

A drop of light for dentistry!



Abstract book

25th - 27th
MAY 2023,
Oradea, Romania

3rd
INTERNATIONAL
CONGRESS OF
LASERS IN
DENTISTRY

9th
INTERNATIONAL
CONFERENCE
ON LASERS IN
MEDICINE

Partners of the event:



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WELCOME ADDRESS

Dear colleagues,

It is a great pleasure for the Romanian Society for Laser in Dentistry (SRLS) to organise the Third Congress of Laser in Dentistry / 9th SRLS International Conference for Laser In Medicine.

The congress integrates many important topics and new developments in this high-end field of laser & biotechnologies in dentistry, thus offering participants the opportunity of enlarging their basic knowledge gathered after experiencing the prior editions.

One of the major goals of this congress is to establish new scientific and professional relationships and to exchange latest results of scientific research and clinical applications of laser therapy.

Moreover, this congress aims to attract both well-known researchers, practitioners as well as PhD students, young doctors and final year undergraduated students.

The exhibitions will present a wide range of laser devices used in dentistry and oral surgery but also the latest equipments and instruments used in nowadays medicine. The congress will also include hands-on, workshops, lectures of prestigious personalities all around the world, scientific papers and posters, which represent great opportunities for updating your knowledge.

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The conference will take place in Oradea, which is one of the largest cities in Romania. Oradea is located in the north-west of the country, nestled between hills on the Crișana plain, on the banks of the river Crișul Repede, that divides the city into almost equal halves. Oradea enjoys a high standard of living and ranks among the most livable cities in the country. The city is also a strong industrial center in the region, hosting some of Romania's largest companies. Besides its status as an economic hub, Oradea boasts a rich Art Nouveau architectural heritage and is a member of the Réseau Art Nouveau Network and the Art Nouveau European Route.

We welcome you on the occasion of these excellent scientific and social events and, last but not least, to discover Oradea's unique local splendor.

Prof. Dr. Carmen Todea, PhD, DMD

Congress President

President of Romanian Society for Lasers in Dentistry (SRLS)

Head of Department of Oral Rehabilitation & Dental Emergencies

"Victor Babes" University of Medicine and Pharmacy of Timisoara, Romania

Director of the Romanian branch of European master's degree in Oral Laser Applications (EMDOLA)

Director of European Division - World Federation of Lasers in Dentistry- European Division (WFLD-ED)

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CONFERENCE COMMITTEES

President

Prof. Dr. Carmen **TODEA** DMD, PhD (SRLS)

Organizing Committee

Prof. Dr. Alessandro DEL VECCHIO

Lecturer Dr. Ruxandra LUCA

Lecturer. Dr. Daliana MOCUȚA

Associate Prof. Dr. Mariana MIRON

Assistant Prof. Dr. Roxana MUNTEANU

Assistant Prof. Dr. Bogdan HOINOIU

Assistant Prof. Dr. Edmond CIORA

Prof. Dr. Cristian RATIU

Scientific committee

Prof. Dr. Carmen TODEA DMD, PhD

Prof. Dr. Samir NAMOUR

Prof. Dr. Adrian Podoleanu

Prof. Dr. Meda Lavinia Negrutiu

Prof. Dr. Francesco Spadari

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INVITED SPEAKERS



Francesco Spadari
(Italy)



Samir NAMOUR
(Belgium)



Meda-Lavinia Negruțiu
(Romania)



Adrian Podoleanu
(UK)



Roeland de Moor
(Belgium)



Carmen Todea
(Romania)



Alessandro Del Vecchio
(Italy)



Marisa Roncati
(Italy)



Marina Vitale
(Italy)



Markus Laky
(Austria)



Mihnea Constantin
(Romania)



Bogdan Crisan
(Romania)



Mariana Miron
(Romania)



Cosmin Sinescu
(Romania)



Virgil Duma
(Romania)



Ruxandra Luca
(Romania)



Marius Leretter
(Romania)



Konstantinos Valamvanos
(Greece)

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CONFERENCE SPEAKERS AND LECTURES (in alphabetical order)

Bogdan CRISAN	<i>Periodontal, peri-implant and oral soft tissue management with LASER</i>
Mihnea CONSTANTIN	<i>Laser Active Irrigation Techniques in the root canal therapy</i>
Roeland DE MOOR	<i>Laser-activated irrigation: a matter of bubbles and why these bubbles do matter</i>
Alessandro DEL VECCHIO	<i>The Photobiomodulation beyond the therapeutic window. New research horizons</i>
Virgil DUMA	<i>Investigations and Modeling of the Sintering of Ceramic Crowns</i>
Markus LAKY	<i>Oral applications of Erbium Lasers</i>
Marius LERETTER	<i>Immediate Implant Placement in Molar sites. From Laser Assisted Decontamination to Hyaluronic Acid Grafting</i>
Ruxandra LUCA	<i>Bone regeneration: from the surgical cut to photobiology</i>
Mariana MIRON	<i>Laser Doppler Flowmetry (LDF) – diagnostic tool in dentistry</i>
Samir NAMOUR	<i>Diode (980nm) Laser Assisted clinical non surgical treatment of Periodontal infra-bony Pockets</i>
Meda-Lavinia NEGRUTIU	<i>OCT Application in Dentistry: Interaction with the Soft Tissue</i>
Adrian PODOLEANU	<i>Optical Coherence Tomography with applications from embryology to dentistry</i>

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Marisa RONCATI	<i>Periodontal and Peri-implant Diseases: Differentiated Laser-assisted Surgical & Nonsurgical Protocols</i>
Cosmin SINESCU	<i>OCT Application in Dentistry Interaction with the Hard Tissue and Different Materials</i>
Francesco SPADARI	<i>Photobiomodulation laser therapies an atypical oral symptomatologies and burning mouth syndrome</i>
Carmen TODEA	<i>Prevalence of Laser in Implantology; Surgical Laser versus Photobiomodulation</i>
Konstantions VALAMVANOS	<i>The critical role of Photobiomodulation Therapy combined with A-PRF for the management of MRONJ cases</i>
Marina VITALE	<i>Mini-invasive dentistry and laser technology in Dental trauma</i>

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SCIENTIFIC PROGRAM

Main Topics:

- ✓ Photodynamic therapy in Dentistry
- ✓ Lasers in Oral Surgery & Implantology
- ✓ Lasers in Periodontology
- ✓ Lasers in Endodontics
- ✓ Lasers in Conservative Dentistry & Esthetics
- ✓ Optical Coherence Tomography
- ✓ Photobiomodulation

Official language:

English

Plenary Sessions:

Several international eminent experts will lecture during the congress on the main topics mentioned above.

Free Paper Sessions:

The presentation has to correspond to the submitted abstract. Please note that the Scientific Sessions are intended to be educational, not commercial or self-promotional. All Oral presentations will last no longer than 15 minutes including discussions. The Organizers will ensure all the technical support required. The presentation slides must be handed over to the slide center in order to facilitate the simultaneous translation one day before or in the morning of the presentation day. It is recommended to rehearse the presentations in order to get a realistic sense of timing at the slide center.

Poster Session:

Poster viewing will be available starting Thursday, 26.05.2023 throughout the congress period. A detailed discussion of each poster will be available during the poster session. The dimensions of the poster boards are 100 cm (height) and 70 cm (width). All the adhesive materials in order to mount the poster will

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be available at the Conference Administrative Secretariat. The poster exhibition area will be in the Varadinum Hall.

Hands-On Workshops:

The Hands-On Workshops 1 will take place in Donaris Hall and Workshop 2 will take place in Augustia Hall.

ADA Credits

This scientific event was approved by the American Dental Association and accredited with 22 international credits. ADA CERP is a service of the American Dental Association to assist dental professionals in identifying quality providers of continuing dental education. ADA CERP does not approve or endorse individual courses or instructors, nor does it imply acceptance of credit hours by boards of dentistry. Concerns or complaints about a CE provider, may be addressed to the provider or ADA CERP at www.ada.org/cerp.

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CONFERENCE PROGRAMME	
Thursday, 25.05.2023	
09:00-13:00	Registration
09:00-13:00	Course of Laser Therapy in Dental Medicine - Module I (with separate registration)
14:30-15:00	Opening ceremony of the Conference - Varadynum Hall
15.00-16:45	PLENARY LECTURES SESSION Chairmen: <i>Carmen Todea (Romania), Adrian Podoleanu (UK)</i>
15:00 - 15:30	Samir NAMOUR (Belgium) <i>Diode (980nm) Laser Assisted clinical non-surgical treatment of Periodontal infra-bony Pockets</i>
15:30 - 16:00	Marisa RONCATI (Italy) <i>Periodontal and Peri-implant Diseases Differentiated Laser-assisted Surgical & Nonsurgical Protocols</i>
16:00 - 16:30	Roeland DE MOOR (Belgium) <i>Laser-activated irrigation: a matter of bubbles and why these bubbles do matter</i>
16:30-16:45	Q. & A. session
16:45 - 17:00	COFFEE BREAK

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17.00-18:15	PLENARY LECTURES SESSION Chairmen: <i>Samir Namour (Belgium), Marisa Roncati (Italy)</i>
17:00 - 17:30	Alessandro DEL VECCHIO (Italy) <i>The Photobiomodulation beyond the therapeutic window. New research horizons</i>
17:30 - 18:00	Carmen TODEA (România) <i>Prevalence of Laser in Implantology; Surgical Laser versus Photobiomodulation</i>
18:00-18:15	Q. & A. session
18:30-19:30	General assembly of the Romanian Society of Lasers in Dentistry - Donaris Hall
20:00 -22:00	OPENING COCKTAIL
Friday, 26.05.2023	
09:00 - 13:00	Registration
09.00-10:45	PLENARY LECTURES SESSION Chairmen: <i>Alessandro Del Vecchio (Italy), Mariana Miron (Romania)</i>
09:00 - 09:30	Bogdan CRISAN (România) <i>Periodontal, peri-implant and oral soft tissue management with LASER</i>
09:30 - 10:00	Marina VITALE (Italy) <i>Mini-invasive dentistry and laser technology in Dental trauma</i>
10:00 - 10:30	Konstantions VALAMVANOS (Greece)

