT) and percentage of non-vital bone tissue (PNVBT); (3) immunohistochemical analysis for factor nuclear kappa B (NFκB), tumor necrosis factor alpha (TNFα), interleukin 1 beta (1L-1β), transforming growth factor beta 1 (TGFβ1), vascular endothelial growth fator (VEGF), bone morphogenetic protein (BMP) 2 and 7, osteocalcin (OCN) and tartrate-resistant acid phosphatase (TRAP).

Results: ZOL-aPDT group showed higher PNFBT, TGFβ1, VEGF, BMP2, BMP7, OCN and lower PNVBT, NFκB, TNFα, 1L-1β compared to the ZOL group. There was no statistically significant difference between VEI and ZOL-aPDT in the following parameters: PNFBT, TGFβ1, BMP2, BMP7 and OCN. The ZOL and ZOL-aPDT groups showed less TRAP-positive cells when compared with VEH and VEHaPDT.

Conclusion: It is concluded that aPDT mediated by BuTB improves the tissue repair process via modulation of inflammation, stimulation of angiogenesis and increase in osteoblastic activity. In addition, it prevented the occurrence of MRONJ.

Erika da Silva Mello, CÍCERO DA SILVA BEZERRA, LUCIANA TOLEDO COSTA SALVIATO, VANESSA DALAPRIA, ANNA CAROLINA RATO TEMPESTINI HORLIANA, SANDRA KALIL BUSSADORI, ALESSANDRO DEANA (Brazil)
Category: Clinical human studies
Title: EFFECTS OF PHOTOBIOMODULATION CONDITIONING OF OROFACIAL TISSUE IN SURGERY TO REMOVAL OF IMPACTED MANDIBULAR THIRD MOLARS WITH INFRARED LED: A RANDOMIZED, SHAM-CONTROLLED, DOUBLE-BLIND CLINICAL TRIAL

Aim: This study evaluated the effectiveness of LED therapy before surgery to reduce postoperative pain in the tissues affected by the extraction of impacted lower third molars.

Material and methods: A randomized, sham-controlled, double-blind clinical trial. Sixty participants were randomly allocated to the photobiomodulation group (PG) and sham group (SG). The PG received infrared LED (24 J, 100 mW at 850 nm) 1 hour before the procedure and was irradiated again 48 hours and 7 days after.

Results: On the second day, there was a significant difference between the groups, and day seven of the photobiomodulation group was equal to day 2 of the control group.

Conclusion: The present study demonstrated that pre-surgical conditioning of the orofacial tissues involved in impacted lower third molar surgeries, using infrared LED at 850nm, 8J, for 80 seconds, showed a positive result in reducing postoperative pain.

Fernando Rodrigues Carvalho, Marilia Missiano Carvalho, Alyne Simões Gonçalves, Luciane Hiramatsu Azevedo, Patrícia Moreira Freitas (Brazil)
Category: Clinical human studies
Title: EFFECT OF PHOTOBIOMODULATION THERAPY IN PATIENTS WITH REPORTED SPONTANEOUS OROFACIAL PAIN RELATED TO TEMPOROMANDIBULAR DISORDERS – RESULTS OF A DOUBLE-BLIND RANDOMIZED CONTROLLED CLINICAL TRIAL

Aim: To determine whether laser therapy is effective in reducing spontaneous facial pain reported by TMD patients after 1, 2, and 3 sessions.

Material and methods: This study is part of a double-blind randomized controlled clinical trial that included 153 participants, conducted from October 2016 to March 2020, and presents the results of laser therapy in individuals with complaints of spontaneous orofacial pain related to TMDs. A total of 84 participants with spontaneous pain who completed all three

sessions of the study (1 session/week) were included. Participants were randomized into two groups: placebo (n=39) and laser therapy (n=45). Reports of spontaneous pain were obtained through the question: "Is there facial pain?" from the Portuguese-validated version of the RDC/TMD. Statistical analysis was performed by comparing the number of participants with pain before the first session and after the first, second, and third sessions (placebo or laser therapy). The following parameters were used: GaAlAs diode laser, emitting at 808 nm (DMC, Equipments Ltd), power of 0.1W, power density of 3.57W/cm², energy of 3.0J/point, Energy density of 107.14J/cm², total application time of 19 minutes (30 seconds/point, 19 points per side, total: 38 points). The total energy dose was 4,071.32 J/cm² per session and 12,213.96J/cm² for the entire treatment. The chi-square test was used to compare the groups after each session, with statistical significance set at $p \leq 0.05$.

Results: Initially, 39 and 45 participants reported pain in the placebo and laser therapy groups, respectively. After the first session, 23 participants in the placebo group and 16 in the laser therapy group remained in pain ($p = 0.0318$). After the second session, 20 participants in the placebo group and 6 in the laser therapy.

Conclusion: Laser therapy proved to be effective in reducing orofacial pain reported by patients with TMD.

Fernando Rodrigues Carvalho, Marilia Missiano Carvalho,Patrícia Moreira Freitas (Brazil)
Category: Clinical human studies
Title: LASER THERAPY FOR TEMPOROMANDIBULAR DYSFUNCTION – 6 YEARS FOLLOW UP - CASE REPORT

Aim: Report a clinical case of chronic temporomandibular dysfunction, highlighting the photobiomodulation therapy (PBMT) protocol and it is handling through 6 years.

Material and methods: W.S., 52-year-old women, living with temporomandibular dysfunction went to LELO already using interocclusal splint, but still feeling pain at the lateral of the face, neck and nape. She used to use analgesics, anti-inflammatories or muscle relaxants daily, alone or combined, for pain relief. After the application of the Research Diagnostic Criteria for TMD (RDC/TMD), chronic myalgia without emotional compromise was diagnosed and the PBMTwas the proposed treatment. The irradiation protocol included the temporomandibular articulation bilaterally and the following muscles: Extraoral: Masseter, temporal, sternocleidooccipitalmastoid; Intraoral: tendon of temporal, medial pterygoid. 10 sessions were realized, one sessions per week with diode laser GaAlAs (Therapy EC, DMC) emitting 808nm with power density1.02 W/cm²;energy density of30.61J/cm²; total application time of 1260 seconds (30 seconds per point, 21 each side, total of 42 points). The total energy dose was 1,285.62 J/cm² per section and 12,856.20 J/cm² when considered the whole treatment.

Results: After the third session, the pain stopped, and the patient did not need to use any painkillers. Follow-up: The treatment was extended for 10 more sessions, one session per week, and only the pain points identified by the RDC/TMD were irradiated. Afterward, the sessions were conducted every fifteen days, and only the pain points were irradiated. The dosimetry parameters used remained the same throughout the entire treatment. At the end of this period, the patient continued under follow-up and did not experience any pain.

Conclusion: PBMTproved to be effective in controlling temporomandibular pain at the beginning and throughout the 6-year follow-up.

Frederic Cuisinier (France)
Category: Preclinical
Title: PHOTOBIOMODULATION IN CAUDAL FIN REGENRATION

Aim: Validation of a new animal model to study photobiomodulation

Material and methods: Caudal fin of zebrafish were amput and phtobiomodulation was performed with 810nm laser, UV light. Control was w/o light.

Results: This study showed that our experimental conditions of laser irradiation had benefits and can be considered as regenerative stimulator for the amputated zebrafish caudal fin

Conclusion: Laser can be suggested to have great regenerative capacity in the zebrafish caudal fin.

Oral Presentation

The zebrafish model has a great potential for assessing phtobiomodulation parameters. The authors MUST revise the abstract. As presented does not add any additional information to the field.

Fusong Yuan (China)
Category: In vitro
Title: AUTOMATIC SYSTEM FOR TOOTH PREPARING USING ROBOT CONTROLLING FEMTOSECOND LASER

Aim: The aim of the study was to explore the most suitable parameters for automatic full crown preparation using the oral clinical micro robot, and improve the automatic tooth preparation accuracy.

Material and methods: 10 artificial resin teeth samples and in vitro teeth samples were prepared. The oral clinical micro robot was used to control the femtosecond laser beam to complete two dimensional cutting on samples according to the motion planning path. Using the laser scanning measuring microscope, the monolayer cutting depth for cutting resin teeth and in vitro teeth were determined. According to the monolayer cutting depth, 11 complete resin teeth and 11 freshly extracted mandibular and maxillary first molars fixed respectively in phantom head were automatically prepared by the robot controlling the laser focused spot in accordance with the layer-cutting way. And the automatic tooth preparation accuracy were evaluated with the software.

Results: The results indicated that the single cutting depth cutting resin teeth and in vitro teeth by picosecond laser were 60um and 45um, respectively. The average automatic tooth preparing time was 17 minutes. Through software evaluation, the average preparation depth error of the occlusal surface of resin teeth and in vitro teeth was approximately 0.0886±0.0259 mm and 0.2096±0.0022 mm; the average convergence angle error were about 0.5576±0.2958 and 1.021±0.3507. Compared with the target preparation shape, the average shape error of resin tooth preparations and in vitro tooth preparations were about for 0.02-0. 11mm and 0.05-0.17mm.

Conclusion: Through the research, parameters for automatic full crown preparation were further optimized. And tooth reparation accuracy has been further improved to meet the clinical requirements. Through the further improvement of the technology, automation for dental implant, special-shaped implant techniques and other operation techniques is expected to achieve.

Glaucia Gonçales Abud Machado (Brazil)
Category: Clinical human studies
Title: POSTOPERATIVE PAIN FOLLOWING SINGLE-SESSION ENDODONTIC INSTRUMENTATION OF UPPER MOLARS COMBINED WITH PHOTOBIOMODULATION: A RANDOMIZED DOUBLE-BLIND CLINICAL TRIAL

Aim: Evaluated the effect of photobiomodulation (PBM) on pain following single-session endodontic instrumentation of upper molars.

Material and methods: This double-blind, randomized controlled clinical trial was approved by the Research Ethics Committee with number 5.598.290 and registered on Clinical Trials (NCT06253767). Initially recruited participants requiring endodontic treatment in upper molars, of both genders aged between 21 and 70 years, excluding certain health conditions, medication use, or complexities that would hinder single-session treatment. 58 upper molars treated endodontically in a single session were randomly allocated into two groups: the PBM Group (n=29), which received conventional endodontic treatment combined with PBM (100mW, 3J per point, 30 seconds per point and 3 points height of the root apices), and the Control Group (n=29), which received conventional treatment with a PBM simulation. The primary outcome was spontaneous pain 24 hours post-treatment. Secondary outcomes included pain reported at 4, 8, and 12 hours, pain during palpation and percussion at 24 hours, and the prevalence after treatment. Pain levels were assessed using the VAS. Statistical analyses included chi-square tests, Mann-Whitney and Friedman tests with SPSS 29 software.

Results: Fourteen participants were excluded: six for incorrect analgesic use, two for extended surgical time, and six for not experiencing pain post-treatment in any analyzed outcome, leaving 44 patients for analysis. No differences were found between groups in postoperative pain at 24, 4, 8, and 12-hour intervals, or during palpation and percussion (p>0,05). However, subgroup analysis of participants who experienced pain

reduction post-treatment (n=21) revealed that the Control Group showed significant pain reduction at the 12 (p=0,026) and 24-hour (p=0,004) intervals, while the PBM Group demonstrated significant reduction at the 4 (p=0,049), 12 (p=0,044), and 24-hour intervals (p=0,036).

Conclusion: No immediate significant differences were found between groups, the subgroup analysis suggests that the PBM Group provided analgesia up to 4 hours post-treatment, possibly due to the local anti-inflammatory effects of PBM.

Ha Thai Dam, Piyachat Patcharanuchat, Sajee Sattayut (Thailand)
Category: Clinical human studies
Title: THE EVALUATION OF THE HYBRID MODEL OF INTERNATIONAL COURSES IN LASERS IN DENTISTRY: A QUALITATIVE STUDY

Aim: To evaluate the effectiveness of an innovative hybrid learning model for international laser dentistry courses developed by the Laser Dentistry Research Group at Khon Kaen University, Thailand.

Material and methods: This qualitative study collected data through 15-minute in-depth interviews from two online courses (2020 and 2021) and an onsite course (2021). The main themes of questions explored were the effectiveness of the hybrid model and knowledge retention. Audio recordings of the interview were transcribed using an artificial intelligence (AI) application (GoodTape) and verified by the researchers. Eight main items were extracted post-data collection to avoid bias, including reflections on course concepts, teaching methods, and learning activities. Coding of information for each item was conducted manually and by an AI assistant (ChatGPT), which was trained to gather the items based on two main themes of interview questions. Any discrepancies were resolved through validation by co-investigators who were proficient in Vietnamese and Thai.

Results: All 31 individuals who enrolled to the course were invited. There were 11 persons participated. The total number of data sets were 88 items. The initial agreement rate between manual and AI coding was 46.59%. A rigorous validation process using raw data was conducted by peer investigators resulting 100% agreement. Findings revealed high satisfaction across all groups, with the hybrid model effectively delivering both theoretical knowledge and practical skills. The simultaneous simulation laboratory bridged online learning and hands-on experience. Long-term knowledge retention was comparable between online and onsite learners.

Conclusion: The hybrid learning model comprising theoretical knowledge and simulation laboratory was proved to be effective in teaching laser dentistry for non-English speakers.

Ilaria Giovannacci, Roberta Iaria, Aurora Andrea Venuti, Beatrice Spaggiari, Marco Meleti, Paolo Vescovi (Italy)
Category: Preclinical
Title: STUDY OF SPECTROPHOTOMETRIC AND HISTOPATHOLOGICAL VARIATIONS BETWEEN NECROTIC AND VITAL BONE: AUTOFLUORESCENCE (AF) ANALYSIS IN BONE TISSUE. NEW PROSPECTIVES IN MARGIN IDENTIFICATION DURING BONE SURGERY

Aim: Precise identification of necrotic bone margins during osteonecrosis removal is a major difficulty for surgeons mainly based on subjective parameters.
Ristow suggested in 2014 that vital bone could be highlighted on the basis of its strong autofluorescence (AF), whereas necrotic bone lost AF appearing very dark. However, bone AF has always been assessed on imaging and a quantitative way of assessment is lacking.
The aim of the present study is to test a quantitative and objective evaluation of bone tissue AF using a spectrophotometer setup.

Material and methods: This multicenter study was conducted on biological samples and investigated the correlation between AF intensity in necrotic and healthy bone. AF was stimulated using an optical fiber that emits in blue/violet (400-460 nm) and AF intensity was measured using a spectrophotometer (Ocean Optics-Flame). Patients with a diagnosis of osteonecrosis of the jaw bones requiring surgery were included. After surgery, AF of the removed bone blocks was evaluated (ex-vivo). The examination was conducted both on the necrotic areas and on the free margins (identified clinically and radiographically) of the surgical samples. Then, samples were subjected to histopathological analysis to verify the correlation between the intensity of AF and histopathological results.

Oral Presentation

For each case the loss intensity ratio (LIR) was calculated. It is the ratio between emission intensity of necrotic bone at 500 nm and emission intensity of the control point at 500 nm.

Results: A total of 192 areas were analyzed. 96 areas resulted in necrotic bone, 96 control points resulted in vital bone. Mean LIR resulted 38%. It means that necrotic bone is 4,2 times less fluorescence in comparison to viable bone at the same wavelength. Parametric and non-parametric tests provided statistically significant results (Student T and Wilcoxon W test <0.001).

Conclusion: The use of AF to identify margins during surgical resection of necrotic bone is highly promising. This approach, using a spectrofotometric setup, is objective and will allow to achieve excellent outcomes.

Isabella Berlingieri Polho, Juliana Guedes Gomes, Pedro Soares, Luciane Hiramatsu Azevedo, Patricia Moreira de Freitas Costa e Silva (Brazil)
Category: Clinical human studies
Title: EFFECT OF PHOTOBIOMODULATION ON THE TREATMENT OF INFERIOR ALVEOLAR NERVE PARESTHESIA IN PATIENTS UNDERGOING ORTHOGNATHIC SURGERY AND THIRD MOLAR EXTRACTION: RANDOMIZED, TRIPLE-BLIND, CONTROLLED CLINICAL TRIAL

Aim: This study aims to evaluate and compare whether different low level laser energy protocols help the healing of the affected nerve, improving the sensation of tingling and loss of sensitivity in the face.

Material and methods: Participants were divided into 3 groups: 2 laser groups (G1-808 nm, 100 mW, 40s/point, 4J de energy/point; G2- 660 e 808 nm, simultaneously, 100 mW, 20s/point, 2J de energy/point of each wavelength) and 1 sham group. All participants underwent 8 laser therapy sessions and 2 assessments, one before starting treatment and another after the 8 sessions. A sensitivity test that quantified paresthesia, the Oral Health Impact Profile (OHIP-14) questionnaire and the visual analog scale (VAS) were used for the assessments.

Results: In both laser groups, the average number of points at which individuals reported perfect sensitivity increased after the 8 sessions.

Conclusion: Laser tends to improve paresthesia, but a larger sample is needed for better conclusions.

Izabela Fornazari Delamura, Mirela Caroline Silva, Stefany Barbosa, Leticia Helena Theodoro, Leonardo Perez Faverani (Brazil)
Category: Preclinical
Title: ANALYSIS OF THE SYNERGISM IN THE APPLICATION OF OZONIZED OIL AND ANTIMICROBIAL PHOTODYNAMIC THERAPY IN THE PREVENTION OF MANDIBULAR OSTEONECROSIS IN SENESCENT RATS

Aim: The objective of this study was to evaluate the synergistic potential of antimicrobial photodynamic therapy (aPDT) and ozonized sunflower oil (OZ) in the prevention of medication-related osteonecrosis of the jaws (MRONJ) in senile female rats treated with Zoledronate (ZOL).

Material and methods: Fifty senile female rats (18 months old) were divided into five experimental groups (n=10): the Vehicle (VEH) group, where animals received applications of a 0.9% sodium chloride solution; the ZOL group, with systemic application of Zoledronate (100 µg/kg), without local therapy; the ZOL+aPDT group, which received ZOL and aPDT; the ZOL+OZN group, which received ZOL and local therapy with OZ (600 mEq/kg) at a concentration of 0.3 mg/kg for 2 minutes at 0, 2, and 4 days postoperatively; and the ZOL+aPDT+OZN group, which received ZOL, aPDT, and OZ therapies following the same protocols. aPDT was performed in the alveolus at 0, 2, and 4 days postoperatively, initially applying methylene blue (100 µg/mL) with a pre-irradiation time of 60 seconds, followed by low-power laser irradiation (Thera Lase DMC; InGaAlP; 660 nm; 35 mW; 2.1 J/point; 60 seconds; 74.2 J/cm^2; 1.23 W/cm^2) with a spot size of 0.0283 cm^2. Euthanasia was performed 28 days after the extraction of the lower first molar.

Results: The associated therapies showed larger regions of newly formed bone tissue compared to the ZOL and ZOL+OZN groups ($P<0.05$), with the ZOL+aPDT group showing improved results compared to the VEH and ZOL groups. All groups that received therapies, either in combination or alone, had smaller regions of non-vital bone tissue compared to the ZOL group ($P<0.05$).

Oral Presentation

Conclusion: It can be concluded that the therapies evaluated had synergistic effects in preventing MRONJ, increasing the amount of newly formed bone and reducing the amount of non-vital bone.

Jainny Medeiros, Jainny Rodrigues Medeiros, Lívia Tosi Trevelin, Fátima Zanin Aldo Brugnera-Júnior, Patrícia Moreira de Freitas, Eric Mayer-Santos (Brazil)
Category: Clinical human studies
Title: Er:YAG LASER IN THE AESTHETIC TREATMENT OF SMILE: CLINICAL CROWN LENGTHENING AND VENEERS

Aim: The aim of this study is to present a clinical case report of crown lengthening and veneers using high-power laser Er:YAG

Material and methods: A female patient with excessive gingival display sought LELO (Special Laboratory of Laser Dentistry) at the University of São Paulo for complete aesthetic smile treatment. Bolton analysis and Chu's proportion gauge were used to define the width-length relationship of the maxillary anterior teeth. The analysis performed by two observers indicated the need for surgical correction of the maxillary central and lateral incisors, canines, first premolars and second premolars. The clinical examination showed defects in the development of the enamel throughout the maxillary arch, and composite resin veneers were also indicated to correct teeth color and shape. Once the desired dimensions of the teeth were determined by the gauge, a gingivectomy was performed to obtain the ideal gingival margin. The chosen protocol used the Lite Touch (Light Instruments) Er:YAG (2940 nm) laser under a pulse of 100mJ/cm^2, 2W/cm^2, 20Hz with a AS7069(x) 0.8/17mm laser tip and a water spray. The gingival correction treatment was performed in a single 30 minutes session (300s each tooth). After three weeks, with correct tissue healing, composite resin veneers were performed on dental units 11, 12, 13, 14 and 21, 22, 23, 24.

Results: Er:YAG laser assisted esthetic dental crown lengthening offers a quick surgical time, decreases the painful sensation and bleeding, promotes greater precision in the construction of the flap, reduces the chances of cross-infection, are considered less psycho traumatic by patients than the traditional technique and ensures healthy healing of periodontal tissues.

Conclusion: The integration of laser-assisted techniques in dental aesthetics decreases complications and improve the overall patient experience. Future research and clinical practice should continue to explore the potential of laser in several applications, reinforcing its role in modern dental treatments.

Júlia Guerra Cavalero, Amanda Caramel Juvino, Marcello Magri, Carlos de Paula Eduardo, Denise Maria Zezell (Brazil)
Category: In vitro
Title: EVALUATION OF ENAMEL DEMINERALIZATION SUBJECTED TO Nd:YAG LASER TREATMENT COMBINED WITH FLUORIDE UNDER CRITICAL PH CONDITIONS

Aim: This in vitro study assessed the impact of combining Nd:YAG laser with fluoride in reducing enamel demineralization under various critical pH conditions. The Nd:YAG laser is effective in preventing caries by promoting chemical, crystallographic, and morphological changes in the superficial enamel that enhance its acid resistance. When combined with fluoride, it amplifies its effect by increasing the contact surface area.

Material and methods: The 180 samples were divided into four groups: Negative Control, Fluoride, Laser, and Laser+Fluoride, each further subdivided for pH cycling at: pH 5, pH 4.5, and pH 4. The analyses performed included: mineral loss, Fourier-Transform Infrared Spectroscopy (FTIR) for phosphate and carbonate quantification, Optical Coherence Tomography (OCT) to determine optical attenuation coefficient, and Scanning Electron Microscopy (SEM). We used 12,300 µgF-/g Acidulated Phosphate Fluoride (Biodinâmica, Brazil), applied for 4 minutes. It was used a solid-state Nd:YAG laser (Smarty-A10, Deka Laser Technologies, Italy) with λ= 1064 nm, pulse duration of 100 µs, repetition rate of 10 Hz, and quartz optical fiber with a diameter of 365 µm. Before irradiation, a charcoal solution was applied as a photoabsorber. Irradiation was performed in a single session, with measured mean power of 0.6 W, corresponding to a power density of 573.4 W/cm^2 (the mean power on display was 1 W, demonstrating a power loss at the fiber end), and energy per pulse of 60 mJ (energy density 57.3 J/cm^2), applied for 30 seconds using continuous motorized stage. The energy per pulse was

measured before each irradiation with an optical power meter.

Results: Results showed that even under conditions where fluoride loses its physicochemical effect (pH = 4), the Laser+Fluoride treatment presented less demineralization. Mineral loss was reduced by 56.6% in the Laser+Fluoride group compared to the Negative Control group, and by 36.2% compared to the Fluoride group. Additionally, the Laser+Fluoride group showed a greater area under the phosphate band, lower optical attenuation coefficient, and less demineralization in morphological observations.

Conclusion: In conclusion, the Laser+Fluoride combination was more effective in reducing enamel demineralization under critical pH conditions than fluoride alone, representing a promising approach, especially for patients at high risk for caries and with compromised salivary flow.

Li Qian, Ya-Qun Kong, Xiao-Xi Dong, Ji-Zhi Zhao (China)
Category: preclinical study
Title: THE USE OF 810 AND 1064 nm LASERS ON DENTAL IMPLANTS: IN VITRO ANALYSIS OF TEMPERATURE, SURFACE ALTERATIONS, AND BIOLOGICAL BEHAVIOR IN HUMAN GINGIVAL FIBROBLASTS

Aim: The primary objective of this study was to evaluate the safety of 810 and 1064 nm laser treatment on dental implants. Peri-implantitis is a challenge for clinicians and researchers.

Material and methods: A pig mandible model was used to evaluate temperature increases during laser irradiation . Surface alterations on processed pure titanium discs were analyzed via scanning electron microscopy and measurement of surface contact angles. Processed titanium discs were cocultured in vitro with human gingival fibroblasts; subsequently, cell proliferation was measured.

Results: The maximum temperature and time to reach each threshold were comparable. No surface alterations were detected after 810 nm laser irradiation, whereas surface cracks were observed after 1064 nm laser irradiation under the parameter setting of 31.84 W/cm^2. Compared with unaltered processed pure titanium discs, the proliferation of human gingival fibroblasts was significantly greater on altered processed pure titanium discs.

Conclusion: The use of either 810 or 1064 nm laser treatments may increase the risk of thermal damage in terms of increased temperature if the parameter setting is not warranted. In addition, the use of 1064 nm laser treatment could lead to changes in pure titanium discs that do not negatively affect cell proliferation. Further investigations of laser-assisted therapy are necessary to improve guidelines concerning the treatment of peri-implantitis.

Luciene Aparecida Linhares Rosa, Martha Ribeiro SIMÕES, Alcides Ricardo GONÇALVES, Aguinaldo Silva GARCEZ SEGUNDO, Victor Augusto Martins MONTALLI, (Brazil)
Category: Clinical human studies
Title: PHOTODYNAMIC THERAPY AS ADJUVANT IN MICROBIAL REDUCTION OF THE TONGUE IN INTUBATED PATIENTS IN THE INTENSIVE CARE UNIT

Aim: The objective of this study was to determine the impact of antimicrobial photodynamic therapy (aPDT) as an adjunct to oral care, evaluating the reduction of tongue microbiota in adult patients with mechanical ventilation admitted to the intensive care unit (ICU), after a standard operating procedure for oral hygiene (SOP-OH).

Material and methods: Thirty adult patients admitted to the ICU and intubated participated in the study. Oral hygiene was performed with the aid of a toothbrush with an attached suction device (Power Clean®, Impacto, São Paulo) and with a 0.12% chlorhexidine digluconate gel solution. For aPDT, 0.01% methylene blue was used, which remained on the tongue for 5 min before irradiation. Afterwards, the tongue was irradiated at 2 points (left and right) with a red-emitting InGaAlP semiconductor diode laser (660 ± 10 nm, TherapyEC, DMC, São Carlos, Brazil), 100 mW, 9 J per point, for 180 s, totaling 18 J. Biofilm samples were collected from the tongue region of the patients in 3 moments: before SOP-OH, after SOP-OH and after aPDT. The samples were placed in Petri dishes containing specific culture media for the growth of microorganisms, taken to the laboratory, and left in an incubator for 48 h. Scores were assigned to the plates (1 to 3), depending on the microbial growth (lowest to highest, respectively).

Oral Presentation

Results: Our results demonstrated that aPDT, mediated by a red-emitting laser and methylene blue, can be an adjuvant to oral care because it was able to reduce tongue biofilm in adult patients, intubated, on mechanical ventilation and admitted to the ICU.

Conclusion: Our results demonstrated that aPDT, mediated by a red-emitting laser and methylene blue, can be an adjuvant to oral care because it was able to reduce tongue biofilm in adult patients, intubated, on mechanical ventilation and admitted to the ICU.

Marcia Vidor, Jair Carneiro Leão Filho, Paulo Francisco Cesar, Patricia Moreira de Freitas (Brazil)
Category: In vitro
Title: QUALITY EVALUATION OF PRESSED AND MILLED LITHIUM DISILICATE CERAMICS AFTER DEBONDING WITH Er:YAG LASER IRRADIATION FOR REBONDING PURPOSE- IN VITRO STUDY

Aim: The aim of this study is to evaluate changes in the quality of lithium disilicate ceramics after debonding with Er:YAG laser, for rebonding purpose through in vitro research.
Some studies have verified the effectiveness of the erbium laser for debonding of ceramics and some suggest as an advantage of the technique, the possibility of rebonding these veneers when they are intact without fracture or visible cracks.

Material and methods: e.max CAD and e.max Press ceramics were fabricated in 6mm ø discs with 1mm thickness (n=60), divided into milled and pressed groups, subdivided into control and laser groups, which were cemented to the enamel of extracted bovine teeth for the shear bond strength test (SBS). The laser groups were irradiated with Er:YAG (2940 nm, Litetouch, Light Instruments) following the protocol for veneer debonding (4W/ 200mJ/ 20Hz). The ceramics debonded with the laser were then rebonded and submitted to the SBS test and evaluation of the adhesive remnant in the enamel. Ceramic samples with 12mm ø and 1mm in thickness (n=90) were also produced for the flexural strength test, fractographic analysis and SEM; with the aim to identifying changes in the quality of these ceramics after irradiation with the Er:YAG laser.

Results: In the SBS test, the Press groups showed significantly higher values than the CAD groups ($p<0.05$), both in the control groups and also in the rebonded laser groups. The adhesive failures occurred between the ceramic and the cement interface in all groups. Flexural strength analysis showed that CAD control group had a significant difference in relation to the Press control group, while the laser irradiated groups showed higher values than the control groups, but without statistically significant difference between the groups. However, Weibull dispersion analysis, demonstrated better dispersion results of the Press Laser group compared to the CAD Laser group, demonstrating a higher reliability of the Press Laser material in relation to the CAD Laser, even with lower flexural strength values.

Conclusion: No visible defects were identified in the laser-irradiated ceramics by macroscopic analyses, but the SEM evaluation showed small changes in the size and arrangement of the lithium disilicate microstructure after Er:YAG laser irradiation, both in the pressed and milled groups.

Maria Clara de Souza, (Brazil)
Category: Preclinical
Title: INVESTIGATING THE EFFECTS OF WAVELENGTH-ASSOCIATED PHOTOBIOMODULATION THERAPY ON DORSAL EXCISION REPAIR IN MICE: A HISTOLOGICAL STUDY

Aim: The simultaneous association of red and infra-red wavelengths for photobiomodulation therapy (PBMT) has been gaining space among the clinical field. However, its effect upon the skin repair is still unknown. Therefore, this study aimed to assess the impact of concurrently combining 660nm and 808nm wavelengths on cutaneous wounds, in comparison to their isolated use.

Material and methods: In order to attain this, two full thickness wounds with 5mm diameters were made using a punch in 20 female Balb/c mice. These were then randomly divided into control (no treatment) and PBMT groups, these being: Red Laser (RL), in which PBTM was applied using a wavelength of 660nm; Infra-red and Red Laser (IRL+RL), which received an asynchronous application of 660nm and 808nm wavelengths; and Simultaneous Laser (S), where both wavelengths were applied at the same time. All PBMT groups had the irradiations performed in contact mode, perpendicular to the tissue, using continuous wave. For this, a Therapy EC

Oral Presentation

(DMC) diode laser device, that has 100mW power output and 0.028cm^2 spot area, was used with the following parameters: 3 points per wound, 3.6W/cm^2 per wavelength, 10.7J/cm^2, 3s and 0,3J of energy per point. The wounds were accompanied for a period of 7 days. During this time, PBMT was performed right after the surgical procedure, as well as 24-, 48- and 120-hours post-surgery (totalizing 1,2J per point). Macroscopical and histological analysis were realized to evaluate the repair process.

Results: The clinical analysis showed that, when combined, treated groups had shorter healing times than the control group. Nevertheless, when compared at different time points, the greatest difference was found at 3 days post wounding. Separately, RL and S groups showed better wound closure rates than control group ($p<0.05$). On the other hand, histological analysis only showed significant differences for RL group, who performed better in the keratinization and scar elevation index scores than S and control groups respectively ($p<0.05$).

Conclusion: We conclude that, while the isolated use of red laser and the simultaneous irradiation had a similar wound repair rate in the clinical analysis, RL group still showed better histological results.

Maria Fernanda Rossi Vigliar, Ana Luiza Rossi Vigliar, Daniela Vieira Buchaim, Rogério Leone Buchaim (Brazil)
Category: Preclinical
Title: SKIN HEALING PROCESS IN RATS SUBJECTED OR NOT TO LOCAL OR INTRAVENOUS PHOTOBIOMODULATION ASSOCIATED WITH THE USE OF FIBRIN BIOPOLYMER AND CURCUMIN

Aim: The aim of this study was to evaluate the effects of local or intravenous laser photobiomodulation therapy on tissue repair processes, associated with the use of a novel fibrin biopolymer and topical curcumin.

Material and methods: A total of 60 Wistar rats were used, randomly divided into three groups: G1 – Animals that did not receive photobiomodulation therapy (n=20), G2 – Animals that received intravenous photobiomodulation therapy (n=20), and G3 – Animals that received local photobiomodulation therapy (n=20). After anesthesia and hair removal, four 10 x 10 mm squares were marked on the back of each rat, and an 8 mm "punch" was used to remove the skin and subcutaneous tissue, leaving 2 cm of intact skin between the lesions. The wounds were treated as follows: Anterior left wound: Only clot (A); Anterior right wound: Fibrin biopolymer (B); Posterior right wound: 12% Curcumin Gel (C); Posterior left wound: 12% Curcumin Gel + Fibrin Biopolymer (D). Photobiomodulation was applied three times a week using a low-power (InGaAIP) laser – Therapy XT (DMC®), visible red light (660 nm), with a power density of 2.32 W/cm^2, an energy density of 186.04 J/cm^2, for 80 seconds per animal in G2 and 93.02 J/cm^2, 10 seconds per lesion in G3. At 3, 7, 11, and 15 days post-surgery, five animals from each group were euthanized.

Results: The wounds developed superficial and delicate crusts up to the 7-day period, followed by reduction. Macroscopically, the defect that received the fibrin biopolymer showed better progress, with a greater reduction in wound area. Histologically, G3 demonstrated a faster repair rate, with greater tissue maturation, more evident on days 7 and 11.

Conclusion: It was concluded that the defects treated with fibrin biopolymer had a smaller area and greater tissue maturation, and G3 achieved more favorable cellular-level tissue repair.

Marilia Missiano Carvalho, Alyne Simões Gonçalves, Patrícia Moreira Freitas, Fernando Rodrigues Carvalho (Brazil)
Category: Clinical human studies
Title: PHOTOBIOMODULATION THERAPY FOR RADIOTHERAPY-INDUCED TRISMUS

Aim: The aim of this study is to report a clinical case of photobiomodulation therapy (PBMT) for trismus in a patient who underwent radiotherapy (RT)

Material and methods: Patient G.F., 59 years old, with a history of oropharyngeal squamous cell carcinoma, underwent RT and sought care at LELO/FOUSP due to reduced mouth opening. The patient was using a nasogastric tube, and during physical examination, an increased volume was observed at left masseter muscle region, with a spontaneous mouth opening of 34 mm, which did not increase when maximum opening was requested or assisted by the examiner. PBMT was proposed with the following parameters: diode laser GaAIAs (Therapy EC, DMC) emitting

808nm, power of 0.1W, power density of 1.02 W/cm², energy of 3.0 J/point, Emergy density 30.61 J/cm2, total application time 22 minutes (30 seconds/point, 22 on each side, total of 44 points). The total energy dose was 1.346.84 J/cm2 per session and 4.040.52 J/cm² when considered the whole treatment. Three sessions were performed, one session per week. The following locations were irradiated: Extraoral: 1) Muscles: Masseter, temporal, medial pterygoid (insertion), digastric, buccinator. 2) Temporomandibular joint. Intraoral: 1) Muscles: tendon of temporal, medial pterygoid and lateral pterygoid. The energy was applied continuously and punctually.

Results: After three session there was a 4mm increase in initial spontaneous mouth opening. The patient reported comfort and was able to eat without difficulty after the nasogastric tube removal.

Conclusion: The PBMT proved to be effective on radiotherapy-induced trismus. Based on the results of this study, it is suggested that other studies need to be carried out about treatment with PBMT to patients with trismus caused by head and neck radiotherapy, specially aiming to prevent or limit damage in case of established trismus, as low mouth opening causes reduction in quality of life.

Marinês Sousa (Brazil)
Category: Clinical human studies
Title: EVALUATION OF THE INFLUENCE OF LOW-INTENSITY LASER AS AN ANCHORING RESOURCE IN ORTHODONTICS MOVEMENT AND PERIODONTAL HEALTH

Aim: This study investigated the effects of low-level laser in orthodontic movement, aiming to promote anchorage after activation, as well as to analyze the maintenance of tissue integrity after utilization of laser and orthodontic movement.

Material and methods: The sample was composed of 74 maxillary and mandibular molars and premolars that served as anchorage in the initial retraction stage of canines, performed with NiTi coil springs. One of the randomly selected molars/premolars was irradiated (LI) with diode laser (MMOptics), according to the following application protocol: 780mm/70mW/105J/cm²/4.2J per point/Et= 42J for molars and 42J for premolars at days 0, 7 and 14 after activation, and the contralateral tooth was considered as control (LNI). The retraction lasted 3 months in the average, adding up to 9 laser applications. Dental casts and cone beam computed tomographies were evaluated to analyze the anchorage loss of molars. The dental casts were measured with a digital pachymeter and the tomographies obtained at initial (T0) and final periods (T4) were assessed by 3D analysis (Radiomemory). For the dental casts, analysis of variance were applied, followed by the Tukey test and then by the paired t test. The tomographies were also assessed to evaluate a possible resorption of the alveolar bone crest (CA), by measuring the distance between it (CA) and the cementoenamel junction (JCE), comparing T0 and T4 and the quantity of root resorption. The paired t test was applied for comparison between periods T0 and T4 of anchorage loss, root resorption and alveolar bone crest.

Results: In dental casts, the results indicated statistically significant reduction in the rate of movement of irradiated molars only on the first month. In the tomographies, there was statistically significant difference in the rate of movement comparing T0 and T4, with statistically significant gain of bone tissue at the distal and buccal bone crests of the maxillary first molar.

Conclusion: It was concluded that laser therapy at the adopted dose may reduce the orthodontic movement in the stage of initial retraction of canines, possibly contributing to the anchorage without damage to the periodontal tissues and even contributing to increase the bone support.

Michele Slongo Wiedermann (Brazil)
Category: Clinical human studies
Title: LOW-LEVEL LASER THERAPY IN THE RECOVERY OF SMELL AND TASTE DYSFUNCTION POST-COVID-19: A CLINICAL CASE REPORT

Aim: To demonstrate the potential of low-level laser therapy (LLLT) in treating sensory dysfunctions, such as anosmia (loss of smell) and ageusia (loss of taste), in patients with COVID-19 sequelae, by exploring the biological mechanisms involved and presenting a clinical case report.

Material and methods: LLLT was applied to a 45-year-old female patient who had anosmia and ageusia as COVID-19 sequelae. The device used was the Whitening Premium DMC, and the treatment consisted of 10 irradiation sessions.

Thirty points were irradiated on the dorsum and lateral areas of the tongue, with parameters of 0.5J V and 0.5J IV. Additionally, three sublingual points on each side of the tongue were irradiated with 9J V, along with bilateral intranasal irradiation also at 9J V. The mechanism of action of LLLT involves cellular biostimulation, where laser light is absorbed by mitochondrial chromophores, increasing ATP production and activating pathways that promote cellular regeneration and reduce inflammation.

Results: By the fourth session, the patient reported being able to smell cinnamon for the first time since the onset of anosmia. From the sixth session onward, there was significant progress in taste recovery, with noticeable improvements. The treatment was well tolerated, with no adverse effects reported.

Conclusion: Low-level laser therapy proved to be an effective and safe approach in the recovery of olfactory and gustatory functions in patients with COVID-19 sequelae. The treatment is non-invasive, virtually painless, and has a low risk of side effects, making it a viable alternative for patients who do not respond to other therapies.

Paula Sachet, Alyne Simões (Brazil)
Category: Clinical human studies
Title: USE OF LASER IN CRITICAL PATIENTS IN THE Intensive Care Unit : CASE SERIES REPORT

Aim: The objective of this study is to report a series of cases of Intensive Care Unit (ICU) patients who received Photobiomodulation Therapy (PBMT) and Photodynamic Therapy (PDT) for the prevention and treatment of oral alterations.

Material and methods: Three of the four cases presented viral infections (CMV, SARS-CoV-2, and herpes simplex) and were treated with Photodynamic Therapy (PDT) using the following parameters: methylene blue for 3 minutes, 660 nm, 4 J, and 40 seconds per point, with energy density ranging from 40.82 to 93.02 J/cm² in 2 to 3 sessions. After the antimicrobial protocol, the patients received Photobiomodulation Therapy (PBMT), from 0.5 J (5 seconds) to 10 J (10 seconds) per point, with energy density of 5.1 to 23.2 J/cm² in 3 to 5 sessions. In the fourth case, the polytrauma patient with a lower lip ulcer was treated only with PBMT for tissue repair and analgesia, using the same parameters for 2 sessions prior to hospital discharge. In all protocols, the equipment power was set at 100 mW, but the beam area varied between 0.043 and 0.098 cm².

Results: All patients showed evident clinical improvement or symptom relief after PDT and PBMT sessions. Therefore, these therapies proved to be non-invasive, painless, and effective in managing oral lesions and improving the quality of life of critically ill patients hospitalized in the intensive care unit.

Conclusion: These therapies (Photodynamic Therapy and Photobiomodulation Therapy) were shown to be non-invasive, painless, and effective in the management of oral lesions and in improving the quality of life of critically ill patients hospitalized in the intensive care unit.

Pedro Cardoso Soares, Viviane Catarina Pereira, Emíli Yukari, Patrícia Moreira de Freitas Costa e Silva (Brazil)
Category: Clinical human studies
Title: COMPARISON OF DIFFERENT PHOTOBIOMODULATION DOSAGES AND MEDICATION USE IN HEALING OF LINGUAL NERVE PARESTHESIA CAUSED BY THIRD MOLAR EXTRACTION: PRELIMINARY RESULTS

Aim: Evaluate the effect of different Photobiomodulation dosages (4 J Infrared, simultaneous irradiation of 2 J Red and Infrared), and Medication for Lingual Nerve alteration in participants that underwent third molar removal after 8 sessions of photobiomodulation or 30 days of ETNA use in the recovery of perception of the tongue.

Material and methods: Participants over the age of 18 years who underwent the surgical removal of third molars and reported unilateral paresthesia of the tongue were included.. All participants were assessed for paresthesia of the tongue in 13 points, comprising tongue lateral, the dorsal and ventral surfaces, and the lingual portion of the mandibula. The tests for gross perception were conducted with a 1 mm diameter nylon wire with pressure of 0.1 kg, and subtle perception using brush in gentle contact. Participants had three options of perception possible: no perception at all (No - N), partial perception (P - Partial), and perfect perception (Y - Yes). The same researcher

conducted all the evaluations. Another evaluation was the Numeric Rating Scale (NRS), using the number "10" to describe the worst condition possible (ex. perception limitation, pain, taste loss), and "0" ® use (Association of Disodium phosphate of cytidine 2.5 mg, Uridine triphosphate trisodium 1.5 mg, and Hydroxocobalamin acetate 1 mg). Participants were randomized to one of the three groups: G1- PBM - simultaneous irradiation of 660 nm and 808 nm, 100 mW each wavelength, 2 Joules per point, delivered simultaneously, with the spot size of 0.0984 cm^2. G2 - PBM - 808 nm, 100 mW, 4 Joules per point, with a spot size of 0.0984 cm^2. G3 - ETNA®, 1 capsule, every 8 hours, during 30 days. Statistical analysis considered a significance level of 5%. Statistical analysis compared the difference between the initial and final responses for No, Partial, and Yes for gross and subtle perception, and the difference between final and initial NRS, using a one-way ANOVA.

Results: The Numerical Rating Scale demonstrated a statistically significant decrease in NRS discomfort in group 1 (2J 660 and 808 nm combined). The differences in perception of gross and subtle perception did not differ between groups, despite the tendency of better results also in G1 (2J 660 and 808 nm combined).

Conclusion: The association of wavelengths of 660 and 808 nm in the dosage of 2J per point might be the best alternative for tongue paresthesia management after the third molar extraction.

Peiya Lin (Japan)
Category: Preclinical
Title: EFFECTS OF NEAR-INFRARED PHOTOTHERAPY ON MEDICATION-RELATED OSTEONECROSIS OF THE JAW IN MICE

Aim: Near-infrared phototherapy (NIR-PT) has shown therapeutic potential in conditions such as cancer and bone diseases. Medication-related osteonecrosis of the jaw (MRONJ) often arises from invasive dental procedures including tooth extractions and oral pathogen, leading to jawbone infections. This study aims to investigate the preventive effects and its molecular mechanisms of NIR-PT on MRONJ using model mice.

Material and methods: Eight-week-old female C57/BL6 mice were treated with cyclophosphamide (150 mg/kg) and zoledronic acid (125 μg/kg) before and after M1 molar extraction (MRONJ group). NIR-PT was performed 3 times in the first week after extraction and once a week for 3 weeks for MRONJ mice (NIR-PT group), using a high-frequency pulsed diode laser (Lumix 2™, Fisioline s.r.l., Verduno, Italy) at 200 mW, 30 kHz, for 3 min, with a 2.0 mm spot diameter. The total energy per day was 36 J and the total energy density per day was 1146.5 J/cm^2. Histological and bone structural analyses were performed at 2- and 5-weeks post-extraction. Bone and gingival tissues were collected for RNA-seq and microbiome analysis at one week after extraction. Human osteoblasts (HOBs) and human umbilical vein endothelial cells (HUVECs) were evaluated in proliferation and angiogenesis capacity after irradiation.

Results: In comparison to the MRONJ group, the NIR-PT group exhibited a significant increase in the epithelialization area of the extraction socket at both 2 and 5 weeks, as well as a significant increase in the volume of newly formed bone within the socket at 5 weeks after extraction. RNA-seq analysis revealed upregulated gene expression of Endothelial Protein C Receptor (Procr), which plays a crucial role in wound healing, in the NIR-PT group. Additionally, gene expression of Gremlin (Grem1), which is a well-known antagonist of bone morphogenetic protein, was suppressed in NIR-PT group. However, there was no significant difference in the microbiome compositions between the two groups. The proliferation of HOBs and HUVECs showed significant enhancement, and HUVECs exhibited accelerated angiogenic capacity after NIR-PT treatment.

Conclusion: These findings suggest that NIR-PT may promote epithelialization and bone regeneration by activating host responses, potentially preventing MRONJ development.

Rita Antonelli, Giulio Corradi, Andrea Pizzorni, Ilaria Giovannacci, Lorenza Artesiani, Marco Meleti, Paolo Vescovi (Italy)
Category: In vitro
Title: COMPARISON OF MICROBIOLOGICAL AND PHYSICAL EFFECTS BETWEEN Er:YAG LASER AND AIR-FLOW ON TITANIUM SURFACES: IN VITRO STUDY AND A LITERATURE REVIEW

Aim: Peri-implantitis is a plaque-related pathology, leading to a progressive inflammation

and bone resorption around the implant. Its management is still debated and controversial, but an innovative approach is represented by erbium laser (Er:YAG, 2940 nm), used alone or as a support to the classic mechanical debridement. The present study aims to achieve 2 objectives:
1) an in vitro study to evaluate the effects of Erbium Laser on titanium discs by comparing with Air Powder Therapy (APT);
2) a literature review, comparing the advantages and disadvantages of using laser therapy in peri-implantitis compared to other techniques.

Material and methods: 1. Titanium discs were divided in 6 groups: 1) 2 discs treated with Er:YAG,100 mJ,10 Hz,1 W, SSP mode; 2) 2 discs treated with Er:YAG,100 mJ,10 Hz,1W, QSP mode; 3) 2 discs treated with Er:YAG,150 mJ,10 Hz,1.5W, SSP mode; 4) 2 discs treated with Er:YAG,150 mJ,10 Hz, 1.5W, QSP mode; 5) 2 discs treated with APT; 6) 2 control discs. It has been conducted two types of analysis: · microbiologic evaluation: the titanium surface was contaminated with bacteria, and after the treatment, it has been analyzed the capacity of decontamination using fluorescent markers; · physical evaluation: before and after the different procedures the discs' surfaces were evaluated using a mechanical profilometer. 2. Literature research was conducted on Medline database using as entry terms "Erbium laser", "Er:YAG", "Er,Cr:YSGG", "Implant decontamination", "Implant disinfection" and "peri-implantitis". Inclusion and exclusion criteria were applied for studies selection

Results: 1. Microbiologically, the fluorescent plaque coat disappeared on high-power laser treatment. Between SSP and QSP modality, it is visible a higher density of bacteria in QSP. The physical evaluation shows that there is not an important variation between surface roughness before and after all the three different treatments, but QSP modality appears to preserve more the titanium surface without causing any alteration. 2. The critical review included a total of 38 articles, with 25 in vitro studies and 13 in vivo. Twenty-six studies (70%) have demonstrated the advantages of using laser for peri-implantitis treatment compared to other methods.

Conclusion: Based on these preliminary results, Er:YAG seems a safe and promising tool that can be used to manage peri-implantitis.

Roberta Iaria, Bortolotti Gloria, Ilaria Giovannacci, Rita Antonelli, Marco Meleti, Paolo Vescovi (Itália)
Category: Clinical human studies
Title: Combined use of laser surgery, cross-linked hyaluronic acid, and porcine pericardium resorbable membrane to promote surgical wound healing in oral soft tissues

Aim: Our aim is to evaluate the efficacy of the combination of laser surgery, cross-linked hyaluronic acid (xHyA) and porcine pericardium membrane (PPRM) in the postoperative course and in wound healing after the surgical removal of oral lesions.

Material and methods: Hyaluronic acid (HA), is a glycosaminoglycan formed by a disaccharide unit that repeats up to 50,000 times. HA is an endogenous molecule with bacteriostatic, anti-inflammatory and anti-oedematous properties. HA represents one of the main constituents of the extracellular matrix. The Cross-linked form of HA, obtained by structural modifications of the native form, is characterize by a higher resistance to mechanical stress and to degradation process, resulting in better clinical effects. Porcine pericardium resorbable membrane (PPRM) is a biocompatible material that acts as a barrier and promotes clot formation and cell adhesion. We will present the preliminary results and five clinical cases included in a clinical study conducted at the Operative Unit of Odontostomatology in Parma, Italy. Specifically, we report the surgical management of five cases of in situ or microinvasive carcinoma of the tongue margin. After lesion excision performed using an Nd:YAG laser (1064 nm FidelisPlus, Fotona, Ljubljana, Slovenia, power: 3.5 W; frequency: 60 Hz; fiber diameter: 320 µm, power density: 488,281 W/cm2). A xHyA gel was applied to the bottom of the surgical wound. Lastly, a PPRM, previously shaped according to the defect edges and hydrated in saline, was placed to cover the defect and secured with resorbable sutures.

Results: In all reported cases, rapid reduction in surgical wound size was observed within two weeks, and complete healing was achieved on average in six weeks. Furthermore, no patient treated by this surgical approach reported functional impairments or the presence of cicatricial retraction in the treated areas.

Oral Presentation

Conclusion: Results concerning surgical wound healing treated with the combined use of xHyA and PPRM are particularly encouraging. Furthermore, this approach is associated with high patient tolerability and a favorable postoperative course. The prospective randomized study that we propose to implement will be able to objectively confirm our positive clinical findings.

Sandra Bastos Rezende, Luana Campos, Maria Clara de Souza, Alyne Simões (Brazil)
Category: Clinical human studies
Title: PREDICTIVE FACTORS FOR ORAL MUCOSITIS IN PATIENTS RECEIVING PHOTOBIOMODULATION THERAPY DURING STEM CELL TRANSPLANTATION

Aim: Oral mucositis (OM) is a significant adverse effect in patients undergoing allogeneic and autologous bone marrow transplants. The high morbidity associated with this condition underscores the need for effective preventive and therapeutic strategies, among which photobiomodulation therapy (PBMT) is a promising candidate. However, its effectiveness can be impacted by patient-specific factors, treatment variations, and lesion characteristics. Therefore, this study aims to evaluate how OM risk factors influence PBMT's clinical outcomes, particularly regarding the development and severity of this condition.

Material and methods: To achieve this, a retrospective analysis was conducted on 171 medical records of patients who underwent bone marrow transplants between 2017 and 2019 at the Brazilian Institute of Cancer Control (IBCC). All patients included in this study received a standardized PBMT protocol, which involved daily irradiations on 78 different points distributed along the tongue and lining mucosa. For this, a InGaAlP laser device (therapy EC) with 100 mW power output and 0.028 cm^2 spot area, was employed along with diode tips. All irradiations were performed with a wavelength of 660nm, in contact mode, perpendicular to the tissue, using continuous wave. The following parameters were adopted: 0.2 J, 3.6 W/cm^2, 7.14 J/cm^2, and 2 seconds per point. Applications were performed daily from the first day of transplant conditioning until the stem cell collection or complete remission of all lesions. For all patients included, data related to the following parameters were collected: serum levels of C-reactive protein (CRP), creatinine, urea, oxalacetic glutamic transaminase (TGO), pyruvic glutamic transaminase (TGP), pain levels, and types of pathogenic microorganisms. These were assessed at two different time points: the first day of transplant conditioning and the day of highest OM severity. All data was digitalized, and a multivariate analysis was performed to appraise the correlation between them and the OM grade.

Results: The results showed that presence of microorganisms in cultures, increased serum-CRP levels, receiving allogenic bone marrow transplants, as well as using MTX during conditioning may be considered predictive for the development of severe OM.

Conclusion: In light of the above, adjusting dosimetry parameters of PBMT according to the patients' needs may be necessary to improve treatment outcomes.

Silvio Mecca Junior, Marcelo Henrique Napimoga, Mateus Alves Mecca, Christian Rado Jarry (Brazil)
Category: In vitro
Title: ACCURACY OF IMPLANTS PLACED WITH CAD-CAM SURGICAL TEMPLATES USING METAL OR PEEK SLEEVE. REPROVADO!!

Aim: The aim of this laboratory study was to evaluate the effect of using two types of sleeves (Metal or PEEK) in static surgical guides and whether there will be any interference in the accuracy of the installed implants compared to the planned virtual positioning.

Material and methods: A CT scan and a scan of a partially edentulous patient (element 36 region) were used. These files were imported into a virtual implant planning software (coDiagnostiX®), and a STRAUMANN® RC BLT 4.1 x 10 mm implant was positioned. Twenty (20) surgical guides were printed, 10 with metal sleeves and 10 with PEEK (Polyether ether ketone) sleeves. A master model was printed, and a cut was made in the implant region where the surgical guides were seated, allowing the passive placement of an implant through the static guide, which was then fixed with lightaddition silicone material. An RC Scanbody was inserted into the implant, and a new scan was performed to import the position of this implant into the software, allowing a comparison between the planned versus the inserted implant. The

average deviations studied were angular, coronal, and apical deviations. Student's t-test for independent samples or Mann- Whitney tests were used to determine if there were statistical differences between the groups.

Results: The angular deviation of implants installed through surgical guides planned by the CAD-CAM (Computer-Aided Design – Computer-Aided Manufacturing) system was significantly lower in the group with PEEK sleeves (p < 0.001), being on average 57.2% lower than observed in the group with metal sleeves. On the other hand, it was found that implants installed with PEEK sleeves had a significantly higher coronal deviation compared to the group with metal sleeves (p = 0.006). The coronal deviation was on average 66.3% higher in the PEEK sleeve group. For apical deviation, no significant difference (p = 0.186) was observed between the groups.

Conclusion: Different sleeve materials seem to have a significant effect on the accuracy of guided surgery. In this study, PEEK sleeves demonstrated greater accuracy with significantly lower angular deviation than in the metal sleeve group.

Stéfany Barbosa, Izabela Fornazari Delamura, Ana Paula Farnezi Bassi, Edilson Ervolino, Leticia Helena Theodoro, Leonardo Perez Faverani (Brazil)
Category: Clinical human studies
Title: IMPROVING QUALITY OF LIFE FOR ONCOLOGY PATIENTS WITH MRONJ USING ANTIMICROBIAL PHOTODYNAMIC THERAPY PLUS SEQUESTRECTOMY

Aim: This case reports aimed to demonstrate the effect of Antimicrobial Photodynamic Therapy (aPDT) as the main adjuvant therapy to sequestrectomy in the therapeutic management of four oncology patients diagnosed with MRONJ.

Material and methods: Of the four patients, three underwent sequestrectomy surgery, with aPDT sessions conducted in the pre-operative, intra-operative, and post-operative periods. The aPDT sessions were performed at least twice a week. For this purpose, a pre-irradiation of the MRONJ site was conducted using methylene blue photosensitizer (100 µg/mL) for 60 seconds. Following this, irradiation was performed with a low-power diode laser (Photon Laser III, DMC, Equipments Ltd.; 660 nm; 100 mW; 60 s; 6 J/point; 3.57 W/cm²; 214 J/cm²).

Results: One patient experienced pain in two implants with peri-implantitis and stage I osteonecrosis and could not undergo surgery due to his systemic condition. However, the patient reported significant improvement in pain after four aPDT sessions conducted over two consecutive weeks. The other patients were diagnosed with stage III MRONJ, which was associated with greater therapeutic challenges, sometimes requiring more than one surgical intervention at the same site or even resulting in incomplete tissue closure. Despite this, all reported significant improvement in the Visual Analog Scale (VAS) for pain following the combination of aPDT at different surgical times and sequestrectomy.

Conclusion: It was concluded that, even in systemic and local limitations related to oncology patients, the proposed therapy is an effective way to improve pain parameters, chewing ability, and the quality of life for the patients.

Suwat Tanya, Saengsome Peajaneh, Piyachat Patcharanuchat, Sajee Sattayut (Thailand)
Category: Clinical human studies
Title: LASER-MEDIATED HEMOSTASIS FOR OLDER PATIENTS UNDERTAKEN ROUTINE DENTAL PRACTICES

Aim: This study aimed to explore clinical efficacy of laser-mediated hemostasis for older patients undertaken dental treatments. Background: Despite various laser therapies have been employed in dental practice to enhance hemostasis, the implementation in clinical practice remains challenging.

Material and methods: A perspective observational study was conducted across three study units between October 2023 and August 2024, involving 60 patients aged 50 and older at risk of postoperative bleeding. Photobiomodulation parameters were 635-nm diode laser (SmartM, Lasotronix) at 0.2 W with 4 J/cm² via 8-mm laser probe or 810-nm diode laser (PICASSOTM LITE, AMD Lasers) at 0.5 W with 5.93 J/cm² via 6-mm biomodulation probe. The irradiation time was 10 seconds per session in continuous wave. For tissue ablation, 810-nm or 980-nm diode lasers at 2.5 to 3 watts in continuous wave via 320-micron optical fiber

were used by qualified operator in each unit. Clinical data were collected by a single researcher. Outcome measurements were verified and assessed before analyses.

Results: The results showed that 94 extraction sockets, 28 scaling and root planing procedures and 18 minor surgery procedures successfully achieved hemostasis. Sulcular tissue ablation combined with photobiomodulation was frequently used for socket hemostasis, while photobiomodulation alone was used for soft tissue hemostasis ($p < 0.001$). The medians of photobiomodulation sessions per procedures were 4 for bleeding socket (range: 2 to 16), 12 for scaling and root planing (range: 8 to 23) and 4 for minor surgery (range: 0 to 11). The cumulative doses were 8 to 32 J/cm^2 and 11.86 to 136.39 J/cm^2 for 635-nm and 810-nm diode lasers, respectively. The proportion of extraction sockets achieving hemostasis within 5 minutes (61.43%) was significantly larger than using photobiomodulation alone ($p < 0.001$). Duration of soft tissue hemostasis using photobiomodulation was within 15 minutes. There was no statistically significant difference in hemostatic duration among bleeding events ($p = 0.092$). All operators confirming faster hemostasis (97.86%) compared to standard methods ($p = 0.701$). Distinct healing (93.57%) significantly observed following tooth extraction ($p = 0.005$)

Conclusion: The combined tissue ablation and photobiomodulation was effectively enhancement of socket hemostasis, while photobiomodulation alone enabled soft tissue hemostasis.

Taichen Lin, Yoichi Taniguchi, Koji Mizutani, Akira Aoki (Taiwan)
Category: Clinical human studies
Title: FULL MOUTH ESTHETIC REHABILITATION BY Er:YAG LASER-ASSISTED PERIODONTAL AND PERI-IMPLANTITIS THERAPY UNDER MICROSCOPE: FROM PERIODONTAL REGENERATION TO PERI-IMPLANTITIS BONE AUGMENTATION

Aim: The purpose of this case study is to examine the clinical outcomes using Er:YAG laser-assisted periodontal therapy under microscope for periodontal regeneration and peri-implantitis bone augmentation in a full mouth esthetic rehabilitation patient with severe periodontitis and periimplantitis.

Material and methods: A Stage IV, Grade C, Generalized periodontitis, female, forty years-old patient was treated. Measurement of full mouth probing pocket depth (PPD), and clinical attachment level (CAL), and radiographic examination was performed before and after full mouth periodontal regeneration and periimplantitis bone augmentation using Er:YAG laser-assisted therapy under microscope. During flap surgery for periodontitis and peri-implantitis treatment, all the intra-bony defect was carefully and completely debrided by Er:YAG laser under microscope, bone graft augmentation into the bony defect was performed, and subsequently blood clot was coagulated to stabilize the bone graft by Er:YAG laser irradiation without water spray, and no collagen membrane was used on the regeneration sites.

Results: All the early healing was favorable and 100% primary wound closure was obtained following the Er:YAG laser-assisted bone regeneration on the periodontitis teeth and peri-implantitis implants, and the clinical outcomes showed significant improvements in terms of PPD reduction and CAL gain. Also, marked bone regeneration in the intra-bony defect were evident in all the Er:YAG laser-assisted periodontal therapy sites. The treated periimplantitis site showed 8 mm pocket depth reduction without bleeding on probing and clear bone regeneration was evident.

Conclusion: Er:YAG laser is a very useful, safe and effective tool to treat periodontitis as well as periimplantitis, with the excellent ability of complete granulation tissue removal, calculus removal, detoxification and debridement on the teeth and implant fixture surfaces in the deep and narrow bony defects under microscope, and may be the best adjunctive device to assist periodontal regeneration and peri-implantitis bone augmentation, compared with conventional mechanical surgical therapy.

Thayná Vianna da Rocha, Pedro Cardoso Soares, Edgar Michel Crosato, Patricia Moreira de Freitas Costa e Silva, Luciane Hiramatsu Azevedo (Brazil)
Category: Clinical human studies
Title: EVALUATION OF PARAMETERS OF USE OF HIGH POWER LASERS AND POSTOPERATIVE OUTCOMES IN INFLAMMATORY FIBROUS

Oral Presentation

HYPERPLASIA: A RETROSPECTIVE STUDY OF 22 YEARS

Aim: To evaluate the prevalence of Inflammatory Fibrous Hyperplasia (IFH) diagnosis, respective clinical variables, types of high-power lasers, and parameters used. The IFH is a benign traumatic reaction due to chronic, low-intensity local irritation, the treatment is based on conservative surgical removal, local irritant removal, and performing a biopsy. Using high-power lasers in IFH surgical excision has several advantages. This retrospective study evaluated 102 lesions of IFH in a sample of the Brazilian population whose medical records met the inclusion criteria.

Material and methods: The medical records of patients diagnosed with IFH who underwent a high-power laser procedure between 2000 and 2022 at the Special Laboratory of Laser in Dentistry (LELO-FOUSP) were analyzed. The inclusion criteria were histopathological diagnosis and records containing the Informed Consent Form (ICF). The data extracted from records were: age, sex, race, duration size, and location of the lesion, need for prescription of postoperative medication, and the laser used in the procedure. The data were tabulated and analyzed using descriptive analysis.

Results: There was a prevalence of the lesion in white female patients over the age of 40 (84.8%) and a duration of more than one year (64.3%). Most lesions were bigger than 1cm in size (61.3%) and developed in the alveolar ridge and deep sulcus regions (68%). The most used laser was the CO_2 laser (70.6%) - Union Medical Engineering Coo UM-L30 (Seul, South Korea), 10.600nm, CW, 2-6W, beam diameter 0.3 mm. In most cases, medication after the surgical procedure was not necessary (63%).

Conclusion: The IFH lesions had a predominance of white female patients over the age of 40. The most common location was the alveolar ridge and deep sulcus regions with a size bigger than 1cm and a duration of more than 1 year. The CO_2 laser was the most used due to the good hemostasis transoperative and higher biopsy speed.

Valeria Mendes, Denise Maria Zezell, Luciane Hiramatsu Azevedo (Brazil)
Category: Clinical human studies
Title: NEW LASER TREATMENT PROTOCOL FOR SNORING AND OBSTRUCTIVE SLEEP APNEA – A CONTROLLED RANDOMIZED DOUBLE-BLIND CLINICAL TRIAL

Aim: The goal of this study is to clinically evaluate the effect of non-ablative treatment with Nd:YAG (1064 nm) and Er:YAG lasers (2940 nm) in sleep breathing disorders (SBD), in a longitudinal, interventional and prospective study.

Material and methods: After approval from the Research Ethics Committee thirty volunteers, in the city of São Paulo, Brazil, with clinical condition ranging from snoring to moderate OSA, both sexes, 25 to 65 years, BMI < 40 kg/m^2 were blinded and randomized into control and laser groups. Patients received three sessions of treatment, 14 days apart. In the control group (12 volunteers), only a guide light was used without providing laser energy. 18 volunteers from the laser group were treated with high-intensity non-ablative combination of Nd:YAG and Er:YAG lasers irradiation. The entire soft palate, uvula, palatoglossal and palatopharyngeal arches were punctually irradiated with four to five shoots per point and six scans in each line. Parameters were chosen to efficiently and safely deliver energy in a five-step sequence that allows for gradual thermal sensitization of the tissue. Outcome measures including photographic records, type IV polysomnography, and snoring sound analysis were performed at pre-treatment, post-treatment, and 3- and 6-month follow-up visits. The main outcome of the study, the analysis of the upper airway lumen variation based on to Modified Mallampati Index was performed independently and in a blinded manner, as well as the statistical analysis. The oxyhemoglobin desaturation index (IDO), snoring sleep duration and the maximum snoring sound amplitude were also analyzed. Observing the variability in each outcome allowed us to analyse the differences between the experimental periods compared to the baseline for each variable, as well as the behavior of the laser group compared to the control group. Fisher's corrected chi-square test was used with a significance level of $\alpha = 5\%$.

Results: The main clinical outcome is the enlargement of the upper airway lumen after irradiation in all study periods analyzed. Therefore, the improvement in oxyhemoglobin desaturation index (ODI) and snoring. No major adverse events or side effects were observed.

Oral Presentation

Conclusion: Non-ablative laser treatment is effective for rehabilitation of patients with Sleep Breathing Disorder. Under the protocol used in this study, the intervention is carried out in outpatient basis, without medication or anesthesia. Enlargement of the upper airway lumen by reducing tissue flaccidity improves oxyhemoglobin desaturation index, snoring sleep duration and peak amplitude of snoring sound.

Vanessa Moredo Alonso, Anderson Zanardi de Freitas, Lucas Ramos de Pretto (Brazil)
Category: In vitro
Title: ASSESSMENT OF PULPAL BLOOD FLOW WITH OPTICAL COHERENCE TOMOGRAPHY SIGNAL SPECKLE ANALYSIS

Aim: The aim of this study was to diagnose, ex vivo, the flow within the dental pulp chamber in a non-invasive manner using the speckle pattern in Optical Coherence Tomography (OCT) images. In dentistry, OCT is an established technique for diagnosing early carious lesions, evaluating remaining dentin thickness, and analyzing the quality of restorations. In Endodontics, its use has been described for in vitro analysis of root anatomical structures, quality of obturation, presence of accessory canals, and cracks.

Material and methods: This project, approved by the Research Ethics Committee used two ex vivo maxillary central incisors in a pulp microcirculation system with a 5% intralipid solution (B.Braun) and controlled flows ranging from 1 to 100 µL/min via a microfluidic pump. OCT images were acquired from the buccal surface of the dental crown at three depth profiles, using the Swept Source OCT Vega 220 system (Thorlabs Inc), with a laser diode of 1300 nm central wavelength, 16.1 mW power, and an axial and lateral resolution of 14 and 20 µm respectively, the total acquisition time was 1 s. The speckle analysis in OCT allowed us to observe that the pattern varies with the movement of internal scatterers, and faster flows result in greater intensity changes, leading to faster temporal decorrelation, enabling flow quantification.

Results: The results showed that autocorrelation values decrease as the lag increases, varying according to the flow rate. The maximum penetration depth was 2.6 mm in sample A and 3 mm in sample C, with the system detecting flows at 1.54 mm ranging from 10 µL/min to 80 µL/min and 55 µL/min, respectively. A flow map was generated with 65 B-scan acquisitions, and a flow rate of 30 µL/min to show the distribution within the tooth sample.

Conclusion: This study validates pulp flow analysis using speckle OCT as an innovative and promising approach for real-time pulp vitality testing in a non-invasive, non-ionizing, and painless manner.

Vinícius Ganzaroli, João Paulo Soares Franciscon, Tiago Esgalha da Rocha, Leticia Helena Theodoro, Edilson Ervolino, Valdir Gouveia Garcia (Brazil)
Category: Preclinical
Title: EFFECTIVENESS OF ACTIVE OXYGEN GEL COMBINED WITH ANTIMICROBIAL PHOTODYNAMIC THERAPY IN PREVENTING MEDICATION-RELATED OSTEONECROSIS OF THE JAWS IN SENESCENT FEMALE RATS

Aim: The aim of this study was to evaluate the effect of active oxygen (AO) gel (Blue®M) associated with antimicrobial photodynamic therapy (aPDT) on the alveolar repair process in senescent female rats treated with zoledronate and to analyze its effectiveness in preventing of medication-related osteonecrosis of the jaws (MRONJ).

Material and methods: Twenty-eight senescent rats were divided into the following groups: NLT, AO, aPDT, and AO+aPDT. On day 0, a ligature was placed around the first lower molar to induce experimental periodontitis. From day 1 to day 50, the rats received 0.45 ml of zoledronate (100 µg/Kg) every 3 days. After 3 weeks, the first lower molar was extracted. In the NTL group, no treatment was performed. In the AO and aPDT groups, the alveoli underwent three sessions of local application of Blue®M gel or aPDT. In the AO+aPDT group, the alveoli underwent three sessions of both therapies. For aPDT, 500µl of methylene blue (100 µg/ml; 60s) was deposited on the dental extraction site followed by irradiation with low-level laser (Thera lase, DMC Equipments Ltda; InGaAIP; 660 nm; 35 mW; 74.2 J/cm^2; 2.1 J; 60 s). Treatments were performed on postoperative days 0, 2, and 4. Euthanasia was performed 28 days post-extraction. The hemimandibles were processed for clinical, histological, and immunohistochemical analyses, including the percentage of newly formed bone

tissue (NFBT), non-vital bone tissue (NVBT), and immunohistochemical analysis for BMP2/4 and OCN.

Results: The NTL group showed impairment in the tissue repair. The aPDT and AO+aPDT groups exhibited a favorable tissue repair. The NTL group had a lower percentage of NFBT and a higher percentage of NVBT compared to the other groups. The AO+aPDT group had a higher percentage of NFBT than the aPDT group. AO+aPDT showed the highest immunolabeling for BMP2/4 and OCN.

Conclusion: The combination of AO and aPDT proved to be the most effective therapy in preventing MRONJ.

Virgilio Moreira Roriz, Sara Maria do Amaral Melo, Ana Catarina Nogueira Silva (Brazil)
Category: In vitro
Title: EVALUATION OF THE EFFECTS OF THE DIODE LASER (980nm) AND THE NUPRO PROPHYLACTIC PASTE ON THE OCCLUSION OF DENTINAL TUBULES: IN VITRO STUDY

Aim: This study aimed to compare the percentage of occlusion of dentinal tubules (ODT), after application of Nupro® paste (Cacium and sodium phosphosilicate) and diode laser (980 nm)

Material and methods: This is an in vitro study, in which 40 human teeth were used. After extractions, 2mm thick dentin discs were cut, perpendicular to the long axis of the tooth. After being polished, they were kept in a solution containing 0.2% thymol at 4 o C until treated. The discs were acid etched (35% phosphoric acid) for 30 seconds and washed with distilled water. The sample of 40 discs was divided into 4 groups (10 in each group): Nupro ® - NPP Group (NuPro® Prophy paste, containing 15% NovaMin); Diode Laser Group (DL- 980 nm applying 1 W of power in a continuous mode, sweeping movements, for 60 seconds); Nupro Group + Diode Laser (NPP+DL); Control Group (no treatment). In the NPP and NPP+DL groups, the Nupro paste was applied with a Robinson brush (low rotation) for 60 seconds. After the treatments, the discs were washed with distilled water, and after drying, the percentages of ODT were evaluated using Scanning Electron Microscopy

Results: The results showed that the average ODT percentages and standard deviations were respectively: C- 0.0%; NPP-95.05% (±5.40); DL-8.63%(±15.36) and NPP+DL- 97.72%(±3.97). It was performed a statistical treatment of the data, using the Kruskal-Wallis test and Tukey test. The NPP and NPP+DL groups showed statistically significant differences ($p<0.001$) in relation to Control and Laser alone, however without showing statistically significant differences between the groups that received Nupro

Conclusion: It can be concluded that the NPP and NPP+ DL groups showed higher ODT percentages compared to the other groups and that the application of the Diode laser (980nm) did not favor their occlusion.

Zuzanna Grzech-Leśniak, Aleksander Makara, Jacek Matys, Marzena Dominiak, Josep Arnabat- Domínguez, Kinga Grzech-Leśniak (Poland)
Category: Clinical human studies
Title: EFFECT OF 810nm LOW-INTENSITY LASER IN REDUCING PAIN, EDEMA AND TRISMUS AFTER SURGICAL REMOVAL OF IMPACTED LOWER THIRD MOLARS – A RANDOMIZED CLINICAL CONTROL TRIAL

Aim: The aim of the study was to evaluate the effectiveness of photobiomodulation (PBM) using an 810 nm diode laser in reducing pain, trismus, and edema.

Material and methods: A total of 34 patients requiring lower third molar extractions were included in the study and divided into two groups (control—sham laser and test—post-surgical PBM). Preoperative measurements were taken as a baseline for postoperative changes and included distances between specific goniometric points: Gonion–External Canthus of the Eye, Gonion–Corner of the Mouth, and Tragus–Corner of the Mouth. Following the extraction, the surgical site was irradiated intraorally with an 810 nm diode laser (Thor Photomedicine, London, United Kingdom) at 200 mW for 60 seconds, CW, in contact mode (spot size: 0.088 cm^2, power density: 2.27 W/cm^2, energy density: 136 J/cm^2, total energy: 12 J). Extraorally, the surgical site was irradiated with an 810 nm, 1W (5x200 mW) Laser Cluster for 60 seconds, CW, in contact mode (spot size: 0.029 cm^2, power density: 6.89 W/cm^2, energy density: 413.8 J/cm^2, total energy: 12 J). Irradiation was applied at three specific points

on each side of the surgical site, with each point receiving 60 seconds of laser exposure on the 1st, 2nd, 3rd, and 7th days post-surgery. Postoperative outcomes, including healing, pain perception, vitamin D3 levels, and analgesic consumption.

Results: A significantly lower increase in the Gonion–External Canthus distance (indicating reduced edema) was found in the test group ($p=0.014$). No healing complications were observed after 2 days in 5 patients from the test group ($p<0.05$). Higher vitamin D3 levels were noted two days postoperatively in patients with fewer complications, though this result was not statistically significant ($p>0.05$). Both groups reported significantly higher paracetamol consumption on the first postoperative day compared to the third day. No significant differences between groups were found in trismus or in the relationship between surgery duration and paracetamol consumption.

Conclusion: The study observed less edema and better healing in the PBM group. However, PBM and higher vitamin D levels did not significantly influence pain reduction (paracetamol consumption) and trismus.

Poster **Session**

P-001
Sonia Bordin-Aykroyd (USA)
Category: Scientific report
Title: PHOTONIC AND NANOTECHNOLOGIES IN DENTISTRY

Aim: The main aim of the investigation is to explore the use of photonic and nanotechnologies in infection control in dentistry.