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	<i>The critical role of Photobiomodulation Therapy combined with A-PRF for the management of MRONJ cases</i>
10:30-10:45	Q. & A. session
10:45 - 11:00	COFFEE BREAK
11.00-12:15	PLENARY LECTURES SESSION Chairmen: <i>Roeland De Moor (Belgium), Marina Vitale (Italy)</i>
11:00 - 11:30	Markus LAKY (Austria) <i>Oral applications of Erbium Lasers</i>
11:30 - 12:00	Francesco SPADARI (Italy) <i>Photobiomodulation laser therapies an atypical oral symptomatologies and burning mouth syndrome</i>
12:00-12:15	Q. & A. session
13:00 - 14:00	LUNCH BREAK
14.00-16:15	PLENARY LECTURES SESSION Chairmen: <i>Ruxandra Luca (Romania), Francesco Spadari (Italy)</i>
14:00 - 14:30	Adrian PODOLEANU (United Kingdom) <i>Optical Coherence Tomography with applications from embryology to dentistry</i>
14:30 - 15:00	Meda-Lavinia NEGRUTIU (România) <i>OCT Application in Dentistry: Interaction with the Soft Tissue</i>
15:00 - 15:30	Virgil – Florin DUMA (România) <i>Investigations and Modeling of the Sintering of Ceramic Crowns</i>

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15:30 - 16:00	Cosmin SINESCU (România) <i>OCT Application in Dentistry Interaction with the Hard Tissue and Different Materials</i>
16:00-16:15	Q. & A. session
16:15 - 16:30	COFFEE BREAK
16:30 -18:30	ORAL COMMUNICATIONS SESSION Chairmen: <i>Carmen Todea (Romania), Markus Laky (Austria)</i>
	Laser Surgical Approach for upper labial frenulum -literature review and personal experience <i>D.F. Nica, M. Ravis, D. Chioran, C. Roi, A. Nicoara, S. Talpos</i>
	Pain therapy in orthodontics by laser biomodulation <i>A. Grigorescu</i>
	Laser Er:YAG-Assisted Debonding May Be a Viable Alternative to the Conventional Method for Monocrystalline Ceramic Brackets <i>D.E. Bojoga, M. I. Miron, D. Lungeanu, M. Mateas, E. Ogodescu and C. D. Todea</i>
	Photodynamic therapy in the decontamination of post-extraction sockets <i>C. Ratiu</i>
	The benefits of the preparation with the laser Er Cr YSGG vs convetional mechanic of hard tissue in the cervical area - SEM analysis - in vitro <i>A.D. Tudose, D.E. Rădulescu</i>
	Digitally designed and manufactured laser doppler probe holder for tooth vitality assesment – a preliminary study for a novel technique <i>E. Ciora, M.I. Miron, C. Todea, A. Jivănescu</i>

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	OCT Investigation of Dental Bleaching <i>E.L. Crăciunescu, D.M. Pop, C. Sinescu, B.D. Caplar, B. Hoinoiu, F.I. Topală, D.E. Bojoga, R.E. Luca, M. Romînu, M.L. Negruțiu</i>
	A micro-invasive approach to treating posterior mih lesions: a case report <i>M.V. Cîrdej, D. Bojoga, C. Todea</i>
	Laser Application In Periodontal Disease <i>T. Hajaj, AM. Heredea, C. Sinescu, E.L. Craciunescu, M.L. Negrutiu, D.M. Pop</i>
16:00 - 19:00	Workshop 1 – Donaris Hall Dr. Paul ICHIM <i>Asistentul meu, laserul dentar</i>
20:00 - 23:00	Galla Dinner Restaurant - ARMONIA VENUE
Saturday, 27.05.2023	
09:30 - 11:30	PLENARY LECTURES SESSION Chairmen: <i>Bogdan Crisan (Romania), Konstantinos Valamvanos (Greece)</i>
09:30 - 10:00	Mariana MIRON (România) <i>Laser Doppler Flowmetry (LDF) – diagnostic tool in dentistry</i>
10:00 - 10:30	Ruxandra LUCA (România) <i>Bone regeneration: from the surgical cut to photobiology</i>
10:30 - 11:00	Mihnea CONSTANTIN (România) <i>Laser Active Irrigation Techniques in the root canal therapy</i>
11:00 - 11:30	Marius LERETTER (România) <i>Immediate Implant Placement in Molar sites. From Laser Assisted Decontamination to Hyaluronic Acid Grafting</i>
12:00 - 13:00	Workshop 2 – Augustia Hall Dr. Ioana Cristina MIRON

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	<i>Avantajele utilizării unui simplu laser diodă în medicina dentară</i>
13:00 - 14:00	POSTER PRESENTATION Chairmen: <i>Mariana Miron (Romania), Cosmin Sinescu (Romania)</i>
14:00 - 14:30	CONGRESS CLOSING CEREMONY
15:00	POST CONGRESS TRIP

Meetings:

SRLS GENERAL ASSEMBLY: Thursday, 25.05.2023, 18:30-19:30

Exhibitors (in alphabetical order):

GURSK MEDICA

ELMEX

FOTONA

HALMADENT

HTP MEDICAL

PHILIPS

TEMCO

Hands-On Workshops:

GURSK MEDICA – FOTONA

HTP MEDICAL

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FURTHER INFORMATION

SCIENTIFIC AND ADMINISTRATIVE SECRETARIAT

Romanian Society for Lasers in Dentistry

Gheorghe Lazar 24 et. 4, SAD 28

300081 Timisoara, Romania

Contact : Prof. Dr. Carmen Todea

Lecturer Dr. Daliana MOCUTA

Phone: +40740 273 589

E-mail: congress.srls@gmail.com

TRAVEL AND HOTEL ACCOMMODATION

Romanian Society for Lasers in Dentistry

Gheorghe Lazar 24 et. 4, SAD 28

300081 Timisoara, Romania

Contact : Assist. Prof. Dr. Roxana MUNTEANU

Phone: +40768262643

E-mail: congress.srls@gmail.com

LASER EXHIBITION

Romanian Society for Lasers in Dentistry

Gheorghe Lazar 24 et. 4, SAD 28

300081 Timisoara, Romania

Contact : Lecturer Dr. Ruxandra Luca

Phone: +40752206703

E-mail: congress.srls@gmail.com

Or visit:

www.srls.ro

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REGISTRATION

In order to register for the Congress, please send us the completed **Registration Form**. The Registration Form can be filled from the Congress website <http://www.srls.ro/>. You will receive a **letter of confirmation** for your registration when the payment has been credited in the organizers bank account. After Sunday, 21.05.2023, registration will be possible only at the Congress Registration Desk starting Wednesday, 25.05.2023, 09:00 AM.

The Registration fee includes:

- access to the Scientific Sessions and Exhibition;
- conference bag;
- coffee or tea during the breaks;
- opening cocktail;
- lunch.

The Registration fee for students includes:

- access to the Scientific Sessions and Exhibition;
- conference bag;
- lunch;
- coffee or tea during the breaks.

The Accompanying person's fee includes:

- opening cocktail;
- lunch;

Cancellations:

Any cancellation request must be notified in writing form to the Congress Secretariat

NO Refunds will be processed **after the Congress**.

If your invoice has not been paid at the time of cancellation, all the amounts outstanding will still be due.

All the details for registration (eg. Payment method, account number etc.) are available on the website Registration form.

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SOCIAL PROGRAM



Thursday 25.05.2023 - 20:00 -22:00 o'clock Opening Cocktail

The welcome speeches will be followed by a cocktail.

Included in the Registration fee and

Accompanying Person's fee.

Address: 9, Aleea Ștrandului, Oradea, Oradea
410051

Friday 26.05.2024 - 20:00- 23:00 o'clock

Gala Dinner

The event will take place at
Restaurant ARMONIA VENUE,
Strada Anghel I. Saligny 11,
Oradea.

The fee is 50 Euro.



POSTCONGRESS TRIP TO MARAMURES

Saturday, May 27th after lunch, we will organize the departure to the Maramures county, considered one of the most traditional regions of Romania, Maramureș is a place full of history, tradition and gastronomy, ranking among the top places worth visiting at any time of the year.

Also called "the land of the wood", located at a distance of about 250 km from Oradea. The return in Oradea is scheduled for Saturday evening, May 28th. You will find attached a few pictures of the area.

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Maramures is the place where ancestral traditions, folk port and old art are preserved like nowhere else in Romania. That is why the strong point of tourism in Maramures is the village life. The traditional architecture of Maramures occupies a significant place in the art of woodworking in Romania and Europe, the originality of the villages in the area consists in the carved gates. These together with the wooden churches create the cultural space located on both sides of the Gutai - Tibles mountains.



The Merry Cemetery in Sapanta is unique in the world, surprising with its originality thanks to its intensely colored crosses, which depict scenes about the lives of those buried there and humorous texts that describe their existence in a funny way. The inspiration for these comes from the Dacian culture, where death was not considered a sad but a joyful event, where the life of the deceased was honored by their loved ones.



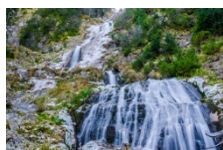
The first cheerful crosses were created by Stan Ioan Pătraș, a renowned sculptor from Maramureș, in 1935. His memorial house can be visited near the cemetery, as it has been transformed into a museum. More than 800 oak crosses, handmade by local craftsmen, with original inscriptions, are part of this unique cemetery in our country.



Viseu de Sus is located 60 km from Sighetu Marmatiei and 18 km from Borsa. The city itself is a tourist attraction, through its well-kept center with green spaces, through the new constructions alongside the traditional ones in which wooden architectural elements abound.



Vaser Valley is stretching over an area of 40 km, one of the many picturesque regions in Romania. Those who visited this area between May and October remember with enthusiasm the steam train "Mocănița" that circulates through the area. This is the last steam train in our country, and tourists are impressed by the fascinating landscape in the area that they can admire from the closed carriages of Mocănița.



The view from the steam train is amazing as it passes through green forests, steep cliffs and clear waters. Depending on the season, the ride on this unique train takes 6-7 hours, with a stop at Paltin. There you can have lunch or

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admire the magnificent views of the area. The Vaser Valley is also famous for its mineral water springs and polymetal deposits, which symbolize the volcanic activity in the area.

The Barsana Church is among the highest buildings of this type in Europe, being an exceptional viewpoint - 62 m. The monastery was built at the beginning of the 18th century. This reflects the strong faith of the locals as the hill on which the monastery now stands was a cemetery in the past. The villagers chose to build a symbol of God there, to give the once buried eternal rest.

This monastery is considered one of the most beautiful in Maramureş due to its impressive interior paintings. The colors white, red, blue and gold dominate the representation of religious scenes in them, with influences of the Baroque style.

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ABOUT Oradea (Varadinum)



General Information

Fast Facts

Location: North East Romania (County: Bihor)

Size: 22.4 sq. miles (58 sq. kilometers)

Elevation: (102-249 meters)

Population: 196,000

Inhabited since: 1113 BC

First documented: 1241 BC (*Várad*)



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City Highlights

Located just 10 km east of Romania's border with Hungary and spanning both shores of the Crisu Repede River, the elegant city of Oradea is a great starting point for exploring Romania, for visitors arriving, by car or train, from Central Europe.