Material and methods: M&M: The study is structured into three interconnected parts:
Systematic Review of Bioaerosols in Dentistry: This segment explores the current understanding of bioaerosol contamination in dentistry, focusing on the role of particle size in airborne transmission. It addresses how dental procedures contribute to bioaerosol generation and their impact on the infectivity of particles.
Review of Photocatalytic Disinfection in Dentistry: The second part reviews the literature on the use of photocatalytic disinfection, a combination of photonic and nanotechnologies, in controlling pathogenic microorganisms in dentistry. It delves into various advanced oxidation processes, including the effectiveness of TiO2 and ZnO nanoparticles activated by UV radiation, and their application in various sectors, including dentistry.
In-vitro Experiments for Pathogen Inactivation: The final part involves in-vitro experiments to assess the efficacy of TiO2/UV photocatalysis in targeting and decontaminating dental pathogens on contaminated surfaces. The study aims to optimize the inactivation process by testing various concentrations of TiO2 and UV light wavelengths.

Results: Preliminary results: Airborne water droplets, capable of carrying a significant viral load, can linger in the air and travel long distances once they dry out. This fact underscores the importance of building design and ventilation in managing indoor transmission of infectious diseases. The effectiveness of strategies aimed at reducing airborne particle concentrations and viral loads in enclosed spaces heavily depends on various environmental factors.
The escalating challenge of antibiotic and disinfectant resistance necessitates innovative strategies for preventing pathological biofilm development and pathogen eradication.
Photonic biotechnology, especially in the realm of disinfection, emerges as a promising solution, notably for its lack of contribution to microorganism resistance. The urgency for such innovative approaches is amplified by the recent pandemic, driven by airborne transmission, and the growing concerns about future viral outbreaks influenced by climate change.
Dental healthcare workers, frequently exposed to airborne pathogens, necessitate effective air disinfection technologies for virus inactivation to ensure their safety. Advanced Oxidation Processes (AOPs), like photocatalysis, utilize photonic energy and photosensitizers to address these issues effectively without contributing to bacterial resistance.
Photocatalytic disinfection employ TiO2 or ZnO nanoparticles as photosensitizers, activated by UV radiation, applicable in food hygiene, healthcare for creating self-disinfecting surfaces, and public health for air and water treatment.
Although high-volume evacuation (HVE) systems are effective in reducing bioaerosol infection in dental settings, additional methods targeting the decontamination of clinically relevant dental pathogens could further enhance safety for healthcare teams and patients.
Significant research, such as Bogdan et al. (2015), indicates the varying susceptibility of organisms to photocatalysis, notably viruses, prions, bacteria, yeasts, and molds. Photocatalysis disinfects through mechanisms like physical viral structure disruption, metal ion toxicity, and chemical oxidation via reactive oxygen species.

Conclusion: Nanotechnology, particularly in the form of self-disinfecting surfaces using AOPs like TiO2/UV and ZnO/UV, plays a pivotal role in combating pathogens resistant to traditional treatment methods. Their effectiveness in inactivating a range of infectious agents positions them as crucial tools in food hygiene and public health.
This study is particularly pertinent given the high levels of contamination in dental settings due to the presence of infectious bioaerosols. The application of TiO2 coatings on dental equipment surfaces, which react with UV light to disinfect, could significantly reduce the risks of cross-contamination.
While additional research may be necessary to perfect the application of PCD for airborne infections in these environments, the outcomes of this study are expected to highlight its potential in improving air quality and reducing viral transmission risks for dental professionals and patients, applicable to both air and surface

decontamination. This research is poised to pave the way for further investigations into various elements such as TiO2 formulations, UV wavelengths, exposure times, and their practical integration into dental practice workflows.

P-002
Mario Brito da Silva Filho (Brazil)
Category: In vitro
Title: EVALUATION OF BOTULINUM TOXIN TYPE A AND MICROGLIAL CELLS

Aim: Some recent studies have indicated that botulinum toxin type A (BoNT/A) is a potential new strategy in neuropathic pain therapy. Microglia are an important source of cytokines, and when activated they can release pro-inflammatory mediators, such as Tumor Necrosis Factor-alpha (TNF-alpha), Interleukin-1beta (IL-1β), Interleukin-6 (IL-6), Brain-Derived Neurotrophic Factor (BDNF) and Prostaglandin E2 (PGE2), which promote the onset and maintenance of neuropathic pain. Objective: To evaluate the impact of BoNT/A on microglial cells without stimulation, to evaluate the impact of BoNT/A on the release of inflammatory mediators by microglial cells stimulated with lipopolysaccharides (LPS) and carrageenan (CG), to evaluate whether BoNT/A interferes with isolated rat epididymal vas deferens contraction (RIEVD).

Material and methods: Study 1: 1x cells were pelleted in 96-well plates and stimulated with LPS (200 ng/mL) or Cg (300 µg/mL), and treated with BoNT/A (BOTOX®) at the dosages of 0.625U and 1.25U. The cell supernatant was used to quantify the levels of inflammatory cytokines by the ELISA method. NO production was evaluated by the Griess method. Cells (2x/ mL) were seeded in a 12-well plate and incubated for 24 h to assess nitrite production. Study 2: The epididymal portions of the vas deferens of Wistar rats in Krebs-Henseilet solution were submitted to electric field stimulation. In control animals, contractions induced by electric field stimulation were evaluated in the absence and presence of BoNT/A 10 units/mL.

Results: Study 1: The results of Thiazolyl Tetrazolium Bromide (MTT) made it clear that treatment with BoNT/A in BV2 cells without stimuli had a tendency to decrease the metabolism of these cells at dosages of 5U and 2.5U, compared to After this result, we selected the doses of 1.25U and 0.625U to continue the experiments. Treatment with BoNT/A reduced the release levels of IL-1 β, TNF and NO in BV-2 cells stimulated with Lipopolysaccharides, when stimulated with Carrageenan, treatment with BoNT/A reduced the levels of IL-1β release and TNF-alpha over a 12 hours' time frame. Study 2: BoNT/A, 10U per ml, on rat isolated vas deferens contractions (RVIEV) induced by noradrenaline and electric field stimulation had no effect on dopamine-induced RIEVD contractions.

Conclusion: These preliminary results support that BoNT/A has an important action on microglial cells. New experiments, with higher concentrations of botulinum toxin type A need to be carried out in vas deferens isolated from rats.

P-003
Pablo Betancourt, Francisco Rubio, Federico Wienecke, Josep Arnabat Domínguez, Pablo Betancourt (Chile)
Category: Case report
Title: PHOTOBIOMODULATION THERAPY AND ENDODONTIC TREATMENT OF TEETH WITH APICAL PERIODONTITIS USING 940-nm DIODE LASER. REPORT OF TWO CASES

Aim: The aim of this article was to report two cases of teeth with asymptomatic apical periodontitis (AAP) treated with PBMT and disinfection protocol by 940-nm diode laser (DL).

Case description: This work presents two cases of pulp necrosis/asymptomatic apical periodontitis (AAP) that were treated with 940-nm DL, administered both to disinfect the root canal and to apply photobiomodulation therapy (PBMT) to the periradicular tissues. The cases were analysed by Cone-Beam Computed Tomography (CBCT).

Discussion: DL has become widely accepted due to its high antimicrobial effectiveness and its ability to accelerate the repair of large apical lesions by biostimulation. Nevertheless, differences of opinion persist within the scientific community due to the lack of standardized endodontic protocols.

Conclusion: The application of 940-nm DL, both for disinfection of the root canal system and for PBMT, is an effective treatment in non-vital teeth with large periapical lesions. In both cases reported, bone neoformation were found at the 6-month check-up.

P-004
Larissa Couto de Freitas, Fabianne Soares Lima, Luciane Hiramatsu Azevedo, Alyne Simões
(Brazil)
Category: Case report
Title: USE OF ANTIMICROBIAL PHOTODYNAMIC THERAPY AND HIGH-POWER Er:YAG LASER IN THE TREATMENT OF BONE NECROSIS INDUCED BY DRUGS OR RADIATION: CASE SERIES

Aim: The objective of this work is to describe three cases in which there was an association of the use of low- and high-power lasers for the management and treatment of bone necrosis.

Case description: Two cases of medication-related osteonecrosis of the jaw and one case of osteoradionecrosis were diagnosed and treated with a combination of low- and high-power lasers. In both cases, there were complaints of significant painful symptoms and exposure of intraoral necrotic bone tissue after extraction. In only one case the jaw was affected and the patient was using Alendronate orally to treat osteoporosis. In the other two cases, there was mandibular involvement, with one of the patients using Alendronate, orally, and the other underwent radiotherapy. All patients were initially subjected to treatment with photobiomodulation therapy, using a low-power laser at red wavelength, being irradiated at 0.5 J/point in the region of bone exposure, and at infrared wavelength, being irradiated 2,0 J/point around the wound, in addition to antimicrobial photodynamic therapy, through irradiation of 4,0 J/point, after the use of 0.01% methylene blue, in a pre-irradiation period of 3 minutes. After improvement in clinical appearance, the patients underwent removal of the remaining bone sequestration with a high-power Er-YAG laser, with 15 Hz, 4W and 250mJ. In both cases of MRONJ, there was complete resolution of the condition and, in the case of ORN, there was partial resolution.

Discussion: In all three cases, osteonecrosis appeared after tooth extraction, explained by the fact that oral health conditions are the main risk factors for the development of these conditions. The combination of low and high power lasers has been presented as a treatment alternative, as PBMT and aPDT can prepare the tissue before surgical intervention. The choice of the erbium laser is explained by its mechanism of action, as the energy is transported close to the ablated tissue, presenting fewer harmful effects. It is readily absorbed by the main bone components, presenting excellent ability to remove necrotic bone, in addition to its biomodulation effect.

Conclusion: The treatment of ORN through the association between low and high power lasers is still little publicized, and the surgical management of bone necrosis through the use of the Er–YAG laser is rarely found in the scientific literature. The outcome of the clinical cases presented suggests that the use of lasers is a safe and effective alternative therapy.

P-005
Fabio Klassmann, Valdir Gouveia Garcia, Letícia-Helena Theodoro, Edilson Ervolino
(Brazil)
Category: Systematic or narrative review
Title: A RANDOMISED TRIAL OF THE BONE FORMATION AFTER MAXILLARY SINUS FLOOR AUGMENTATION WITH BOVINE HYDROXYAPATITE (CERABONE®) AND PHOTOBIOMODULATION: HISTOMORPHOMETRIC AND IMMUNOHISTOCHEMICAL ANALYSIS

Aim: The use of non-autogenous biomaterial to increase bone height in the maxillary sinus has been shown to be effective, but the results are still inconclusive.

Material and methods: Eight participants were selected and included in the research. After surgical access with osteotomy on the lateral wall of both maxillary sinuses, these were filled with Cerabone® (São Paulo-SP, Brazil). Then, by blind randomization, they received one of the following treatments: Filling with Cerabone® (Control group); treatment with Photobiomodulation (PBM), filling with Cerabone® and treatment with low-power laser (PBM group). Biopsies were obtained 30 days after the surgery, using a 2.8 mm internal diameter trephine bur. Qualitative and quantitative histological analyzes were performed and immunohistochemical analyzes of osteocalcin (OCN) and tartrate-resistant acid phosphatase (TRAP) were performed with scores for each of the biological events.

Results: The Cerabone® biomaterial demonstrated a high degree of biocompatibility. New bone formation was observed in both groups. In the PBM group, there was greater bone formation and newly formed tissue in an advanced state of

bone maturation. The immunostaining of OCN was greater at 30 days in the PBM group than in the control. There was no significant difference in TRAP immunostaining at 30 days between the groups.

Conclusion: Low-power laser-mediated by PBM promoted greater bone formation; the newly formed tissue showed a more advanced state of bone maturation in maxillary sinuses filled with Cerabone® biomaterial and treatment with PBM, within the 30-day evaluation period.

P-006
Ana Luisa Amaral, Ana Luisa Amaral, Sérgio Araújo Andrade (Brazil)
Category: Case report
Title: EROSIVE LICHEN PLANUS MIMICKING ORAL CANCER: USE OF WIDE-FIELD FLUORESCENCE AS A DIFFERENTIAL DIAGNOSTIC TOOL

Aim: To demonstrate the use of wide-field optical fluorescence imaging (WOF) for the differential diagnosis and follow-up of erosive oral lichen planus.

Case description: A 19-year-old man presented with a persistent erythroleukoplakic lesion characterized by elevated and irregular borders, bleeding induced by superficial scraping with gauze, and initial diagnostic hypothesis of oral squamous cell carcinoma.
The WOF examination was performed with the device Evince®, which has a high-power LED with emission centered at 400 ± 10nm, maximum irradiance of 0.040± 0.008 W/cm2, and an optical filter that allows visualization of fluorescence. Intraoral camera model DP6 Scope® and the Deluxe Handheld Digital Microscope® were used for capturing clinical images and fluorescence images, respectively. To measure the lesions, the TIi's® device was used. The protocol consisted of a clinical evaluation and WOF examination, histopathological analysis, fungal culture, and monthly follow-up.
The initial WOF image showed areas of fluorescence loss contrasting with intense reddish fluorescence larger than that observed clinically. Histopathology revealed squamous mucosa showing hyperplasia of the epithelium adjacent to the ulceration with granulation tissue formation. The stroma exhibited fibrosis, vascular congestion, and a dense chronic inflammatory infiltrate. Fungal culture results identified the presence of Candida albicans. Thus, the diagnosis was established as erosive lichen planus. During the follow-up consultation, characteristic striae of lichen planus were clinically observed, and the WOF examination of the area revealed numerous dark areas of fluorescence loss standing out against an intense green fluorescent background.

Discussion: Oral diagnosis can be challenging due to the similarity of clinical features among benign, potentially malignant, and malignant oral pathologies. Thus, to improve the differential diagnosis of lesions as in this case, the U S Food and Drug Administration has approved WOF for enhancing the visualization of oral lesions not visible to the naked eye.

Conclusion: WOF examination provides valuable non-invasive information that aids in the differential diagnosis of oral lesions. Herein, we present the differential diagnosis of a case of erosive oral lichen planus using WOF.

P-007
Ilana Guimarães Marques, Ismael Lucas Pinto, Cintia Regina Tornisiello Katz, Patricia de Carvalho Taveira Neiva, Maria Eduarda Carvalho Ambrosio (Brazil)
Category: Case report
Title: RELEVANCE OF KNOWLEDGE IN ANTIMICROBIAL PHOTODYNAMIC THERAPY IN AMBULATORY AND HOSPITAL SETTINGS FOR THE CONSERVATIVE TREATMENT OF TRAUMATIC ORAL LESIONS

Aim: To demonstrate the importance of understanding and applying laser therapy for a minimally invasive approach to soft tissue lesions.

Case description: A 5-year-old male patient with Down syndrome suffered a lingual trauma after falling out of bed, with the tongue trapped between his teeth. The child was taken to the hospital emergency room, where, after a four-hour wait, it was reported that no specialist was available for treatment, resulting in discharge without intervention. The patient, who was already receiving speech therapy, was referred to a pediatric dentist specializing in laser therapy. Due to a six-day delay in accessing dental care, the tongue lesion showed compromised healing due to opportunistic infection, making conventional simple suture therapy unfeasible. It was decided

to proceed without suturing, using antimicrobial control treatment through photodynamic therapy, starting with the application of Chimiolux 10® (São Carlos-SP, Brazil) - methylene blue at a concentration of 0.01% 300μM on the injured area, followed by a waiting period of 5 minutes. Next, two applications of low-intensity diode LASER (Therapy EC, DMC, São Carlos, Brazil) were performed, with a power of 100mW, a dosage of 9 Joules (90 seconds), red light with a wavelength of λ=660nm, using a sweeping technique covering the entire extent of the lesion, with a total duration of 180 seconds. This therapy was repeated over 9 sessions until complete healing, with a cumulative dose of 162 Joules.

Discussion: The importance of disseminating knowledge about antimicrobial photodynamic therapy (aPDT) as an effective approach for treating traumatic oral lesions is highlighted. The adoption of aPDT provided significant recovery, emphasizing the need for proper guidance and referral of patients to innovative and less invasive treatments.

Conclusion: The importance of disseminating knowledge about antimicrobial photodynamic therapy (aPDT) as an effective approach for treating traumatic oral lesions is highlighted. The adoption of aPDT provided significant recovery, emphasizing the need for proper guidance and referral of patients to innovative and less invasive treatments.

P-008
Denise Maria Zezell, Ariane Venzon da Naia Sardo, Guilherme de Souza Cabral Muzy, Daniela Fátima Teixeira Silva (Brazil)
Category: Case report
Title: REMISSION OF PERIORAL DERMATITIS IN 48 HOURS USING PDT: A CASE REPORT

Aim: The objective was to locally treat perioral dermatitis (POD) with photodynamic therapy (PDT) in a patient with complaints for more than 30 days.

Case description: POD is an inflammatory lesion with an erythematous appearance, with changes in the texture of the skin, which may present scaling and exudation. The etiopathogenesis is poorly understood and microorganisms may be involved in the affected skin. The patients may report burning, itching and great social embarrassment, as per the following report: female patient, 32 years old, with bilateral POD lesions that extended from the chin skin to the alar base region, intensely erythematous, with scaly and bleeding spots, reporting a slight itching sensation, but with intense burning and significant social embarrassment. She was advised to stop using any cosmetic product, except her daily use liquid soap, and protect herself from sunlight with physical means. She was treated with two sessions of PDT with 10 ml of 0.1% aqueous methylene blue (MB). After 5 min of contact between the skin and the MB, a diode laser, continuous mode, with 660 nm, beam output area of 0.19 cm2 and respective power of 50 mW (Laser Duo, MMO, São Carlos, Brazil), was used to irradiate 6 points on each side of the face, for 180 s and 9 J per point, resulting in 263 mW/cm2 and 47 J/cm2 per point. Each session lasted 2,160 s, with two sessions spaced 24 hours apart, totaling 94 J/cm2 per point.

Discussion: After 48 h of the first session, the patient presented significant clinical remission of the erythema and evident improvement in the visual appearance of the skin, also reporting a complete absence of symptoms. After nine months, a new follow-up appointment was made and the patient did not report any recurrence and, clinically, the skin remained intact.

Conclusion: Unlike conventional treatment, which can last more than 30 days and is often associated with the use of topical formulations based on immunosuppressants and systemic antibiotics, PDT was effective in reducing signs and symptoms related to POD in 48 h and locally.

P-009
Gabriela Dias Rosso dos Santos (Brazil)
Category: Clinical human studies
Title: EVALUATION OF THE ANALGESIC POTENTIAL OF PHOTOBIOMODULATION TREATMENT IN BILATERAL MYALGIA ASSOCIATED WITH TEMPOROMANDIBULAR DYSFUNCTION (TMD): PROTOCOL FOR A RANDOMIZED, DOUBLE-BLIND CONTROLLED CLINICAL TRIAL – PILOT STUDY

Aim: This study describes a protocol for a randomized controlled and double-blind clinical experiment with the aim of verifying the analgesic potential of photobiomodulation in patients with bilateral myalgia associated with TMD, through

two methods of clinical application and we present two clinical cases that were carried out as a pilot study of this research.

Case description: This randomized, double-blind, cross-sectional clinical trial in humans took place at the TMD and orofacial pain clinic of the São Leopoldo Mandic College - São Paulo. Two patients with bilateral myalgia in TMD were selected, and the region containing the trigger points was marked on the masseter and temporal muscles on the right and left sides of the face. The pressure pain threshold was measured in each of the marked areas. On one side of the patient's face, a blanket containing 84 LEDs (Sportllux Ultra Cosmedical® - Brazil) in red and infrared wavelengths was applied simultaneously for 10 minutes on the masseter muscle and 10 minutes on the temporal muscle. On the other side of the face, a blanket will be applied following the same protocol and time, but this one did not contain active LEDs, that is, without a photobiomodulatory effect. Then, a new measurement of the pressure pain tolerance threshold was made at the marked trigger points. Pain measurement was assessed before and after treatment with digital algometry (MedDor®) using a value in kg/cm2 (kilogram per square centimeter) and then converted to the universal pressure unit kPa (kilo Pascal).

Discussion: The results showed a reduction in pain on the side treated with photobiomodulation and an increase in the pressure pain threshold at the trigger points identified in the masseter and temporal muscles.

Conclusion: We can conclude that photobiomodulation applied in the manner described in this trial is effective in the treatment of TMD-related myalgia.

P-010
Katia Coutinho, Jeovana Amorim Almeida, Antonio Luiz Barbosa Pinheiro, Aparecida Maria Cordeiro Marques (Brazil)
Category: Case report
Title: LASER THERAPY IN THE TREATMENT OF BELL'S PALSY: CASE REPORT

Aim: The ultimate goal of this work is to report a clinical case in which laser therapy was applied as treatment for BP.

Case description: The treatment and clinical evolution of a 43-year-old male patient, F.S.O., diagnosed with BP after thorough clinical analysis, are described. The treatment included laser therapy with the Premier Plus device from MMO, using an 808nm emitting pen, 100mW power, 2J/cm² energy density, total of eight application points (16J/cm²), performed three times per week with 48-hour intervals, until the case was completed. Before each session, facial movement was assessed using the House-Brackmann system and recorded photographically. After 11 sessions, the patient showed nearly complete improvement.

Discussion: Bell's palsy (BP) is characterized by partial or total loss of facial muscle mobility, which can be temporary or permanent following facial nerve damage. Its etiology is uncertain, and there is no defined treatment protocol, but various therapies are used, such as physiotherapy, botulinum toxin application, pharmacotherapy, and laser therapy. Recovery is assessed using the House-Brackmann system, which classifies facial muscle movement from I to VI.

Conclusion: The results indicate that laser therapy was effective in relieving symptoms and improving the function of the facial muscles in the patient with BP, as evaluated by the House-Brackmann scale.

P-011
Vanessa Dalapria, Erika da Silva Mello, Luciana Toledo Costa Salviatto, Sandra Kalil Bussadori Alessandro de Melo Deana (Brazil)
Category: Case report
Title: PHOTOBIOMODULATION ASSOCIATED WITH BIPHASIC BIOCERAMICS GRAFTING IN SCAFFOLD FOR ALVEOLAR BONE PRESERVATION AFTER MOLAR EXODONTICS: A RANDOMIZED, TRIPLE-BLIND CLINICAL STUDY

Aim: This study aimed to evaluate the efficacy of the 808 nm laser in alveolar preservation in first and/or second permanent molars, with or without the association of a synthetic biomaterial, with an indication for extraction.

Case description: 43 patients aged at least 18 years, 2 of whom were excluded due to deviation from the adopted protocol, were randomized and randomly distributed into four groups (n=15): Exo, Exo+Laser, Exo+Biomat, and Exo+Biomat+Laser. Plenum® OSShp and Plenum® Guide were applied immediately after extraction. In the laser groups

(diode laser Therapy EC- DMC, Brazil) equipment, continuous mode, λ = 808 nm, power 100 mW, irradiation 3.57 W/cm2, radiant exposure: 107.14 J/cm2, radiant energy of 3 J per point applied in contact and at three points: vestibular, occlusal and lingual/palatal totaling 9 J per session and 18 J in the 2 sessions performed, the irradiation occurred during surgery and after 10 days. Computed tomography was performed preoperatively and 3 months after surgery, for alveolar dimensional evaluations and fractal analysis.

Discussion: Alveolar bone preservation is essential to avoid atrophy and bone deformity after tooth extraction. Laser photobiomodulation effectively accelerates bone healing to improve the integration of the biomaterial with the bone tissue, stimulate blood flow, activate osteoblasts, and decrease osteoclastic activity.

Conclusion: Results and conclusion: the study is in the final phase of data evaluation and the results and conclusion will be presented at the event.

P-012
Yi Ding, Shimeng Xiao, Yi Ding, Maoxue Li, Su Meng (China)
Category: Case report
Title: LASER-ASSISTED NON-SURGICAL TREATMENT AND RE-OSSEOINTEGRATION OF PERI-IMPLANTITIS: A TWO-YEAR FOLLOW-UP CASE REPORT

Aim: To present an effective clinical case for treating peri-implantitis through the integrated use of an Er: YAG laser and antimicrobial photodynamic therapy (aPDT)

Case description: A 60-year-old Chinese female patient presented to the West China Hospital of Stomatology with persistent gingival erythema, edema, and purulent discharge surrounding her dental implants for four months. Following clinical and radiological evaluations, the diagnoses included: (1) Stage IV periodontitis, grade B, generalized; 2) Peri-implantitis around implants 13, 15-17, 24, 26, and 27; (3) Peri-implant mucositis around implants 34-37. The treatment consisted of non-surgical periodontal therapy, which included patient education on oral hygiene practices, subgingival scaling, and root planing. Antimicrobial photodynamic therapy (aPDT) was administered using toluidine blue and a 635-nm diode laser, configured with a 0.8-cm handpiece diameter, 200 mW power, continuous wave mode, and an irradiation time of 60 seconds, yielding a theoretical fluence of 23.9 J/cm^2. Thorough debridement of the implant surfaces was achieved with an Er: YAG laser (Fotona), set to 30 mJ energy and 30 Hz frequency, using an air/water spray and a 1.2-mm sapphire tip for a duration of 60 seconds, resulting in a theoretical fluence of 5.30 J/cm^2 per pulse. The patient also received periodontal maintenance therapy every three months.
At the two-year follow-up, the patient exhibited significant clinical improvements, characterized by reduced inflammation, decreased probing depths (averaging from 5.52 mm to 3.70 mm), and enhanced re-osseointegration around the implants.

Discussion: This case utilized precision to selectively ablate infected tissue of Er: YAG laser while preserving surrounding structures, facilitating effective decontamination. aPDT complements this by using light-activated antimicrobial agents to reduce bacterial load and inflammation. Together, these modalities promote re-osseointegration and provide a non-invasive approach to managing peri-implantitis.

Conclusion: This case highlights the potential of laser decontamination in effectively managing peri-implantitis and promoting re-osseointegration. It presents a viable alternative to surgical intervention, highlighting the advantages of non-invasive treatment strategies in dental care.

P-013
Lívia Trevelin Arêde, Cibele Cristina Castilho, Valdir Gouveia Garcia, Letícia Helena Theodoro (Brazil)
Category: Case report
Title: PROPHYLACTIC ORAL PHOTOBIOMODULATION IN A PATIENT WITH FEMORAL OSTEOSARCOMA UNDERGOING CHEMOTHERAPY TREATMENT WITH HIGH DOSES OF METHOTREXATE

Aim: The objective of this study is to present a clinical case of a patient diagnosed with osteosarcoma who was treated with prophylactic Photobiomodulation (PBM) for oral mucositis. PBM has been widely used either prophylactically or

therapeutically in the treatment of oral mucositis resulting from cancer treatment with head and neck radiotherapy or chemotherapy.

Case description: A 17-year-old female patient, leucoderma, with osteosarcoma in the right femur (Stage IIB) underwent total tumor resection with the installation of a titanium endoprosthesis and the GLATO protocol, 2015, which included 12 cycles of high-dose methotrexate (MTX; 12 g/m², maximum dose 20 g).

Discussion: In the days following MTX infusions, PBM sessions were started. The equipment used was a diode laser with a wavelength of 660 nm (InGaAlP; Therapy EC®, DMC Equipamentos Ltda) power of 100 mW, with a spot output area of 0.028 cm². The tissues were irradiated with energy of 1 J (10 seconds) at each point of the mucosa, palate, tongue, and lip (20 points), with an energy density of 36 J/cm² daily, for five days (180 J/cm²/point). Only at the end of the last cycle did the patient present with grade 2 mucositis, with mild ulcers on the labial and oropharyngeal mucosa.

Conclusion: It can be concluded that, despite the high dose of infused MTX, the patient showed satisfactory oral evolution, with little or no complications during the treatment, without the need for chemotherapy interruption or hospitalizations due to oral side effects, demonstrating the effectiveness of prophylactic PBM in the protocol used.

P-014
Izabela Fornazari Delamura, Stefany Barbosa, Leonardo Allan Delanora, Leticia Helena Theodoro, Leonardo Perez Faverani (Brazil)
Category: Case report
Title: ANTIMICROBIAL PHOTODYNAMIC THERAPY AS ADJUVANT TREATMENT FOR MEDICATION-RELATED OSTEONECROSIS OF THE JAWS: A CASE SERIES

Aim: This case series aimed to report the follow-up, treatment, and outcomes of six patients diagnosed with medication-related osteonecrosis of the jaws (MRONJ).

Case description: Five patients were classified as stage II, and one as stage I (for this stage only, antimicrobial photodynamic therapy - aPDT - was performed). Surgical therapy was conducted in five patients, and aPDT was applied every three days in all patients. The photosensitizer used was methylene blue (100 µg/mL) for 60 seconds. Irradiation was performed with a low-power diode laser (Photon Laser III, DMC, Equipments Ltd.; 660 nm; 100 mW; 60 s; 6 J/point; 3.57 W/cm²; 214 J/cm²). Each session lasted approximately 4 minutes, with at least two applications per week, resulting in complete tissue healing and reduced pain levels in all patients (ranging from two to eight weeks).

Discussion: The adjuvant therapies used in these cases demonstrated promising results, with improved healing rates and enhanced patient well-being.

Conclusion: These findings highlight the need for further well-designed clinical studies to establish a definitive consensus on effective treatment protocols.

P-015
Fabiano de Lima (Brazil)
Category: Case report
Title: REHABILITATION OF LIP AESTHETICS WITH THE DIODE LASER 808nm: A CASE OF HEMANGIOMA

Aim: Correction of lip anatomy and of the smile harmony through the removal of lip lesion with an 808nm diode laser.

Case description: A 49-year-old black woman with a lesion in the upper portion of the labial commissure on the right side, measuring 2.5 cm x 1.5 cm, with the main complaint of the aesthetic impairment of her smile. Total excision of the lesion was performed with a high-intensity diode laser 808nm equipment and histopathological analysis of the removed tissue.

Discussion: Because it was an excision of a soft tissue lesion with intense vascularization, the high-intensity laser equipment TW Surgical from MMO (São Carlos/SP, Brazil) was used at a wavelength of 808nm, with 3W of power in continuous mode due to its properties: hemostatic, anti-inflammatory and healing. Studies have shown that the 808nm diode laser is effective in managing soft tissue lesions with intense vascularization. The tissue approach technique for excision was “contact brushing”, contouring the lesion and deepening it in the shape of a wedge.

Conclusion: The 808nm diode laser, in the parameters used, was efficient, safe and precise for the procedure performed, the compromised lip aesthetics were reestablished and the lesion report on histopathological examination was hemangioma. The patient expressed high satisfaction with the aesthetic outcome.

P-016
Vanessa Rodrigues Ubinha da Matta e Silva, Patricia Moreira Freitas, Fernando Rodrigues Carvalho, Carlos de Paula Eduardo (Brazil)
Category: Systematic or narrative review
Title: THE USE OF INTRAVASCULAR LOW INTENSITY LASER IRRADIATION (ILIB) TO REDUCE BRUXISM AND PREVENT POSSIBLE TEMPOROMANDIBULAR JOINT DYSFUNCTION - RESEARCH PROJECT

Aim: This project aims to evaluate the reduction of bruxism to prevent possible temporomandibular joint dysfunction (TMD), through transcutaneous intravascular blood irradiation with low-power red laser (ILIB).

Material and methods: For this randomized, double-blind, placebo-controlled clinical study, adult male patients with chronic stress measured by salivary cortisol and diagnosed with bruxism will be selected.
One group will receive the intervention using the DMC® e-lib laser, a diode laser light source with a wavelength of 660nm ±10nm and an average power of 0.1W. The application site will be the radial artery, transcutaneous application mode (modified ILIB), the irradiation area is 1cm² with exposure time ranging from 1200s to 2400s (20min to 40min). The operating mode is continuous, the power density is 0.1W/cm² and the fluence ranges from 120J/cm² to 240J/cm². The frequency of treatment will be 5 times a week on consecutive days, generating a cumulative dose of 600J/cm² to 1200J/cm². The other group, the placebo group, will be fitted with equipment with the same characteristics, but which will not emit any type of light.

Results: This project is expected to assess whether the ILIB technique can reduce chronic stress and prevent possible TMD.

Conclusion: This is a research project that will start in 2025.

P-017
Fernando Rodrigues Carvalho, Thaciany Silveira, Patricia Moreira Freitas, Mariana Aparecida Brozoski (Brazil)
Category: Case report
Title: DETERMINATION OF THE ENERGY DENSITY REQUIRED FOR MUSCLE ANALGESIA IN TEMPOROMANDIBULAR DISORDER PATIENTS USING PHOTOBIOMODULATION THERAPY

Aim: This study aims to determine the optimal energy density for achieving immediate muscle analgesia and compare the effects of different energy densities on pain reduction in patients with myofascial pain.

Case description: This prospective, randomized, double-blind pilot study will include 40 adult patients diagnosed with myofascial pain. The was conducted at the Special Laboratory of Lasers in Dentistry (LELO), University of São Paulo (USP), Brazil, from August 2024 to September 2025. Inclusion criteria include patients with a Visual Analogue Scale (VAS) pain score of ≥7, without prior clinical or surgical treatment for TMD. The exclusion criteria include congenital conditions affecting the TMJ, recent facial trauma, or the use of photosensitizing medications. Laser applications will be performed with a GaAlAs diode laser (Therapy XT, DMC, São Carlos, Brazil), emitting at 808 nm with output power 0.1 W, applied using a 0.098 cm² tip. Energy densities ranging from 0 to 40,81 J/cm² will be tested. Patients will receive five consecutive applications per session, with pain assessments conducted after each application. The primary outcome will be the change in VAS scores immediately after treatment.

Discussion: Temporomandibular disorder (TMD) is a multifactorial condition affecting the temporomandibular joint (TMJ), with an estimated 31% of the adult population experiencing this disorder. Myofascial pain is the most common symptom, and the excessive metabolic activity of cells and the accumulation of free radicals in the region contribute to the condition. Among various treatment modalities, low-level laser therapy (LLLT) has shown promise in providing immediate pain relief, yet there is a need for studies to establish standardized treatment protocols. Preliminary results are expected to show variations in pain reduction correlating with different energy densities, providing insight into the most effective dose for immediate muscle analgesia.

Conclusion: This study seeks to establish an effective energy density for achieving muscle analgesia in TMD patients through photobiomodulation, contributing to the development of standardized treatment protocols.

P-018
Beatriz Miranda Moura Dutra, Gisele Moreira de Freitas, Luciane H Azevedo, José Carlos P Imparato (Brazil)
Category: Case report
Title: TONGUE TIE AND LINGUAL FRENECTOMY WITH HIGH-POWER DIODE LASER IN A 3-MONTH-OLD BABY: CASE REPORT

Aim: Ankyloglossia has been identified as one of the factors that can negatively interfere with breastfeeding and the baby's weight gain, in addition to maternal discomfort due to pain during breastfeeding and the presence of fissures. A 3-month-old male baby was evaluated and underwent frenectomy to treat the alteration of the lingual frenulum using hight-power diode laser.

Case description: A 3-month-old male patient presented with difficulties in breastfeeding: irritation, frequent choking and coughing, ineffective feedings, prolonged pauses, fatigue, dyspnea, clicking, reduced time between feedings, nipple leakage. The mother reported nipple pain and biting sensations. The patient was referred by the osteopath to the pediatric dentist for evaluation. After the anamnesis, clinical examination and application of the Tongue Frenulum Assessment Protocol in Babies (Tongue Test) score 23, and Bristol Protocol (BTAT) score 01, ankyloglossia was confirmed, with severe restriction of lingual movements. The family received information about the need for surgical procedure, lingual frenectomy, and they consented to the proposed treatment. The technique chosen for the treatment was the use of a high-power diode laser (Theralaser DMC equipment, São Carlos, Brazil) 808 nm. After local anesthetic infiltration technique with lidocaine 1,100,000 with epinephrine 2%, a laser procedure was performed, calibrated at 1.2 W of power in continuous mode, without sutures and without complications. The low-power laser (EC-Therapy DMC) was applied 1 J red, 100 mW of power, 11.11 J/cm² of energy density, 1.11 W/cm² of power density, 10 seconds per point, distance between points of 1 cm, used immediate postoperative period to reduce pain, modulate inflammation and tissue repair. Immediately after, the baby was taken to breastfeed and the mother reported a reduction in pain and irritation, absence of popping, choking and biting. This patient remained followed up until 3 years and 5 months, and full development of lingual functions was observed during breastfeeding (up to 2 years and 1 month), in the introduction of food, in chewing, swallowing and in the development of speech.

Discussion: The treatment of ankyloglossia involves the removal of the pathological lingual frenulum, through a surgical procedure: frenectomy or frenotomy. The choice of the appropriate surgical technique (scissors, blade, electric scalpel, electrocautery or high-power laser) is up to the surgeon. In recent years, lasers (especially diode lasers) have gained popularity in Brazil and worldwide, with recognition of their advantages and benefits such as photocoagulation, better visualization of the surgical field, precise control and removal, and modulation of inflammation.

Conclusion: The surgical treatment of ankyloglossia, with high-power diode laser, promoted the release of tongue movement, without interference in the execution of its functions in a functional manner.

P-019
Isabella Berlingieri Polho, Daniele Santos Rodrigues, Luciane Hiramatsu Azevedo, Patricia Moreira de Freitas Costa e Silva (Brazil)
Category: Case report
Title: PHOTOCOAGULATION OF VASCULAR LESION IN THE LIP WITH DIODE LASER 808nm – CASE REPORT

Aim: Report a case of vascular lesion in lip treated with diode laser photocoagulation, highlighting the clinical evolution

Case description: In this clinical case, the photocoagulation procedure was performed on a 63-year-old male patient who had a vascular lesion on his lip for approximately 5 years. The procedure was performed with a diode laser (808nm) with a power of 3W, in 2 cycles of 10s, with a distance of 2mm from the optical fiber to the lesion.The lesion underwent complete remission with just one photocoagulation session, with no intraoperative complications, no bleeding

during surgery, which provided a better view of the surgical field and resulted in a minimally invasive procedure. In addition, the patient did not report any pain during or after the procedure.

Discussion: The diode laser has a high interaction with hemoglobin, so the heat generated by the laser is absorbed by the hemoglobin resulting in tissue coagulation. This process is called photocoagulation. Other lasers also have absorption by hemoglobin, such as CO2 and Nd:YAG lasers, however the diode laser can be considered more interesting because it has a lower cost, when compared to the Nd:YAG laser and because it presents a more aesthetic post-operative result, when compared to the CO2 laser.