First documented in 1113, under the Latin name Varadinum, the city was administered at various times by the Principality of Transylvania, the Ottoman Empire, and the Habsburg Monarchy. In 1598, the Oradea fortress was besieged, and, on August 27, 1660, it fell to the Ottoman raids, only to be seized in 1692 by the Austrians.

Until the construction of flood-banks along the length of the Crisu Repede River, Oradea was facing constant flooding threats. In 1836 a large part of the town was destroyed by fire. The picturesque town of present-day Oradea was rebuilt in the 18th century to the plans of Viennese engineer Franz Anton Hillebrandt following the then-trendy Austrian architectural style called Secession with its richly decorated facades of pale pink, blue, green and white. In addition to the many Baroque buildings, Oradea is remarkable for its particularly rich collection of Art Nouveau architecture.

Landmarks

Did you know that Oradea was designated the most beautiful Art Nouveau destination in Europe in 2022?

The city boasts 89 Art Nouveau buildings and monuments, 26 sites declared historical monuments, 25 sites proposed to be declared historical monuments and 38 sites of inestimable architectural value.

The town is crossed by the main road linking the Hungarian border with Cluj Napoca and Deva.

On opposite sides of the Crisu Repede River are the Union Square (Piata Unirii) and King Ferdinand Square (Piata Regele Ferdinand), off which runs Republicii

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street, a central pedestrian-only shopping street in Oradea, displaying an incredible number of Secession buildings.

In the summertime, the café terraces lining the banks of the Crisu Repede afford some great views of the town's lavish landmarks.

The Bishop's Palace (Palatul Episcopal), one of Oradea's most splendid edifices, was modeled on drawings by Italian architect Giovanni Battista Ricca and completed in 1770 by Austrian architect Franz Anton Hillerbrandt. Today the three-story, U-shaped mansion featuring 100 fresco-adorned rooms, 365 windows, and a facade punctuated with ionic capitals is home to the Museum of the Crisana Region (Muzeul Tarii Crisurilor).

The Roman Catholic Cathedral (Catedrala Romano-Catolica) in Oradea, built between 1752 and 1780, is Romania's largest Baroque religious edifice. Drawing on plans for the Church of the Gesu in Roma, the cathedral forms part of the architectural ensemble that Hillerbrandt designed, which includes the Bishop's Palace.

The Black Eagle Palace (Palatul Vulturul Negru), located in Piata Unirii, was built between 1907 and 1909 by Hungarian architects Marcell Komor and DezsoJakab. A glass-roofed art nouveau shopping arcade (Pasajul Vulturul Negru) runs through the two main buildings of the palace. Inside you will find shops, a four-star hotel, cafes and a cinema.

The late **Baroque Church of the Moon** (Biserica cu Luna), was completed in 1790. The clock mechanism, installed in 1793, features a half-gold, half-black sphere, maintained in perpetual motion, reproducing the phases of the moon and lending the church its name.

The The Greek Catholic Bishopric Palace, located opposite the Church of the Moon, was designed by local architect Kalman Rimanoczy Jr. Built in 1903, the edifice features a sophisticated eclectic combination of decorative elements: Neo-Romanesque, Neo- Gothic, Neoclassical and Neo-Byzantine.

The robust, asymmetrical, **City Hall** (Primaria) was designed, in 1903, by architect Kalman Rimanoczy Jr. as well.

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The building features a 170 feet-tall tower with four clocks – one on each of its sides - and three observation decks.

Local watchmaker Mezey Dezső built the main mechanism of the clocks, called the "mother clock", in 1904.

At the top of the hour the clock plays a fragment from Iancu's March (Marsul lui Iancu), a 1849 revolutionary song.

Oradea City Hall Tower is open to visitors Tuesday through Sunday.

Union Square or the Little Square (Piata Unirii), took shape at the beginning of the 18th century when the areas became the centre of Oradea New Town. Beginning with 1753, the square underwent a series of transformations: monumental buildings in various architectural styles were erected, street lighting was introduced and the city's first tram line – connecting the area with the railway station – was built. Seven architectural styles: Baroque, Classical, Eclectic, Historicist, Secession, Romantic and neo- Romanian can be admired while visiting Oradea's most popular promenade area: the Union Square.

The **State Theater** (Teatrul de Stat), a neoclassical structure that dominates the King Ferdinand Square (Piata Regele Fedinand), was designed in 1900 by Austrian architects Fellner and Hellmer, who also designed the Vienna Opera House.

Along one side of the King Ferdinand Square visitors can admire the undulating festoons and floral decorations of the Adorjan Houses (Casele Adorjan), built between 1907 and 1908 by Jakab and Komor, architects of the Black Eagle Palace.

Another exuberant art nouveau structure is the **Moskovits building** (Cladirea Moskovits), located at the corner of str. Independentei and str. Vasile Alecsandri. Designed by Kalman Rimanoczy Jr, the architect of the City Library and the Town Hall, it was completed in 1905.

Oradea's most imposing sight is the spectacular Oradea Fortress (Cetatea Oradea).

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The present shape of the five-point-star fortress was given in 1569, when Italian military architect Domenico da Bologna was commissioned with rebuilding it after repeated invader attacks.

One of its interesting elements is a network of underground channels that were supplied by ducts of warm water during the winter.

Throughout the year the citadel is host to several art exhibitions and craft fairs.

Museums



Oradea City Museum - Oradea Fortress

Address: Piața Emanuel Gojdu, nr. 39-41

Tel: 0241 617.012

Open:

Tuesday-Sunday: 10:00-14:00; 15:00-18:00 (last admittance at 16:00);

Admission charge

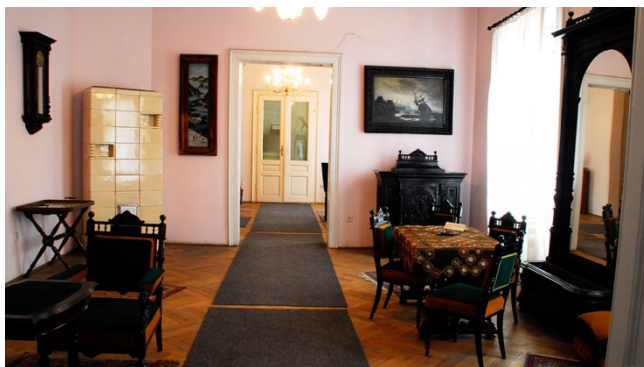
<https://muzeulmoo.ro/>

History has taken refuge in this city and invites you to visit each museum. In the Oradea City Museum located in Oradea Fortress, you will be able to explore art galleries dedicated to adults and children alike, permanent exhibitions - "General Traian Moșoiu. The First World War and the Liberation

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of Oradea", "'70s and '80s Disco" or the Griffon's Hall, but also a series of temporary exhibitions - "50 years of Romanian graphics 1970 - 2020" and "The inventions of the Middle Ages. Leonardo da Vinci in Oradea



Iosif Vulcan Museum

Address: 16, Iosif Vulcan Street, PC: 410041

Tel: 0359/466088

Open:

Tuesday - Sunday: 10.00 a.m. - 5.00 p.m.

Admission charge

<https://mtariicrisurilor.ro>

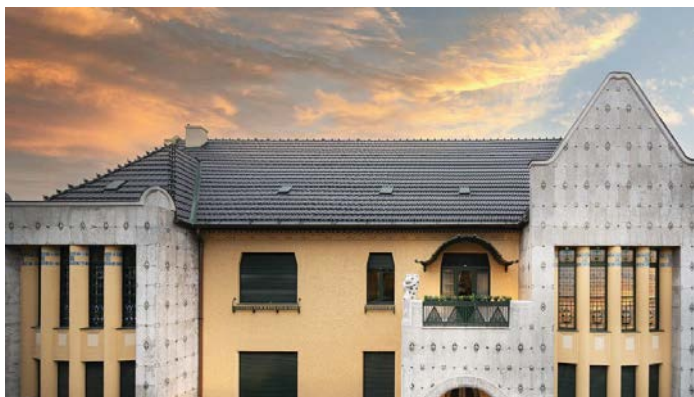
Here you will discover the collection of volumes from the author's work (history, poetry, theatre: *My Lira*, *The Romanian Pantheon*, *The Wounds of the Nation*, *The Gargoyles of Love* (manuscript), *The Sun with Rain*, *Bride for the Bride*), literary and historical magazine collection: "*Familia*", series I, II, III, IV, V, "*Luceafărul*", *The magazine of Royal Foundations*, "*Paper for heart, mind and literature*", "*The Three Rivers*", as well as documents containing several

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school papers belonging to Iosif Vulcan, Mihai Eminescu's debut at Familia magazine, some texts related to the admission of the scholar in the Romanian Academy, a manuscript hymn dedicated by George Enescu to the founder of the Transylvanian magazine, manuscripts such as a holographic poem signed by Mihai Eminescu, or texts signed by Vasile Alecsandri and George Coșbuc .

The title page reproduction of "Dimitrie Cichindeal. Reception speech" by Iosif Vulcan can also be found here, as well as reproductions after the correspondence between Dimitrie Sturza and the Transylvanian publicist



Darvas-La Roche House

Address: Str. Iosif Vulcan 11, Oradea 410041

Tel: 0771 553 065

Open: Wed. - Sun. 10 a.m. - 6 p.m.

Admission charge

Darvas-La Roche House, built between 1910 and 1911, adorned with numerous Viennese elements, with essential geometrical shapes, with white

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stone plate ribs and ceramic corner studs with metallic enamel, giving it a distinctive appearance. Today is the most beautiful Art Nouveau Museum.

The Darvas-La Roche House in Oradea, a symbolic building of the northwestern Romania city, is now hosting the first Art Nouveau Museum in the country.

Sub-section of the Oradea City Museum, the new Art Nouveau Museum includes permanent exhibitions dedicated to "La Belle Epoque" interiors from Oradea - it recreates the city's bourgeois life with original objects (furniture, decorations, documents), temporary exhibitions, video mapping projections, but also spaces for local artists' workshops, conference rooms, theater and event spaces, local Agerpres reported.