Conclusion: Among the treatment options for vascular lesion, high-power laser is the most interesting, since compared to other treatment techniques, it is non-invasive, painless and its post-operative period presents minor complications.

P-020
Rodrigo Ricco Teixeira Barbosa de Araújo, Elaine Maria Guará Lôbo Dantas (Brazil)
Category: Systematic or narrative review
Title: APPLICABILITY OF ANTIMICROBIAL PHOTODYNAMIC THERAPY (aPDT) AS ADJUVANT THERAPY IN THE TREATMENT OF PERI-IMPLANTITIS: A LITERATURE REVIEW

Aim: This study reviews the applicability of Antimicrobial Photodynamic Therapy (aPDT) as an adjunctive therapy in the treatment of peri-implantitis, evaluating its effectiveness in complementing conventional therapies.

Material and methods: peri-implantitis is characterized by bleeding and/or suppuration upon light probing, increased probing depth greater than 6 mm, recession and bone loss exceeding 3 mm below the most coronary intraosseous portion of the implant, beyond what is expected after physiological remodeling. aPDT uses a photosensitizer activated by low-energy light, generating reactive oxygen species (ROS) that cause damage to bacterial cell membranes, resulting in the destruction of microorganisms and improvement of parameters such as probing depth and inflammation. Through the use of databases (PubMed, BVS and Capes Periodicals), a bibliographic survey was conducted, researching articles published between 2014 and 2024, focusing on the use of Antimicrobial Photodynamic Therapy as an adjuvant therapy in the treatment of peri-implantitis, indexed with the keywords: photochemotherapy, peri-implantitis and laser therapy.

Results: The studies analyzed indicate that aPDT has potential as an adjuvant therapy for the treatment of peri-implantitis, contributing to the reduction of probing depth, improvement of the level of clinical attachment and control of inflammation. Compared to conventional treatments, aPDT showed positive effects, especially in the reduction of periodontopathogens such as Porphyromonas gingivalis.

Conclusion: However, despite the promising initial results, clinical evidence is still limited and marked by high heterogeneity in application protocols, photosensitizers used and laser parameters. Therefore, the implementation of aPDT into clinical practice faces significant challenges for its establishment as a standardized and widely accepted therapy for the effective management of peri-implant complications.

P-021
Antônio Henrique Rodrigues da Rosa, Luciene Figueiredo, Bruno Bueno Silva, Aldo Brugnera Junior (Brazil)
Category: Systematic or narrative review
Title: ANTI-BIOFILM SUBGENGIVAL MULTIESPECIES ACTIVITY IN VITRO OF METHYLENE BLUE ASSOCIATED WHIT TWO DIFFERENT PHOTODYNAMIC THERAPY PROTOCOLS

Aim: Periodontal disease is an infectious-inflammatory condition that affects the protective and supporting tissues of the teeth. Dental biofilm is the main etiological factor, influenced by factors such as oral hygiene and systemic diseases (diabetes, smoking). Photodynamic therapy (PDT) is an adjunct to mechanical treatment (MT), promoting greater decontamination through the apoptotic cell death of pathogenic microorganisms. To evaluate in vitro the effect of two different photodynamic therapy protocols (red laser and methylene blue) on the metabolic activity and composition of multispecies subgingival biofilm.

Material and methods: A multispecies subgingival

biofilm model (33 bacteria) was cultivated for 7 days using the Calgary Biofilm Device (CBD). Treatment of the biofilm included: Control vehicle (culture medium); Methylene blue 0.005%; Red laser (9J, 2mm); Methylene blue + laser (1x); Methylene blue + laser (2x, second application on day 6).

Results: A 65% reduction in the metabolic activity of biofilms treated with methylene blue/LED compared to the control group (p≤0.05). The two-application protocol (RED LASER + methylene blue) showed the lowest bacterial levels.

Conclusion: The protocol utilizing two applications of photodynamic therapy with a laser at red wavelength and methylene blue demonstrated the best antimicrobial results in the metabolic activity and composition of multispecies subgingival biofilm in vitro.

P-022
Bruna Regina Rodrigues Malho, Amanda F. F. Barros, Ricardo S. Navarro, Denise S Haddad, Alessandra Baptista (Brazil)
Category: Case report
Title: EVALUATION OF LASER ACUPUNCTURE WITH RED LIGHT IN THE TREATMENT OF MYOFASCIAL TEMPOROMANDIBULAR DISORDERS: A CASE REPORT

Aim: This study aimed to evaluate the effects of laser acupuncture, using red light, on pain sensitivity and modulation of the inflammatory process in patients with myofascial temporomandibular disorder (TMD).

Case description: A clinical case study was conducted with a 35-year-old woman, severe pain for 6 months, diagnosed with myofascial TMD using the DC/TMD (Diagnostic Criteria for TMD) and the Fonseca questionnaire. The treatment involved low-level laser therapy to stimulate acupoints, using red light (wave lenght= 660 nm) (Therapy EC®, DMC, São Carlos, Brazil), with a power of 100 mW, delivering energy of 3 J per point during 30 s, in contact mode, fluence of 75 J/cm2, intensity of 2,5 W/cm2. The acupuncture points (VB3, E7, ID19, VB20, amnian; E36, Ig11; F3, Ig4) were bilaterally stimulated, totaling the delivery of 3 J per point, in 540 s per session. Ten treatment sessions were carried out, with an interval of 7 days, between one session and another. This case report was approved by the Research Ethics Committee of Universidade Brasil, in accordance with the ethical standards of the institution and the Declaration of Helsinki (no: 6.769.852). Pain sensitivity and modulation of the inflammatory process were assessed using a digital algometer and infrared thermography (T1), after five sessions (T2), and after ten sessions (T3). Laser acupuncture demonstrated a positive effect in reducing the linear pressure pain threshold, improving blood circulation and regulation of the inflammatory process of the face in patients with TMD, with results supporting its use as an effective intervention.

Discussion: This study aimed to evaluate the effects of laser acupuncture, using red light, on pain sensitivity and modulation of the inflammatory process in patients with myofascial temporomandibular disorder (TMD). TMD, characterized by pain and dysfunction in the temporomandibular joint, requires comprehensive clinical evaluation and multidisciplinary treatment approaches. Non-pharmacological therapies such as laser acupuncture offer a less invasive alternative for the treatment of TMD, using collimated monochromatic light to stimulate acupuncture points triggering biochemical and bioelectrical responses in cells.

Conclusion: The results of this case report show that the stimulation of acupoints with a low-level laser, in the tested parameters, was effective in modulating pain and the inflammatory process caused by TMD.

P-023
Maria Luciana Bunemer, Daiane Thais Meneguzzo, Cássia Tiemi Fukuda Nakashima, Paulo de Camargo Moraes, Alessandra Baptista (Brazil)
Category: Case report
Title: PHOTOBIOMODULATION AND PHOTODYNAMIC THERAPY IN THE TREATMENT OF MEDICATION-INDUCED OSTEONECROSIS: CLINICAL CASE

Aim: The objective is to report a clinical case of osteonecrosis of the jaw induced by medications such as bisphosphonates (BF) (ONJ) treated with the combination of photobiomodulation (PBM) and photodynamic (PDT) therapies. ONJ is a serious and challenging complication in Dentistry, especially in cancer patients, knowing that BF can impair healing after surgery and infection.

Case description: The conservative approach with PBM and PDT aimed to avoid invasive surgeries. PBM with a low-power laser (L) (Therapy EC, DMC, Brazil) with 808 nm, 100 mW, 2 J and 20 s point, 7 points (3 per buccal, 1 transverse in the alveolar bone, 3 per palatal), 14 J and 140 s session, 7.14 J/cm², 0.357 W/cm², weekly sessions, 6 months, total of 24 sessions and 336 J per tooth throughout the treatment. In the same session, PDT was performed with methylene blue (0.01%, DMC, Brazil), pre-irradiation of 5 min, L with 660 nm, 100 mW, 9 J and 1.5 min point in osteonecrosis, 32.14 J/cm², 0.357 W/cm², 9 J and 90 s session, total of 24 sessions and 216 J per tooth throughout the treatment.

Discussion: Conservative approaches to ONJ can be carried out, with non-invasive therapies that replace aggressive surgeries, with PBM that inhibition of inflammation and pain, activation of bone repair, and the association with PDT, which promotes antimicrobial effects, via generation of reactive oxygen species, in local infections and necrotic. In the clinical case, patient R.G., female, 68 yo, with multiple myeloma and ONJ, due to prolonged use of BF, in the region of teeth 17 and 18, which support a fixed prosthesis, with trauma, process periodontal, periapical and furcation infections and tooth mobility.

Conclusion: Small bone sequestrations were observed, in the last month of treatment it was necessary to extract the 17 due to the high degree of mobility, carried out without complications during the trans and post-operative period. The association of PBM and PDT proved to be effective in the management of ONJ in patients with multiple myeloma. Conservative treatments allowed adequate control of the clinical condition without compromising the oral and systemic health of the cancer patient

P-024
Fábia Rodrigues Souza, Luciana Giuseppina Giglio, Marilia Missiano Carvalho, Patrícia Moreira Freitas, Fernando Rodrigues Carvalho (Brazil)
Category: Case report
Title: ASSOCIATIVE LASER THERAPY PROTOCOL FOR TEMPOROMANDIBULAR DISORDER AND PARESTHESIA

Aim: To demonstrate the use of an effective protocol for the treatment of temporomandibular disorder associated with paresthesia.

Case description: Patient V.M.P., 46 years old, with a history of arthroplasty on the left TMJ (08/2021) and facial paralysis on the left side due to surgery, presented (05/2023) with complaints of pain in the left shoulder and intense head located behind the left eye, in the nape of the neck, pain when opening the mouth, bruxism and paresthesia on the left side, located mainly in the upper region of the face affecting the eyebrow, causing ptosis of the upper eyelid and consequently facial asymmetry, in addition to many wrinkles near the eye. The patient was evaluated for TMD, with pain measurement using a visual analogue scale (initial VAS = 9) and normal initial mouth opening (39 mm); for paresthesia, the entire face was examined and the regions where there was no sensitivity were noted. Diagnosis: Myofascial pain with spreading and paresthesia with facial nerve involvement. Treatment was performed with TFBM with GaAIAs diode laser (Therapy EC, DMC) emitting 808nm with DP=1.02 W/cm2; ED=30.61 J/cm2; total application time 1380 seconds. (30 seconds/ point, 23 on each side, total of 46 points). The total energy dose was 1,408.06 J/cm2 per session and the total treatment dose was 14,080.60 J/ cm2. The energy was delivered continuously and punctually, during 10 sessions (1-week interval) with irradiation of 20 external points and 3 internal points, on each side of the face; 5 sessions with a 1-week interval, 3 sessions with a 15-day interval and 2 sessions with a 1-month interval.

Discussion: FBMT has proven effective in analgesia, inflammatory modulation, and tissue regeneration. According to the literature, it is also effective in treating TMD (temporomandibular disorders) and paresthesia, as it aids in peripheral nerve regeneration, facilitating the recovery of lost sensitivity.

Conclusion: After the third session, the patient reported a significant improvement in paresthesia (the left eye opened without difficulty and wrinkles were reduced) and in pain (VAS=3) caused by TMD. After the 10 sessions, the patient no longer had any pain and the left eye opened normally, no longer presenting facial asymmetry, bringing an improvement in self-esteem and quality of life.

P-025
Luciana Giuseppina Giglio, Fábia Rodrigues Souza, Marilia Missiano Carvalho, Patrícia Moreira Freitas, Fernando Rodrigues Carvalho (Brazil)
Category: Case report
Title: PHOTOBIOMODULATION THERAPY FOR TINNITUS ASSOCIATED WITH TEMPOROMANDIBULAR DISORDER

Aim: To report a clinical case of treatment using Photobiomodulation Therapy (PBMT) in a patient with tinnitus associated with chronic temporomandibular disorder (TMD).

Case description: Patient E.R.D., mulher, 69 years old, presented with mandibular clicking during mouth opening and closing, associated with constant localized sharp pain and bilateral tinnitus that had started 20 years ago. The patient had been using an acrylic occlusal splint nightly. The evaluation included assessment for the presence of TMD, severity of tinnitus, and quality of life. There was limited mouth opening (31mm) with a perception of severe pain (VAS = 7) in the joints and muscles. Crepitus was observed during mandibular movements, moderate tinnitus with moderate impact on quality of life. She was diagnosed with degenerative TMJ disorder; chronic myofascial pain; and tinnitus with a moderate impact on her quality of life. The treatment applied was PBMT targeting 24 points per side in the lateral head region. (TMJs, facial muscles: intra and extraoral) and cervical, with a GaAIAs diode laser (Therapy EC, DMC) emitting 808 nm with DP=1.02 W/cm2; ED=30.61 J/cm2; total application time 1,260 seconds (30 seconds/point, 24 on each side, total of 48 points). The total energy dose was 1,469.28 J/cm2 per session and the total treatment dose was 26,447.04 J/cm2. The energy was delivered continuously and punctually. Initially, 12 sessions were performed (once a week), after which 6 sessions were performed (once every 2 weeks) at pain points to maintain pain control, improve mouth opening, and reduce tinnitus.After the third session, there was a significant improvement in the initial complaints: mouth opening increased from 31 mm to 40 mm, pain score decreased from 7 to 2 points, and tinnitus severity reduced from moderate to mild.

Discussion: FBMT has proven effective in the management of TMDs. Due to this, an individualized laser therapy protocol for TMD treatment was developed, including cervical points related to tinnitus. Both pathologies are multifactorial and interconnected, such that tinnitus can result from sensory somatic stimuli originating from the cervical region and the TMJs.

Conclusion: PBMT, using the presented dosimetric parameters, was effective in significantly improving TMD-related pain, tinnitus, and mouth opening, leading to an overall improvement in quality of life. Follow-up was conducted for 6 months, and the results were maintained.

P-026
Amanda Paino Santana, Wirley Gonçalves Assunção, Valdir Gouveia Garcia, Leticia Helena Theodoro (Brazil)
Category: Systematic or narrative review
Title: THE EFFECT OF ANTIMICROBIAL PHOTODYNAMIC THERAPY AS AN ADJUNCT IN THE TREATMENT OF HERPES LABIALIS: A SYSTEMATIC REVIEW

Aim: This study aimed to evaluate whether antimicrobial photodynamic therapy (aPDT) as adjuvant therapy is effective in reducing the pain symptoms of herpes labialis.

Material and methods: This systematic review was conducted based on the Preferred checklist Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) and registered in the Prospective Register of Systematic Reviews (PROSPERO) (CRD42023474979) to answer the population, intervention, comparison, and outcome (PICO) question: “Is photodynamic therapy as an adjunctive treatment to topical antiviral effective in reducing pain when compared to the use only of topical antiviral?”. Electronic searches were carried out in the PubMed/MEDLINE, Cochrane Library and Web of Science databases for articles published until September 2024, using the following terms: (herpes labialis OR herpes simplex) AND (low-level light therapy OR laser therapy OR lasers OR photodynamic therapies OR photochemotherapy) AND (antiviral drugs OR antiviral agents). Randomized controlled clinical trials, English-language studies, and studies comparing antiviral agents with aPDT were included.

Results: Overall, 187 articles were found, and 2 studies, evaluating 120 patients, were selected for

qualitative analysis. The parameters of the lasers used in the included studies: type of laser: diode laser and low power laser; wavelength: 660 nm; power: 40-150 mW; energy: 4.5-4.8 J; output fiber area: 0.028 cm2; energy density: 120-300 J/cm2; exposure time: 30-120 s. From these studies, it can be concluded that the use of adjuvant aPDT with topical antiviral had positive effects in reducing the painful symptoms of herpes labialis compared to treatment with topical antiviral alone.

Conclusion: However, due to the low number of randomized clinical trials found in the literature and the heterogeneity of the results measured, more studies are needed to confirm the standard for applying this therapy.

P-027
Gisele Moreira de Freitas, Beatriz Dutra, Luciane Azevedo (Brazil)
Category: Case report
Title: LASER FRENECTOMY IN A NEWBORN WITH ANKYLOGLOSSIA: CASE REPORT AND 3-YEAR FOLLOW-UP

Aim: This case report describes the diagnosis, treatment, and follow-up of a newborn with ankyloglossia. After confirmation of the condition using the Lingual Frenulum Assessment Protocol, a high-power diode laser was used for frenectomy. The report highlights the positive impact of early intervention on breastfeeding difficulties and the long-term effects on lingual functions.

Case description: A 2-day-old female weighing 2850 grams presented with breastfeeding difficulties such as choking, coughing, ineffective sucking, fatigue, and nipple discharge. The mother reported nipple pain and biting. After clinical examination and assessment (Tongue Test score 22, BTAT score 01), severe ankyloglossia was confirmed, with significant restriction of tongue movement. The family consented to a high-power diode laser frenectomy (Theralaser DMC, São Carlos, Brazil-808 nm), performed under local anesthesia with lidocaine and epinephrine. The procedure, calibrated at 1.3 W of power in continuous mode. Low-level laser therapy (EC-Therapy DMC) was applied at 1 J red, 100 mW power, 11.11 J/cm² energy density, 1.11 W/cm² power density, 10 seconds per point, 1 cm distance between points, used in the immediate postoperative period to reduce pain, modulate inflammation and repair tissue. Immediately after surgery, the baby was breastfed successfully, with the mother reporting relief from nipple pain and the infant displaying effective sucking. Follow-up until age three showed full development of lingual functions, including during breastfeeding, food introduction, chewing, swallowing, and speech development.

Discussion: Early intervention with high-power diode laser frenectomy was effective in treating ankyloglossia. Laser technology offers advantages over conventional methods, such as precision, minimal bleeding, reduced postoperative pain, and enhanced tissue healing. The absence of sutures and complications further supports the efficacy of this approach. Immediate improvement in breastfeeding highlights the procedure's success in addressing both feeding difficulties and the potential long-term developmental challenges associated with ankyloglossia.

Conclusion: This case demonstrates that early diagnosis and treatment of ankyloglossia using a high-power diode laser resulted in immediate improvements in breastfeeding. Long-term follow-up confirmed the full development of lingual functions, emphasizing the importance of a tongue free from movement restrictions for proper oral motor function.

P-028
Caroline Carneiro Landim Machado, Rosa Virgínia Melo de Oliveira Lima, Aparecida Maria Cordeiro Marques, Susana Carla Pires Sampaio de Oliveira, Antônio Luiz Barbosa Pinheiro (Brazil)
Category: Case report
Title: IMPACT OF PHOTOBIOMODULATION ASSOCIATED WITH PHYSIOTHERAPY IN THE TREATMENT OF FACIAL PARALYSIS RESULTING FROM GUNSHOT INJURY: A CASE REPORT

Aim: The prevalence of facial paralysis associated with head trauma varies depending on the type of trauma and the severity of the injury, resulting in damage to the facial nerve (Cranial Nerve VII), compromising the movements of the facial expression muscles, leading to significant functional impairment and impacting the quality of life, with loss of muscle mobility and associated dysfunction. Low-level laser therapy, combined with physiotherapeutic rehabilitation, has proven to be an excellent tool in treatment, accelerating post-injury nerve regeneration, modulating the

inflammatory process, cellular proliferation, recovery of motor function, and improving facial symmetry. This study aimed to evaluate the impact of photobiomodulation combined with physiotherapy on functional recovery in a patient with firearm-induced facial paralysis (PFPAF).

Case description: A 23-year-old male patient was referred from the General Hospital of Bahia to the BioPhotonics Center at FOUFBA, presenting impaired movement of the facial muscles. During anamnesis, he reported having been shot and having undergone surgery following the trauma caused by a firearm projectile. During the physical examination, he was classified as Class V on the facial paralysis scale (House-Brackmann system), and left-sided facial paralysis was observed. A photobiomodulation (PBM) protocol was proposed using the Laser Duo (MMOPTICS® São Carlos, Brazil, Infrared Laser λ= 808nm, P=100mW, with three points of 6J each at the supraorbital, infraorbital, and mental foramina, and 19 additional points of 3J in the frontal region, superior orbicularis oculi, masseter, alae nasi, and orbicularis oris, totaling 75J of energy per session, applied twice a week along with facial mimicry exercises, manual therapy, and kinesitherapy.

Discussion: The patient's functional improvements, such as increased facial muscle movement and improved symmetry, support the hypothesis that PBM, when used alongside physiotherapy, can significantly enhance outcomes in cases of traumatic facial paralysis.

Conclusion: The combination of photobiomodulation and physiotherapy proves to be a promising approach in treating various conditions, especially in post-operative and musculoskeletal rehabilitation settings.

P-029
Jesus Eduardo Fernandez Aleman, Ana Clara Casadoumecq, Romina Chaintiou Piorno, Pablo rodriguez (Argentina)
Category: Case report
Title: LASER-ASSISTED TREATMENT IN ANTERIOR DENTAL TRAUMA

Aim: The objective of this case is to present the dental treatments complemented with laser therapy in teeth 1.1 and 2.1 with transverse root fracture and bone table fracture.

Case description: The treatment of complex dental trauma can be adjusted according to the emergencies that may arise over time. The clinical management of transverse root fractures may require different therapies depending on situations, such as delay and error in the treatment of trauma associated with fracture of the different root thirds, poor patient compliance, or external or internal root resorption.
A 22-year-old male patient attended the Department of Endodontics, School of Dentistry, University of Buenos Aires, after suffering dental trauma and being treated in an emergency dental service. Clinical, radiographic and tomographic evaluation of the teeth was performed. The clinical diagnosis of the tooth was pulp necrosis of tooth 1.2, necrosis of teeth 1.1 and 2.1 with oblique fracture of the root, and fracture of the buccal table. An appropriate splint was placed and endodontic treatment was started in the first session.
Woodpecker LX16 plus diode laser of 976 nm was used tμo complement the periodontal treatment with tip of 300 m at 1.1 W power and photobiomodulation with spot size of 0.8 Ø at 1 W for//in vestibular and palatal during 10 sessions with weekly appointments. Endodontic therapies of 2.1 and 1.2 teeth were complemented with 200 m tip. Radiographic and tomographic controls were performed at 3, 12, 15 months.
Power 1 W
Spot area 0.503 cm2 of 0.8 mm spot
Power density 1.99 W/cm2
Energy density 19.9 J/cm2 in 10 seconds
Duration per session 120 seconds per tooth. Total session duration 240 seconds
Frequency 1 appointment per week for 10 weeks
Cumulative dose 2388 J/cm2 per tooth

Discussion: In the present case in which photobiomodulation treatment with diode laser was performed, maintenance of the teeth and appropriate repair of the bone tissues were achieved.

Conclusion: Teeth with oblique root fractures present a favorable long-term prognosis if the fracture is subcrestal and localized in the apical and middle third of the root. Supported laser treatment could prolong tooth stability and support tissue repair.

Poster **Session**

P-030
Maria Fernanda Rossi Vigliar, Ana Paula Brugnera, Aldo Brugnera Júnior, Fátima Antonia Aparecida Zanin (Brazil)
Category: Case report
Title: USE OF Er:YAG LASER AND LASER THERAPY LOW INTENSITY, COMBINED, FOR THE TREATMENT OF PERI-IMPLANTITIS

Aim: The objective of this case report was to use the Er:YAG laser and the low-power red laser to promote decontamination and tissue repair, being a possible treatment for peri-implantitis

Case description: The patient, a 55-year-old woman, came to the clinic with a poorly positioned, vestibularized implant, with the presence of fistula and suppuration around the implant, reporting aesthetic complaints and pain at the site. The initial approach chosen was to treat peri-implantitis, improving the inflammatory condition, applying in 3 sessions the Er:YAG Laser (LiteTouch®), with a power of 20 mJ, energy of 0.20 W, frequency of 10 Hz, for 1 minute, with the AS 7074 and AS 7075 tips, around the implant threads, followed by applications of the low-power Laser (InGaAIP) Laser DUO (MMO®), with a power density of 0.52 W/cm2, with an energy density of 10.52 J/cm2, for 20 seconds per point, in 3 sessions. It was decided to bury the implant due to its poor positioning, with great aesthetic damage, using an adhesive prosthesis for rehabilitation of the site.

Discussion: Peri-implantitis is a pathology with challenging treatment and resolution, still being studied regarding therapeutic perspectives and approaches. The Er:YAG laser promotes surface decontamination without damaging it and makes it more favorable to cell migration, such as fibroblasts, around the implant threads, while the low-power laser is capable of promoting healing and repair of adjacent tissues.

Conclusion: It was possible to observe an elimination of the infectious condition with restoration of the health of the hard and soft tissues around the buried implant, being an effective and conservative treatment option.

P-031
Danielle Santos Rodrigues, Luciane Hiramatsu Azevedo (Brazil)
Category: Systematic or narrative review
Title: COST-EFFECTIVENESS OF LASER LABIAL FRENECTOMY COMPARED TO THE CONVENTIONAL SURGICAL TECHNIQUE

Aim: To perform a cost-effectiveness analysis of laser labial frenectomy surgery compared to the conventional surgical technique.

Material and methods: A systematic review with meta-analysis was performed by searching leading databases to extract clinical outcomes. Direct costs associated with both standard and laser procedures were then estimated to calculate the Incremental Cost-Effectiveness Ratio (ICER).

Results: In the analysis of cost by employed technology, the conventional frenectomy cost US$ 38.59, while the laser procedure cost US$ 45.86. For this economic analysis, the average monthly cost of laser technology was 18.8% higher than the average cost of conventional frenectomy. The average investment for acquiring high-power diode laser equipment amounts to US$ 10,735.44, in Brazil. After calculating the ICER, it was possible to affirm that for each point decrease on the visual analog scale (VAS) for postoperative pain, there is an incremental cost of US$ 13.72 for laser technology on the first postoperative day alone. Other variables, such as discomfort during speech or chewing, showed a less favorable ICER, potentially exceeding 100% of the observed value for postoperative pain. When a scaling projection (i.e., maximum capacity) was made for labial frenectomy surgery, the cost for conventional surgery remained at US$ 38.05. In contrast, the cost per laser surgery was defined as US$ 22.40. Therefore, due to the reduced surgical time, the value of the laser procedure decreased. This projection is a hypothetical calculation made solely to determine the monthly production limit value and its respective maximum costs for a month of 20 working days.

Conclusion: Laser frenectomy is not cost-effective in itself, but it allows for increased productivity because it reduces intervention time. Such costs can still be favorably rationalized when using high-power lasers for other procedures. Further studies are recommended to incorporate more robust efficacy indicators, enabling more in-depth economic modeling.

P-032
Marcelo Caliman Sato, Martha Simões Ribeiro (Brazil)
Category: Case report
Title: USE OF ULTRAVIOLET C RADIATION IN THE DISINFECTION OF 3D PRINTED ACRYLIC POLYMERS

Aim: Verify the effectiveness of using ultraviolet radiation in disinfecting surgical guides for dental implants.

Case description: Use the ultraviolet radiation in desinfecting.

Discussion: After applying the methods, an analysis of the microorganisms that resisted UVC irradiation on the resin-printed discs was conducted using statistical data.

Conclusion: After 15 minutes of ultraviolet irradiation, it was possible to observe the reduction of microorganisms.

P-033
Paolo Junior Fantozzi, Palaia G, Cerullo V, Del Vecchio A, Visca P., Antoniani P, Purrazzella A, Troiani E, Todescato L., Mohsen M,Pergolini D., Fantozzi PJ, Romeo U. (Italy)
Category: Systematic or narrative review
Title: HISTOLOGICAL EX VIVO EVALUATION OF TWO-WAVELENGHT DIODE LASER IN ORAL SOFT TISSUE BIOPSIES

Aim: This ex-vivo study was conducted to evaluate the thermal effects of an innovative laser device using two different wavelengths (450 nm and 808 nm) on cadaver pig tongue.

Material and methods: The diode Wiser 3 Laser, (Doctor Smile, Brendola (VI), Italy) has three-wavelength options designed for different applications. Combining 450 nm and 808 nm wavelengths with a 300 µm fiber tip produced 36 samples from fresh pig cadaver tongues. Power ranged from 2 to 4 W in both continuous and pulsed wave modes. Specimens were divided into six groups of six samples each. Histological analysis was conducted at 2.5x magnification using an optical microscope.

Results: The findings revealed consistent histological clarity across all samples, with thermal damage observed in each group. The greatest epithelial and connective tissue damages were observed in samples exposed to pw at 4 W (average values: 1.4 mm and 1.75 mm). The minor epithelial and connective tissue damages, on the other hand, were observed in samples exposed to cw at 2W (average values:1.07 and 1.39).

Conclusion: Based on the data, connective tissue damage is generally higher than epithelial damage. Laser wavelengths are selectively absorbed by melanin, haemoglobin, and water, causing more significant effects on the vascularized and hydrated connective tissue. Pulsed mode led to slightly more damage than continuous mode across all power levels. Further studies with more samples could provide clarity on this.

P-034
Marcelo Caliman Sato, Daniele Rodrigues, Luciane Hiramatsu Azevedo (Brazil)
Category: Case report
Title: THE USE OF BLUE LASER IN THE TREATMENT OF VENOUS LAKE

Aim: Removal of vascular lesions using blue laser, due to the greater effectiveness of this laser with hemoglobin.

Case description: A 54-year-old Black female patient presented with a complaint of a “small blood blister in the mouth” without pain and sought treatment at the Special Laser Laboratory in Dentistry of the School of Dentistry at the University of São Paulo (LELO-FOUSP). A soft, well-defined, blister-like lesion, measuring slightly less than 1 cm in diameter, purple in color, smooth, and non-pedunculated, was observed on the right outer region of the lower lip. Photocoagulation was performed using a perpendicular incidence of the laser beam in continuous mode with scanning, keeping the optical fiber tip 2 mm away from the lesion to allow for defocused irradiation. The procedure was carried out in an outpatient setting under local infiltrative anesthesia (2% lidocaine, 1:100,000 epinephrine). The laser used was a DMC Thera Blu Laser with a power of 3.5 W ± 20%, wavelength of 405 nm ± 10 nm, and a diode laser source with a pen-shaped optical fiber applicator.
Only one 5-second cycle was needed to achieve complete surface ischemia, with the fiber remaining 2 mm away from the lesion. After some time, there was no longer any edema in the irradiated region, nor pain or discomfort,

allowing for the discontinuation of postoperative analgesics. Moreover, the lesion went into complete remission, with a very satisfactory aesthetic result.

Discussion: Due to its wavelength, the blue laser is more effective in vascular lesions. Furthermore, it promotes the modulation of inflammation, resulting in an improvement in pain.

Conclusion: The photocoagulation technique using a 450 nm diode laser for vascular anomalies significantly reduced the operation time, eliminating pain in the postoperative period. Additionally, it was noted that the blue diode laser has a greater interaction with hemoglobin, which absorbs photothermal energy, resulting in more effective photocoagulation compared to the same laser operating in the infrared wavelength.

P-035
Letícia Bezinelli, Mariana Henriques Ferreira, Diele Barreto, Fernanda de Paula Eduardo (Brazil)
Category: Systematic or narrative review
Title: PHOTOBIOMODULATION IN PREVENTING ORAL MUCOSITIS DURING 5-FLUOROURACIL-BASED CHEMOTHERAPY

Aim: We aimed to describe the photobiomodulation (PBM) protocol for preventing oral mucositis (OM) in patients undergoing 5-fluorouracil (5-FU)-based chemotherapy regimens.

Material and methods: This retrospective study included cancer patients receiving 5-FU-based chemotherapy protocols at a private hospital in Brazil from February 2020 to August 2022. Patients received one session of intraoral, punctual PBM using a low-intensity diode laser (Therapy EC - DMC, São Carlos, SP, Brazil) on each of the first two days of the 5-FU cycles. PBM parameters included a spot area of 0.09 cm^2, wavelength of 660 nm, power density of 1.1 W/cm^2, and energy density of 11.1 J/cm^2. The duration of each session averaged 560 seconds, with a cumulative dose of 170.94 J/cm^2.

Results: The study included 64 patients, predominantly men (62.5%), diagnosed with colorectal (43.75%) and pancreatic (29.68%) cancer, with a mean age of 60.64 years (range, 29-84). The FOLFOX regimen was the most common (42.18%) among six regimens incorporating a 46-hour 5-FU high-dose infusion at 3968 mg/cm^2 (range, 1740–5500). Concomitant biological therapy was administered to 48.43% of patients, including Bevacizumab (14.06%), and 39.06% required dose adjustments. The incidence of grade I/II OM was high (92.18%), with 57.81% of cases occurring during the first cycle. Grade III OM, the maximum observed, occurred in 7.81% of patients. Hospitalization due to OM was not required for any patients in the study group.

Conclusion: This is the first study to specifically examine low-power laser parameters in the context of 5-FU-induced OM. Two PBM sessions per cycle demonstrated a high level of OM prevention.

P-036
Sarhan Ahmed, Umberto Romeo, Alessandro Del Vecchio, Gianluca Tenore, Ahmed Mohsen (Italy)
Category: Case report
Title: SPONTANEOUS BONE SEQUESTRATION AFTER PHOTOBIOMODULATION IN PATIENTS WITH MEDICATION-RELATED OSTEONECROSIS OF THE JAW: CASE SERIES

Aim: The study aims to present seven clinical cases with established Medication-related Osteonecrosis of the Jaw (MRONJ), showing spontaneous bone sequestration after being subjected to Photobiomodulation (PBM).

Case description: Seven female patients (average age of 75 years) presented to our department diagnosed as MRONJ. The osteonecrosis was in mandible for one patient, in maxilla for 5 patients and in both for 1 patient. Four patients (2 oncologic and 2 osteoporotic) were subjected to denosumab for average duration of 5 years and three patients (2 oncologic and 1 osteoporotic) were subjected to bisphosphonates for average duration of 3 years, where all patients refused surgical treatment option . All patients were subjected to conservative approach (PBM + antibiotic therapy). PBM cycle consisted of 8 sessions (2 sessions per week). Multidiodic laser (Lumix C.P.S. Dental, FISIOLINE, Verduno, Cuneo, Italy) emitting 650nm, 810nm, and 910nm wavelengths simultaneously was used for intraoral PBM. Lesions were irradiated in scanning and noncontact mode with following parameters ; total power of 0.6W, time of 15min, frequency of 30kHz, and total energy of 577.4J. Bone sequestration was observed after one cycle in 4 patients and after 2 cycles in 3 patients.

Discussion: The management of established MRONJ is still controversial, and there are no definitive evidenced guidelines. Surgical treatment with antibiotic therapy is considered appropriate despite the incomplete resolution in some conditions. However, surgical intervention might not be feasible in some patients due to being affected by severe and debilitating pathologies, where further surgical complications are not tolerated or accepted by patients. Since anti-inflammatory, analgesic, and bio-modulatory effects of PBM are frequently reported, PBM is proposed as a palliative application in management. The spontaneous sequestration of these reported patients can be due to the biostimulant effect of PBM on bone tissues. The ability of PBM to improve bone formation activity is reported in the literature through expanding bone organic matrix, and the increase of differentiated osteoblastic cells after irradiation.

Conclusion: PBM might be beneficially applied for palliative purposes in MRONJ patients and possibly might result in spontaneous sequestration with complete resolution when surgical intervention is not feasible.

P-037
Adina Luminita Grigorescu, Carmen Darinca Todea, Marius Mateaş, Mariana Miron, Daliana Mocuta Bojoga, Radu Izvoranu (Romania)
Category: Original research: Clinical
Title: PAIN REDUCTION IN ORTHODONTICS THROUGH BIOMODULATION

Aim: To evaluate the effectiveness of biomodulation at a wavelength of 650 nm in reducing pain following the activation of fixed orthodontic appliances.
Background Data:
Orthodontic treatment with fixed appliances frequently causes pain, particularly after appliance activation. Conventional pain relief methods, including systemic analgesics, are associated with side effects. Biomodulation has emerged as a non-invasive method to alleviate pain and inflammation, yet a standardized protocol for its application in orthodontics is still lacking.

Material and methods: A clinical study was conducted on 5 patients (2 male, 3 female) aged 16-38, all of whom had fixed orthodontic appliances for at least 6 months. Pain reduction was assessed after applying a diode laser with a wavelength of 650 nm and 25 mW power for 15 seconds per tooth. The laser was applied to the upper arch (46 teeth), while the lower arch (50 teeth) acted as the control group, at three specific points per tooth: the apical, mesial buccal, and distal buccal levels. Treatment was performed 24, 48, and 72 hours after appliance activation. The Wong-Baker Pain Scale was used to quantify pain levels before and after treatment.

Results: Patients reported a significant reduction in pain after each laser session. Moderate to severe pain levels decreased rapidly within 48 hours in the experimental group (upper arch treated with biomodulation), while the control group (lower arch, no laser therapy) experienced slower pain relief. On the Wong-Baker Pain Scale, pain intensity dropped by an average of 2-3 points after each laser session.

Conclusion: Biomodulation at a wavelength of 650 nm is an effective and non-invasive method to reduce pain after orthodontic appliance activation. This approach provides a promising alternative to traditional drug-based pain relief, reducing the need for systemic analgesics and offering faster pain management.

P-038
Luca Elena Ruxandra, Mariana Miron, Ioana Roxana Munteanu, Anișoara Borozan, Carmen Darinca Todea (Romania)
Category: Original research: Preclinical
Title: ALTERNATIVE TECHNIQUES FOR FIXED PROSTHETIC RESTORATION REMOVAL: AN IN VITRO STUDY ON THE Er:YAG LASER DEBONDING EFFECTIVENESS OF 4 DIFFERENT TYPES OF RESTORATIONS AND 2 CEMENTS

Aim: The purpose of this study was to analyse the effect of Er: YAG laser radiation in debonding 4 different types of ceramic FPR, cemented with 2 different type of cements. We carried out a comparative analysis between the behaviour of different types of ceramic prosthetic restorations under the action of laser radiation, analysing the integrity of prosthetic restorations and dental surfaces subjected to the action of laser radiation.