The rooms located on the first floor of the museum take visitors back to the early 20th century. They can visit the entrance hall, the dressing room, the living room, the gentlemen's lounge, the ladies' lounge, the maid's room, the kitchen, the pantry, and even the bathroom. Access to the bedroom is restricted, but visitors can still see the white painted maple wood furniture, inherited from the last owner

MUSEUM OF JEWISH HISTORY

Address: Strada Primăriei nr. 25,
Oradea
Tel: 0771 553 065

Open:

April 1 - October 31: Tuesday - Sunday, 10.00 a.m. - 6.00 p.m.; (last entrance at 5.30 pm) November 1 - March 31: Tuesday - Sunday, 9.00 a.m. - 5.00 p.m.; (last entrance at 4.30 pm)



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Admission charge

<https://www.oradeaheritage.ro/the-aachvas-rein-synagogue/?lang=en>

Starting from 1870, on the current location of the synagogue, there was a small house of prayer of the Jewish community. In the same period, the members of the Orthodox Jewish community in Oradea created the first societies for self-help and charity. Such entity is "Chebra Ahab Reim " ("Jewish Orthodox Benevolent Association"), which was intended to provide social and financial assistance for those in difficulty. As you can guess, the name of the Aachvas-Rein Synagogue comes from this association.

Due to the substantial increase of the community, the prayer house became way too small, so the work for its expansion began in 1912. Noting the degradation of the building, in 1926 a new synagogue was built, by architect Pintér István and manufacturer Weimann Béla.

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ABSTRACT - PLENARY LECTURES



Prof. Adrian Podoleanu is Head of the Applied Optics Group, Professor of Biomedical Optics at the University of Kent, Canterbury, UK. He leads the research of the Applied Optics Group, oriented on high resolution noninvasive imaging with emphasis on optical coherence tomography. Honorary professor in the University College London, a Doctor Honoris Causa of the “Victor Babes” Medicine and Pharmacy University of Timisoara and former visiting professor in the New York Eye and Ear Infirmary. Awards: Coroana Romaniei (Order of the Crown), officer, Royal House of Romania, 2017; Royal Society Wolfson Research Merit Award, 2015;

Optical Coherence Tomography with applications from embryology to dentistry

The presentation will review technical perspectives of recent developments in optical sources and signal processing for optical coherence tomography (OCT) that with further refinements can be translated to better imaging relevant to medical imaging and biosciences. More than 50% of reports on OCT are on ophthalmology and optometry.

I will present recent developments in two other very distinct areas with high potential. Monitoring the development of embryos at their early stages may provide information on their health with implications in animal welfare and meat production, as well as for their selection in human IVF. In such applications, micron transversal resolution is important while axial range is limited, to less than 0.1 mm. This relaxes the need for large penetration depth, while interface optics requires versatility in changing microscopy objectives for quick identification of features. In dentistry, both gum observations and dental

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constructs inspection are less demanding in terms of transversal resolution needed, while the large axial extension demands enhanced penetration depth. The presentation will refer to the best choice of OCT method to suit the two applications. Also, how to design the interface optics to best facilitate inspection of samples in embryology and dentistry.



Prof. Dr. Samir Namour, DDS, MSc, PhD, Agr
General Director of the European Inter-University
Master of EMDOLA;
Director of the European Master: "Oral Laser
Applications" (EMDOLA);
Director of the Post-graduate: Laser in Dental
Medicine;
Chairman of International relations and legal affairs of
the WFLD;
Department of Dental Sciences, Faculty of Medicine,
University of Liege, Belgium

Diode (980 nm) Laser-Assisted clinical non-surgical treatment of periodontal infra-bony Pockets

Background: Mechanical debridement is the gold standard in the periodontitis therapy. However, it is suggested that adjunctive use of lasers can result in a more effective treatment outcome. Objective: Evaluate the efficiency of diode laser-assisted nonsurgical therapy of periodontitis as adjunctive to scaling and root planing (SRP). Methods: One hundred sixty vertical bone defects [pocket depth (PD) at baseline ± 6 mm] had been randomly allocated to receive SRP alone (group C) or SRP coupled to a diode laser (980 nm) protocol (group C+L): SRP, irrigation with hydrogen peroxide solution (3%), de-epithelization of the internal and external gingiva followed by blood stabilization, and coagulation by laser beam were made. Beam parameters: 10 lsec/pulse duration, 10 kHz, pick power of 10 W, average power of 1 W, and fiber diameter of 400 μ m. Plaque index (PI), bleeding on probing, gingival recession (GR), clinical

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attachment level (CAL), and PD were measured at baseline, at 6 weeks, 12 weeks, 18 weeks, 6 months, and 12 months. Microbiological data were collected randomly from 26 pockets from both groups at baseline, 6 weeks, 12 weeks, and 6 months after treatment. Results: At all periods of follow-up, there was a significant difference between both groups in all clinical parameters except in GR. In group C+L, 76 % of pockets had PD: 3 mm after 12 months of follow-up and an average of PD = 1.77 ± 0.46 mm, while 56% of pockets in group control (C) had an average of PD = 5.00 ± 0.83 mm after 12 months of follow-up. Total bacteria count in group C+ L was significantly lower compared to group C only at 12 weeks and 6 months of follow-up. Furthermore, there was high significant decrease in the number of *Aggregatibacter actinomycetemcomitans*, *Porphyromonas gingivalis*, *Tannerella forsythia*, and *Prevotella intermedia* at all the follow-up periods. Conclusions: As adjunctive to SRP, diode laser-assisted nonsurgical therapy of periodontitis has significantly improved clinical parameters of PI and POB and has significantly reduced the clinical attachment loss (CAL) and PD compared to the control group after 1 year of follow-up. A significant reduction in periodontal pathogens has been observed in group C+ L only at 12 weeks and 6 months of follow-up.



Dr. Bogdan Crișan – is an faculty expert lecturer for „Laser and Health ACADEMY” on domain of laser application in surgery and dentistry, with over 16 years experience in the use of lasers diodes on soft tissues and with over 10 years of experience in the use of lasers on hard tissues. In 2011 he got his certificate of complementary studies in "Therapeutic and surgical use of laser in dentistry" and the “Phd” in Medical Sciences in 2013, with his doctorate on

the subject of the use of laser in treatment of vascular malformations and oral soft tissues benign tumors. His scientific activity has resulted in the participation in numerous national and international scientific meetings,

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where he gave lectures and oral presentations related to the use of laser in oral surgery, periodontal disease, peri-implantar complications and dental aesthetics. He published as first author and co-author a numerous scientific paper in national and international journals. Is an active member of the Romanian society of Lasers in Dentistry (SRLS) affiliated to WFLD (World Federation for Lasers in Dentistry). He is currently Lecturer at the " Iuliu Hațieganu" University of Medicine and Pharmacy Cluj- Napoca and associate laser practitioner at two private clinics in Cluj.

Periodontal, peri-implant and oral soft tissue management with LASER

Many types of lasers have been described for oral soft tissues, including the diode lasers, Nd:YAG laser, CO2 laser and also Er:YAG laser. The laser – tissue interaction is determined by the absorbtion of the laser light in different chromophores contained in the structure of soft tissues. The laser can be an very useful tool in removing or remodeling soft tissues, both around natural teeth and dental implants.

Several modalities of use of diode laser (980 nm), Nd:YAG laser (1064 nm) and Er:YAG laser (2940 nm) in diseases of the oral and peri-implant soft tissues were analyzed in the present study on selected groups of patients. The laser was used for incision, excision or vaporisation of oral and peri-implant soft tissue. Clinical cases with oral and peri-implant soft tissues diseases will be exemplified from the point of view of laser management. Cases have been documented clinical regarding pre and post-operative asspect of oral soft tissues and postoperative patient comfort developments related to the procedure. Laser-assisted interventions have been validated as reliable methods to improve patient comfort during and after procedures in the oral regions owing to their advantages regarding shortening of intervention and healing duration.

Laser radiation from the near infrared spectrum also has a photobiomodulation effect on the soft tissues of the oral cavity. The role of the low-level laser energy in combination with nanocomposite membranes releasing substances with an antimicrobial effect have been studied in the case of the treatment of periodontal disease. In experimental animals with induced periodontal defects, nanocomposite membranes releasing - gentamicin were used in combination with 635 nm diode laser for its photobiomodulation

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effect. The preliminary results of this experimental study, financed by the project “The nanocomposite membrane releasing substances with an antimicrobial effect for the treatment of periodontitis” (PN-III-P1-1.1-TE-2021-0531), will be presented.



Prof. Dr. Marina Consuelo Vitale MD., DDS, PhD is graduated in Medicine and Surgery (1986) and specialized in Stomatology and Orthognatic in University of Pavia (Italy).

She specialized in “Laser assisted oral surgery” at University of Paris V (France) where she carried on research in laser applications and worked with professors Jacques and Françoise Melcer.

Lecturer in the proficiency course "Laser in Dentistry" at University of Florence and

Professor in the International Master of “Laser in Dentistry” at University of Genova and in “Master de Odontologie Laser” at University Sophie Antipolis in Nice (France), she is currently Director of Master of “Laser assisted Dentistry” in University of Pavia and Professor of Paediatric Dentistry, Community Health Dentistry and Medical Techniques applied in Paediatric patient in School of Dentistry, School of Hygiene and School of Specialization in Orthodontic in University of Pavia.

She has published many works in Italian and International scientific journals, and she has taken many lectures in National and International Congresses all over the world. Since 1990 she is active member in World Federation for Laser Dentistry (WFLD) and in Italian Society of Paediatric Dentistry (SIOI).

Mini-invasive dentistry and laser technology In Dental Trauma

In Paediatric Dentistry, dental traumas are very common, and they represent a real emergency. Maxillary central incisors (50%) and maxillary lateral incisors (30%) are the teeth most frequently affected, in primary and in permanent dentition.

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Dental traumas require a precise therapeutic choice in order to promote the correct evolution of dento-alveolar structures. Nowadays, the evolutions of technologies and restorative materials have improved the prognosis in dental trauma, realizing a mini-invasive dentistry with better aesthetic results, if compared to the past.

Laser technology represents a new therapeutic strategy to obtain a better patient's compliance and a micro-invasive restoration of the traumatized teeth. In fact, laser could simplify and reduce the treatment time, perform, in the same time, decontamination of the treated dental and/or gingival surface, a more conservative preparation in respect of dental anatomy

Laser light is able to produce the phenomenon of photo-bio-stimulation on the irradiated tissues, inducing anti-inflammatory and anti-oedemigenous effects, reducing post-traumatic pain, avoiding the necessity to take medications and promoting tissue repair. Unfortunately, there are no well-coded guidelines for laser applications in these clinical events.

Aim of this lecture is to give some guidelines and protocols with specific doses and application sites.



Prof. Dr. Meda-Lavinia Negruțiu is habil. professor at the "Victor Babeș" University of Medicine and Pharmacy Timișoara, Faculty of Dentistry, Prostheses Technology and Dental Materials Department. Her research activities and competences are in the fields of dental materials and prostheses technology, alternative technologies in prosthodontics; imagistic investigations in dentistry – optical coherence tomography, polymer injection technology;

numeric simulation studies; soldering and welding technologies (plasma, laser); unconventional technologies of investigation, analysis, prognosis in dentistry. She was part of the research group that developed the first Time Domain Optical Coherence Tomography and the first Spectral Domain Optical Coherence Tomography Systems dedicated to dentistry in the east of Europe. She has 557 scientific works – 255 of them published (137 listed on the ISI Web

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of Science) and 302 oral communications at meetings in Romania and abroad. She is an author and coauthor at 21 monographies and 6 courses, co-author of one accorded (RO 121317 B1 /29.05.2009) and three in work OSIM patents. She is/was member in the research team of 11 grants - by 3 of them as project manager and 1 partner project responsible. She was member in the Management Comitee, representing Romania, of the FP7 COST Action MP 1005 and FP7 COST Action FP1101. According to Web of Science, the Hirsch index is 9. The address of the researcherid.com profile is: <http://www.researcherid.com/rid/B-6974-2008>.

She is Visiting Profesor in the School of Physical Sciences, University of Kent, Canterbury, UK. She is member of the Romanian Society of Biomaterials, West Romania Multidisciplinary Research Association, Romanian Society of Lasers in Dentistry, Romanian Society of Esthetic Dentistry, SPIE, OSA, ADEE.

OCT Application in Dentistry: Interaction with the Soft Tissue

Oral squamous cell carcinoma (OSCC) represents more than 90% of oral cancer. Early detection is a cornerstone to improve survival. Interaction of light with tissues may highlight changes in tissue structure and metabolism. Different imagistic methods were employed for this goal. Oral Velscope, Oral ID and optical coherence tomography were used for soft tissue evaluation and the validation was performed by histology method. Optical coherence tomography (OCT), as a non-invasive diagnosis method, is a new high-resolution optical technique that permits tri-dimensional (3-D), real-time imaging of near surface abnormalities in complex tissues. In this study half of the excisional biopsy was directed to the pathologist and the other half was assigned for OCT investigation. Histopathology validated the results. Soft tissue plastination could also be used for evaluation and validation for both histology and OCT methods.

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Prof. Dr. Cosmin Sinescu is full professor at the "Victor Babeș" University of Medicine and Pharmacy Timișoara, Faculty of Dentistry, Prosthesis Technology and Dental Materials Department. The Habilitation Thesis (2015) was focused on new methods of diagnostic and forecast in dentistry. His main research interests and competences include invasive and noninvasive, destructive and nondestructive methods of investigations in dentistry, dental materials, bioengineering, biocompatibility, optoelectronics, imagistic investigations in dentistry –

optical coherence tomography, management of scientific research projects in medicine and pharmacy; principles and applications of optical coherence tomography; modern optical testing – field guide to interferometric optical testing; structural adhesives for optical bonding; principles of diffraction, interferometry, holography and diffractive optical elements, synchrotron investigation. He was part of the research group that developed the first Time Domain Optical Coherence Tomography and the first Spectral Domain Optical Coherence Tomography Systems dedicated to dentistry in the east of Europe. Since 2005 he is a Visiting Senior Research Fellow in the Applied Optics Group at the University of Kent at Canterbury, UK. He is member in the research team of 14 grants – by 4 of them as project manager. He published many papers in ISI refereed journals and conference proceedings. The address of the researcherid.com profile is: <http://www.researcherid.com/rid/G-1528-2011>. He is a member of SRLS, SSB, SRB, IEEE, OSA and SPIE.

OCT Application in Dentistry Interaction with the Hard Tissue and Different Materials

Direct composite restorations imply the use of a dental adhesive which bond the tooth structure to the composite material. However, this layer could easily fracture and lead to microleakage, secondary cavity and the failure of the restoration. The adhesive layer is also hard to identify and evaluate on the imagistic methods such as optical coherence tomography.

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The aim of this research was to evaluate a new class of dental adhesive mixed with different micro and nanoparticles in order to increase the scattering of the adhesive layer and the strength of the bonding, while the adhesive layer will decrease in thickness.

The magnetic nanoparticle seems to be able to achieve those goals except the aesthetic appearance of the entire direct restoration.

One solution is to encapsulate in a polymeric shell the magnetic nanoparticle to accomplish this aspect, too.

Each component contribute to achieve this goal: Fe₃O₄ nanoparticles have biocompatible, non-toxic properties and also antimicrobial effects; the SiO₂ layer significantly increases the mechanical strength of the material and the Ca(OH)₂ layer initiates local calcification and significantly improves the color of the dental composite material.



Virgil - Florin Duma is Professor of Engineering at the Aurel Vlaicu Univ. of Arad (UAVA), head and founder of the 3OM Optomechatronics Group, and currently PI of a PED and of a Bridge Project, as well as WP Responsible of a POC and of a PTE grant of the Romanian National Authority for Scientific Research (<http://3om-group-optomechatronics.ro/>). In the last ten years Prof. Duma has thus secured funds in excess of 2M Euro for his group. He received his PhD cum laude in 2001, from the Polytechnic Univ. of Timisoara

(UPT), Romania, after graduating at UPT in Fine Mechanics & Optics in 1991, valedictorian. He has worked at UPT since graduating until 2001, when he moved as an Assoc. Prof. at the UAVA, where he reached full professorship in 2006. He was awarded for 2009-2010 a Fulbright Senior Research Fellowship at The Institute of Optics, Univ. of Rochester, NY, where he currently holds a Visiting Scientist position. He is also Visiting Senior Research Fellow at the Univ. of Kent, Canterbury, UK, as well as Adjunct Prof. at the West Univ. of Timisoara and at UPT (at the latter, as PhD supervisor). Prof. Duma defended his

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Habilitation Thesis in 2013 at the Polytechnic Univ. of Bucharest. He is author of more than 250 publications in journals and conferences, 15 books & book chapters, 1 patent awarded and 2 patent applications pending, with around 30 Invited Lectures at int'l conferences and universities (https://www.researchgate.net/profile/Virgil-Florin_Duma). Prof. Duma is a reviewer for more than 20 journals in ISI Web of Science, as well as for several national and int'l grant programs. His main research interests are in Measuring Systems, Optics, and Optomechatronics. He is a member of OSA, a Senior Member of SPIE, and a Life Member of the Fulbright Association.

Investigations and Modeling of the Sintering of Ceramic Crowns

We report an objective calibration procedure of dental ovens. Their loss of calibration can be a major issue for the quality of dental crowns: temperatures that are lower than those indicated by the manufacturer result in unbaked ceramics, while temperature that are higher than indications result in ceramics that are glassy and have even defects that can lead to fractures. The developed procedure is utilizing non-destructive evaluations based on Optical Coherence Tomography (OCT), using in-house developed experimental Swept Source (SS) OCT systems, Master-Slave (MS) enhanced. Two types of dental crowns have been approached: metal-ceramic and all ceramics, in two consecutive studies [doi: 10.3390/app7060552, <https://doi.org/10.3390/ma12060947>]

Statistically relevant study groups were considered for each type of crowns. En-face OCT images and B-scans were obtained, processed, and analyzed. The first study extracted qualitative rules-of-thumbs for assessing the level of temperature in the ovens. The second study went further on to quantitative assessments: reflectivity graphs were obtained from the OCT images, modelled mathematically, and various parameters were deduced and tested in order to carry on the planned assessments. Finally, the most appropriate parameter was demonstrated to be the ratio of the filtered maximum and minimum of the reflectivity curves: it continuously increases as the temperature strays from the normal level. The performed studies demonstrate that OCT can be utilized to test objectively the loss of temperature calibration of dental ovens, using only the manufactured crowns (and not other samples, thus cutting the testing costs). Also, a quantitative parameter was obtained to evaluate this calibration loss, which can be thus corrected.

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Prof. Dr. Darinca Carmen Todea is Head of Department of Oral Rehabilitation and Dental Emergencies, “Victor Babes” University of Medicine and Pharmacy, Timisoara. She is Co-Director of the European master’s degree in Oral Laser Applications at Timisoara University Branch and visiting senior lecturer in the School of Physical Sciences, University of Kent, Canterbury, UK. Professor Todea main research interests include laser application for investigations and treatment in dentistry, laser

biomodulation as a noninvasive and nondestructive treatment method, dental materials, bioengineering, biocompatibility, optoelectronics. She is fellowship in WFLD, SOLA, WALT, ASLMS, SPIE and vice president of ED-WFLD (European Division of World Federation of Laser Dentistry). Since 2003 she is Founding member and President of SRLS (Romanian Society of Lasers in Dentistry). She was President of the congress for the past six editions of International Congress for Laser in Medicine. Prof. Todea was editor of the SPIE ISI Proceedings, for The Fifth and six International Conference on Lasers in Medicine. Since 2018 she is , Co-editor in the section of Laser dentistry in the Dentistry Journal.

In the field of laser dentistry, she has since 1990 a research team focused on laser application in dental medicine. She has the Advanced Proficiency Certification from ALD (Academy of Laser in Dentistry) in the use of Er:YAG and Nd:YAG Laser in dentistry and the Competency for „Laser – Dental Therapy”.

Prevalence of Laser in Implantology; Surgical Laser versus Photomodulation

Nowadays, oral rehabilitation with dental implants represents a treatment method, which is well integrated in the daily practice. The use of lasers has become increasingly common in the field of implantology, and there is a growing need for a deeper understanding of the procedure and its effects on tissue. Their numerous advantages and applications of laser on soft and hard tissue surgeries make them a great alternative to conservative methods in dental implantology.

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The lecture will present the most important applications of using surgical laser but at the same time those application of therapeutic lasers for photobiomodulation.

The use of surgical laser radiation has shown to be an alternative or adjunctive treatment for bone tissue ablation due to the vaporization of the tissues and absence of the smear layer. The goal is to obtain a good osseointegration, to have a direct bone-to-implant contact (BIC), without the interposition of any other types of tissues.

Laser photobiomodulation become a hot topic in implant dentistry being extended to clinical practice due to the positive effects of laser radiation on bone metabolism, as observed especially in the consolidation of fractures. The effects of photobiomodulation (PBM) on implants have been explored with regard to both the connective tissue cells, as well as cells mediating osseointegration. Laser irradiation at the grafted site stimulated osteogenesis during the initial stages.