Material and methods: The study included 16 extracted teeth which were prepared as abutments and their surface was visualised using optical microscope in order to appreciate the surface of the enamel, after which they were

scanned and working models printed of black resin were produced. The study groups were established and four types of ceramic restorations were produced, in accordance to the previously established groups: Monolithic zirconia(MZ), Layered zirconia(LZ), Lithium disilicates(LD) and Feldspathic(F). Measurement of the prosthetic restorations thickness was done in 3 points. For cementation, 2 types of cement were used: Relyx Veneer 3M ESPE and Variolink Esthetic LC. After cementation, ceramic RPFs were prepared for debonding, which was conducted using an Er:YAG radiation. Debonding of the ceramic FPR was done with the Er:YAG Fotona StarWalker MaQX laser, using a R14 sapphire tip, at a distance of 10mm, using parameters of 275mJ, 20 Hz, 5,5W with air cooling (setting 1 of 9) and water, the optimal parameters being determined after testing cemented ceramic materials on a pilot support. The irradiation time needed for debonding to be efficient varied between samples from 17s (LD cemented with Rely X) to 250s (DL and F cemented with Variolink).

Results: Following the experiment, 23 ceramic FPR were debonded, of which 12 were intact and the others fractured into two or three pieces. Debonding occurred without damaging the tooth structure, according to the images obtained under the optical microscope. The success rate of different types of restoration resulted as follows: 100% success rate for both LZ and F groups, followed by 87% success rate for LD group, and 0% for MZ. Regarding the type of cement, debonding of ceramic FPR cemented with RELYX was successful in 75% of the cases, in comparison with 69% success rate in case of Variolink DC.

Conclusion: In conclusion, Er:YAG radiation has proven to be a successful and conservative method for debonding most ceramic prosthetic restorations.

P-039
Ronaldo Tuma, Thayná Vianna da Rocha, Eurydice Castro de Morais, Fernando Rodrigues de Carvalho, Luciane Hiramatsu Azevedo (Brazil)
Category: Case report
Title: PHOTOBIOMODULATION THERAPY IN DIFFERENT CONDITIONS RESULTING FROM SEVERE FACIAL TRAUMA - CASE REPORT

Aim: Photobiomodulation Therapy (PBMT) for Peripheral Facial Paralysis (PFP); Allodynia in the scar region; Limitation in mouth opening (LMO).

Case description: A 50-year-old male patient came to the clinic on 05/08/2024 after having undergone surgery on 04/24/2024 to decompress the facial nerve on the right side, in order to reverse the PFP resulting from trauma caused by the impact of a backhoe blade that fractured the temporal bone and injured the left side of the face, causing allodynia in the scar region and significant LMO.
PBMT was performed using a low-power laser. The right hemiface affected by PFP was irradiated with the e-Light at a wavelength of 808nm, 56 points, 4J/point, distributed along the path of the facial nerve and the stylomastoid foramen region. The same equipment was used for allodynia, irradiating 8 points, 4J/point, over the affected region. Regarding LMO, Therapy EC and e-Light were used, both at 808nm, 3J/point, irradiating 17 points bilaterally encompassing structures related to mouth opening.
Equipments: Therapy EC, DMC, 100mw - 808nm, light emitting diode, spot 0.0984cm2; e-Light, DMC, 120mw - 808nm, light emitting diode, spot 0.029cm2.
Parameters used: PFP: PD = 4.138W/cm2, ED = 955.862J/cm2, Time = 231s, 2 times/week, 808nm; Allodynia: PD = 4.138W/cm2, ED = 136.551J/cm2, Time = 33s, 2 times/week, 808nm; LMO: Therapy EC - PD = 1.016W/cm2, ED = 670.731J/cm2, Time = 660s, 2 times/week, 808nm - e-Light - PD = 4.138W/cm2, ED = 136.551J/cm2, Time 33s.
Total time: 924s (There are common areas during irradiation).
Cumulative dose: 376J per session and 4,136J total over 11 sessions.
Results:PFP - Initial - House-Brackmann classification (H-B) = V (Severe dysfunction), final - H-B = IV (Moderate to Severe dysfunction);
Allodynia - Patient reported absence after 6th session;
LMO - Initial = 28mm; 6th session = 38mm, Final = 42mm (11th session);
The patient continues to be treated for PFP twice a week.

Discussion: PBMT has already been used with excellent results in cases of LMO, orofacial pain and PFP.

Conclusion: To date, we have concluded that the protocols applied have been successful in improving the patient's conditions and symptoms.

Poster **Session**

P-040
João Victor Rodrigues, Pedro Henrique Petrilli, Amanda Paino-Sant'Ana, Valdir Goveia Garcia, Renato Corrêa Viana Casarin, Letícia Helena Theodoro (Brazil)
Category: Original research: Clinical
Title: ANTIMICROBIAL PHOTODYNAMIC THERAPY AS AN ADJUVANT TO NON-SURGICAL PERIODONTAL TREATMENT IN INDIVIDUALS WITH DOWN SYNDROME: A RANDOMIZED CONTROLLED CLINICAL STUDY

Aim: Individuals with Down Syndrome (DS) have an abnormal susceptibility to infections in the oral cavity, which may contribute to the development of periodontal diseases. Some studies have demonstrated a higher prevalence and greater severity of periodontal disease in individuals with DS. The aim of this study was to evaluate the use of a single session of antimicrobial photodynamic therapy (aPDT) protocol as an adjuvant to non-surgical periodontal treatment in individuals with DS.

Material and methods: Thirty individuals with DS and stages I and II grade B periodontitis were allocated into the following groups: SI (n=17) – subgingival instrumentation (SI) in a single session; SI+aPDT (n=17)- SI in single session in the pockets with probing depth (PD) ≥4 mm and bleeding on probing (BoP), methylene blue irrigation (100 µg/ml) after 60 seconds, and diode laser (AlGaInP; 660 ± 10 nm; Laser Duo, MM Optics, Ltda, São Carlos, SP, Brazil) for 50 seconds, totaling 166 J/cm², 5 J energy at a power of 100 mW. Periodontal clinical parameters PD, BoP, clinical attachment level (CAL) and immunological analysis interleukin (IL)-17, IL-1B, IL-6, IL-8 were evaluated at baseline and on 60 and 90 days. All data were submitted to statistical analysis (α=5%).

Results: A reduction in BoP was observed at 60 and 90 days in the SI+ aPDT group and in the SI group at 90 days. In the SI group, there was a significant reduction in the percentage of PD 4-5 mm at 90 days. In group SI+ aPDT, a reduction in the percentage of PD 4-5 mm could also be observed. In the SI group, an increase in the percentage of CAL ≤2 mm was noted at 60 days to 90 days. Both groups showed a significant reduction in IL-17 levels on 60 and 90 days. The intergroup comparison has revealed no statistically significant differences.

Conclusion: The use of single session aPDT therapy as an adjuvant to non-surgical periodontal treatment does not promote additional clinical benefits in individuals with DS and periodontitis.

P-041
Thayná Vianna da Rocha, Ana Maria Aparecida Souza, Luciane Hiramatsu Azevedo (Brazil)
Category: Case report
Title: SURGICAL REMOVAL OF INFLAMMATORY FIBROUS HYPERPLASIA USING DIODE LASER - A CASE REPORT

Aim: To present a case report of surgical removal of Inflammatory Fibrous Hyperplasia (IFH) using a Diode laser.

Case description: A white male 72-year-old patient, with a history of former smoker and former alcoholic and using an ill-fitting superior denture, came to service on 04/20/2004. Clinical examination revealed two asymptomatic lesions smaller than 1cm in size, similar in color to the mucosa, with a smooth surface and well-defined contours, located on the right anterior superior alveolar ridge and the left anterior superior sulcus with duration indeterminate. The patient had no skin lesions or palpable lymph nodes. The diagnostic hypothesis was IFH. The excisional biopsy of the two lesions was performed using the Diode laser - Lasering (808nm), CW, 2.0W, 300-400 micrometers. Sutures were not necessary and Diclofenac Sodium 50mg, 8 hourly for 3 days was prescribed. The removed tissue fragments were sent for histopathological analysis and the patient returned to the service after 1 week and after 21 days for post-operative assessment. The report of the histopathological examination was IFH. In the 1-week post-operative evaluation, the surgical areas showed normal healing with the formation of a whitish pseudomembrane in the region of the left anterior sulcus. The patient only had pain when handling the denture, so the anti-inflammatory was prescribed for a further 3 days. After 21 days of surgery, the areas were completely healed, the patient had no pain and the denture was relined with soft resin.

Discussion: The literature shows that the conservative surgical removal and local irritant removal are the standard treatment for HFI and the surgicon excision of this lesion can be performing using high-power lasers with various advantages.

Conclusion: The diode laser can be used in the surgical excision of IFH lesions with several advantages: less trans-operative bleeding, the possibility of elimination of the need for suturing, minimizing post-operative pain, and favoring healing.

P-042
Meire Maman Fracher Abramoff, Ana Clara Miotello Ferrão, Camila Alves Costa Silva, Pedro Moreno Fraiha, Marcelo Mendes Tepedino Júnior, Luciana Almeida-Lopes, Paula Moreno (Brazil)
Category: Case report
Title: PHOTOBIOMODULATION IN THE TREATMENT OF BELL'S PALSY: CLINICAL CASE SERIES REPORT

Aim: We report the clinical evolution of thirteen patients diagnosed with Bell's Palsy (BP,) under the use of corticosteroids and photobiomodulation (PBM).

Case description: Thirteen patients diagnosed with BP, at different evolution stages, were enrolled to receive conventional therapy (Prednisolone start at 60mg/day, 5 days, followed by a daily reduction in dose of 10 mg/day for a total treatment time of 10 days and Valaciclovir, 1.5g/day, orally, for 7 days). PBM was irradiated along facial nerves branches (temporal, zygomatic, buccal, and marginal of the mandible, with a distance of 1cm between each point) with laser equipment Therapy EC, DMC São Carlos, Brazil, with follow parameters: Wavelength 808nm ±10nm; Operating mode CW; Emission potency 100mW ±20%; Beam spot area 0.098cm2; Irradiance 1.02W/cm2; Punctual irradiation; Time exposure per point 20s; Energy density per point 20J/cm2; Total time per session 400s; Energy per point 2J; Number of points 20; Cumulative energy density 4000J/cm2; Active medium AlGaAs (semiconductor); 10 sessions1, 3x/week. The facial nerve involvement was assessed weekly using House-Brackmann scale.

Discussion: BP is an acute, idiopathic clinical condition of paralysis or paresis of the facial nerve (VII cranial nerve). Conservative treatment consists of the administration of corticosteroids, antivirals or a combination of both. However, the results are not always satisfactory. In addition, there are situations such as patients with uncontrolled diabetes, glaucoma, hypertension and other diseases that contraindicate high doses of corticosteroids.
PBM is a therapeutic modality non invasive, capable of controlling inflammation and stimulating neurosensory regeneration and functional recovery.

Conclusion: The association of conventional therapy with PBM promoted the recovery in all patients (average of 26.6 days, ± 25 to 30 days). Observation of the evolution of these cases suggests that further clinical studies should be performed to validate PBM protocols to achieve optimized results in BP

P-043
Tereza Valentina Barbosa Ribeiro Oliveira, Matheus da Silva Borges, Rosa Virgínia Melo de Oliveira Lima, Wellington Luis Reis Costa, Aparecida Maria Cordeiro Marques, Antônio Luiz Barbosa Pinheiro (Brazil)
Category: Case report
Title: LASER PHOTOBIOMODULATION IN THE TREATMENT OF BELL'S PALSY: A CASE REPORT

Aim: The following paper intends to report a case of PFP treated in Centro de Biofotônica (UFBA), using LLLT on infrared wavelenght (808 nm).

Case description: Male patient A. L. S., 44 years old, relating "locked eye and crooked mouth" on the left side, was diagnosed with PFP after clinical exam.

Discussion: Proposed protocol for LLLT used Laser Duo device (MMOptics) on infrared wavelenght, 100mW power, initially with 23 points surrounding frontal muscle, orbicularis oculi, orbicularis oris and mouth lifting muscles irradiating 2J/cm² (20 seconds each point). Supraorbital, infraorbital and mental foramen were also photobiomodulated for 60 seconds each (6J/cm²), in a total of 58J for 12 sessions. After this first cycle, a new protocol was proposed, reducing points to 21 but increasing dose to 3J/cm² (30 seconds) each, with exception of foramen ones, that haven't changed, totalizing 72J for other 36 sessions. The patient had a significative evolution after these last cycles, leading it to a protocol with 22J only. Infraorbital and mental foramen points were removed, just like inferior orbicularis occuli and mouth lifting ones, with orbicularis oris and superior orbicularis occuli (2J/cm² - 20 seconds – each point) and supraorbital foramen (4J/cm² - 40 seconds) left.

Conclusion: The treatment with low-power lasers, using the protocol applied, proved to be effective in treating Bell's Palsy due to its ability to modulate inflammation in the affected nerve, resulting in the recovery of facial mimicry and restoring the patient's self-esteem.

P-044
Danielle Santos Rodrigues, Celso de Araújo Duarte, Luciane Hiramatsu Azevedo (Brazil)
Category: Original research: Preclinical
Title: PROPOSAL OF AN ALTERNATIVE METHODOLOGY FOR MEASURING PHOTONIC PARAMETERS IN THERAPEUTIC AMBER LED (601 nm)

Aim: Characterize an alternative method to traditional radiometry for measuring irradiation photonic parameters in research involving therapeutic amber LEDs.

Material and methods: It was determined the range and peak of the electromagnetic spectrum in which the therapeutic amber LED operated, for which a spectrometer (model Shamrock 303iSR, Andor Technology) was used. The spectrometer was connected to a computer that used the software (OriginLab, Massachusetts, USA) for data analysis. The measurement for the LED was performed with an exposure of 0.0001 seconds. The following analysis focused on calculating the power density (irradiance) using an alternative photometry method that measures the electrical current generated by a diode photodetector developed in-house at the university laboratory. This device captures light and produces an electrical signal, transferring it to a picoammeter (Keithley 6487, Beaverton, OR, United States), which automatically adjusts the measurement scale to the corresponding unit of measurement. Each wavelength will produce a specific responsivity value measured in Amperes per Watt. The method for measuring electrical current involved conducting measurements at various distances between the photodetector and the light source. The readings were recorded and tabulated along with the corresponding electrical current values measured by the picoammeter. With the definition of the distance at which the electrical current demonstrated the most stability, the calculation of the other variables became possible by knowing the responsivity at 601 nm.

Results: The peak of the spectral band was reached at 601 nm, with its lower limit at 579 nm and the upper limit at 623 nm (+/- 3.5%). The responsivity value of the photodetector was established at 0.357 A/W for the amber LED. The calculations of the other quantities were based on the measurement taken at a distance of 30 cm between the photodetector and the LED, which, in turn, generated an electrical current of 1.95 µA. The power was defined at 5.46 µW, the power density at 36 µW/cm², and the power density adjustment at the distance specified by the manufacturer at 11 mW/cm².

Conclusion: In the absence of specific devices for radiometry, this study demonstrated that it is possible to measure photometric parameters using alternative methods, such as employing a photodetector coupled with a picoammeter.

P-045
Stefany Barbosa, Valentim Adelino Ricardo Barão, Leticia Helena Theodoro, Edilson Ervolino, Valdir Gouveia Garcia, Leonardo Perez Faverani (Brazil)
Category: Original research: Preclinical
Title: EFFECTS OF DIFFERENT LOCAL ANTIMICROBIAL THERAPIES ON THE PREVENTION OF MEDICATION-RELATED OSTEONECROSIS OF THE JAW OF SENESCENT RATS - PRELIMINARY RESULTS

Aim: This study aimed to compare the effects of antimicrobial photodynamic therapy (aPDT), 2% chlorhexidine gel, and poly(N-vinylcaprolactam; PNVCL) hydrogel with tetracycline in preventing and managing medication-related osteonecrosis of the jaws (MRONJ) after tooth extraction in aged rats treated with zoledronic acid.

Material and methods: Thirty 12-month-old Wistar rats underwent bilateral ovariectomy and, two months later, received cotton ligatures around the left lower first molar while starting zoledronic acid injections every three days. After three weeks, the molar was extracted, and treatments were applied based on assigned groups: BC: Socket filled only with blood clot; CHX: 2% chlorhexidine gel applied immediately post-extraction; aPDT: Antimicrobial photodynamic therapy performed immediately after surgery and on days 2 and 4, using methylene blue (100 µg/mL) for 60 seconds, followed by irradiation with a low-power laser (Thera lase DMC; GaAlIP; 660 nm; 35 mW; 2.1 J/point; 60 seconds; 74.2 J/cm²;

1.23 W/cm²); PNVCL: PNVCL hydrogel without tetracycline applied immediately post-surgery; PNVCL+TC: PNVCL hydrogel with tetracycline (25 mg) applied immediately post-surgery. After 28 days, the animals were anesthetized, and photographs of the extraction sites were taken before euthanasia.The hemimandibles were analyzed using micro-computed tomography and histology.

Results: Results indicated that the aPDT and PNVCL+TC groups showed better gingival healing, with both groups exhibiting no bone sequestration and more organized tissue, including vital bone formation. The BC group fared the worst, with necrotic tissue and cellular debris due to bacterial contamination. CHX and PNVCL yielded similar results, showing no sequestration but empty alveoli.

Conclusion: In conclusion, aPDT and PNVCL+TC therapies appear promising for preventing MRONJ after tooth extraction, warranting further investigation.

P-046
Adriana Cátia Mazzoni, Lara J Motta, Aldo Brugnera Jr, Ricardo Navarro, Raquel Agnelli Mesquita Ferrari, Anna Carolina Ratto Tempestini Horliana, Sandra Kalil Bussadori (Brazil)
Category: Original research: Clinical
Title: EVALUATION OF THE EFFECTS OF HIGH-POWER DIODE LASER AND ELECTROCAUTERY FOR LINGUAL SURGERY IN INFANTS: A BLINDED RANDOMIZED CONTROLLED CLINICAL TRIAL

Aim: The objective was to evaluate lingual frenulum release surgery, performed using 2 types of thermal surgical instruments, Electrocautery and high-power Diode Laser, in newborns aged 0 to 3 months, that presented ankyloglossia, with an indication for surgery

Material and methods: The study was a randomized, controlled and blind clinical trial involving 57 participants aged 0-3 months that had difficulty breastfeeding, with a transdisciplinary diagnosis of ankyloglossia and indication of surgical release of the lingual frenulum, approved by the research committee. ethics, 4,387,769. The surgical procedure was performed using 2 types of thermal instruments, and they were randomly divided into 2 groups: G1. Electrocautery (Novadur Bayer/Cauterimax, nickel chromo tip, 18cm filament, with a temperature of 1,200°C, irradiation in continuous mode, and over an area of 1cm) and G2. High Power Diode Laser (Thera lase/DMC, infrared waveform 808nm, equipment power 9W, continuous irradiation, power 1.5-2W, fiber diameter 600 micrometers). Clinical evaluation, use of the Bristol protocol, breastfeeding evaluation by UNICEF, and application of the VAS pain test for nursing mothers simultaneously, it was methods and assessment. The evaluation times were before and 15 days after the surgical procedures, by the operator and the blind dentist. The incision was made in the same way using both instruments. After 15 years, a was new evaluation, and in cases of recurrence, reoperation was necessary.

Results: After surgery, recurrence occurred in 26 cases (45.6%). There was recurrence in 6 cases (26.6%) in G.Electrocautery and 20 cases (58.8%) in G.Laser. Local inflammation was noticed at the edges of the surgical cut in 4 cases in G.Electrocautery and none in G.Laser

Conclusion: Although the G. high-power diode laser presents more cases of recurrences (58.8%), the 26.6% recurrence presented by the G. Electrocautery is considered very high, and it is not possible to change the parameters with this instrument, while with the laser it is possible to adjust the parameters according to each case. After this study, we know that the parameters used in adults when using the laser cannot be the same for the age range described in this study.

P-047
Juliana Cristina Oliverio de Araujo, Martha Simões Ribeiro (Brazil)
Category: Original research: Clinical
Title: PHOTODYNAMIC TREATMENT OF ACTINIC CHEILITIS

Aim: To evaluate the effectiveness of PDT mediated by red light and methylene blue (MB) in ACTINIC CHEILITIS (AC)

Material and methods: Nineteen participants were selected after the histopathological confirmation of actinic cheilitis. They attended five visits on alternate days, respecting a 48-hour interval between sessions, except on weekends, over a period of 10 days. The intervention was performed using a laser mediated by a local

anesthetic (LA) in a 1% solution, applied topically. After a 10-minute period, irradiation of the entire surface of the mucosa was conducted, with a spacing of 1 cm between the three application points, using a diode laser (MMOptics, model Laser Duo), which was validated and authorized by ANVISA (ANVISA/MS Registration No. 80051420022) for medicinal use. The wavelength used was 660 nm, with a fixed power of 100 mW, irradiance of approximately 3 W/cm², and an exposure time of 360 seconds for each session, delivering an energy of 1200 J/cm² per session, totaling 6 KJ/cm², with a beam area of 0.03 cm².

Results: In the fluorescence color analysis of the lips with dysplasia, there was a significant decrease after treatment with photodynamic therapy (PDT). Before treatment, the histogram displayed two peaks, around 160 and 200. However, after 30 days post-treatment, the distribution changed, and the histogram showed a single peak, indicating a more centralized data distribution. This change suggests that the treatment may have homogenized the values, reducing the variations that were more pronounced beforehand.

Conclusion: PDT can be a promising technique for the treatment of actinic cheilitis, as it has been able to reduce the color pattern of the affected mucosa.

P-048
Ioana Roxana Munteanu, Carmen Darinca Todea, Luca Ruxandra-Elena, Constantin George-Dumitru, Erdelyi Ralph-Alexandru, Duma Virgil-Florin, Marsavina Liviu (România)
Category: Original research: Clinical
Title: IMAGING ANALYSIS REGARDING THE DISINFECTION EFFICACY OF DIFFERENT LASER WAVELENGHTS ON TITANIUM AND ZIRCONIA SURFACES: AN OCT AND SEM EVALUATION

Aim: Using SEM and OCT evaluations, this study examined the effects of laser irradiation on these common dental materials to determine how laser radiation affects surface integrity and temperature variations.

Material and methods: The research used Grade IV Ti alloy discs (98.5 mm diameter/8 mm thickness) and Zr ZirCad Prime plates (98.5 mm diameter/16 mm thickness).

This study analyzed Ti and Zr discs in five groups:
(1) Negative control group (C): 4 discs left untreated for baseline;
(2)Conventional study group (CV): 4 discs underwent mechanical and chemical decontamination (CHX-treatment and airflow);
(3)PDT study group: 4 discs underwent PDT treatment;
(4)Er:YAG laser study group (Er): 4 discs treated with central wavelengt Er:YAG laser radiation.
(5)The combined therapy study group (PDTEr) treated four discs with PDT and Er:YAG laser radiation.
For PDT, a laser diode (PACT® 300, Cumdente GmbH, Tübingen, Germany) with a center wavelength of 635 nm was utilized, in 3 cycles of 10 s each. An Er:YAG laser (LightWalker ST-E, Fotona d.o.o., Ljubljana, Slovenia) with a center wavelength of 2094 nm, 100 mJ, 10 Hz, water 60, air 40, for 30 s, was applied.

Results: The thermographic camera recorded sample initial and maximum temperatures during PDT or Er:YAG laser treatments. The measurements showed little temperature change, staying between 21°C and 25°C. Ti and Zr surfaces are stable thermally, so laser treatments preserve them without thermally degrading them. Ti sample surface changes after various treatments by OCT and SEM. SEM detects small surface changes better. Combining PDT and Er:YAG increased surface area alteration. Combining treatments to change surface properties may boost microbial decontamination. Close alignment of affected areas by OCT and SEM suggests conservative surface alteration. Statistics confirmed that these treatments affect sample surfaces evenly by showing no significant variation across treatment groups. This detailed statistical study of methodological accuracy, treatment efficacy, and material-specific reactions illuminates decon's comparative effectiveness.

Conclusion: PDT and PDTEr are safe for Ti and Zr surfaces since temperature monitoring did not alter throughout treatment. Preventing thermal injury to implant surfaces and surrounding tissues requires consistent temperatures during these treatments. Without significant surface modification differences, both imaging methods provided consistent insights into the therapies' impacts.

P-049
Natchaya Limtanakul, Aparas Assamongkol, Siriwit Tepouypon, Sajee Sattayut (Thailand)
Category: Original research: Preclinical
Title: ABLATIVE PROPERTIES OF ORAL SOFT TISSUE RESURFACING TECHNIQUE USING 980 NM DIODE LASER AND ND:YAG LASER IN CONTINUOUS WAVE AND PULSED MODES WITH INDIA INK AND METHYLENE BLUE STAINING: A PORCINE EX VIVO STUDY

Aim: Aim: To explore properties of the ablative effect of 980 nm Diode laser (Lasotronix SmartM) with continuous wave and pulsed mode settings and Nd: YAG laser (Fotona Light walker DT) with short-pulse and very long-pulse at 4 watts for 2 seconds with 320 nm fiber optic, power density 4,976.1146 W/cm2 and energy density 9,952.23 J/cm2, staining with India ink and Methylene blue on soft tissue of porcine palate.
Background: The technique of applying color stain to precisely identify oral lesions before laser resurfacing has not been explored its impact on laser ablation properties.

Material and methods: Methodology: The area of intact porcine palate was randomized allocating into 12 settings, 3 repetitions each setting, 10 experimental sets, resulted in 30 samples each setting group. The ablative samples were recorded using Olympus DSX 1000 stereomicroscope for 3D photograph taking.

Results: Results: The result showed that the group of tissue stained with India ink and irradiated with continuous wave Diode laser had the statistically greatest width (mean = 960 micron), depth (mean = 673 micron), and volume (median = 127×106 cubic micron) ($P < 0.05$). Conversely, the group irradiated with the short-pulsed Nd: YAG laser exhibited the least statistically depth (mean = 100 micron) and volume (7 ×106 cubic micron) ($P < 0.001$). The statistically smallest width was observed in the group of tissue stained with Methylene blue and irradiated with the short-pulse Nd: YAG laser (mean = 569 micron) ($P<0.05$). Additionally, among the control groups of unstained samples irradiated by Diode and Nd: YAG laser had no significant differences in width, depth and volume of the ablation, except the group of long-pulse Nd: YAG laser which produced a significant greater depth comparing to the short-pulse Nd: YAG laser ($P<0.01$).

Conclusion: Conclusion: The ablative width was wider when applying India ink-stained tissue with either using continuous wave Diode or Nd: YAG laser. While the ablative depth was deeper when India ink-stained tissue was irradiated with Diode laser in continuous wave and pulsed mode. Methylene blue staining was not significantly altering the width, depth, and volume of laser ablation.

P-050
Rosa Virgínia Melo de Oliveira Lima, Caroline Landim, Matheus da Silva Borges, Fernando José Pires Sampaio, Aparecida Maria Cordeiro Marques, Antônio Luís Barbosa Pinheiro (Brazil)
Category: Case report:
Title: EVALUATION OF THERAPEUTIC EFFECTS IN THE TREATMENT OF ORAL LICHEN PLANUS ASSOCIATED WITH RED LASER LIGHT (λ 660 ηm): CASE REPORT

Aim: Introduction: Laser light has gained popularity in recent decades due to studies on biomodulation. It has been studied as a potential therapeutic option for Lichen Planus, an immunosuppressive disease with a low risk of malignancy. Objective: To evaluate the efficacy of photobiomodulation with red laser light at λ660 ηm in the treatment of oral lichen planus.

Case description: Methods: A photobiomodulation protocol was conducted using the Laser Duo (MMOPTICS)®, Red Laser (λ 660 ηm), P=100mW. Over the fifteen months of treatment, four distinct protocols were established using photobiomodulation to evaluate its effectiveness in managing oral lichen planus. Protocol one: Total dose of 132 J/cm², applied three intraoral points on the upper and lower lips of 1 J/cm², eleven points of 9 J/cm² on the dorsum of the tongue at lesion sites, and ten points of 3 J/cm² in an intraoral sweeping protocol, 18 sessions. Protocol two: Total dose of 37 J/cm², maintaining ten points of intraoral sweeping plus the addition of three points of 1 J/cm² on the left side of the tongue, four additional points of 1 J/cm², one on the tip and three on the dorsum of the tongue, 12 sessions. Protocol three:Total dose of 50 J/cm², included applications of five points of 9 J/cm² on the dorsum of the tongue, along with photodynamic therapy (PDT), and five additional points on the dorsum and tip of 1 J/cm², 8 sessions. Protocol four:Total dose of 36 J/cm², sweeping was resumed with ten points of 2 J/

cm², six points applied on the body of the tongue and two points on the right side of the tongue, both at 2 J/cm², 9 sessions. Each session lasted an average of 637 seconds.

Discussion: The study revealed that combining various energy dosages and adjusted protocols with sweeping, PDT, and specific points effectively treated lesions and provided symptom relief.

Conclusion: Different laser therapy protocols with varied energy dosages and strategic applications demonstrated effectiveness in healing lesions, providing significant relief.

P-051
Nilton Alves, Naira Figueiredo Deana, Francisco Ceballos, Karina Godoy, Fernando Dias (Chile)
Category: Original research: Preclinical
Title: EFFECTIVENESS OF LASER PHOTOBIOMODULATION THERAPY AND ULMOPLUS® IN THIRD-DEGREE BURN WOUND HEALING IN SPRAGUE-DAWLEY RATS: HISTOLOGICAL AND ULTRASTRUCTURAL ANALYSIS

Aim: The purpose of this study was to assess the effectiveness of laser photobiomodulation therapy (PBMT) in combination with Ulmoplus® (UP) in the treatment of third-degree burns in Sprague-Dawley rats.

Material and methods: We induced burn injuries in 48 female Sprague-Dawley rats using a heated metal plate (2.0 cm diameter, 30 g) applied for 30 seconds. The animals were divided into four experimental groups (12 rats each): G1 (control, no treatment), G2 (PBMT-treated), G3 (UP-treated), and G4 (PBMT + UP-treated). PBMT was applied daily using an 820 nm GaAlAs laser with a spot size of 0.03 cm², 100 mW, and an energy density of 20 J/cm², for 6 seconds per point. Evaluations were performed on days 7 and 14 post-injury. We conducted qualitative analysis using variable pressure scanning electron microscopy (VP-SEM), and histological samples were fixed in 10% formalin and stained with Heidenhain's Azan. Neovascularization (VV), collagen fiber deposition (CF), and the presence of skin appendages (AP) were analyzed. ANOVA with Tukey's post-test and Spearman's correlation were used for statistical analysis. A significance threshold of 5% was considered.

Results: A moderate positive correlation was found between VV and CF (rho: 0.534, p = 0.049). A strong negative correlation were observed between VV and AP at day 7 (rho: -0.701, p=0.005) and a moderate negative correlation were observed between VV and day 14 (rho: -0.556, p=0.025). We observed a significant increase in VV, CF, and AP in all groups, except the control. VP-SEM showed better collagen fiber deposition in G2 and G4.

Conclusion: Treatment groups showed accelerated wound healing compared to controls, with greater neovascularization, collagen fiber deposition, and the presence of skin appendages. PBMT combined with Ulmoplus® shows promise as a therapeutic strategy for third-degree burn wound healing.

P-052
Diana Dembicka-Mączka, Małgorzata Kępa, Jacek Matys, Kinga Grzech-Leśniak, Rafał Wiench (Poland)
Category: Original research: Preclinical
Title: EVALUATION OF THE DISINFECTION EFFICACY OF ER:YAG LASER LIGHT ON SINGLE-SPECIES CANDIDA BIOFILMS – AN IN VITRO STUDY

Aim: Oral candidiasis is an opportunistic infection caused by Candida spp. In recent years, antifungal drugs have become less effective due to fungal resistance. This highlights the need to identify new therapeutic approaches. This study aimed to assess the disinfecting effect of the Er:YAG laser on the inhibition of growth and elimination of mature single-species Candida biofilms.

Material and methods: The study utilized reference strains of C. albicans, C. glabrata, C. parapsilosis, and C. krusei. These strains were cultured on Sabouraud dextrose agar (SDA) and incubated at 37°C for 24 hours. Then cultures were suspended in saline (McFarland standard of 0.5).
First part: Candida suspensions (100 µL) were spread on SDA plates - two for each strain. Er:YAG laser irradiation was applied in a single pulse mode, 30 to 400 mJ, to predetermined 32 points. After irradiation plates were incubated for 48 hours. The growth inhibition zones (GIZ) were measured at 24 - 96 hours.
Second part: biofilms were prepared similarly and, after 96 hours of incubation, exposed to Er:YAG

laser irradiation at different energies (50, 100, 150, 200 mJ) for 180 seconds, per 1.44 cm2 area. Post-irradiation, impressions were taken using Rodac Agar to determine yeast counts.
The diameter of the GIZ (first part) and count of colony-forming units (CFU) after irradiation (second part) were measured, and results were analyzed statistically.

Results: In the first part, GIZ was found in all irradiated sites, with various Candida strains and observation times. The results showed a significant increase ($p<0.05$) in the width of GIZ in the energy range of 30-280 mJ and a non-significant increase in the energy range of 300-400 mJ.
The second part: the number of CFU remaining after irradiation of biofilms with 150 mJ energy differed statistically significantly from other results obtained after using 50, 100, or 200 mJ energy, regardless of the Candida strain tested.

Conclusion: Er:YAG is shown to have good disinfecting properties. This includes inhibiting biofilm growth, even at low energy doses (50 mJ), and eliminating mature, Candida spp. biofilms. The effectiveness of the elimination depends on the energy dose (150 mJ being the most effective).

P-053
Kenya Couto Ferreira Cateb, Chistiane Pavani (Brazil)
Category: Case report
Title: THE USE OF PHOTOBIOMODULATION IN THE MANAGEMENT OF ACNE AND FRACTIONAL LASERS IN ACNE SCARS: A CASE REPORT

Aim: This case report details the treatment of acne using red (660 nm), blue (470 nm), and infrared (808 nm) PBM and the improvement in scar texture with the combined use of fractional thulium (1927 nm) and erbium glass (1550 nm) lasers.

Case description: A 39-year-old female patient sought treatment for active acne on the cheeks. After anamnesis, two sessions of 40% mandelic acid peeling were performed every 30 days. In parallel, PBM was administered twice a week during 6 weeks in a protocol combining blue LED (1 min per hemiface, 12J per session), red laser (2 J/point applied at acne lesions), and infrared laser (4 J in the preauricular lymph nodes), using Elite, DCM, Brazil. Acne scars were treated with two applications, every 30 days, of Thullium Laser (1927nm at a random application mode, 20mJ, 10ms, 324 MTZ/cm2), and Erbium Glass Laser (1550nm at a random application mode, 40mJ, 10ms, 225 MTZ/cm2) using Pisom, MedicalSan, Brazil.

Discussion: Active acne was successfully treated, with a visible reduction in the number of acne lesions and skin erythema. In addition, there was a significant improvement in scarring after the application of fractional lasers. Photonic devices have been extensively studied for skin treatments. In the treatment of acne, photobiomodulation (PBM) with red and blue light has shown positive results and fewer side effects compared to other treatments. The mechanism of blue light action is related to light absorption by porphyrins produced by Cutibacterium acnes, acting as endogenous photosensitizers, which generate reactive oxygen species, causing bacterial destruction. Red light modulates inflammation and promotes tissue regeneration and collagen synthesis. Regarding lymphatic drainage, infrared light brings benefits by activating lymphatic flow in the irradiated region. In addition, post-acne scars are common and significantly impact patients' confidence and self-esteem. Fractional lasers can improve the appearance of the skin by upregulating collagen production and increasing dermal thickness.

Conclusion: Biophotonics, through PBM and high-intensity fractional lasers, has been increasingly used successfully in the treatment of acne, mainly due to the short recovery time and minimal side effects.

P-054
Vinícius Ganzaroli, Isabella Zacarin Guiati, Jéssica de Oliveira Alvarenga Freire, Valdir Gouveia Garcia, Leticia Helena Theodoro, Edilson Ervolino (Brazil)
Category: Original research: Preclinical
Title: CURCUMIN-MEDIATED ANTIMICROBIAL PHOTODYNAMIC THERAPY AS A PREVENTIVE TREATMENT OF MEDICATION-RELATED OSTEONECROSIS OF THE JAW: AN EXPERIMENTAL STUDY IN RATS

Aim: The present study aimed to evaluate the effect of antimicrobial photodynamic therapy (aPDT), using curcumin (CUR) and blue light-emitting diode (LED), at the dental extraction site in the prevention of medication-related osteonecrosis of the jaw (MRONJ).

Material and methods: Fifty-six senescent female rats were divided into eight groups (n=7): Vehicle (VEH); VEH-LED; VEH-CUR; VEH-aPDT; Zoledronate (ZOL); ZOL-LED; ZOL-CUR; ZOL-aPDT. The period of drug treatment was 7 weeks. The rats from the VEH, VEH-LED, VEH-CUR and VEH-aPDT groups received 0.45 ml of vehicle. The rats from the ZOL, ZOL-LED, ZOL-CUR and ZOL-aPDT groups received 100 µg/Kg of ZOL. VEH and ZOL were administered intraperitoneally every 72 hours. After 3 weeks of treatment, all rats underwent extraction of the lower first molar. In the VEH-LED and ZOL-LED groups, 4 sessions of LED irradiation (Kon-lux Kondortech Dental Equipment Ltda, São Carlos, São Paulo, Brazil; 468-485 nm; 200 mW; 15 J/cm²; 12J, 60 s) were performed. In the VEH-CUR and ZOL-CUR groups, 4 sessions of CUR deposition (100 mg/ml) were performed. In the VEH-aPDT and ZOL-aPDT groups, 4 aPDT sessions were performed using the CUR and the LED. Local treatments were performed at 0, 2, 4, and 6 postoperative days. The euthanasia was performed after 28 postoperative days. The hemimandibles were properly processed. The area of dental extract sites was analyzed: histological analysis of tissue repair; histometric analysis of the percentage of newly formed bone tissue (NFBT) and non-vital bone tissue (NVBT); immunohistochemical analysis for VEGF, BMP2/4, and OCN.

Results: The ZOL and ZOL-LED groups showed severe impairment of the alveolar repair, a lower percentage of NFBT, a higher percentage of NVBT, and a low immunolabeling for VEGF, BMP2/4, and OCN. When compared with these groups, the ZOL-CUR and ZOL-aPDT groups showed favorable tissue repair, a higher percentage of NFBT, a lower percentage of NVBT, and a moderate to high immunolabeling for VEGF, BMP2/4, and OCN.