Our conclusions lead first to the possibility of applying immediate occlusal loading after laser preparation of implant bed and how the use of the laser compared to the traditional drill leads to the presence of a greater share of lamellar bone and a lower necrotic share in the implant site. Second, we demonstrated that laser photobiomodulation therapy is effective in short periods on bone density and bone regeneration.



Prof. Dr. Konstantinos Valamvanos DDS, PhD

Graduated from Athens Dental School and has a PhD in Removable Prosthetics. Since 2010 is the Director of the Dental Dpt. of NHS Hospital "ALEXANDRA". He is President of the Hellenic Dental Association of NHS, Member of WALT, HELSOLA and since 2018 elected member of the Board of WFLD-ED. He has been trained in Oral

Laser Applications in Athens and Vienna. He has attended more than 150 congresses and seminars. He has given more than 50 lectures in a variety of

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topics such as Removable Prosthetics, Laser Physics/Safety and Phototherapy in Oral Pathology.

He is specialized in treating patients with a severe medical history and in Oral Phototherapy Applications, whereas the conventional dental approach is ineffective.

“The critical role of Photobiomodulation Therapy combined with A-PRF for the management of MRONJ cases”

Medication-Related OsteoNecrosis of the Jaws is an adverse drug reaction consisting of progressive bone destruction that can occur after exposure to certain agents (bisphosphonates, denosumab or angiogenesis inhibitors) predominantly used to reduce skeletal complications in patients with malignant or osteometabolic bone diseases. The etiology of MRONJ still remains unclear, the pathogenesis seems multifactorial and associated with medication -related risk factors, local trauma, infection and systemic comorbidities. Despite the growing body of evidence that has been published on the diagnosis, staging, prevention and management of this debilitating complication, specific and predictable guidelines for successful treatment are still lacking. Besides the conservative non-surgical and extensive surgical procedures, alternative treatments have been also proposed like teriparatide, bone morphogenetic proteins, platelet concentrates, hyperbaric oxygen, ozone therapy and lasers but still are all considered as adjunctive therapies. Regarding lasers, the high-power Erbium family has been effectively used either for bone debridement or evaporation of necrotic sites, due to the increased (wavelength-dependent) absorption from water and hydroxyapatite. Photobiomodulation Therapy (PBMT) has also been introduced into the clinical practice as it possesses anti-inflammatory, analgesic and biostimulatory properties with favorable action on wound healing and bone formation. The combined approach including piezosurgery +A-PRF + PBMT that has been successfully used in our dental department will be presented.

The utilization of different high-technology devices with minimally invasive surgical techniques can result in reduced postsurgical morbidity, pain elimination, tissue healing promotion and bone regeneration, representing an interesting therapeutic modality for the management of different MRONJ cases.

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Assoc. Prof. Dr. Mariana-Ioana Miron

DMD, PhD Dental Consultant

Part of the teaching staff, since 1998, in the Faculty of Dentistry, University of Medicine and Pharmacy "Victor Babes" from Timisoara, Romania. Currently, she is Assoc. Prof. in the discipline of Oral Rehabilitation and Dental Emergencies, Department 2 and Dental Consultant in the Dental Ambulatory of the Emergency Municipal Clinic Hospital, Timisoara.

The teaching activity implies lectures holding, as well as seminars and practical laboratories within the disciplines of Oral Rehabilitation and Dental Emergencies, Methodology of Medical Scientific Research and Patients with Risk in the Dental Practice. The research activity cover participation in research projects, both as project manager and member, publication of articles as well as presentation of numerous scientific materials in national and international specialty manifestations. She had a PhD. in dental medicine since 2005, with the thesis *Using Lasers in Periodontal Diseases*. Also, she is Lecturer in E.M.D.O.L.A. (European Master of Dental Oral Lasers Applications), founding member and vice-president of SRLS (Romanian Society of Lasers in Dentistry).

Laser Doppler Fowmetry (LDF) – Diagnostic tool in Dentistry

The health status of the dental-periodontal tissues is mandatory for maintaining the dento-maxillary system functions in optimum parameters. The first indicator of an injury is the change in the microcirculation so, knowing the evolution of the vascular micro-dynamics at the level of the gingiva and the dental pulp, as well as its significance, would allow a correct and early diagnosis of the dental-periodontal tissues. The laser Doppler flowmetry (LDF) technique was first described in the specialty literature in 1986 by Gazelius, as a procedure of recording the blood flow in the human dental pulp and the phenomenon on which it is based was first reported by Christian Doppler in 1942. Currently, LDF is used in dentistry as a diagnostic tool and essentially it

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is acknowledged being a noninvasive method of recording the blood perfusion at micro-vascular level, which allows continuous and real-time recordings.

There are numerous applications of LDF in the dental research as well as in the dental practice, this method being particularly used for the investigation of microcirculation and vitality of the dental pulp and gingival/ mucosal blood flow.

The biggest challenge was to achieve a specific acquisition technique and very good control of the disturbing factors of the laser Doppler signal. The main requests of the LDF technique are stability of the probe, insulation of the recorded area, the reproducibility of the signals, which required the fixation of the probe in the same position each time. Essential aspects for validating the LDF signal are the level of the signal as well as its pulsatile character.

The great advantage of the LDF technique is that provides data which evaluate the evolution of the vascular flow dynamics before the appearance of the clinical signs.



Dr. Marisa Roncati, BS, RDH, DDS.

Teacher in Dental School, Albanian University.
Assistant Professor: Master of Prosthesis and Implantology, Bologna University (2008-2020);
European master's degree on Oral Laser Applications (EMDOLA), Parma and Rome University, and master's degree in Oral Surgery and Pathology, Parma University, Italy. Invited Lecturer for Harvard School of Dental Medicine, Continuing Education programs.

Periodontal and Peri-implant Diseases: Differentiated Laser-assisted Surgical & Nonsurgical Protocols

The surgical treatment of periodontal and peri-implant diseases should always follow nonsurgical therapy and performed only when initial treatment results are unsatisfactory. Periodontal patient management and modus operandi will be discussed.

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Guidance will be provided on differentiated protocols. The use of modified subgingival debridement techniques, state-of-the-art technologies, cause-related laser-assisted nonsurgical periodontal therapy, and novel materials to obtain effective decontamination of the implant surface will be fully illustrated. Innovative materials for a multi-antimicrobial approach will be also reviewed. Specific protocols for mucositis and/or peri-implantitis will be outlined and discussed. The nonsurgical approach has proven effective for mucositis, when adequate home care is combined with mechanical instrumentation, and can sometimes even prolong the survival of severely ailing implants. In addition, for patients who may not be able to accept surgical management for any reasons, the dentist must evaluate the potential for a nonsurgical approach to achieve reasonable long-term results. Clinical cases will be used to demonstrate how patient home care performance can influence the clinical management and outcomes, as well as to document satisfactory clinical stability following periodontal nonsurgical treatment. Although it is often possible to treat periodontal and peri-implant disease, prevention remains the best cure.



Prof. Dr. Marius Leretter DDS, PhD

University lecturer at the Department of Prosthetic Dentistry, Faculty of Dentistry at UMF Timișoara. Member of the Association for Multidisciplinary Research, the National Union of Dental Associations, the Balkan Dental Society, the Deutsche Gesellschaft für Zahnärztliche Implantologie, and the Romanian Society of Lasers in Oral Medicine.

Immediate Implant Placement in Molar sites. From Laser Assisted Decontamination to Hyaluronic Acid Grafting

One of the most stressful moments for a patient is the day of extraction. The legitimate question is: “Doctor, when am I getting my tooth back?” The answer

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is many times disappointing: “Let it heal, let the chronic infection go away and then will see”

Immediate Implant placement in the single root sites is more or less manageable and nowadays predictable. The Immediate Implant Placement for the 2-3 root sockets is more technique sensitive. Furthermore, in the lateral areas we have anatomical limitations, like the maxillary sinus and mandibular canal, that should be taken into consideration.

The author is presenting a case-series of Immediate Implant Placement in Molar Sites using Photodynamic Therapy, Osseodensification, Piezosurgery, PRF and Hyaluronic Acid Sticky Bone as main techniques to achieve predictable long term results.



Private lecturer **Markus Laky** MD, DMD, MSc
Division of Conservative Dentistry and
Periodontology, University clinic of dentistry
Medical University of Vienna, Austria; Course
Instructor SOLA Academy; Senior staff, Division of
Dental Student Training and Patient Care, School of
Dentistry, Medical University of Vienna.

Oral applications of Erbium-Lasers

Er:YAG and Er,Cr:YSGG lasers are promising tools for different fields in dentistry. Erbium-Lasers can be used for cavity preparation. Additionally, available evidence suggests that subgingival and submucosal debridement with Erbium-Lasers may help in reducing periodontal and peri-implant mucosal inflammation. Erbium-Lasers have the capability to perform minimally invasive regenerative periodontal procedures and might be important devices in the treatment of peri-implantitis. Erbium-Lasers could also be used as an adjunct treatment in the root canal in endodontic therapy.

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Prof. Dr. Francesco Spadari

Head of Unit of Oral Pathology and Medicine - Dental and Stomatological Hospital - University of Milan-Head Chairman Prof. Franco Santoro, from October 1999.

National Habilitation to Full Professor

Member of ITALIAN ASSOCIATION OF ORAL MEDICINE AND ORAL PATHOLOGY.

Member of SILO Societa' Italiana Laser in Odontostomatologia. Speaker at national and international congresses. Author of scientific publications in national and international journals.

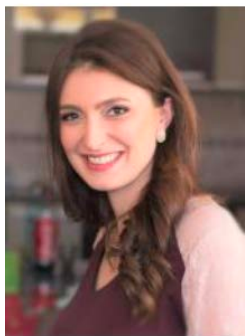
Photobiomodulation laser therapies an atypical oral symptomatologies and burning mouth syndrome

Burning Mouth Syndrome (BMS) is a clinical and symptomatological condition described and defined as atypical. In fact, the concept of atypicality can be correlated to a controversial etiopathogenesis and to a clinical presentation, without objective clinical signs and laboratory findings. BMS is characterized by chronic burning symptomatology, with variable intensity and duration. Potentially, all oral regions can be affected, but tongue burning is more common. It would be likely to consider a pathogenetic matrix characterized by peripheral neuropathic suffering. However, peripheral and central nervous system fiber sufferings are frequently, associated with conditions of behaviour and psychological disorders. In the international literature, many scientific studies and several therapeutic proposals are described and documented. However, local and systemic drug therapies have rarely satisfied the parameters of healing and alleviation of painful symptoms. In this clinical context, Photobiomodulation Laser Therapy (PBMLT) has been considered as a therapeutic alternative. The aims and assumptions of this clinical trial would be to be able to evaluate the efficacy of PBMLT in a homogeneous group of patients with BMS. Our research was structured as a monocentric study and randomized controlled clinical trial. At the Oral Pathology and Medicine Unit of the Dental University Hospital of Milan, 52 patients were selected. All

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patients were formulated the clinical diagnosis of BMS, with localized burning symptomatology, only on the lingual dorsal surfaces. The selected subject cohort was comprised of 36 females and 16 males, with a mean age of 60.73 years. All patients were divided into two groups following a block randomization method. PBMLT was performed at the test group, of 24 patients. The 28 patients of the control group were exposed to the pointing light with a placebo effect. Three sessions were scheduled weekly, for four weeks. A total of twelve therapeutic applications were planned. Subsequently, a one-year follow-up was scheduled, with bimonthly checks. At the end, clinical data were evaluated. The study was concluded in December 2022.



Dr. Ruxandra Luca DDS, PhD, Dentist,
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Timisoara

Defense of doctoral thesis: Study on the influence of
photobiomodulation therapy on the biological
mechanism of guided bone regeneration, with
obtaining the qualification *Summa cum laude*.

Postgraduate course in the specialization of Laser
Therapy in Dental Medicine

Bone Regeneration: from the surgical cut to photobiology

Starting from the premises already known and investigated in the literature, our research aims at a comprehensive, both qualitative and quantitative analysis of the bone healing process and of photobiomodulated bone regeneration, using optical coherence tomography, computerized microtomography, histological study of samples and, not least, the measurement of bone density using cone beam computed tomography. Such studies are essential to evaluate the effectiveness of different techniques that can be used in bone regeneration, taking into account in particular the complexity of the healing process and the large number of factors that

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influence it. Multimodal CMS / SS OCT was applied to render images and analyze different groups considered in the evaluation of the healing and bone regeneration process. Analyzing the evolution of the amount of newly formed bone over time, the most significant difference was highlighted after 21 days, so after about two thirds of the total time interval analyzed. After more time considered, the amounts of bone tend to approach, tending to fill the available defect. From current knowledge, this is the first time that OCT has been used as a tool to evaluate the effects of laser photobiomodulation on bone regeneration. The major advantage of OCT is that it can be applied for in vivo evaluations, using manual scanning samples, in the oral cavity.

Computed microtomography complemented the previously acquired knowledge, demonstrating that photobiomodulation therapy is effective in short periods of time. This effect was particularly evident for the shortest period of time considered, i.e. 14 days after surgery. It was also suggested a possible interaction with the biomaterials used, which could influence our future experimental studies. We hypothesized a possible xenograft shielding action in terms of laser action on cells and we intend to verify this assumption through future studies. This effect can be combined with a delay in bone regeneration in the presence of biomaterials, as already documented in previous studies. Moreover, in terms of the ability to detect statistically significant differences in patients undergoing laser photobiomodulation treatment after oral surgery, laser therapy was shown to increase bone density in both cortical bone and medullary bone, independent of the patient's sex. This positive effect was observed and quantified both in the anterior maxillary bone and in the posterior areas. The quantification of the effect of photobiomodulation on the bone mineral density using cone beam computed tomography allowed the formulation of some clinical conclusions, in accordance with the experimental ones, obtained in the studies we performed previously.

In general, the interaction between laser radiation and different tissue types in vivo remains a major concern when establishing clinical protocols. Our studies brought together the experimental results with the clinical ones, highlighting valuable information in areas of current interest, such as bone regeneration and, while clarifying the usefulness of various methods of scientific and paraclinical investigation of bone healing.

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Prof. Dr. Roeland J.G. De Moor, DDS, PhD, MSc.

Ghent University, Dept. of Oral Health Sciences, Section Endodontics, Gent, Belgium.

At present, he is a senior full professor at the Ghent University (Belgium) and guest professor at the University Clinic of Vienna (Austria); his private clinical practice is devoted to endodontics, dental traumatology, orofacial damage assessment and dental laser bleaching. He has a 35-year expertise in

the field of laser applications in dentistry.

Laser-activated irrigation: a matter of bubbles and why these bubbles do matter

Laser-activated irrigation (LAI) with Erbium lasers was marketed in 2009. This approach is based on the creation of expanding and imploding cavitation bubbles in the irrigation solution, resulting in three-dimensional spreading, activation and agitation of the fluid in the root canal system. Hence, it is a powerful approach to clean and disinfect root canals. From activation with the fiber inside the root canal, we evolved to the use of the laser tip positioned in the pulp chamber. Originally, the fiber was positioned in the root canal and moved up and down. Subsequently, together with the development of super short pulses (50 μ sec) a new type of LAI was launched in 2013 i.e. the PIPS (Photon-Induced Photoacoustic Streaming) approach where the fiber tip is no longer positioned inside the root canal, but in the pulp chamber. A double pulse modality was introduced in 2018 with the goal to enhance the disinfecting and activating efficacy of SSP (super short pulse) laser-assisted activation (PIPS). This SWEEPS (Shock Wave Enhanced Emission Photoacoustic Streaming) approach consists of delivering a subsequent laser pulse into the liquid at an optimal time when the initial bubble is in the final phase of its collapse.

During this presentation the differences between the different approaches is clarified, the impact on and differences in their efficacy are demonstrated with high-speed imaging and new insights on how LAI interacts with the biofilm are shared. Finally, clinical protocols and recommendations are provided.

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Prof. Dr. Alessandro Del Vecchio DDS, PhD.

Visit. Professor of Elements of Oral Diseases at Dental Hygiene School of Sapienza University of Rome sect. Cassino from 2014-15

PhD in Dental Science at Sapienza University of Rome
Past President of SILO (Italian Society of Laser in Dentistry)

Secretary of the European Division of WFLD (World Federation for Laser Dentistry)

Secretary of the International Academy of EMDOLA

Scientific Coordinator of European master's degree on Oral Laser Application
EMDOLA – Sapienza University of Rome

Coordinator of Postgraduate Course in Oral Pathology and Medicine at Sapienza University of Rome
Lecturer in the EMDOLA Master courses in Barcelona, Timisoara, Wroclaw, Liege and Parma.

The Photobiomodulation beyond the therapeutic window. New research horizons

The Photobiomodulation (PBM) is the application of low dosages of light energy to evoke a response in the irradiated tissues to promote different effects like tissue healing and cell regeneration, reduction of inflammatory response, neovascularization, neuroregeneration and pain reduction. Most of the clinical applications of the PBM described in the literature until now have been focused about the biologic effects of the red and Near Infrared (NIR) wavelengths, between 600nm and 1200nm, a range that is also known as the "therapeutic window".

However, more recently arose an increasing interest about the possibility to obtain therapeutic effects through the application of different wavelengths, in particular the visible blue (from 400nm to 470/480nm) and green (495nm – 570nm), with the first involved in reduction of superficial inflammation and wound healing, and the latter more efficient in reducing cellulite appearance and swelling. As further interest in the application of these new wavelengths, is the increasing body of evidence about the antimicrobial effects, especially

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of the blue light probably due to the activation of endogenous photosensitisers, that are supposed to induce specific bactericidal effects. The growing interest in the clinical applications of the PBM requires a deep and clear knowledge of the biological mechanisms of action of the therapeutic lights induced both directly by the absorption of the light, and indirectly by downstream intracellular processes most of them involving ROS production. Nevertheless, this increasing attention to PBM claims once more a mandatory statement about parameters and data that must be clearly enounced in each scientific study, to reach a clear consensus about protocols that may permit a valuable comparison of its efficiency with conventional medical treatments.



Dr. Mihnea Constantin

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Master in Laser Dentistry - MSc Universita Cattolica del Sacro Cuore, Rome, Italy (2019- 2020),
Master in Laser Dentistry - LA&HA Institute, Ljubljana, Slovenia, (2016-2017)
Faculty of Dental Medicine, "Iuliu Hatieganu" University, Cluj-Napoca, Romania (1999-2005)

Laser Active Irrigation Techniques in the Root Canal Therapy

Root canal treatments consist of mechanical instrumentation followed by irrigation to facilitate removal of bacteria, debris and therapeutic materials such as gutta-percha, sealer and medication from root canals. While the effectiveness of irrigation relies on both, the ability of the irrigant to dissolve tissue, and the mechanical flushing action to remove material from the canal, it has been suggested that the flushing action is more important than the ability to dissolve tissue, especially since most of the dentine is inorganic matter that cannot be dissolved by sodium hypochlorite (NaOCl) solution. In order to achieve optimal results, several methods of irrigation where imagine along time. Laser active irrigation was proven to be very efficient aiming to obtain clear dentinal tubules and ideal sealing conditions.

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ABSTRACTS - ORAL PRESENTATIONS

01. Laser Surgical Approach for upper labial frenulum -literature review and personal experience

Diana Florina Nica, Mircea Ravis, Doina Chioran, Ciprian Roi, Adrian Nicoara, Serban Talpos

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Frenectomy and frenulotomy are both rationale approaches for an abnormal and hypertrophied upper frenulum due to major aesthetic and functional disorders which could lead from its persistence. Gingival recessions, diastemas, eruption abnormalities are the most frequent lesions induced by a strong or a papillary insertion. The goal of this review is to identify the best approaches for these surgeries. PubMed, Scopus, Cochrane Library, and Embase were searched for papers that matched our topic from 1st September 2012 up to 10 April 2023 using "laser", "frenulum" and "surgery". A total of twelve articles were selected for this review. For a labial frenotomy or frenulectomy, traditional surgery or laser surgery are both indicated. Laser surgery has intra- and post-operative benefits for patients, in terms of faster healing, fewer side effects and greater patient co. Diode lasers, Nd:YAG and Er:YAG lasers were used for these techniques. To date, it is not possible to identify which type of laser achieves the best clinical results for the treatment of upper labial frenulum.

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02. Pain therapy in orthodontics by laser biomodulation

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Objectives. The aim of the study was to evaluate the effectiveness of low-level laser therapy (LLLT) on pain following the application of orthodontic forces by activating fixed orthodontic appliances

Material and method. 5 patients with fixed orthodontic appliances on both maxillary and mandibular arches were selected for the present study. Laser therapy was administered only to the upper arch, while the lower arch was the control group. A 650 nm wavelength, 25mW power laser was used for therapy continuously and applied to each tooth considered in the study at 3 points. One application was performed at the apical level and two other applications at the cervical level; mesial and distal of the tooth. Treatment was performed in three sessions, at 24 hours after orthodontic arch application, at 48 hours and at 72 hours. Evaluation was done using the Wong-Baker visual pain scale, by questioning the patient on the level of pain felt before and after treatment for the upper arch that received laser therapy and at the beginning of each session for the lower arch that was considered the control group.