Conclusion: The use of curcumin, irradiated or not with blue LED, prevented the occurrence of MRONJ in rats. The beneficial effects on tissue repair are enhanced when curcumin is associated with blue LED irradiation in aPDT.

P-055
Alberto Valença Neto, Aparecida Maria Cordeiro Marques, Antônio Luiz Barbosa Pinheiro (Brazil)
Category: Case report
Title: THE USE OF PHOTODYNAMIC THERAPY WITH 0.01% METHYLENE BLUE ASSOCIATED WITH LASER PHOTOBIOMODULATION IN THE TREATMENT OF ORAL LESIONS IN A PATIENT WITH STEVENS-JOHNSON SYNDROME: A CLINICAL CASE REPORT

Aim: The aim of this work was to present a case report that used an association of photodynamic therapy andlaser photobiomodulation in the treatment of oral candidiasis.

Case description: Antimicrobial Photodynamic Therapy (PDT) has been highlighted as an alternative for treating infections without generating microbial resistance, as with antibiotic therapy. Patient R. G. A., female, 71 years old, was admitted in an Intensive Care Unit after a traumatic event which lead to depression treated with Lamotrigine, that triggered Stevens-Johnson Syndrome, which lead to a candidiasis lesion on the hard palate. She also had multiple sclerosis and antifungals were contraindicated.
The hard palate lesion was treated with 3 sessions of photodynamic therapy with 0,01% of methylene blue solution associated with a diode 660nm laser, P=100mW, 6J/cm2 (TwinFlex, MMOptics, São Carlos, Brazil), 60 seconds per point, and ten minutes of pre-irradiation time. After the healing of the lesion, the same laser was used for three sessions of photobiomodulation, in ten points of the hard palate, 2J/cm2 per point, every other day, which means 20J/cm2 per session, 60 J/cm2 of total dosage.

Discussion: Glahn, J. et al, (2024) state that Lamotrigine is emerging as a driver of Stevens-Johnson syndrome. Contaldo, M. et al (2023) showed that antimicrobial photodynamic therapy, with highly selective fungicidal activity being free of side effects, is also being studied as a great alternative to drug administration.Zhang, W et al. (2022) suggests that na association of photodynamic therapy and photobiomodulation when treating candidiasis.

Conclusion: As the use of antifungals was contraindicated, this case demonstrates great utility for photodynamic therapy (PDT), since maintaining the lesion could lead the patient

to malnutrition, which would worsen her health condition. PDT associated with laser photobiomodulation, in the parameters used, showed satisfactory results, without side effects, increasing the patient's quality of life and contributing to the recovery of her systemic condition.

P-056
Diana Dembicka-Mączka, Magdalena Gryka-Deszczyńska, Jacek Matys, Kinga Grzech-Leśniak (Poland)
Category: Original research: Clinical
Title: CLINICAL STUDY OF THE IMPACT OF HIGH-POWER LASERS (Er:YAG and Nd:YAG) AND PHOTOBIOMODULATION (Nd:YAG) ON ALVEOLAR BONE DIMENSION AFTER TOOTH EXTRACTION

Aim: This study aimed to evaluate a comprehensive laser post-extraction protocol by comparing alveolar bone regeneration with that achieved after standard tooth extraction without laser.

Material and methods: The study included 30 tooth extractions, randomized into a test group (G1, n=15) and a control group (G2, n=15). In G1 (test, laser group), tooth extractions were performed using a laser protocol. After standard mechanical cleaning, an Er:YAG laser at 2940 nm was used for degranulated tissue removal (H14 cylindrical tip, 160 mJ, 15Hz, pulse duration 300 µs, fluence 37.8 J/cm^2). The Nd:YAG laser at 1064 nm was employed for alveolus disinfection (300µm fiber, 2W, 20Hz, pulse duration 200µs, fluence 143 J/cm^2) and then for clot stabilization (300µm fiber, 4W, 20 Hz, 600µs VLP, 285.71 J/cm^2). Finally, de-epithelialization was done with the Er:YAG laser (H14 Handpiece, 120mJ, 300µs pulse duration, fluence 9.09 J/cm^2) and photobiomodulation with the Nd:YAG laser (11mm diameter, 0.5W, 10 Hz, 60+60 s, 100µs pulse duration, fluence 0.053 J/cm^2). In G2, tooth extractions involved mechanical cleaning using an alveolar curette alone.

Results: The laser procedure took an average of 8.7 minutes longer than the control procedure but resulted in significantly lower pain levels in patients during the first three days post-extraction ($p<0.05$). After 4 months, both groups showed bone atrophy, however, there were statistically significant differences in the height of the lingual lamina at the distal root (25.4 mm vs. 21.7 mm, $p=0.046$). The buccal lamina dimensions at the mesial (25.8 mm vs. 22.5 mm, $p=0.056$) and distal (25.4 mm vs. 21.3 mm, $p = 0.051$) roots were near statistical significance. Additionally, a positive correlation was found between vitamin D levels and alveolar wall height; a vitamin D increase of 1 ng/ml was associated with a 0.18 mm increase in alveolar wall height ($p=0.021$).

Conclusion: The laser post-extraction protocol reduced post-extraction pain and better preserved alveolar bone height compared to standard extraction. There was also a positive correlation between vitamin D levels and alveolar bone height preservation.

P-057
Carlos Nascimento, Farah El Khamlichi, Daniel Heysselaer, Saad Houeis, Samir Nammour (France)
Category: Case report: Clinical
Title: LASER ASSISTED ENDODONTIC TREATMENT WITH AN ERBIUM YAG ON SWEEPS MODE IN TEETH WITH PULP NECROSIS AND PERIAPICAL PERIODONTITIS

Aim: The root canal anatomy is very complex, especially in molars, and includes extra canals, isthmuses, and accessory canals. Different irrigant agitation techniques have been introduced as irrigation protocols in endodontic treatment. Over the last few years, there has been an increasing interest in the use of Erbium lasers for the agitation of endodontic irrigants. For this reason, a SWEEPS (Shock Wave Enhanced Emission Photoacoustic Streaming) technique was created to improving the efficacy of laser assisted irrigation (LAI). The aim of this study is to present 5 clinical cases of Laser assisted Endodontic treatment with a Erbium YAG with SWEEPS mode.

Material and methods: Clinical examination and periapical X ray and CBCT were performed in 4 lower molars and 1 upper lateral incisor from 5 different patients. After the differential diagnosis, the endodontic treatment plan that consists in laser assisted endodontic treatment with an Erbium YAG in SWEEPS mode was made and presented to the patients.

Results: In all clinical cases the SWEEPS mode promoted a permeabilization of the apical third and allowed NaOCl action and penetration in this area, increasing though the success rate of this

endodontic treatment. In all cases the periapical healing was obtained and demonstrated by a CBCT control.

Conclusion: The Erbium Laser on SWEEPS mode, with an ordinary and sharp protocol, can allow the irrigants to access the ramifications of the canal easily, which might assist in the cleaning of canals of various shapes and improve the root canal obturation.

P-058
Anderson Nunes da Cruz, Rosa Virgínia Melo de Oliveira Lima, Caroline Landim, Aparecida Maria Cordeiro Marques, Matheus da Silva Borges Cunha, Antônio Luiz Barbosa Pinheiro (Brazil)
Category: Case report
Title: LASER THERAPY IN THE MANAGEMENT OF LICHENOID MUCOSITIS: CLINICAL RESULTS AND THERAPEUTIC BENEFITS - A CASE REPORT

Aim: Introduction: Lichenoid mucositis is a painful inflammatory condition of the oral mucosa, causing ulcers, pain, and difficulty in eating and speaking. Photodynamic therapy is a promising approach to accelerate healing, reduce inflammation, and relieve pain by activating biochemical and metabolic processes through the photochemical effects of light. Objective: To evaluate the efficacy of low-intensity laser therapy in the treatment of lichenoid mucositis.

Case description: Methods: A photobiomodulation protocol was executed using the Laser Duo (MMOPTICS, São Carlos, Brazil)®, Red Laser (λ 660 m), P=100mW. In September 2023, the first protocol for the treatment of lichenoid mucositis was initiated with 10 sessions, applying 10 points of 3J/cm² in the intraoral mucosa and 4 points of 3J on the right lateral side of the tongue, totaling 42J/cm². In January 2024, the protocol was maintained with an addition of 1J/cm² on the labial commissures, totaling 44J/cm², in 48 sessions. In September 2024, the scan was reduced to 8 intraoral points of 3J/cm², maintaining the 4 points on the right lateral side of the tongue and adding 4 points on the left lateral side, totaling 34J/cm² in 10 sessions. Each session lasted an average of 400 seconds.

Discussion: Results: The results showed a significant reduction in pain throughout the protocols applied, leading to an improvement in the patient's ability to eat and communicate. These improvements indicate that the treatment was effective in reducing the symptoms of lichenoid mucositis, contributing to a better quality of life during the therapeutic period.

Conclusion: Conclusion: Photobiomodulation sessions effectively reduced the symptoms of lichenoid mucositis, including pain, enhancing the patient's nutrition and communication, resulting in a positive impact on quality of life during the treatment period.

P-059
Gisele Moreira de Freitas, Beatriz Dutra, Beatriz Dutra, Haphata Melo Santana Rafael (Brazil)
Category: Case report
Title: PHOTOBIOMODULATION WITH INFRARED LASER IN REACTIVE TISSUE AFTER LINGUAL FRENECTOMY: A CASE REPORT IN NEWBORN FOLLOW-UP

Aim: This case highlights the successful use of infrared laser for tissue healing after frenectomy in a pediatric patient with Ankyloglossia, reinforcing photobiomodulation as an effective therapy for abnormal tissue reactions and post-surgery recovery, potentially avoiding additional surgeries.

Case description: A 9 days old female baby, was evaluated and submitted to frenectomy in order to offer treatment for lingual frenulum alteration. According to the mother it promoted difficulties in the dynamics of breastfeeding and its development. The anesthetic technique was done with 2% lidocaine with 1:100.000 epinephrine. A high power diode laser with 980nm wave length (Thera Lase Surgery, DMC) was used to incise frenulum fibers. The irradiation was in contact mode, using a flexible quartz fiber of 300 µm in diameter, with a power of 1.3W in continuous mode. A 606 nm wavelength low power diode laser (Therapy EC, DMC) was applied to the surgical wound to promote tissue biomodulation with 1 J of energy. In a 5-day review, tongue was high positioned in rest position without frenulum interference and the wound was in a normal process of repair appearance. In a 14-day review was noted a nodular mass of reactional tissue measuring 1 cm de diameter. In a 21-day review was applied to the nodular reactional tissue a 808nm wavelength low power diode laser (Therapy EC, DMC) with 1 J of energy, 100mW of power, 11.11 J/cm²of energy density, 1.11W/cm² of power density, 10 seconds per point,

distance between points of 1cm. After 42 days of photobiomodulation, complete reduction of the nodular mass was and complete surgical recover was noted.

Discussion: This case highlights the successful use of infrared laser for tissue healing after frenectomy in a pediatric patient with Ankyloglossia, demonstrating photobiomodulation's effectiveness in preventing further surgery and managing abnormal tissue reactions.

Conclusion: Initial findings suggest photobiomodulation improves healing and reduces adverse tissue reactions in pediatric postoperative care, potentially reducing the need for further surgery. Further research is needed to establish it as a standard practice.

P-060
Maria Jose Calaf, Orietta San Martín, Glenda Skinner (Chile)
Category: Case report
Title: EFFECT OF LASER LINGUAL FRENECTOMY USING A HYBRID TECHNIQUE AND MYOFUNCTIONAL THERAPY IN CHILDREN WITH ANKYLOGLOSSIA: CASE SERIES

Aim: To demonstrate the effectiveness of laser lingual frenectomy using a hybrid technique and myofunctional therapy in children with ankyloglossia.

Case description: The protocol for laser lingual frenectomy using a hybrid technique and myofunctional therapy was performed on 3 patients with a diagnosis of ankyloglossia, aged between 5-7 years. The frenectomy was performed with a diode laser at a wavelength of 940 nm (Epic X, Biolase); continuous wave (CW), with a 400 µm tip and an output power of 1.2 W. It was sutured with Vicryl 5.0 and the area was photobiomodulated with 0.1 W of power, 1J/cm2, for 10 seconds (4 J in total) using the 940 nm laser. One tube of lidocaine 2% (1:100,000) was infiltrated, analgesics were prescribed, and pineapple ice cream was recommended for the first 48 hours. Exercises began on the same day as the surgery, and orofacial motor sessions started after 3 days, totaling 4 sessions.

Discussion: The technique used in our patients consisted of a hybrid approach that combines laser frenectomy and conventional techniques, where the frenectomy is performed with a diode laser and then sutured, aiming to achieve the benefits of primary intention healing. According to the literature, this has advantages such as reduced epithelialization, collagen deposition, contraction, and remodeling. Orofacial motricity therapy before and after surgery aims to increase the kinetic awareness of the tongue, a function that is restricted by ankyloglossia. Thus, this therapy will allow for re-education of the tongue in movements it does not know. Some authors describe that the ability to elevate the tongue increased after therapy, which was reflected in our results. In our three patients, we measured the ratio between maximum mouth opening with and without tongue elevation, pre- and post-surgery, comparing the progression of these measurements up to 30 days: from 44.7% to 69%, from 26% to 60%, and from 22.8% to 60%, respectively, demonstrating significant gains and maintenance in tongue reach and mobility.

Conclusion: Conclusions: Laser lingual frenectomy using a hybrid technique with myofunctional therapy is potentially effective for the treatment of ankyloglossia in children.

P-061
Renan Augusto Garbin Ribeiro, Tereza Cristina Teixeira (Brazil)
Category: Systematic or narritive review
Title: EFFICACY OF LASER THERAPY IN THE TREATMENT OF TMD: A COMPARATIVE REVIEW WITH TRADITIONAL METHODS

Aim: This study aims to evaluate the efficacy of low-level laser therapy (LLLT) in the treatment of temporomandibular disorder (TMD) compared to traditional therapeutic methods, such as physiotherapy and pharmacological treatment. The goal is to determine which approach provides better outcomes in terms of pain reduction, improvement in mandibular function, and overall impact on quality of life.

Material and methods: A systematic review of the literature was conducted using the PubMed, Scopus, and Cochrane Library databases, including studies published between 2000 and 2023. The search focused on randomized clinical trials, controlled studies, and systematic reviews that compared the effectiveness of low-level laser therapy with traditional methods for treating

TMD. The primary outcomes analyzed were pain reduction, measured using visual analog scales (VAS), improvement in mandibular function, and the overall impact on patients' quality of life. Secondary outcomes, such as treatment duration and side effects, were also evaluated to provide a comprehensive comparison.

Results: The results indicated that low-level laser therapy (LLLT) led to an average pain reduction of 40%, significantly higher than the 25% reduction observed with traditional methods like physiotherapy and medication. Patients receiving LLLT also experienced a 75% improvement in mandibular function, which included increased range of motion and reduced joint stiffness, compared to a 60% improvement in the groups using conventional treatments. Additionally, LLLT was associated with faster symptom relief, improving patients' quality of life. This contrasts with the prolonged treatment periods often required for traditional therapies. Furthermore, laser therapy presented fewer side effects, particularly when compared to long-term medication, which can lead to issues like gastrointestinal discomfort. These findings suggest that LLLT offers more consistent and effective relief for TMD patients, enhancing both physical function and overall well-being.

Conclusion: Low-level laser therapy appears to be a highly effective alternative in managing temporomandibular disorder, particularly in terms of pain reduction and improved mandibular function. The results suggest that laser therapy may offer superior outcomes compared to traditional methods. However, further studies are needed to standardize treatment protocols and better understand the biological mechanisms involved in LLLT for TMD.

P-062
Mariela Peralta-Mamani, Maria Cecilia Aveiga-Zambrano, Ángel Terrero-Pérez, Renato Yassutaka Faria Yaedú (Brazil)
Category: Case report
Title: PHOTOBIOMODULATION IN THE MANAGEMENT OF CHRONIC BELL'S PALSY: A CASE REPORT WITH 1.5 YEARS OF FOLLOW-UP

Aim: The objective is to present the management of a case of Bell's palsy diagnosed 4 years ago, treated with photobiomodulation (PBM).

Case description: During the extraoral examination, facial asymmetry, nasolabial folds asymmetry, deviation of the left labial commissure downward, and pain in head and neck muscles were observed. The patient showed limited facial expressions and altered mimicry. Pain was assessed using the Visual Analog Scale (VAS), scoring 6 on the left side with trigger points on the right. PBM was performed using the Laser Duo®, MMOptics, São Carlos, Brazil, power of 100mW, wavelength 808nm, solid-state diode laser, GaAlAs, single emitter, continuous mode, applied in contact with the skin, 0.030cm² spot size, 3.33W/cm² irradiance, 100J/cm² fluency, 30 seconds/point, 3J energy/point, 1cm between points, 80 points, 2400 seconds/session, 2x/week, 2 weeks. After the first session, the patient showed improvement in pain symptoms and was able to move her head without pain. After 4 sessions, pain persisted only in a few points, and PBM treatment for the paralysis was continued. The protocol remained the same, but was reduced to 44 points, 1320 seconds/session, 2x/week, 4 weeksThe cumulative dose was 20,160 seconds, 67,200J/cm². In the 5th session, VAS = 4 to 5. In the 6th session, VAS = 3 to 4. In the 10th session, VAS = 2 to 3. In the 12th session, VAS = 1 to 2. Since the 8th session, muscle movement improved, and the patient reported better facial sensitivity on the left side, being able to open and close her mouth without difficulty. After 12 sessions of PBM, facial asymmetry improved, particularly in the labial commissure, nasolabial fold, and facial expressions. At the 1.5-year follow-up, the patient was satisfied with the results.

Discussion: Bell's palsy can negatively impact the patient's quality of life, often leading to chronic pain. PBM is essential for pain management and improving paralysis.

Conclusion: It is concluded that facial paralysis can lead to chronic orofacial pain. PBM is a viable alternative for treating facial paralysis, as it promotes nerve structure regeneration and aids in chronic pain control.

Poster **Session**

P-063
Matheus da Silva Borges Cunha, Tereza Valentina Barbosa Ribeiro Oliveira, Rosa Virginia Melo de Oliveira Lima, Caroline Carneiro Landim Machado, Aparecida Maria Cordeiro Marques, Antônio Luiz Barbosa Pinheiro (Brazil)
Category: Case report
Title: TREATMENT OF TRAUMATIC PERIPHERAL FACIAL PARALYSIS FOLLOWING ODONTOGENIC INFECTION ASSOCIATED WITH INFRARED LASER LIGHT (Λ 808 NM): CASE REPORT

Aim: To evaluate the phototherapeutic effects in treating peripheral facial paralysis secondary to surgical procedures and odontogenic infection.

Case description: A photobiomodulation protocol was implemented using the Laser Duo® (MMOPTICS), with a wavelength of 808 nm and a power of 100 mW. Initially, a therapy protocol of 18 J/cm² was proposed with six points surrounding the orbicularis oris muscle at 3 J/cm² each, or 30 seconds per point. After the first cycle of 12 sessions, three times a week, the dose was increased to 27 J/cm² by adding three points of 3 J/cm², following the path of the buccal branch of the facial nerve. The last cycle was configured similarly to the second, adding 5 J/cm² per point, totaling 45 J/cm².

Discussion: The results showed a significant improvement in the recovery of the patient's peripheral facial paralysis, initially reported as PFP level III re-evaluated and classified after the sessions as PFP level II.

Conclusion: The study demonstrates that low-level laser photobiomodulation effectively recovered facial paralysis, significantly improving facial motor function.

P-064
Ángel Terrero-Pérez, Ana Lúcia Álvares Capelozza, Izabel Regina Fischer Rubira-Bullen, Paulo Sérgio da Silva Santos, Mariela Peralta-Mamani (Brazil)
Category: Case report
Title: PHOTOBIOMODULATION AS A TREATMENT FOR ANOSMIA AND AGEUSIA RESULTING FROM COVID-19: A CASE REPORT WITH 3.5 YEARS OF FOLLOW-UP

Aim: The objective is to present a case of anosmia and ageusia as sequelae of COVID-19, treated with photobiomodulation (PBM).

Case description: A 38-year-old man, experienced anosmia, ageusia, loss of appetite, and depression following a SARS-CoV-2 infection three months prior. The patient contracted COVID-19 early in the pandemic during an international trip, before vaccines were available. The diagnosis was confirmed by RT-PCR testing. After seven days, the patient exhibited general malaise, fever, claustrophobia, photophobia, and encephalopathy. The symptoms worsened after three days, and after two weeks, the RT-PCR test came back negative. The patient's quality of life was severely affected. PBM treatment was initiated using a diode laser (DMC Therapy XT®), one emitter, continuous wave, 100mW power, 0.043cm² spot size, 2.32W/cm² irradiance. For the treatment of ageusia, PBM was applied in contact with the dorsum and lateral borders of the tongue at 16 points, spaced 1cm apart, 5 times/week, 2 weeks, wavelength 660 nm, 3J, 30 seconds/point, 69.77 J/cm² fluency, 480 seconds/session. Upon reevaluation, the protocol was adjusted to 808 nm, 2J, 16 points, 20 seconds/point, 46.51 J/cm² fluency, 5x/week, 3 weeks, 320 seconds/session. After a 7-week break, a final cycle was administered using the same protocol (2x/week, 2 weeks, 320 seconds/session). The cumulative dose was 10,880 seconds, 25,302.24J/cm². For anosmia, the treatment lasted 5 weeks (5x/week), with the device tip introduced into the nostrils, 808 nm, 10J, 232.56 J/cm² fluency per nostril, 200 seconds/session. The cumulative dose was 5,000 seconds, 11,628J/cm². Chemosensory and olfactory tests were conducted weekly with the patient blinded to stimuli. Gradual improvement was observed, with full recovery of smell after 25 sessions and taste after 29. The DASS-21 test, applied over 5 weeks, showed a gradual reduction in depression levels. At the 2-month follow-up, recovery was 95-100%. After 3 and a half years, the patient continues to have 100% recovery.

Discussion: At the beginning of the pandemic, protocols for ageusia from radiotherapy and anosmia from Alzheimer's were adapted for COVID-19, resulting in a significant improvement in the patient's quality of life.

Conclusion: PBM is an alternative, safe, and effective treatment for ageusia and anosmia following SARS-CoV-2 infection, with long-lasting results.

P-065
Lucas Neves de Oliveira, Ana Carolina Novo de Castro, Selma Cury Camargo (Brazil)
Category: Case report
Title: THE USE OF PHOTODYNAMIC THERAPY FOR ENDODONTIC CASES IN THE UNDERGRADUATE PROGRAM AT THE UNIVERSIDADE CIDADE DE SÃO PAULO – PROTOCOL AND RESULTS

Aim: The aim of this study is to evaluate the effectiveness of photodynamic therapy in endodontic cases among undergraduate students at Universidade Cidade de São Paulo, focusing on the established protocol and its results.

Case description: This case series evaluated the efficacy of photodynamic therapy (PDT) in the decontamination of teeth with necrotic involvement. A total of five teeth were included, which underwent conventional endodontic treatment followed by the application of PDT. The technique involved conventional endodontic treatment using automated instrumentation with rotary files, followed by irrigation with chemical substances including 1% NaOCl and EDTA. After instrumentation, the canals were dried with absorbent paper points and inoculated with 0.001% methylene blue for a pre-irradiation period of 3 minutes. The photosensitizer was activated using the LASER DUO MMOPTICS with the following specifications: Wavelength: 660 nm, the Light emitter was Semiconductor laser (GaAlAs and InGaAlP);Optical fiber: Tip area = 0.0177 cm²; Intracanal irradiation: Total energy = 9 Joules (E[J] = P[W] x T[s] per irradiation);Irradiance: 5.65 [W/cm²];Dose: 508.5 [J/cm²];Duration of irradiation: 90 seconds per canal (1 irradiation per PQC).
Subsequently, the canals were irrigated with 1% NaOCl, and the obturation protocol was performed. Radiographic evaluations were conducted at baseline, 4 months, 6 months, and 1 year post-treatment, allowing for the comparison of periapical lesion remission over time. The radiographic images were analyzed to determine the effectiveness of the described technique in promoting lesion remission.

Discussion: The results of this case series highlight the potential of antibacterial photodynamic therapy (PDT) as an effective adjunctive treatment in endodontics, particularly in cases involving necrotic pulp and periapical lesions. The incorporation of PDT into the conventional endodontic protocol has shown promising results in improving the decontamination of the root canal system.
The anatomical complexity of the root canal system often complicates the elimination of pathogenic microorganisms, which is critical for the success of endodontic treatments. The use of PDT, combined with conventional methods such as rotary instrumentation and chemical irrigation, appears to enhance the efficacy of microbial decontamination. In our study, the significant reduction in periapical lesions observed during follow-up radiographic evaluations suggests that PDT can play a crucial role in achieving favorable treatment outcomes.

Conclusion: The incorporation of antibacterial photodynamic therapy (PDT) into endodontic treatment protocols presents a promising approach to improving outcomes in cases of necrotic pulp and periapical lesions. As we continue to refine these techniques, they may become integral components of standard endodontic practice.

P-066
Ángel Terrero-Pérez, Mariela Peralta-Mamani, Izabel Regina Fischer Rubira-Bullen, Ana Lúcia Álvares Capelozza, Eduardo Sant'Ana, Cássia Maria Fischer Rubira (Brazil)
Category: Case report
Title: PHOTOBIOMODULATION FOR PERMANENT PARESTHESIA RESULTING FROM LOWER LIP VERMILIONECTOMY: A 5-YEAR FOLLOW-UP CASE REPORT

Aim: This report presents the management of permanent paresthesia after vermilionectomy.

Case description: A 67-year-old leucoderma male, presented with a two-year white lesion on the Lower Lip (LL), crusting, and loss of vermilion border. An incisional biopsy confirmed chronic actinic cheilitis with moderate epithelial dysplasia. After a LL vermilionectomy, the patient reported paresthesia in the LL and chin (5x4cm) two years later, along with difficulty drinking liquids and shaving. PBM was performed with Twin Laser®, MMOptics, São Carlos, Brazil), solid-state diode laser, GaAlAs, single emitter, continuous mode, applied in contact, 70mW power, 0.04cm² spot size, 1.75W/cm² irradiance. Protocol: three times/ week, 5 weeks (14 sessions), 16 extraoral, 4 intraoral points, 157.5J/cm² fluency, 90 seconds/

point, 6.3 J energy/point, 1cm between points, 1800 seconds/session. Treatment progress was evaluated using the visual analog scale (VAS). Initially, VAS=10 (no sensitivity). Over the sessions, VAS scores progressively decreased (VAS=8, 8, 6, 5, 3, 2, 2, 2, 2, 1, 1, 1, and 1.5). The return of sensitivity, although partial, was considered highly satisfactory by the patient. After two years, paresthesia in 40% of the LL (VAS= 4). Citoneurin 5000 mcg was prescribed (1 ampoule every 15 days, 6 doses), along with 15 Photobiomodulation (PBM) sessions, twice weekly, 6 points on the mucocutaneous line, 4 on the lower lip, 1 point on each mental foramen bilaterally, intraoral and extraoral. Protocol: 780nm wavelength, 70mW power, 262.5J/cm² fluency, 150 seconds/point, 10.5J energy/point (VAS=4, 4, 5, 5, 4.5, 4, 3, 3.5, 2.5, 2, 2, 1.5, 1.5, 1.5, 1.5). Six months later, the patient reported a cold sensation on the left side of the LL. Fourteen PBM sessions were conducted (VAS=1.5 to 0.2). The cumulative dose was 86,100 seconds, 150,675J/cm². The patient reported stability of the paresthesia and significant improvement in quality of life. After 5 years, the patient reports a VAS score of 5, and treatment will resume.

Discussion: The findings of this case suggest that PBM played a crucial role in the partial recovery of sensitivity in cases of permanent paresthesia; however, regular follow-up is important.

Conclusion: PBM contributed to substantial improvement in sensory nerve stimulation in this case of permanent paresthesia following LL vermilionectomy.

P-067
Mariela Peralta-Mamani, Ángel Terrero-Pérez, Fernanda Gabriela Guimarães, Gabriel Bispo Botari, Claudia Akemi Nacamura, Renato Yassutaka Faria Yaedú (Brazil)
Category: Case report
Title: ANTIMICROBIAL PHOTODYNAMIC THERAPY IN THE TREATMENT OF CHROMOGENIC BLACK DENTAL STAINING: CASE SERIES

Aim: The objective is to present the management of three patients with extrinsic stains, using antimicrobial photodynamic therapy (aPDT).

Case description: The first two cases are siblings, a 2-year-old girl and an 8-year-old boy, both with black stains on all teeth. Previous prophylaxis sessions temporarily removed the stains, which reappeared after 1-2 weeks. The parents reported similar experiences, disappearing after prophylaxis. The children had good oral hygiene and a balanced diet. Initial scaling and pumice prophylaxis removed 20% of stains. After seven days, aPDT and a second prophylaxis achieved complete stain removal, with no recurrence at 1- and 4-month follow-ups. The DMC Therapy EC® laser was used (one emitter, continuos wave, applied in contact, 100mW, beam spot size 0.0984cm2, irradiance 1.02W/cm2). A 67-year-old leucoderma woman with 2-year black stains (score 3-Gasparetto) and oral sensitivity, impacting her aesthetics and self-esteem. Ultrasonic scaling one month prior had partially removed the stains but caused tooth sensitivity. Sialometry indicated hyposalivation (unstimulated:0.06; stimulated:0.48). Photobiomodulation (PBM) was applied to the tongue for pain relief (660nm, 2J, 20 seconds/point, 5 points, 20.3J/cm2), and hyposalivation (1 session/week, 3 sessions. Minor salivary glands: 660nm, 1J/point, 82 points, 10.16J/cm2. Major salivary glands: 808nm, 3J/point, 25 points, 30.49J/cm2). In the third session, saliva accumulation was observed (Unstimulated sialometry: 0.08; stimulated: 0.52). The patient continues treatment for hyposalivation. For black stain, aPDT was performed on the right side (0.01% methylene blue gel), while the left side was treated without MB, following a split-mouth design (660nm, 60.98J/cm2 fluency, 60 seconds/point, 36 points on vestibular/palatal surface, 1 session). The cumulative dose was 31,270 seconds, 9,278.64J/cm². After one week, 80% of the stains were removed with prophylaxis. The side without MB showed better results. After repeating prophylax is, all stains were removed. At the 1-month follow-up, no recurrence was noted.

Discussion: aPDT is an alternative treatment for persistent black stains, with better response from pigment interaction than isolated MB application. Red light may reduce treatment time and pain in cases of dentin sensitivity and black stains.

Conclusion: aPDT is a viable and effective adjunctive treatment for persistent chromogenic stains in both children and adults.

P-068
Andréia Pereira de Souza Pavani, Paola Elizabeth Fuentes Galvez, Guilma Llaneli Cobba Novoa, Isadora Messias Batista Rosa, Vitor Arthur Miyahara Kondo, Carla Andreotti Damante (Brazil)
Category: Case report
Title: USE OF PHOTOBIOMODULATION FOR RESOLVING POSTOPERATIVE COMPLICATIONS FOLLOWING FREE GINGIVAL GRAFT: A CASE REPORT

Aim: The objective of this study is to present a clinical case utilizing photobiomodulation to resolve bone exposure following the second surgical phase of implantation.

Case description: A 72-year-old female patient presented to the periodontics clinic for the reopening several implants. During the clinical examination, systemic alterations were observed (hypertension, osteoporosis, fibromyalgia, insomnia) requiring continuous medication, which included Risedronate Sodium (a bisphosphonate of significant clinical importance in dentistry due to its association with jaw osteonecrosis). A free gingival graft was performed during the reopening of the implant 36 to obtain an area of keratinized mucosa (KM) to ensure the stability and health of the peri-implant tissues. At six days after surgery, the patient reported severe pain in the affected area. Clinical evaluation revealed necrosis of the graft and exposure of the buccal bone plate. Laser therapy was initiated using the Therapy EC (DMC) device, which emitted red (InGaAlP diode, 660 nm wavelength, 100 mW power) and infrared (AlGaAs diode, 808 nm, 100 mW with a visible red beam at 660 nm and 0.5 - 2.5 mW) lasers simultaneously. The output spot had an area of 0.028 cm^2, with continuous operation of the laser emitters. The following parameters were utilized: simultaneous application of red and infrared light, total energy of 4 J per point, power of 100 mW, fluence of 140 J/cm^2, and irradiation of 3.57 W/cm^2, applied at ten points for 20 seconds each (eight points surrounding the exposed bone tissue, spaced 1 cm apart, plus two points in the center), resulting in a total application time of 200 seconds per session. Applications were repeated three times per week until complete closure of the surgical wound, achieved after ten sessions, with a cumulative administered dose of 14,000 J/cm^2.

Discussion: Low-intensity laser therapy in dentistry aims to enhance cellular metabolism, thereby improving tissue repair and reducing postoperative pain. Clinical results indicated improved pain and resolution of the complication after 25 days of treatment, along with the formation of a KM band.

Conclusion: This case demonstrates the efficacy of laser therapy in stimulating tissue, accelerating healing, and promoting bone regeneration, thereby preventing further deterioration.

P-069
Allana Rodrigues Serrano, Caio Lima Pires, Maria Eduarda de Moura Silva Albuquerque, Maria Regina Almeida de Menezes, Nathalia Seimi Deama, Rafaela Santana Freitas Monteiro, Marleny Elizabeth Márquez de Martínez Gerbi (Brazil)
Category: Original research: Clinical
Title: THE USE OF LASER BIOPHOTONICS IN THE TREATMENT OF BELL'S PALSY: A SERIES OF CASES

Aim: This study evaluates the efficacy of laser therapy in patients with Bell's palsy at UNIPECLIN of HUOC and LABFOTONI of FOP-UPE, in Recife, Pernambuco, Brazil.

Material and methods: Ten patients diagnosed with Bell's palsy (2019-2024) were treated at HUOC and LABFOTONI. The protocol utilized a laser device (light-emitting diode) model THERA LASE (DCM – São Carlos/SP) with irradiation in the infrared spectrum (IR 830nm), a power of 50mW, and an energy density of $40J/cm^2$ per session. A laser in the red spectrum (R 685nm) was also employed, with a power of 30mW and an energy density of $20J/cm^2$. Two series of 12 sessions were conducted, totaling 24 sessions. Each session lasted 300 seconds (IR 830nm) and 180 seconds (R 685nm), with a frequency of twice a week every 72 hours, resulting in a cumulative dose of $480J/cm^2$ (IR 830nm) and $240J/cm^2$ (R 685nm) over 12 sessions.

Results: Laser photobiomodulation was effective, reducing the time to complete remission of the disease to about 45 days in patients who began treatment at early stages. In advanced and late stages, complete remission of facial movements was not observed; however, improvement in movements and muscle relaxation was noted, contributing to the well-being and self-esteem of the patients.

Conclusion: Laser photobiomodulation proved effective in treating Bell's palsy, achieving complete results when initiated as soon as possible after the onset of the disease. In late cases, it also provided benefits, achieving improvements in movements and muscle relaxation, thereby enhancing the quality of life of the patients.

P-070
Erika da Silva Mello, Cícero Dayves da Silva Bezerra, Luciana Toledo Costa Salviato, Vanessa Dalapria, Anna Carolina Ratto Tempestine Horliana, Alessando Melo Deana, Kristianne Porta Santos Fernandes (Brazil)
Category: Case report
Title: BONE GRAFT SCAFFOLD ASSOCIATED WITH PHOTOBIOMODULATION IN A PATIENT UNDERGOING BARIATRIC SURGERY: A CASE REPORT

Aim: Bariatric surgery reduces the absorption of nutrients essential for bone homeostasis (1), Leading to sparse trabecular bone and greater bone loss post-tooth extraction compared to eutrophic patients (2). Photobiomodulation positively influences pre-osteoblastic cell viability and proliferation, enhancing bone repair (3), and bone grafts (4). This case report details the effect of photobiomodulation combined with bone grafts in these patients.

Case description: Patient M.M.L., 65 Years old, female, bariatric surgery (2013), severe malnutrition (2016), lost 57 kilograms, residual roots of teeth 24,25 and 26 (2020) (figures 1,2 and 3). After removing the 24, 25, and 26 roots of teeth, the bovine-origin bone graft was inserted. Photobiomodulation was performed during 26 weeks, 2021 May, using infrared and red laser simultaneously (figure 4). Then, a new tomographic examination was performed (figures 5, 6, and 7). the list of materials and equipment include Lumina-Bone® (Critéria), medium granulation (600 to 425 µm), batch LB 0104/20, exp 27/03/2022, bovine-origin collagen membrane Lumina-Coat® (Critéria), dimensions 1 X 20 X 30 mm, batch LC 036/20, exp 02/04/2022, and Laser (Therapy EC® DMC Laser). Radiometric parameters: Central wavelength (nm) - red: 660 - infrared: 808; Spectral width - FWHM (nm) - red: 20 - infrared: 20; Operating mode – Continuous; Average radiant power (mW) - red: 100 - infrared: 100; Polarization – Random; Beam profile - Top hat; Beam area at target (cm^2) – red: 0,098 – infrared: 0,098; Irradiance at target (mW/cm^2) – infrared: 1016; Exposure time (s) – red: 20 per point – infrared: 20 perpoint; Radiant energy per point (J) – red: 2 – infrared: 2; Radiant exposure (J/cm^2) - 20,41; Number of points irradiated – 9; Total energy per session (J) – red: 18 – infrared: 18; Application technique – Contact; Number of sessions and frequency - weekly during 6 months; Total energy irradiated (J) – red: 468 – infrared: 468.

Discussion: According to the literature, dimensional changes in alveolar ridge width within the first year following tooth extraction can result in a 50% reduction, with approximately two-thirds of this reduction occurring within the initial 3 months (5). A comparison of the patients with complete dentition after and before surgery reveals a superior bone loss in obese patients after bariatric surgery when compared to eutrophic patients (6). In this case report, six months after the surgical procedure and weekly sessions of PBMT with 660±10 nm (InGaAIP), and 808±10 nm (AlGaAs) laser concurrently, the alveolar ridge thickness loss for teeth 24 and 25 was 26.55% and 34.45%, respectively, while in the region of tooth 26, it was 51.42%. Within 19 months after the placement of implants, with only one month of irradiation, the thickness in tooth 24 was reduced by only 33.04%, tooth 25 by 34.33%, and tooth 26 by 56.88% compared to the initial values.

Conclusion: Navigating the patient's nutritional challenges post-bariatric surgery, the ingenious integration of scaffold biomaterials, and the subtle prowess of photobiomodulation therapy have revealed remarkable efficacy. This approach has safeguarded the integrity of alveolar dimensions and paved the way for meticulous implant positioning thus allowing for comprehensive oral rehabilitation. With the PBMT uses, the barriers posed by the patient's nutritional constraints were circumvented, culminating in a better clinical response exceeding theresults obtained by eutrophic subjects.

P-071
Andréia Pereira de Souza Pavani, Isadora Messias Batista Rosa , Adriana Campos Passanezi Sant'Ana, Mariana Schutzer Ragghianti Zangrando, Carla Andreotti Damante (Brazil)
Category: Case report
Title: EFFICACY OF LOW-INTENSITY LASER THERAPY ON HEALING FOLLOWING FREE GINGIVAL GRAFT: A CASE REPORT

Aim: The present study aims to present a clinical case utilizing photobiomodulation to accelerate the healing process of a free gingival graft (FGG).

Case description: A 42-year-old female flight attendant presented to a private clinic for periodontal treatment. She exhibited RT1 gingival recessions, as classified by Cairo, on teeth 31 and 41, along with a narrow band of keratinized mucosa (KM). An FGG was performed to prepare the area for subsequent root coverage. Due to the need to return to work and the inability to fly with sutures in place, six sessions of laser therapy were conducted to expedite the healing of the graft and allow for early suture removal. The device used was the Clean Line Three Light, emitting red laser light (diode, wavelength 660 nm, 120 mW power, with an output spot area of 0.065 cm^2). The total energy was 2 J per point, with a power density of 1.85 W/cm^2, applied at 6 points for 30 seconds each, totaling 180 seconds per session. The cumulative administered dose was 1,116 J/cm^2, with applications repeated daily for the first four sessions, followed by sessions after 72 hours (fifth session) and 24 hours (sixth session). During the final session, the sutures were removed as planned. The patient returned for postoperative follow-up at 2, 11, and 26 months, at which point a broad band of KM was observed, along with nearly complete coverage of the recessions. The patient reported no complaints regarding the gingival recessions, eliminating the need for a second surgical intervention.

Discussion: The observed root coverage can be explained by the phenomenon of creeping attachment, which refers to the coronal migration of the gingival margin, often seen in long-term follow-up of FGGs, and in this case may have been enhanced by the initial photobiomodulation therapy.

Conclusion: Thus, this case demonstrated the tissue-stimulating effect of laser therapy, accelerating the healing process, promoting KM formation, and contributing to the resolution of gingival recessions with only one surgical intervention.

P-072
Daniela Abreu de Moraes, Matilde Caroline Augusto de Oliveira, Mariana de Oliveira Barros, Emilio Barbosa e Silva (Brazil)
Category: Clinical human studies
Title: PHOTODYNAMIC THERAPY IN ENDODONTIC TREATMENT OF PRIMARY TEETH

Abstract: Pulpectomy is a radical treatment of pulp pathologies of primary teeth, which aims to clean up the root canals and fill them to preserve the tooth in the dental arch. Treatment protocols use irrigating solutions to sanitize root canals and eliminate bacteria, however, they can cause damage to periodontal tissues and the formation and eruption of the permanent successor. Therefore, the objective of the study was to evaluate the effectiveness of photodynamic therapy in clinical cases of irreversible pulp damage in primary teeth. The methodology was a longitudinal clinical trial on 45 primary teeth. The patients were anesthetized and the teeth with indication for pulpectomy underwent endodontic access, convenience preparation and cleaning of the canals with a manual file. To remove debris, chlorhexidine was used as an irrigant in 14 teeth, in 15 teeth 1% sodium hypochlorite was used and in 16 teeth saline solution was used as a control in order to test the effectiveness of photodynamic therapy (aPDT) in the complete elimination of microorganisms. After sex months, 31 simples were analyzed. The results showed that aPDT complementary to endodontic treatment was effective in sanitizing root canals in 100% of cases. This study provides important information about aPDT in root canal disinfection. Therefore, it can be concluded that aPDT was effective, regardless of the irrigating material used, since patients showed positive responses to the treatment.

P-073
João Victor Rodrigues, Mariella Boaretti Deroide, Wilton Mitsunari Takeshita, Rafael Scaf de Molon, Valdir Gouveia Garcia, Leticia Helena Theodoro (Brazil)
Category: Systematic or narrative review:
Title: ADJUNCTIVE EFFECTS OF ANTIMICROBIAL PHOTODYNAMIC THERAPY IN TREATMENT OF RESIDUAL POCKETS IN INDIVIDUALS WITH TYPE 2 DIABETES MELLITUS: SYSTEMATIC REVIEW AND META-ANALYSIS

Aim: The objective of this systematic review was to investigate the efficacy of antimicrobial photodynamic therapy (aPDT) as an adjunct to subgingival instrumentation (SI) in the maintenance therapy of individuals with type 2 diabetes mellitus and periodontitis.

Material and methods: The PICOS strategy was performed on a systematic review (SR) to answer the following question: "What is the effect of aPDT as an adjunct to SI compared to SI monotherapy in maintenance therapy in individuals with type 2 diabetes mellitus and periodontitis?" The PROSPERO registration is CRD42023486429. A systematic search was performed in the databases: PubMed (including MedLine), Scopus, and Web of Science. 95 studies were selected, after screening titles and abstracts, three in the quantitative analysis. The periodontal clinical parameters such as probing depth (PD), bleeding on probing (BOP) plaque index (PI) and serum levels of glycated hemoglobin (HbA1c). The parameters used in aPDT were: 1) methylene blue with diode laser (660 ± 10 nm) for 50 s with a total of 166 J/cm2, an energy of 5 J, a power of 100 mW; 2) methylene blue with diode laser (660 ± 10 nm) for 50 s, with 100 mW, totaling 157 J / cm^2, energy of 4.7 J. and 3) Curcumin with LED irradiation (465-485 nm) for 60 s, with 78 mW and total energy of 7.69 J/cm2. The treatment effects were plotted in a Forest-plot. The certainty of the SR evidence was assessed using the GRADE tool.

Results: The values of the analyzed variables showed p>0.05 and heterogeneity (I2) equal to 0%, except for platelet (Pl) and HbA1c tests with I2 values, 10% and 85%, respectively. All values analyzed comparing the SI group with the SI and aPDT groups they presented p>0.05.

Conclusion: Treatment with SI and SI associated with aPDT showed similar results with low risk of bias in the maintenance therapy of individuals with type 2 diabetes mellitus and periodontitis.

P-074
Marcia Vidor, Nagano, MH (Brazil)
Category: Case report:
Title: HIGH-POWER LASERS AS THE IDEAL TREATMENT OPTION FOR TREATING SMALL VASCULAR MALFORMATIONS ON THE LIP. A CASE REPORT

Aim: The aim of this case report is to demonstrate how a high power laser (980nm diode laser) can be very effective, with excellent healing outcome for the treatment of a vascular lesion of the lip, giving back joy and confidence to the patient.

Case description: In this case, an 82-year-old female patient presented a vascular lesion on her upper lip, measuring approximately 8.0 mm in diameter, which she had for over 20 years. The 980nm Infrared diode laser was used for the treatment, performed under local anesthesia using a flexible quartz fiber, held about 2 mm from the lesion, in continuous wave mode at 1.5 W for 10 seconds, with a 30-second cooling interval to prevent heat damage to surrounding tissue. The entire procedure lasted about 3 minutes, until the lesion appeared shrank and white. At the 30-day follow-up, the lesion had completely healed without any scarring.

Discussion: Small vascular lesions frequently occur on the lips and other parts of the oral mucosa. These lesions are often referred to as venous lake lesions, and their treatment can be addressed through various surgical and non-surgical approaches. In recent years, the use of lasers, particularly high-power diode lasers, has gained popularity in dental practices for treating these conditions. This technique delivers energy in a non-contact manner, leading to lesion coagulation with minimal invasiveness, thereby reducing the likelihood of scar formation. Several wavelengths have been used for the treatment of such lesions in the literature. These includes Blue diode lasers, Infrared diode lasers, Nd:YAG lasers, Erbium lasers, and CO2 lasers. The choice of laser will result in different tissue interactions, allowing clinicians to select from a variety of wavelengths for optimal therapeutic results.

Conclusion: The diode laser proved to be a highly effective treatment option for this type of lesion,

offering several benefits, such as coagulation, excellent healing outcome, no postoperative complications, and no need for sutures. Additionally, this procedure is cost-effective, often requiring just one appointment, and is mostly well-accepted by patients. This supports the argument for why lasers should be considered the best treatment option for treatment of small vascular malformations of the oral cavity.

P-075
Carolina Montagn Carvalho, Valéria Cerqueira Costa,Rebeka Gadelha Ricarte, Juliana Borges de Lima Dantas, Fernanda Lyrio Mendonça (Brazil)
Category: Case report
Title: MANAGING HIPERSENSITIVITY WITH PHOTOBIOMODULATION IN MOLAR INCISOR HYPOMINERALISATION: A CASE REPORT

Aim: The aim of this study was to report the use of low level laser for the management of hypersensitivity in a patient of 10 years old with MIH.

Case description: The patient arrived complaining of tooth sensitivity.The treatment proposed was the low level laser application in the incisors and molars following the parameters: Laser Duo MMO, 100mW, diode laser, wavelength 660nm and 808nm, 2J per point, 20s per point, fluence of 66.6 J/cm2, power density of 3.33W/cm2. It was applied the infrared laser (808nm) in two perpendicular points and in contact in each teeth (one point in the vestibular and one point in the palatal or lingual. The red laser (660nm) was applied in two points in each molar affected in the region of exposed dentin on the crown of the molars. The total dose per session was 56J, and was applied in two sessions.To measure pain intensity the visual analogue scale addapted for children with faces and and the Schiff Cold Air Sensitivity Scale were applied before and after each session and 1 month after the procedure. Immediatly after laser application the patient reduces significantly pain report. The restauration was conducted in the second session of laser irradiation without anesthesia and without pain related.

Discussion: Molar Incisor Hypomineralisation (MIH) is a developmental enamel defect that clinically presents with porous and fragile enamel, making it more susceptible to post-eruptive breakdown. In some patients, sensitivity may occur, and this symptom may manifest regardless of whether post-eruptive enamel breakdown is present or not. Considering that MIH is a complex condition with no established treatment protocol, dentists face significant challenges in managing these patients, especially when the hipersensitivity is present. Photobiomodulation has been used as a non-invasive treatment for dental hypersensitivity, but few studies have investigated the effects of low-level laser therapy in patients with MIH.

Conclusion: It was concluded that low level laser can be used in the management of hypersensitivity in MIH to control pain and to improve patient confort during reabilitation.

P-076
Marco Magnavita, Anna Paula Lima Teixeira da Silva, Aparecida Maria Cordeiro Marques, Antonio Luiz Barbosa Pinheiro (Brazil)
Category: Case report
Title: LASER THERAPY IN THE TREATMENT OF ORAL MUCOSITIS LESIONS: A CASE REPORT

Aim: This report aims to describe the laser therapy treatment performed on a patient with oral mucositis (OM) in the Laser Clinic of the School of Dentistry at the Federal University of Bahia.

Case description: A 55-year-old male diagnosed with skin cancer developed a grade III oral mucositis (WHO classification). Clinical examination evidenced pain and intraoral erythematous ulcerated lesions as well as on the lower lip. The therapeutic approach involved using a λ660nm laser (MMOptics). Initially, 12 sessions were conducted, which included applications to five points on the lower lip with 2 J/cm² for 20s (λ660nm, 100mW, CW) and intraoral sweeping (λ660nm, 100mW, CW, 20 J/cm², 200s) to the lower lip, upper lip, dorsum of the tongue, and the left and right buccal mucosa, totaling 110 J/cm², with intervals of 48 hours between sessions. Upon reevaluation, the patient still presented some lesions, and a new protocol was initiated with a further 12 sessions(110 J/cm²) using the same interval as the previous one. Five points were irradiated with 2 J/cm² for 20s (λ660nm, 100mW, CW): one point on the upper left vestibular mucosa, three points on both right and left side of the tongue combined with sweeping applications

to the upper and lower arches, each one receiving 50 J/cm² for 500s (λ660nm, 100mW, CW). At the end of the protocol, the patient's mucosa reached grade 0 on the mucositis scale.

Discussion: Antineoplastic therapies, such as radiotherapy and chemotherapy, can cause side effects like mucositis. This condition is an acute, painful inflammation that affects the quality of life of affected individuals and can lead to modification or suspension of cancer therapy, impacting tumor control and patient survival. Oral mucositis (OM) is found in approximately 40% of patients receiving chemotherapy and in almost 100% of patients undergoing radiotherapy in the head and neck region.

Conclusion: Based on this report, it is possible to conclude that, although no well-established protocol exists for using laser therapy in treating OM, laser therapy is a viable alternative that can improve the quality of life during cancer treatment.

P-077
Xinyu He, Qian Li, Zhen Li, Qi Wang, PAN Chong, Jizhi Zhao (China)
Category: Original research: Clinical
Title: PHOTOACOUSTIC-STEAMING UNITE MIMINAL-INVASIVE CHEMOMECHANICAL-PREPARATION HYDRAMATIC-OBTURATION (PUMCH) ROOT CANAL THERAPY

Aim: To investigate a novel clinical treatment method, termed "Photoacoustic-steaming Unite Minimal-invasive Chemomechanical-preparation Hydramatic-obturation (PUMCH) therapy", which employs the erbium-doped yttrium aluminum garnet (Er: YAG) laser-activated irrigation and a negative pressure system for root canal treatment. The aim is to enhance chemical disinfection and optimize filling of the complex root canal structures, thereby reducing procedural time and complications.

Material and methods: Two key experiments were conducted.
Experiment 1: A randomized controlled trial involving 103 patients (60 with endodontitis, 43 with apical periodontitis) compared the efficacy of the Er: YAG laser minimally invasive preparation with conventional techniques. Clinical outcomes were assessed at 12 months post-surgery using periapical indices.
Experiment 2: The filling effectiveness of PUMCH was evaluated in 20 isolated teeth, divided into four groups (hot glue, cold pressure, single cusp, and PUMCH negative pressure filling). Filling densities were analyzed via imaging techniques.

Results: Experiment 1 showed no significant difference in clinical outcomes between the two preparation methods at one year postoperatively. In Experiment 2, the PUMCH technique achieved effective filling into the apical foramen, demonstrating comparable outcomes for simple anatomies and superior filling densities for complex cases.

Conclusion: Er: YAG laser-activated irrigation offers a promising method for infection control in minimally invasive endodontic treatment, with preliminary evidence supporting its ability to streamline the mechanical preparation phase. The negative pressure filling system aligns well with this approach, achieving outcomes comparable to conventional methods.

P-078
Huang Xiaojing, Guoying Lu, Jue Yang (China)
Title: IN VITRO STUDY ON THE ALLEVIATION OF INFLAMMATORY INJURY IN HUMAN DENTAL PULP CELLS BY LOW-ENERGY LASER

Aim: This study aimed to explore the safe laser parameters of low-level laser therapy (LLLT) for directly irradiating human dental pulp cells (HDPCs), and to study its effect on the anti-inflammatory effect and osteogenic differentiation of HDPCs in the lipopolysaccharide (LPS) - mediated inflammatory microenvironment.

Material and methods: An in vitro LLLT irradiation model was constructed, and different laser energy densities were set to observe the proliferation and morphological changes of HDPCs after LLLT irradiation, then explore the effect on cell proliferation ability. The inflammatory cell model of HDPCs was constructed by LPS. The mRNA expression of related pro-inflammatory factors, reactive oxygen species (ROS) level and alkaline phosphatase (ALP) activity were detected after LLLT irradiation.

Results: LLLT irradiation with an energy density of 3.36 J/cm2 had good cytocompatibility, significantly promoted cell proliferation, which inhibited the mRNA expression of related pro-

inflammatory factors in inflammatory cell models, decreased the level of ROS in inflammatory cells, and promoted the expression of ALP activity in inflammatory cells.

Discussion: The modern concept of minimally invasive dental medicine and successful clinical cases show that by controlling and eliminating the inflammation of irreducible pulpitis, which is expected to achieve the success of viable pulp preservation treatment. The photobiostimulating effect of LLLT can promote various biological properties of cells and regulate intracellular inflammatory processes. This study confirmed that LLLT can effectively alleviate the inflammatory injury of hDPCs under the appropriate laser parameters, providing a certain reference significance for LLLT assisted treatment of pulpitis.

Conclusion: LLLT with appropriate energy has anti-inflammatory effect and can promote the proliferation of hDPCs.

P-079
Huang Xiaojing, Yanhuang Wang, Guoying Lu (China)
Category:
Title: APPLICATION OF MB-APDT IN SINGLE-VISIT ROOT CANAL TREATMENT

Aim: This study aimed to explore the feasibility of Methylene blue medicated antibacterial photodynamic therapy (MB-aPDT) applied in single-visit root canal therapy of asymptomatic chronic apical periodontitis (CAP).

Material and methods: Twenty-four single root canal teeth diagnosed as CAP were selected and randomly divided into two groups. After the same traditional root canal preparation and irrigation, the two groups were given different treatment schemes as following: 1) group A (single visit root canal therapy): root canal filling was completed immediately after MB-aPDT assisted root canal disinfection; 2) group B (multi-visit root canal therapy): root canal filling was completed after two weeks of Calcium hydroxid (CH) dressing. Samples were obtained after exposing the pulp chamber and after different root canal disinfection strategies. Then, the 16S rRNA sequencing technology was used to detect the effect of different disinfection strategies on the microbial community in root canal, and the clinical efficacy was evaluated by the periapical index (PAI).

Results: The results of the species components analysis showed that the relative abundance of pathogenic microorganisms such as Bacteroidetes and spirochetes in both groups were decreased significantly after treatment ($P < 0.05$). Besides, group A also showed a significant decline in the relative abundance of firmicutes and actinobacteria. The PAI evaluation found that there was no statistical difference in the success rate between the two groups for 9 months of follow-up ($P > 0.05$).

Conclusion: There was no difference in short-term efficacy between the two groups. Single-visit root canal therapy with MB-aPDT could help to reduce the treatment time.

P-080
Zuzanna Grzech-Leśniak, Filip Michalak, Jan Kiryk, Marzena Dominiak, Kinga Grzech-Leśniak (Poland)
Category: Original research: Clinical
Title: EFFECT OF PHOTOBIOMODULATION ON THE TREATMENT OF PATIENTS WITH STAGE I, II AND III OF MRONJ

Aim: The aim of this study was the evaluation of photobiomodulation (PBM) effectiveness in patients with I, II and III stage of medication-related osteonecrosis of the jaw (MRONJ).The development of pharmacotherapy has led to the creation of new antiresorptive and antiangiogenic drugs, which has resulted in the emergence of a significant side effect—MRONJ. Due to the rising incidence of cancer, clinicians are increasingly facing the challenge of managing this condition.

Material and methods: The total of 26 patients were divided into two groups: Group 1 (10 patients) – I stage of MRONJ, Group 2 (16 patients) – II and III stage of MRONJ. For treatment protocol PBM with diode laser was used (Lasotronix Smart M Pro) with parameters: 100mW, CW, 635mm, 4J/cm 2 for 20 seconds, rradiance for 1 point: 0.398 W/cm 2 , fluency for 1 point: 7.96 J/cm 2 , and for four points which was 1 appoitment: 31.83 J/cm 2 ; tip diameter 8mm (3 points from buccal surface, perpendicular at the outermost points towards the lesion and 1 point from the side of the floor of the mouth). The protocol assumed 10 sessions in 3 days intervals. Three days before treatment antibiotic

therapy was started in the form of amoxicillin with clavulanic acid 875mg + 125mg or clindamycin 600mg every 12h. Antibiotic was taken for 14 days in total.

Results: Out of 10 patients in group 1, no one showed signs and symptoms of MRONJ in the follow-up examination after 3 months. 10 patients in group 1 were cured completely. Out of 16 patients in group 2, after completion of treatment, 11 of them showed stage I MRONJ, while the remaining 5 showed stage 2 and higher. In both groups 1 and 2, pain measured on the VAS scale decreased. The average level of pain before the procedure in both groups (M=5.04; SD=0.30) was significantly higher than the pain after 3 months (M=0.81; SD=0.20; p<0.001). In stage II MRONJ, while inflammation and pain were resolved, further surgical intervention was required to complete the treatment.

Conclusion: Laser photobiomodulation is an effective method for achieving complete recovery in patients with stage I MRONJ. However, patients in stage II and III of the disease still require additional surgical intervention to fully resolve the condition.

P-081
Zuzanna Grzech-Leśniak, Jacek Sitkiewicz, Frédéric Cuisinier, Ivan Panayotov, Alban Desoutter, Jacek Matys (Poland)
Category: Original research: In vitro
Title: EFFICACY OF LASER-ASSISTED MINIMALLY INVASIVE ENDODONTIC TREATMENT WITH ULTRACONSERVATIVE APICAL THIRD PREPARATION AND THREE-DIMENSIONAL OBTURATION: AN IN VITRO ANALYSIS

Aim: Minimally invasive endodontic treatment aims to preserve natural tooth structure while ensuring effective root canal disinfection and obturation. Lasers have shown promise in endodontics due to their precision and enhanced disinfection capabilities. This study evaluates the efficacy of laser-assisted minimally invasive treatment with ultraconservative apical third preparation and three-dimensional obturation. The primary goal was to assess whether successful obturation could be achieved with minimal or no mechanical apical third preparation using Er:YAG laser-activated irrigation.

Material and methods: Eighty multi-rooted teeth were divided into four groups. Group I followed a conventional chemo-mechanical protocol with full-length mechanical preparation and ultrasonic activation of irrigants. Groups II, III, and IV used Er:YAG 2940nm laser activation, with Group II undergoing full-length mechanical preparation, Group III prepared 5mm short of the apex, and Group IV without mechanical apical preparation. Laser parameters: 2940nm wavelength, Auto-SWEEPS modality, pulse energy 20mJ, frequency 15Hz, power 0.6W. Activation time: 30-120s depending on the treatment stage pulse duration 25µs, SWEEPS flat tip 400µm 9mm length Irrigants included 5.25% NaOCl, 17% EDTA, and distilled water, activated by ultrasound or laser. The teeth were scanned using CBCT, and six endodontists evaluated the obturation quality based on length, density, and taper.

Results: Results showed that Group II, with full mechanical preparation and laser activation, produced the best obturation, but Group III, with minimal apical preparation and laser use, showed comparable results. Group IV, with no apical third preparation, had the lowest quality of obturation.

Conclusion: The study concluded that while laser activation enhances cleaning and obturation, mechanical preparation, particularly in the apical third, remains important. Full-length mechanical preparation may not always be necessary when using lasers, as minimal apical preparation combined with laser activation can achieve similar outcomes. Laser-activated irrigation techniques, especially SWEEPS, outperform traditional methods like ultrasonic activation, but further research is needed to optimize laser settings and minimize mechanical preparation while maintaining effective treatment results.

P-082
Zuzanna Grzech-Leśniak, Anna Ewa Kuc, Jacek Kotuła, Maria Kulgawczyk, Grzegorz Piątkowski , Krzysztof Kotuła, Aneta Zalewska (Poland)
Category: Case report:
Title: ORTHODONTIC TREATMENT OF AN IMPACTED LOWER CANINE IN TRANSMIGRATION USING A DIGITALLY DESIGNED AND 3D-PRINTED ORTHORAMA COMBINED WITH CORTICOTOMY AND LASER THERAPY

Aim: Canines play a vital functional and aesthetic role in human dentition. Impacted canines, particularly in the mandible, are rare but can lead

to functional disorders, such as the absence of canine guidance, and negatively affect a patient's self-esteem. Transmigration of mandibular canines adds complexity to treatment. One method to reduce treatment time, especially for impacted teeth, is corticotomy-assisted orthodontic therapy (CAOT).

Case description: A 13-year-old patient presented with a horizontally impacted lower right canine, located beneath the apices of the lower incisors, showing transmigration. A digitally designed and 3D-printed orthorama was attached to the lower molars with hooks on the lingual side, allowing the application of multi-directional orthodontic forces. CAOT was performed using an Er:YAG laser (LightWalker, Fotona, Slovenia) at 200mJ, 12Hz, 2.4W, with a pulse duration of 100µs, and an MSP H14 conical tip (0.6mm spot diameter). Photobiomodulation (PBM) with a 635nm diode laser (Lasotronix, Smart ProM, Poland) was applied at 10J per point (20J/cm^2) for 100 seconds per point, with a total energy of 20J per session to minimize the risk of root resorption, manage pain, and accelerate healing as the tooth was moved into the alveolar ridge.

Results: The treatment lasted two and a half years. The orthorama allowed precise traction of the canine, aided by exposure from the lingual side and attachment of a hook. Gentle forces applied via orthodontic thread gradually moved the canine beneath the oral mucosa. Mid-treatment CBCT confirmed no root resorption of the lower incisors. A corticotomy, enhanced by laser therapy, was performed before moving the canine into the alveolar ridge. The canine was successfully rotated 180 degrees and positioned without any signs of resorption in the canine or adjacent teeth.

Conclusion: The use of a digitally designed and 3D-printed orthorama allowed precise control of the traction of impacted teeth. When combined with corticotomy and laser therapy, it minimized the risk of root resorption, reduced pain, accelerated healing, and improved the overall success of the orthodontic treatment.

P-083
Qi Wang (China)
Title: TREATMENT OF MANDIBULAR SUBLUXATION IN A CHINESE GIRL USING LOW-LEVEL LASER THERAPY (LLLT)

Aim: Mandibular subluxation, characterized by the partial dislocation of the mandibular condyle, is a condition that can cause significant discomfort and dysfunction. This case study explores the application of low-level laser therapy (LLLT) for the treatment of mandibular subluxation in a Chinese girl, focusing on the irradiation of the temporomandibular joint (TMJ) area and the use of cone-beam computed tomography (CBCT) for pre- and post- treatment assessment. The main goal of this study is to assess the effectiveness of LLLT in managing mandibular subluxation and to evaluate the changes in the TMJ through CBCT imaging before and after the intervention.

Material and methods: Minutes at a low intensity. CBCT scans were taken to document the position of the mandibular condyle and the status of the joint both prior to and following the treatment.

Discussion: Post-treatment, the girl exhibited a successful reduction in her mandibular subluxation. CBCT scans revealed that the mandibular condyle on the left side had realigned within the glenoid fossa, confirming the effectiveness of the treatment.

Conclusion: LLLT emerges as a potential non-invasive treatment for mandibular subluxation. The application of low-level lasers in this case study resulted in positive outcomes, as indicated by the reduction of subluxation and the CBCT scan findings. Further research is necessary to validate these results and to investigate the therapeutic mechanisms of LLLT on joint conditions.

P-084
Toni Zeinoun, Georges Aoun, Mansour Chantiri, Samir Nammour, Sami El Toum (Lebanon)
Category: Original research: Clinical
Title: EFFECT OF rh-BMP-2 IN THE INITIATION OF NEOVASCULARIZATION IN HUMAN GINGIVAL TISSUE: A SPLIT-MOUTH CLINICAL STUDY

Aim: The aim of this study is to evaluate the effect on the initiation of new blood vessel formation of rh-BMP-2 administration in the human gingival tissue during bone regeneration surgery.

Material and methods: The randomized controlled clinical trial included twenty patients with bilateral partial edentulous of the mandibular premolar and molar region. Each patient received one implants on each side. Only one side received a 0.25 _g injection of rhBMP-2 into the gingival flap and grafted
material during guided bone regeneration (GBR) for dental implantation. And the other side received GBR without injection. Three samples were collected from each patient as follows: one from the anterior area of the mandible (control group #1) collected at the time of all implant surgeries, and the two other samples during the placement of healing abutments at 4 months of follow-up, from treated side with rh-BMP-2 (test group) and untreated ones (control group #2). A total of 60 gingival samples were collected. Samples were stained with hematoxylin-eosin, and immunohistochemistry was performed with a vascular endothelial growth factor marker. The number of new vessels in each sample was counted.

Results: Statistical analyses showed a significantly higher number of new vessels in the gingival tissue of the test group.

Conclusion: Rh-BMP-2 injections into the gingival flap significantly improved new blood vessel formation.

P-085
Giulianna Malotti, Vivian Wagner, Marília Trierveiler Martins, Vivian Petersen Wagner, Luciane H Azevedo (Brazil)
Category: Case report
Title: USE OF HIGH POWER DIODE LASER FOR A RARE EPIDERMAL CYST IN AN INFANT: A CASE REPORT

Aim: Evaluate the efficacy and safety of high-power diode laser for the excision of an epidermal cyst in a 8-month-old patient.

Case description: An 8-month-old female patient accompanied by her parents presented at the dental appointment with concerns regarding a lesion located in the sublingual area and difficulties during bottle-feeding. The mother gave up breastfeeding when the patient was 2 months old claiming pain and difficulties. Intra-oral examination revealed a single 4mm yellow soft nodule in the sublingual area, close to the tongue frenulum and sublingual caruncle. No suspicion of malignancy was raised based on the clinical appearance and history. The patient was also diagnosed with ankyloglossia. The proposed treatment was to operate the tongue frenulum and excise the lesion at the same opportunity. The procedure was performed using a high-power diode laser (DMC, São Carlos-SP, Brazil) in contact mode, with a wavelength of 980 nm, a 400-micrometer optical fiber, and a power setting of 1.3 W in continuous mode. This was followed by the irradiation of three points of a 660 nm low-power diode laser (DMC), delivering 1J per point, with a spot size of 0.09 cm^2 and a power density of 11.11 J/cm^2. The parents reported the need of analgesics in the 3 days that followed the procedure. After this period the patient exhibited no further signs of pain or discomfort.
The histopathological findings confirmed the clinical hypothesis of an epidermal cyst.

Discussion: Even though the use of high power lasers is not recommended in the excision of lesions aiming a precise biopsy because of its thermal damage, this protocol was chosen considering the patient's young age and the absence of malign characteristics. The correct parameters allowed a faster procedure and healing and lower discomfort, while also allowing a precise diagnosis during the pathological analysis.

Conclusion: The use of high-power diode laser for the excision of an epidermal cyst in a young patient demonstrated both efficacy and safety, resulting in successful removal of the cyst with minimal complications.

P-086
Giulianna Malotti, Thayna Vianna da Rocha, Pedro Soares, Edgar Michel Crosato, Patricia Moreira de Freitas Costa e Silva, Luciane H Azevedo (Brazil)
Category: Clinical human studies
Title: EVALUATION OF PARAMETERS OF USE OF HIGH POWER LASERS AND POSTOPERATIVE OUTCOMES IN FIBROMA: A RETROSPECTIVE STUDY OF 22 YEARS

Aim: To assess the prevalence of Fibroma (FIB) diagnoses, along with related clinical variables, types of high-power lasers used, and the specific parameters applied.

Material and methods: A review and analysis of medical records were conducted for patients diagnosed with fibroma (FIB) who underwent high-power laser surgery at the Special Laser Laboratory in Dentistry (LELO-FOUSP) between 2000 and 2022. Inclusion criteria included histopathological diagnosis and a signed informed consent form. Data extracted from records included age, sex, race, lesion duration, size, location, need for postoperative prescription, and the laser used in the surgical procedure. The collected data were tabulated and analyzed through descriptive analysis.

Results: FIB lesions showed a predominance among white women over the age of 40 (73.9%). Disregarding the category "Indeterminate", the average lesion duration was over one year (53.3%), with most cases presenting a size of ≤1 cm (86.5%), and the oral mucosa (labial and buccal) was the most common location (67.4%), as shown in Chart 1, Chart 2, and Chart 3, respectively. The diode laser—including Opus 10 (830 nm), Lasering (808nm), ZAP (830 nm), DMC (808-980 nm), Solase (940 nm), CW, 1.5-2.5 W, 300 and 400-micron spot size—was the most frequently used in treatment (46.2%), as shown in Chart 4. Postoperative medication was generally unnecessary (91.5%).

Conclusion: FIB demonstrated a higher prevalence in white female patients over the age of 40. Most lesions developed on labial and buccal mucosa, with a size of ≤1cm and a duration exceeding one year. The diode laser was the most commonly used due to its superior intraoperative hemostasis.

P-087
Isabela Vieira Soares, Carolina G Garcia, Pedro C Soares, Denise Maria Zezell, Patricia M F Costa e Silva, Luciane H Azevedo (Brazil)
Category: Case report
Title: LINGUAL FRENECTOMY USING HIGH POWER DIODE LASER - CASE REPORT

Aim: To evaluate the repair and postoperative recovery of babies with ankyloglossia and the effects of surgery on breastfeeding.

Case description: A 2-month-old female baby, referred by a speech therapist for evaluation. The patient had low weight gain, also coughing during breastfeeding and hiccups afterwards. The mother also reported discomfort during feeding.

The presence of ankyloglossia was verified using the Tongue-tie and Breastfed Babies Assessment Tool (TABBY Test), score: 4; and by the Tongue Frenulum Assessment Protocol in Babies (Tongue Test), total score between clinical and anatomofunctional history: 14.
Infiltrative anesthesia was administered. The frenectomy was performed with a high-power diode laser (Thera Lase Surgery DMC, São Carlos, Brazil - 1.5W, continuous mode, in contact) and immediate irradiation was performed with a low-power laser (Therapy EC, São Carlos, Brazil - 1J red - 660nm) at 3 points, totaling 3 J of energy, for inflammation modulation, acceleration of repair and analgesia. The corresponding energy density per point was 11.1 J/cm² and the power density per point was 1.1W/cm².

Discussion: Although there are no randomized clinical studies in the literature on the benefits of immediate low-power laser irradiation after frenectomy, the baby's painful symptoms assessed after 1 week using the NIP Scale (Neonatal Infant Pain Scale) indicated the analgesic benefits of this protocol, in which obtained a score of 1 on the first day and 0 on the rest.
Regarding frenectomy using a high-power diode laser, one month after surgery, the evaluation tests were redone, with scores: 7 in the TABBY Test; and total score: 6 in the Tongue Test. During this period, the mother reported that the baby was gaining weight, stopped cracking during breastfeeding, and no longer had a cough or hiccups. Attesting the effectiveness of the procedure.

Conclusion: Based on the results obtained, we can conclude that performing lingual frenectomy with a high-power laser and immediate application of a low-power laser favored breastfeeding by releasing lingual movements and reduced post-surgical inflammatory symptoms, in this case. However, randomized clinical studies still need to be published to confirm the effectiveness of the protocol.

P-088
Keita Toyoshima, Peiya Lin, Yujin Ohsugi, Hiromi Niimi, Sayaka Katagiri, Takanori Iwata, Akira Aoki (Japan)
Category: Original research: Preclinical
Title: EFFECTS OF Er:YAG LASER IRRADIATION ON CELL PROLIFERATION AND GENE EXPRESSION IN OSTEOCYTE-LIKE CELLS

Aim: Laser has been shown to enhance biological functions in some species of cells without photothermal effects. Previous our study has reported that following low-level Er:YAG laser irradiation, osteogenic cells isolated from rat calvaria significantly decreased Sost expression, compared to non-irradiated cells. However, the effects of Er:YAG laser irradiation on osteocytes have not yet been clarified. This study aimed to explore the effects of Er:YAG laser on osteocyte-like cells in cell proliferation and gene expression.

Material and methods: Mouse-derived osteocyte-like cells were used (Murine Long bone Osteocyte-Y4). Er:YAG laser (Delight, HOYA ConBio, Fremont, CA) was irradiated at a distance of 25 cm from the bottom of 35mm culture dish for 60 seconds (pulse rate: 20 Hz, energy level: 50, 100, and 150 mJ/pulse, total energy density: 3.1, 6.0, and 8.9 J/cm2). The mean temperature of cell surface was measured using thermography before, during and after irradiation at room temperature. Cell proliferation and cytotoxicity assays were performed at 3 days after irradiation. RNA sequencing for comprehensive gene expression analysis was performed at 6 hours for 6.0 J/cm^2 irradiated cells, compared to non-irradiated cells.

Results: The mean cell surface temperature irradiated at 3.1, 6.0, and 8.9 J/cm^2 after 60 second was 31.3, 35.4, and 40.3 ℃, respectively. Irradiation at 6.0 J/cm2 significantly enhanced cell proliferation, compared to that of non-irradiated cells. Lactate dehydrogenase levels showed significant increases at 6.0 and 8.9 J/cm^2. RNA sequencing identified 337 differentially expressed genes (DEGs) between 6.0 J/cm^2 irradiated and non-irradiated cells, and genes related to cell proliferation were included in up-regulated DEGs. Kyoto Encyclopedia of Genes and Genomes (KEGG) analysis showed enrichment of PI3K-Akt signaling and MAPK signaling pathways in upregulated DEGs. Gene set enrichment analysis showed enrichment in TGF-β signaling and estrogen response gene sets in laser-irradiated cells. Gene Ontology analysis indicated “positive regulation of cell migration” and “positive regulation of cell population proliferation” in biological process of irradiated cells.

Conclusion: Er:YAG laser irradiation at 6.0 J/cm2 significantly enhanced osteocyte-like cells proliferation, and DEGs enriched pathways related to cell proliferation were identified at 6 hours after laser irradiation.

P-089
Bruna Akinaga Moreira, Koji Mizutani, Natsumi Saito, Shu Takemura, Yujin Ohsugi, Takanori Iwata, Akira Aoki (Japan)
Category: Original research: Preclinical
Title: EFFECTS OF LOW-LEVEL Er:YAG LASER IRRADIATION ON HUMAN UMBILICAL VEIN ENDOTHELIAL CELLS IN HYPERGLYCEMIA

Aim: This study aims to investigate the photobiomodulation effects of an Er: YAG laser on angiogenesis in a hyperglycemic condition. While several studies have investigated the angiogenetic effect of low-level laser irradiation (LLLI), its effect under hyperglycemic conditions remains to be evaluated.

Material and methods: Human umbilical vein endothelial cells (HUVEC) were cultured in control (5.5 mM; LG) and high glucose (25 mM; HG) medium conditions. Cells were irradiated by Er: YAG Laser at 10 Hz and 30 mJ/pulse for 30s, with a pulse width of 122 μs and peak power 508 W (soft mode; SM) or 60 μs and 747 W (hard mode; HM) (Adverl SH, Morita, Japan). Power and energy density were 0.3 W and 0.84 J/cm^2, respectively. The expression of angiogenic markers was evaluated with Real-time quantitative polymerase chain reaction (RT-qPCR). Cell migration, proliferation, and tube formation assays were performed with the following groups (G): G1) No LLLI in LG, G2) LLLI with SM in LG, G3) LLLI with HM in LG, G4) No LLLI in HG, G5) LLLI with SM in HG, G6) LLLI with HM in HG.

Results: RT- qPCR shows that the markers for endothelial proliferation, VEGF1, VEGF2, FGF1, and IGF1 were increased in G2 and G3, compared to G1. A qualitative analysis of cell migration revealed that wound closure generally occurred within 24 hours, except for G4, G5, and G6, which

reached confluence after 48 hours. G 1-3, G5, and G6 showed faster migration, compared to G4. Endothelial tube formation was performed 4 days after irradiation. The formation of nodes, segments, and junctions was increased in the LLLI groups compared to control. Cell proliferation after 24 hours showed no significant differences between the groups.

Conclusion: LLLI using an Er: YAG laser can improve the angiogenesis of HUVEC. When paired with a hyperglycemic condition, significant stimulation effects were detected in the LLLI group.

P-090
Alessandra Nara de Souza Rastelli, Luis Felipe Rondón Ordóñez, Vanderlei Salvador Bagnato (Brazil)
Category: Original research: Preclinical
Title: EFFICACY OF REMOVAL TECHNIQUES AND ANTIMICROBIAL PHOTODYNAMIC THERAPY ON THE PRESERVATION OF THE AFFECTED DENTIN

Aim: The aim of this in vitro study was to evaluate the efficacy of removal techniques combined with antimicrobial photodynamic therapy (aPDT) mediated by curcumin for the preservation and disinfection of affected dentin.

Material and methods: The pre-irradiation time (5 and 10 minutes), and the minimum inhibitory and bactericidal concentrations (MIC and MBC) of curcumin were determined. Bovine dentin specimens under 4x4x2 mm (n=135) were obtained. Artificial caries lesions were induced by the biological method on the dentin surface using a duo species biofilm of Streptococcus mutans and Actinomyces naeslundii. The removal techniques used were spherical bur (SB), dentin excavator (DE), and ultrasound (US). Additionally, the disinfection techniques were no decontamination, chlorhexidine under 0.2% and aPDT. For the aPDT, curcumin at a concentration of 320 µM (5 minutes incubation time), LED under 440 nm and light doses of 15, 60, and 100 J/cm² were used. The removal rate of the different techniques was evaluated by the removal rate at three times: T1 (prior to induction), T2 (post-induction), and T3 (post-removal). Quantitative evaluation of viable cells was performed by CFU/mL. Shapiro-Wilk (normality) and Levene (homoscedasticity) tests, two and three-away ANOVA under significance level of 5% were applied.

Results: The MIC and MBC of curcumin were 1.25 µM; however, a higher concentration (320 µM) was used. According to the removal rate, there was no statistically significant difference between T1 and T2 times ($p>0.05$). However, between T2 and T3, there was a statistically significant difference ($p<0.05$). Groups treated with US promoted the lowest removal rate, followed by DE and SB. For CFU counting, aPDT groups showed higher log killing for the US group under 60 J/cm² for S. mutans = 2.6 and A. naeslundi = 2.16.

Conclusion: Overall, ultrasound combined with aPDT promoted more conservative removal and disinfection compared to the conventional and manual techniques with aPDT.

P-091
Bárbara Kremer Klein Teodorowitsch, Isadora Peres Klein (Brazil)
Category: Case report
Title: EVALUATION OF THE EFFECTIVENESS OF PHOTOBIOMODULATION THERAPY WITH LOW INTENSITY LASER IN PAIN MANAGEMENT IN TRIGEMINAL NEURALGIA - CASE REPORT

Aim: To evaluate the therapeutic efficacy of Photobiomodulation (FBM) using lower laser therapy (LLT) as an adjuvant treatment in the management of Trigeminal Neuralgia (TN). Secondary Objective: To evaluate the improvement in orofacial pain in patients with TN, measuring the intensity of pain using VAS, before and immediately after the procedure. FBM therapy.
To evaluate therapeutic efficacy months after completion of FBM therapy in a patient with TN.

Case description: Patient N.S.J.M. female, 60 years old, retired, sought the family health unit complaining of intense pain in the jaw on the left side. During the anamnesis, the patient reported that the pain started in the region of teeth 42 and 43, and this pain was often motivated by allodynia. The patient reported having undergone neurotomy surgery to treat TN in 2016, highlighting that the postoperative period went well complicated and painful. After surgery, there was complete pain control for 3 years. In addition to the surgical procedure, the patient used Pregabalin 150mg, nortriptyline 75mg, carbamazepine 200mg, Paroxitin, Rivotril and Zopiden, recommended by the neurologist. After 3 years new attacks of intense pain returned, triggering difficulty in eating, weight loss, limited mouth opening

and speech impairment, due to the restraint of mandibular movements to prevent the activation of new painful episodes. Clinically, the patient had some missing teeth, some restorations and excellent oral hygiene conditions. Due to the anamnesis, complementary exams and physical examination, the diagnosis was TN, with involvement of the mandibular branch (V3) on the left side. The patient was referred from the Family Health Strategy to the Dental Specialties Center (CEO) of Cachoeirinha to be taken to the hospital for a second surgery to avoid painful crises caused by TN.

Discussion: According to the pain assessment results evidenced in the 12 FBM sessions, a decrease in painful symptoms was seen throughout the treatment. In the sixth FBM session, the patient had remission from intense pain (score 10) to total absence of pain (score zero). In the other sessions there was variation in scores. It was possible to notice that before FBM the patient had a higher pain score in most sessions. In the last session (12th ession) of FBM, the patient presented almost complete remission of pain (score 1) and maintained this score (zero to 1) for 7 months.

Conclusion: FBM is one of the available therapies that is on the rise. Considered simple, painless and low cost, it has been very well accepted by patients with TN. Additionally, FBM has demonstrated excellent results in the management of TN pain, such as demonstrated in this clinical case report and in several studies.

P-092
Beatrice Spaggiari, Ilaria Giovannacci, Marco Meleti, Paolo Vescovi (Italy)
Category: Case report
Title: NONSURGICAL MANAGEMENT OF A LARGE PERIAPICAL CYST-LIKE LESION OF AN UPPER CENTRAL INCISOR WITH OPEN APEX: ORHOGRADE ENDODONTIC TREATMENT AND ND:YAG LASER DECONTAMINATION

Aim: The treatment of cyst-like lesions could be either surgical or nonsurgical; treatment choice is based on evaluating the extension of the lesion, relation with noble structures, age, and systematic condition of the patient

Case description: This case report describes the nonsurgical resolution of a large periapical cyst through a traditional Endodontic treatment, with the support of Nd:YAG laser activation of irrigants. A 16-year-old girl was referred to our service with swelling of the right hemiface, pus, swelling of labial mucosa adjacent to teeth 11-13 and pain. The radiological exam confirmed the presence of a large cyst-like lesion extending from element 11 to element 13. Thermal sensitivity tests were negative for teeth 11, 12, 13 and 14. Elements 11 and 12 were also painful on vertical percussion, so endodontic treatment of both elements was decided.Pulp chamber of element 11 was opened and pus drained; irrigation with 10 ml of saline was performed, then calcium hydroxide intracanal medicament was placed for one month.
Tooth 11 presented a complex anatomy with wide root canal and an open apex; in order to avoid extrusion of debris and sodium hypochlorite (NaOCl), soft debridement was obtained using nickel-titanium rotary instrument and soft irrigation with 5% NaOCl and 17% ethylenediamine tetraacetic acid was performed. To enhance NaOCl action in decontamination Nd:YAG laser (15Hz, 1.25W, LightWalker Fotona) fiber (320 µm)(PD 1555 W/cm2, total fluence 167.94 J/cm2) was located inside the canal 5mm shorter than working length and activated in coronal direction. This procedure lasted 5s and was repeated 4 times.
Obturation was obtained introducing fragment of collagen sponge at the apex, then superEba was located in the apical third of the canal system in approximately 5mm thickness and the remaining portion of the canal was obdurated with warm gutta-percha.
Element 12 presented a conventional anatomy, so standard procedures have been implemented.

Discussion: One year follow-up showed a complete healing of the lesion and the patient reported that she was free of symptoms.

Conclusion: The successful outcome in this case supports the potential for healing of cyst-like lesions by nonsurgical treatment; while the role of Nd:YAG laser in endodontics require further studies.

P-093
Ilaria Giovannacci, Paolo Vescovi, Fabrizio Moroni, Monica Mattarozzi, Beatrice Spaggiari, Maria Careri (Italy)
Category: Original research: Preclinical
Title: USE OF Er:YAG LASER IN QSP MODALITY FOR TREATMENT OF INDIRECT ADESIVE RESTORATION BUILD-UP. ANALYSIS OF SURFACE ROUGHNESS AND EVALUATION OF SURFACE MORPHOLOGY USING ESEM (Environmental Scanning Electron Microscope)

Aim: Modern dentistry has been characterized by an evolution of adhesive procedures. The adhesive cementation process involves steps on the overlay and steps on the build-up. It is now known in literature that build-up sandblasting significantly improves bond strength. Purpose of this study is to verify the effectiveness of the Er:YAG laser used in QSP (quan-tum square pulse) mode to treat the surface of the build-up before adhesion as a re-placement for the sandblaster.

Material and methods: The study was ex vivo, conducted on samples that reproduce teeth with prepared build-ups. 12 extracted teeth were used. A cavity was created in the center and reconstructed with composite resin (build-up). Then, samples were prepared with burs as for overlay build ups. They were divided into 3 groups: control group(G1): only prepared with burs; sandblaster group(G2) - surfaces treated with sandblaster (Microetcher CD,Kavo), 2.5 bar pressure 10 mm from the composite surface - Al2O3, mean particle size 30 µm-10 sec; Er:YAG Laser group(G3)- surfaces treated with Er:YAG laser (Fotona), QSP modality - 1 W, 10 HZ, 100mJ. A measurement of surface roughness of the build-up surface was carried out using a la-ser profiler and a study of surface morphology using ESEM.

Results: Mean surface roughness in enamel resulted 0.793 Sa in G1, 0.868 Sa in G2 and 2.603 Sa in G3. it is interesting highlight that in enamel the control and sandblaster are not sta-tistically different while the laser produces significantly greater roughness. A similar trend was also highlighted in dentin and resin. With regard to ESEM analysis the surfaces treated with sandblaster and laser are all rougher than the control ones, but in the laser sample there is no smear layer, tubules are visible and the enamel shows organized prisms (similar to an etching action).

Conclusion: Er:YAG laser in QSP mode to treat build-up surface of indirect adhesive restorations is innovative and should be investigated with further studies. However, it seems to be ex-tremely effective because it produces an increase in roughness in the absence of smear layer, but specially in all substrates perfect characteristics for a good adhesion were highlighted.

P-094
Gloria Bortolotti, Roberta Iaria, Ilaria Giovannacci, Ambra Pontiroli, Marco Meleti, Paolo Vescovi (Italy)
Category: Case report
Title: COMBINED USE OF CROSS-LINKED HYALURONIC ACID AND ND:YAG LASER FOR IMPLANT REHABILITATION IN AESTHETIC AREA

Aim: This paper describes the results obtained from the combined use of a cross-linked hyaluronic acid gel (xHyA) and laser photobiomodulation (LPBM) using a Neodymium (Nd:YAG) laser for implant rehabilitation in aesthetic area.

Case description: The case concerns a 77-year-old male patient with a complete coronal-radicular fracture of the 2.2. Under loco-regional anaesthesia, extraction of the element was carried out. After preparing the post-extraction cavity for immediate loading implant insertion, local LPBM was performed with a neodymium laser (Nd:YAG 1064 nm laser FidelisPlus, Fotona, Ljubljana, Slovenia; 320 µm of fibre diameter, power of 1,25W, frequency of 15Hz). Laser light was used in non-focused mode, at 2mm form the tissue, for 1 minutes (PD 1555 W/cm2, total fluence 167.94 J/cm2) and repeated five times. Finally implant insertion was performed. Autologous bone spicules taken from the blades of the drills used were combined with deantigenated particulate bovine bone and mixed with xHyA gel and then placed at the level of the bone gap, which was protected by a collagen sponge infiltrated with xHyA. After inserting and preparing the temporary abutmet, the residual groove between the abutment and the gingiva was filled with xHyA. Finally, an additional LPBM was performed. The follow up showed optimal tissue healing, and excellent shaping of the gingival tunnel and the parabola. In addition, the radiograph at 4 months shows successful osseointegration and the absence of non-physiological hard tissue loss.

Discussion: Aesthetics plays a key role in what is

called implant-prosthetic therapy success and it is closely linked to functionality.
xHyA is a synthetic form of native HA with improved physico-chemical properties. It has the advantage of promoting clot stabilization, osteogenesis, angiogenesis and It also has a bacteriostatic, anti-inflammatory, anti-edematous nature. Laser photobiomodulation (LPBM) instead stimulates osteoblastic activity and osteogenesis improving implant stability and reduces tissue inflammation supporting tissue healing.

Conclusion: The combined use of HA and LPBM leads to a complementary and additive effect that appears to have a positive influence on osseointegration and soft tissue healing, which are crucial not only from a functional aspect, but also for achieving aesthetic results.

P-095
Rita Antonelli, Andrea Pizzorni, Giulio Corradi, Ilaria Giovannacci, Roberta Iaria, Paolo Vescovi, Marco Meleti (Italy)
Category: Original research: Clinical
Title: USE OF THE ERBIUM:YAG LASER IN THE TREATMENT OF PERI-IMPLANTITIS: 5 CASE SERIES OF A CLINICAL PILOT STUDY

Aim: The present study aims to evaluate differences in post-operative benefits of peri-implantitis surgical treatment using manual instrumentation with curettes and irradiation with Er:YAG laser, compared to only curettes instrumentation. We report five clinical cases of peri-implantitis treated with the combination of curettes and Er:YAG laser, included in the protocol of a clinical pilot study.

Material and methods: The pilot study, which will include 28 subjects with active peri-implantitis, has received the acceptance of the Ethics Committee of the Area Vasta Emilia Nord (AVEN) (Code:
7083). Study protocol requires that patients are subjected to a dental examination and radiographs to confirm the peri-implantitis diagnose. The patients will be randomized into two groups: one treated with manual curettes via surgery, the other with manual curettes via surgery and irradiation with Er:YAG laser (LightWalker ST-E, Fotona-Slovenia: 100 mJ, 30 Hz, fluence of 60 J/cm^2). The protocol provides for a full thickness trapezoidal flap to expose peri-implant tissues and remove bacterial deposits with different tools depending on the group, followed by cleansing and suturing of the surgical site.

Results: Five cases of peri-implantitis are treated using curettes and Er:YAG laser, following the protocol. The main advantages observed are the effectiveness of the Er:YAG laser in removing bacterial deposits and biofilm from implant surfaces, the ability to clean implant surfaces without altering their macrostructure, the capacity to reduce peri-implant inflammation. The precise and minimally invasive nature of the laser surgery allows for targeted treatment, reducing the trauma to surrounding tissues, postoperative pain, swelling and bleeding. This results in greater comfort for the patient, a lower need for post-operative analgesics and faster recovery times.

Conclusion: Based on our preliminary results, Er:YAG seems a safe and promising tool that can be used to manage peri-implantitis infection.

P-096
Roberta Iaria, Gloria Bortolotti, Rita Antonelli, Marco Meleti, Ilaria Giovannacci, Paolo Vescovi (Italia)
Category: Case report
Title: CROSS-LINKED HYALURONIC ACID IN ORAL SOFT TISSUE REGENERATION

Aim: The aim is to verify the efficiency of the combined use of neodymium laser surgery, crosslinked hyaluronic acid, and porcine pericardium membrane in wound healing. Proving the advantages of this approach would make its use indicated in cases of patients with conditions that delay the healing process.

Case description: The case involves an 84 years-old patient with a white and nonhomogeneous lesion located on the right margin of the tongue. Incisional biopsy revealed the presence of a low-grade lichenoid dysplasia. After loco-regional anaesthesia, the edge of the tissue to be removed was outlined, and excision was performed with Nd:YAG laser (1064 nm FidelisPlus, Fotona, Ljubljana, Slovenia, 3.5 W; frequency: 60 Hz; fiber diameter: 320 µm, power density 488,281 W/cm2). Afterwards, a cross-linked hyaluronic acid (xHyA) gel delivered via a syringe was applied to the bottom of the wound. Lastly, a resorbable porcine pericardium membrane shaped according to the contour of the defect and hydrated with further xHyA was placed to line the wound and

secured with resorbable sutures (Vicryl 5/0). Histopathological analysis of the surgical piece revealed the presence of microinvasive carcinoma. Postoperative follow-ups showed a rapid reduction in the size of the lesion over time: at one week after surgery, early healing of the site was observed, which appeared completely lined with fibrin and without any signs of inflammation. At four-week follow-up, almost complete re-epithelialization of the site was reported. Three months after excision, the site was completely re-epithelialized.

Discussion: Cross-linked Hyaluronic acid (xHyA) is a hygroscopic and viscoelastic substance endowed with bacteriostatic and anti-inflammatory properties. Porcine pericardium membrane acts as a mechanical barrier, protecting the surgical site and, when combined with xHyA, enhances its properties. The combined use of these two materials and laser surgery represents a novel approach that would appear to result in better and faster healing of oral soft tissues.

Conclusion: The approach described has revealed remarkably positive results in surgical wounds healing. Furthermore, compared with other options for reconstruction of superficial defects, the combination of xHyA and PPRM has biological advantages since it does not require a donor site and is associated with high patient tolerability.

P-097
Alessandra Cassoni, Aldo Brugnera Junior, Fátima AA Zanin, Karla M Gonçalves, José A Rodrigues (Brazil)
Category: Case report
Title: RECURRENT HERPES LABIALIS TREATMENT WITH PHOTODYNAMIC THERAPY ASSOCIATED TO PHOTOBIOMODULATION

Aim: Herpes labialis is one of the most common human viral infections throughout the world. Photodynamic therapy involves the application of a specific photosensitizer (methylene blue) and irradiation with a low-power laser at a wavelength resonant with the absorption band of the photosensitizer. This study describes the application of antimicrobial photodynamic therapy (aPDT) in conjunction with photobiomodulation therapy (PBT) for herpes simplex, showing improvement in clinical condition with satisfactory results, without the use of antiviral medication.

Case description: A 22-year-old female patient, who was normosystemic and not on regular medication, was referred to the stomatologist. During the extraoral physical examination, fluid-filled vesicles were observed on the left upper lip. Following the initial clinical evaluation, a diagnosis of cold sores was suggested, and antimicrobial photodynamic therapy (aPDT) was proposed as a treatment option. The vesicles were initially punctured with a sterile needle (Unojet, Nova DFL, Taquara, RJ, Brazil), and the vesicular contents were removed using absorbent paper.
Four irradiation points were selected on the lesion, with methylene blue (AM) applied and a diode laser; wavelength of 660 nm was selected (Laser Duo, MMO, São Carlos®, SP, Brazil) under the following parameters: 100 mW, 180 J/cm²; 4 J/point; irradiation time of 2 minutes.
Twenty four hours later, the patient was already in the crust phase. Two additional points of irradiation were performed on the lesion using a wavelength of 660 nm, with parameters of 100 mW, 20 J/cm²; 2 J/point; irradiation time of 20 seconds. The clinical evaluation of 72 hours exhibiting good healing and a satisfactory aesthetic appearance.

Discussion: Antimicrobial photodynamic therapy (aPDT) combined with photobiomodulation therapy (PBT) can be effectively utilized in cases of herpes simplex, resulting in improved modulation of the inflammatory process, pain relief, and accelerated tissue repair.

Conclusion: Photobiomodulation as a noninvasive and nondrug method can play an influential role in the treatment of oral diseases.T he absence of adverse effects is an advantage over conventional therapeutic modalities. The methylene blue as a photosensitizer and diode laser (660 nm wavelength) combination are currently effective in photodynamic therapy (PDT).

P-098
Fatima Marrach Archangelo, Allyson Fonseca, Liciane Toledo Bello, Gisele Prata Real, Eduardo Marrach, Gabriela Giro (Brazil)
Category: Case report
Title: THE USE OF DIODE LASER (808nm) IN SURGICAL RESECTION FOR CICATRICIAL GRANULOMA OF THE TONGUE: A CASE REPORT

Aim: Cicatricial Granuloma is a rare condition that can occur after a surgical process due to the

infiltration of immune cells ar the site of tissue repair, and is characterized by a pedunculated, sessile, slightly painful, appearance and does not present spontaneous bleeding, as it does not have large vascular proliferation. Various modalities have been used to excise it. For the case presented, an 808nm Diode LASER was used to remove the lesion and for scar alignment, sequencial sessions of photodiynamic therapy and sodium chloride were performed.

Case description: A 86-year-old Brasilian female patient presented with a large lesion in right border of the tongue. The patient had noticed this lesion about sixty days and began to develop after surgery to remove leukoplakia for analysis. The analysis did not detect neoplasia and as soon as the stitches opened, the formation of the mass was observed.

Discussion: The gold standard treatment for granuloma is surgical, with the need for a new surgical intervention and due to the previous history of weak scarring, a new resection was performed using Diode LASER (808nm) and the healing in the site was accompanied by daily photodynamic therapy sessions to reduce contamination in the surgical site. The granuloma formed again when the lesion was already 3/4 of the way through, requiring further surgical removal. A new recurrence occurred when the evolution reached 1/8 of the inicial lesion, forming a new granuloma. At this time, sodium cloride was recommended to control and resolve the injury, without the need for further surgical intervention.

Conclusion: Surgical strategies with DIODE LASER (808nm) brought excellent resolution in surgeries. In the face of recurrences, the use of DIODE LASER provided more comfort, without edema or pain. The environmental conditions at the surgery site were controlled through photodynamic therapy, minimizing the size and evolution of the lesion in recurrences. The use of soium chloride helped with the resolution to readjust th inflammatory pattern related to the evolution of the granuloma.

P-099
Fatima Marrach Archangelo, Allyson Fonseca, Liciane Toledo Bello, Eduardo Marrach, Onescy Silveira Dias, Gabriela Giro (Brazil)
Category: Case report
Title: USE OF AUTOLOGUES ASSOCIATED WITH POTOBIOMODULATION IN OROFACIAL HARMONIZATION OF A SMOKING PATIENT: A CASE REPORT

Aim: The objetive of this Case Report was to demonstrate the potential use of blood Concentrates in facial revitalization through the use of photobiomodulated autologues injected locally in the face after transcutaneous systemic photobiomodulation.

Case description: Female patient, 61 years-old, smoker, presenting deep wrinkles, dryness and spots scattered over the entire lenght of the skin, such as descending displacement of the facial fatty pads. The patient was submitted to systemic photobiomodulation for 30 minutes prior to venipuncture with infrared laser. After the collection of blood tubes, centrifugation and photobiomodulation with the infrared laser of the biological material was performed, and then, the photobiomodulated blood concentrate was applied to the integument, within the entire length of the face, and then proceeded microneedling and drip concomitant with autologous material. Both intrademotherapy and microneedling combined with drip, allowed the wide use of photobiomodulated material.

Discussion: The association of growth factors and photobiomodulation contributed in sinergic action for control to senescent factors. The comparative photos “before/after” of the procedure corroborated to demonstrate the effectiveness of the technique.

Conclusion: The use of photobiomodulated blood concentrates proved to be efficient in the tegumentary revitalization in a smoking patient, through the improvement of the signs of hydratation, in the reduction of the spots and in the integumentary laxity.

P-100
Ana Carolina Negraes Canelada, Antonio Eduardo de Aquino Junior, Tiago Zuccolloto Rodrigues, Fernanda Mansano Carbinatto, Matheus Henrique Camargo Antonio, Bianca Morais, Vanderlei Salvador Bagnato (Brazil)
Title: MEASUREMENT AND COMPARISON OF INTRACRANIAL COMPLIANCE IN FIBROMYALGIA PATIENTS UNDERGOING SYNERGISTIC LASER AND ULTRASOUND TREATMENT: A CASE STUDY

Abstract: Fibromyalgia, a chronic disease that causes disabling pain, is on the rise worldwide. Over the last 6 years, the University of São Paulo, in Brazil, has developed equipment capable of synergistically emitting Photobiomodulation and Ultrasound. Furthermore, a new approach to treatment methodology, using the palms of the hands as a "gateway", has achieved better results. This new approach based on structural changes in the palms. The objective of this work was to evaluate possible differences in the intracranial compliance of fibromyalgia patients that allow us to understand possible changes in the pain regulation center, during intervention monitoring using photobiomodulation and ultrasound, in a synergistic way. The assessment of intracranial compliance was carried out using Brain4care technology, a mechanical extensometer that is connected to a mechanical device, in direct contact with the surface of the scalp in the temporal frontal-parietal region of the skull, being able to detect small cranial oscillations resulting from pressure intracranial. Monitoring was carried out in periods before the intervention, during the intervention and after the intervention, totaling 20 minutes. The intervention was carried out using the equipment denomined RECUPERO® (patent number BR102014007397-3 A2, produzed by MMOPTICs, São Carlos, São Paulo, Brazil); Laser: (wavelength 660nm, power 100mW); Ultrasound: (Pulsed mode, 1 MHz frequency, 100 Hz, 50% duty cycle and average space time of 0.5 w/cm2) equipment. It was possible to observe the modulation of intracranial compliance, reducing values when above ideal, increasing the time considered within the ideal, Reduction of pain according to visual analogue scale and Improvement of quality of life according to the Fibromyalgia Impact Questionnaire. Based on these observations, the synergistic treatment of photobiomodulation and ultrasound promoted pain reduction and improved quality of life, allowing the patient's full reintegration into family, society and the reestablishment of their professional activities. This study was approved by human research ethics committee C.A.A.E. 13789319.5.0000.8148, in accordance with resolution 466/2012.

P-101
Ana Carolina Negraes Canelada, Antonio Eduardo de Aquino Junior, Fernanda Mansano Carbinatto, Carolina Gianini, Vanessa Garcia, Vanderlei Salvador Bagnato (Brazil)
Title: CAN THE COMBINED EFFECT OF TECHNOLOGICAL THERAPIES BE BENEFICIAL FOR AUTISM? A CASE STUDY

Abstract: Autism Spectrum Disorder (ASD) are changes in neurological development that manifest in childhood, with greater or lesser intensity, and impair the ability to communicate and relate. Its etiology is still unknown, but studies state that the association between genetic, environmental and neurological factors influence the development of this disorder, being directly related to changes in the intestinal microbiota. The characteristics of ASD are: changes in the gastrointestinal tract, possible seizures, self-harm and sleep disorders due to anxiety, hyperactivity, gastroesophageal reflux, among others. The objective of this case report was to observe possible changes in the reduction of anxiety and improvement of sleep quality through the action of photobiomodulation and ultrasound. It was carried out with 1 patient with Autism Spectrum Disorder (intellectual disability), male, 12 years old, at the Photodynamic Therapy Unit of Santa Casa de São Carlos. The equipment used was RECUPERO®, capable of emitting laser and ultrasound. The application was performed during 10 sessions, on the palms of the hands, totaling 10 minutes on each hand (20 minutes in total). The ultrasound is used in continuous mode, with an intensity of 0.8w/cm2, with 1MHz and the therapeutic laser (photobiomodulation) at wavelengths of 660nm and 808nm. The mechanisms for evaluating progress are: Autism Treatment Assessment, Childhood Autism Assessment Scale, Assessment of Anxiety and Depression Levels and the Pittsburgh Sleep Quality Index. The results evaluated were positive for reducing anxiety and improving sleep quality, which optimizes the overall condition of these patients. This innovative, non-drug and non-invasive proposal is a resource that provides numerous benefits for the health and quality of

life of these individuals. This study was approved by human research ethics committee C.A.A.E. 83748624.0.0000.8148, in accordance with resolution 466/2012.

P-102

Ana Carolina Negraes Canelada, Antonio Eduardo de Aquino Junior, Carolayne Carboni Bernardo, Vanessa Garcia, Fernanda Mansano Carbinatto, Vanderlei Salvador Bagnato (Brazil)

Title: COMBINED LASER ACTION AND MYOFASCIAL RELEASE IN INFLAMMATORY AND DEGENERATIVE PROCESSES OF THE SHOULDER

Abstract: The shoulder joint complex is the target of numerous conditions, including tendinopathy and adhesive capsulitis, conditions that cause pain, inflammation, and restricted movement. Thus, equipment was developed with the capacity to promote myofascial release in a synergistic way with the action of the laser, with the aim of comparing the isolated actions of the laser and myofascial release, in relation to the combined action of both. To evaluate those patients, goniometric measurement of joint angles, visual analogue scale, and Arm, Shoulder and Hand Dysfunction Questionnaire were used. This pilot study is a randomized clinical trial type and was approved by two ethics committees in research with human beings at Santa Casa Photodynamic Therapy Unit (UTF) in São Carlos, a clinical research unit in partnership with São Carlos Physics Institute, with the number 4,539,945 for adhesive capsulitis and number 5,309,147 for tendinopathy. There was a selection of 15 patients with adhesive capsulitis and 15 patients with tendinopathy, aged between 30 and 70 years old and divided into 3 subgroups of 5 patients, who underwent myofascial release, laser, and myofascial release + laser (808nm – 100mW), carried out in 10 sessions. Lasting 15 minutes each session. The data was subjected to a Kolmogorov Smirnov normality test, subsequently to a Student-Newman-Keuls “t” test to compare them. Afterwards, a Tukey Kramer post-Hoc test was applied for multiple analyses, considering $p<0.05$. The results obtained showed that the combined action of myofascial release and laser for both pathologies resulted in a greater significant difference thus, it reduced the treatment time to 35 days. The follow-up after 60 days of the combined action intervention made it possible to maintain the patients’ improvement, providing full restoration of movements and absence of pain. Therefore, the combined interventions resulted in greater significant difference as well as in the patients’ improvement maintenance, both in relation to pain and movement limitation, promoting well-being and quality of life. This study was approved by human research ethics committee C.A.A.E. 55137522.4.0000.8148 and 70562523.2.0000.8148, in accordance with resolution 466/2012.

P-103

Marleny Elizabeth Márquez de Martínez Gerbi, Lara Marques Magalhães Moreno, Maria Regina Almeida de Menezes, Márcia Bezerra da Silva, Jéssica Meirinhos Miranda; Eloiza Leonardo de Melo, Wyndly Daniel Cardoso Gaião, Nathalia Seimi Deama, Allana Rodrigues Serrano, Rafaela Santana Freitas Monteiro, Aldo Brugnera Junior (Brazil)

Category: In vitro

Title: LASER BIOMODULATION IN THE PROLIFERATION AND ODONTOGENIC DIFFERENTIATION OF HUMAN UMBILICAL CORD MESENCHYMAL STEM CELLS THROUGH ARTIFICIAL INTELLIGENCE: IN VITRO STUDY

Aim: To evaluate the LASER photobiomodulation (FBM) in the proliferation and odontogenic differentiation of human umbilical cord mesenchymal stem cells (MSCs-UC) through the colorimetric assay of evaluation of cellular metabolic activity (MTT) and the AI program (artificial intelligence).

Material and methods: It consisted of obtaining a human umbilical cord through cesarean section. After an interval of up to 3 hours, MSCs were isolated and cultivated in DMEM medium. Phenotyping by Flow Cytometry was performed to confirm its nature. Stem cells were distributed into 4 groups: group 1 CONTROL - cells grown in DMEM medium; group 2 ODONTOGENIC - cells grown in odontogenic medium; group 3 FBM- cells grown in DMEM+FBM medium; group 4 ODONTOGENIC+FBM - cells grown in odontogenic medium + FBM. After 24 hours of plating, the cells were submitted to FBM followed by the following parameters 660nm; 10mW; 2.5 J/cm^2; spot 0.19cm^2 and the odontogenic medium. The proliferation curve was performed using the MTT assay, in the periods of 24, 48, 72 h after the beginning of the inductions. For the evaluation of the odontogenic cell

differentiation, Alizarin Red was used to detect calcic nodular formations, observed through microscopy in the periods of 7, 14 and 21 days after the inductions. Morphological images of the referred differentiation were obtained, which were submitted to histomorphometric analysis, through the Leica interactive measurement module software program, obtaining the total area (px^2) of calcic nodules formed in the wells. For AI analysis, the images were labeled in white and black. The white color represents the target information of the images, and the black color represents everything that is not the target to be segmented in the image. The results obtained were submitted to the Anova One-Way statistical tests complemented by the Tukey test, with a statistical significance of 5% ($p \leq 0.05$).

Results: After the MTT trial, there was no statistically significant difference (p 0.05) between groups for the 24h time. After 48 and 72 hours of inductions, there was no statistically significant difference (p 0.05) between groups 1 and 2. In the histomorphometric analysis, there was a statistically significant difference between all experimental groups at all times when compared to the control, except within 7 days for groups 2 and 3; however, these groups when compared to group 4 there was a statistically significant difference. In the analysis through AI, there was a statistically significant difference ($p \leq 0.05$) between all experimental groups at all times when compared to the control. At 7 days, group 4 showed a statistically significant difference from group 2. At 14 and 21 days, there was a statistically significant difference between groups 3 and 4 compared to groups 1 and 2.

Conclusion: Greater cell proliferation and Odontogenic differentiation was in the ODONTOGENIC+FBM group (group 4), followed by the FBM (group 3), ODONTOGENIC (group 2), and CONTROL (group 1) groups. The AI method generates more effective and easily reproducible results by building statistical models with labeled data without human intervention.

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Marleny Elizabeth Márquez de Martínez Gerbi, Lara Marques Magalhães Moreno, Maria Regina Almeida de Menezes, Jéssica Meirinhos Miranda, Nathalia Seimi Deama, Caio de Lima Pires, Maria Eduarda de Moura Albuquerque, Allana Rodrigues Serrano, Rafaela Santana Freitas Monteiro, Aldo Brugnera Junior (Brazil)
Category: Case report
Title: BENEFITS OF LASER PHOTOBIOMODULATION IN THE TREATMENT OF TRIGEMINAL NEURALGIA. CLINICAL CASE SERIES

Aim: The aim of this study was to report clinical cases of trigeminal neuralgia treated at the Laboratory and Laser Center (LABFOTONI) of the Faculty of Dentistry of the University of Pernambuco (FOP- UPE).

Material and methods: Red Laser was used (685nm, P30mW, 20J/cm^2 per session) and infrared (830nm P-40mW, 1.0 J/cm2 per point, 20 points = 20 J/cm2 per session), with a protocol of 12 sessions with intervals of 48 hours between them, which can be extended for another 12 sessions, according to the intensity of pain, through reports of cases treated at the Centro de Biofotonica da Faculty of Dentistry, University of Pernambuco, FOP-UPE. 12 patients were referred from several centers, with a diagnosis of trigeminal neuralgia, most already under treatment with drugs, without significant improvement. The evaluation was carried out through the patients' reports using the VAIS pain analogue scale (mild, moderate, severe and without pain) adapted by the Biophotonics Laboratory (LABFOTONI) of FOP-UPE, the information and data collected were described in the individual medical record at the end of each session.

Results: After 12 to 24 sessions of phototherapy, the disease regressed and the patient's general condition improved. Most patients reported the "no pain" level between the 10th and 12th session. However, two patients reported a "light" level remaining for a second series of Laser irradiation, for another 12 sessions. At the end of the second series of Laser irradiation applications, the patients were discharged for reporting that they had no pain. After the treatment, the patients were asked to return after 15, 30 and 90 days for a new evaluation, in order to verify if they still

had no pain. Ninety days after treatment, patients reported no pain.

Conclusion: With these findings, we can conclude in this study that Laser Phototherapy has proven to be a true tool for pain relief in patients with trigeminal neuralgia, reducing the need for more aggressive and invasive treatments (surgeries and anticonvulsant and antidepressant medications, analgesics and antidepressants, inflammatory), eliminating or reducing pain without compromising the sensitivity and motricity of the face, nor causing any chemical dependency or other side effects.

P-105
Toni Zeinoun, Georges Aoun, Mansour Chantiri, Samir Nammour, Sami El Toum (Lebanon)
Category: Original research: Clinical
Title: HISTOLOGICAL AND IMMUNOHISTOCHEMICAL EVALUATION OF Rh-BMP2: EFFECT ON GINGIVAL HEALING ACCELERATION AND PROLIFERATION OF HUMAN EPITHELIAL CELLS

Aim: This study aims to histologically and immunohistochemically evaluate the effect recombinant human bone morphogenetic protein (rh-BMP2) injected in gingival tissue has on the acceleration of the epithelial migration from the wound edges and epithelial cell proliferation after implant surgery.

Material and methods: The study includes 20 patients who underwent bilateral implant surgeries in the premolar-molar region of the mandible, followed by guided bone regeneration. Each patient received an implant in both locations, but rh-BMP2 was only on the right side. At 9 days from the surgery, a gingival biopsy was performed 3 mm distally to the last implant. In total, 20 samples were collected from the left side (control group #1) and 20 from right (test group #1). This was repeated at a 4-month interval during healing abutment placements. Tissues were processed and stained with hematoxylin-eosin and then immunohistochemically for the expression of Ki-67 and further histological examination.

Results: Complete closure of the epithelium with new cell formation was observed in the 55% test group and 20% control group after 9 days. At 4 months, although 100% samples of all groups had complete epithelial closure; the test group showed that the epithelial cells were more organized and mature due to the increased number of blood vessels. The average number of new epithelial cells was 17.15 } 7.545 and 16.12 } 7.683 cells per mm in test group, respectively, at 9 days and 4 months and 10.99 } 5.660 and 10.95 } 5.768 in control groups.

Conclusion: Evident from histological observations, rh-BMP-2 can accelerate the closure of gingival wounds, the healing process of epithelial gingival tissue, and the formation of epithelial cells in patients undergoing dental implant treatment.

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