Results. All patients involved in the study reported a significant reduction in pain for the upper arch after each treatment session, which was also statistically confirmed ($p < 0.001$).

Conclusions. The application of low-level laser therapy with the parameters used can be considered an alternative therapy for pain reduction in orthodontics

Keywords: low level laser therapy, orthodontic pain, orthodontic treatment, pain, laser

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03. Laser Er:YAG - Assisted Debonding May Be a Viable Alternative to the Conventional Method for Monocrystalline Ceramic Brackets

Daliana-Emanuela Bojoga, Mariana I. Miron, Diana Lungeanu, Marius Mateas, Emilia Ogodescu and Carmen D. Todea

Oral Rehabilitation and Emergencies In Dental Medicine, "Victor Babes" University of Medicine and Pharmacy Timisoara, Faculty of Dental Medicine

Abstract: In orthodontic practice, due to the increased interest among patients in smile aesthetics, different types of brackets are now being used, with those most frequently applied being ones made of polycrystalline and monocrystalline ceramic. The aim of this study was to evaluate the laser Er:YAG - assisted debonding technique compared to conventional methods for removing monocrys- talline ceramic brackets from human teeth. The study sample included 60 vital teeth (frontals of the upper jaw) from 10 patients who had monocrystalline ceramic brackets and were in the final phase of orthodontic treatment. The debonding procedure was carried out following a split-mouth study design, using either the conventional technique or laser Er:YAG 2940 nm radiation. For each tooth, three variables were evaluated: the patient's subjective tooth sensitivity associated with the debonding, the time required for debonding, and pulp blood flow microdynamics after the debond- ing. Three evaluation instruments were used to assess and quantify the treatment effects: (i) the Wong-Baker FACES Pain Rating Scale for pain assessment; (ii) a digital stopwatch/timer to measure the time required to remove the bracket; and (iii) laser Doppler flowmetry (LDF) for recording the pulp blood flow evolution. The statistical analysis of the recorded data showed a statistically significant difference between the two debonding methods regarding the tooth sensitivity during the debonding and the time required for the procedure. The subjective tooth sensitivity was reduced from a mean \pm standard deviation of 3.07 ± 1.46 to 0.47 ± 0.86 on the Wong-Baker FACES scale (Wilcoxon signed rank, $p < 0.001$). The necessary time for debonding was reduced by 0.697 ± 0.703 s per tooth (paired t-test, $p < 0.001$). There was no difference in the blood microdynamics between the

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two debonding techniques. According to the results of this study, the laser Er:YAG - assisted debonding technique may be a viable alternative to the conventional method for monocrySTALLINE ceramic brackets.

Keywords: monocrySTALLINE ceramic brackets; laser Er:YAG; debonding; laser Doppler flowmetry

04. Photodynamic therapy in the decontamination of post-extraction sockets

Cristian Ratiu

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The use of lasers in all medical fields is in a continuous increasing during the recent years. In the field of dentistry, the lasers have multiple applications in every specialization: caries, endodontics, orthodontics, dental aesthetics or prosthetics. In parodontology, implantology and oral surgery lasers are also used more and more often.

This presentation tries to make a review of the literature of the field related to the insertion of the post-extraction implants in the sockets of the teeth with granulomas or radicular cysts. The information are gathered about the infection of the sockets of the teeth with root canal treatment, granulomas and cysts trying to find out how important the necessity of administrating antibiotics in these cases is; at the same time we looked for information about the possibility of replacing the antibiotic treatment with a laser treatment. In the special part, I collected bone samples from the sockets of the teeth with granulomas and cysts and I analyzed them with the PCR method trying to detect the pathogen agents present in the socket bone before and after the laser treatment. In two situations, implants were inserted after the photodynamic decontamination of the infected sockets. Although the study was realized, due to objective reasons represented by the COVID pandemics, on a reduced number of patients, the results are encouraging from the

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perspective of the efficiency of laser decontamination of the post-extraction sockets and of the inserted implants.

05. The benefits of the preparation with the laser Er Cr YSGG vs convetional mechanic of hard tissue in the cervical area - SEM analysis - in vitro

Andreea Dana Tudose, Diana Eugenia Rădulescu

Titu Maiorescu University – Bucharest, Romania

Technological development has led to the implementation of new concepts in the field of dental medicine. Laser treatment is no longer something new, but if in the beginning there were few doctors who used it, now it is more and more known and used. In this way, new therapeutic protocols have appeared in accordance with modern methods of laser preparation.

This research aims to highlight in as much detail as possible the clear advantages of the ablation of dental hard tissues for curative purposes when we use the dental laser, compared to the preparation with burs.

Material and method: Tree recently extracted teeth were used as samples. Preparations were performed on two samples with the Er Cr YSGG -2740 nm ablative laser, at the level of the cervical areas. On one sample, a cervical preparation was made with a bur. After preparation, the dental crowns were examined under the SEM microscope, at magnifications of up to 40,000 X, analyzing the appearance of the enamel and dentin.

Results: Images of the enamel were obtained with the visibility of the crystalline-prismatic network and very clean dentinal canals, as a sign of selective vaporization, in the case of laser ablation treatments. In the case of the preparation with a bur, the appearance of the smear layer at the dentinal level, but also of the marginal microcracks at the level of the enamel, is observed.

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Conclusions: Hard tissue preparation using the Er Cr YSGG laser shows greater decontamination of the remaining dental tissue. The marginal dental tissue is protected from the appearance of microcracks.

Using the ablation laser, we work conservatively and can approximately only remove the altered tissue, without compromising healthy tissue, forming well-cleaned and decontaminated cavities.

Keywords: Laser, cervical, smear layer, ablation

06. Digitally designed and manufactured laser doppler probe holder for tooth vitality assesment – a preliminary study for a novel technique

Ciora Edmond, Miron Mariana, Todea Carmen, Jivănescu Anca

Oral Rehabilitation and Emergencies In Dental Medicine, "Victor Babes" University of Medicine and Pharmacy Timisoara, Faculty of Dental Medicine

Aim of the study. The purpose of this study was to develop a new method to facilitate laser Doppler tooth vitality assessment, using a digitally designed probe holder. Material and methods. A laser Doppler probe holder was digitally designed after scanning a casted model and then the probe holder was 3D printed. In order to test the probe holders, a straight optical probe from MoorLab instruments was used. Conclusions. The probe holder proved to be stable and could be used to obtain accurate signal acquisition in these experimental conditions, however further testing is necessary.

Key words: Laser Doppler, probe holder, pulp vitality

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07. OCT Investigation of Dental Bleaching

Emanuela Lidia Crăciunescu¹, Daniela Maria Pop^{1*}, Cosmin Sinescu¹,
Boris Caplar¹, Bogdan Hoinoiu³, Florin Topală², Daliana Bojoga³,
Ruxandra Luca³, M Romînu¹, ML Negruțiu¹

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Introduction: Dental bleaching is a common procedure in aesthetic dentistry. Materials are designed for in offices or at home use to remove intrinsic and/or extrinsic tooth discolorations.

The Aim: This study is evaluating the action of hydrogen peroxide on the enamel by using the non-invasive Optical Coherence Tomography (OCT).
Material and method: Ten human teeth were sectioned longitudinally buccal to lingual using a low-speed diamond saw. Samples were cleaned with brushes and fluoride free paste. The carbamide peroxide gel (Opalescence) 16% was laid on the buccal enamel and observed with the OCT. The samples with the bleaching gel were positioned in a silicone key and were scanned in real time for thirty minutes. The registered micrometer depth resolution allows in vivo evaluation of thickness, area and volume in the tissue. *Results and discussion:* The images captured before and during the chemical treatment in Time Domain OCT-C Scan have revealed the capacity of bleaching agent to penetrate the enamel and produce superficial modification into the tissues structure due to oxidative process. OCT high-resolution image the superficial tissue or material with penetration depths of up to 2–3 mm, depending on the scattering and absorption properties of the tissue. The technology can

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reach a depth resolution better than 15 µm and a larger band width source allows a resolution depth of 2 µm.

Conclusions: The side effects of excessive external bleaching treatments may be related to the high diffusion and oxidative reactions of bleaching agents.

Key words: OCT, dental bleaching, enamel

08. A micro-invasive approach to treating posterior mih lesions: a case report

Mihaela-Valentina Cîrdei* ^{1, 2}, Daliana Bojoga², Carmen Todea²

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² *Moisa Dentistry SRL - Private Clinic,*

Introduction: Molar incisor hypomineralization (MIH) is a clinical condition that typically coexists with impacted incisors and is defined by a systemic enamel quality impairment of one to four permanent first molars. Clinically, it can be noted that the first molar hypersensitivity is a major concern; thus, the lesions that are presented with various degrees of demarcated discolored areas on the occlusal surface; areas that are porous, and with a well-defined opacity.

Case report: A few patients were referred to our clinic due to sensitivity concerns. Their medical history was unremarkable. Patients reported greater tooth sensibility. Risks and benefits of any dental intervention were discussed with patients and their parents. The following cases were treated using tricalcium-silicate based dentine and composite-resin restorations.

Discussion: How to address the sensitivity concerns of patients with MIH should be carefully considered. Mininvasive procedures such as laser therapy, also excavating the dentine structural defects and preservation of healthy enamel and dentine being a priority.

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Conclusion: Children with Molar Incisal Hypomineralisation of systemic origin have a poor quality of life and need to have an effective treatment strategy.

09. Laser application in periodontal disease

Tareq Hajaj, Anne-Maria Heredea, Cosmin Sinescu, Emanuela Lidia Craciunescu, Meda-Lavinia Negrutiu, Daniela Maria Pop

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Introduction: The periodontal disease is a very serious condition which affects great numbers of patients worldwide. Even though it is known by now what are the risks factors and what causes it, the clinical success is sometimes hard to achieve. This is, in part, due to the fact that not all protocols have the same effect on all patients.

Aim of study: The present study tried to determine the efficacy of laser therapy on periodontally-affected patients, by examining the bacteria inside the periodontal pockets before and after the treatment.

Material and method: From each patient, samples of crevicular fluids were taken to determine the direct effect of the laser in vivo.

Result and discussion: The results were then analyzed and compared with similar studies from the literature. Patients who benefited from this procedure developed fewer complications than those who went through open flap techniques. Conclusions: The results clearly show the relevance of laser in periodontal therapy, which should not be overlooked by any practitioner. Laser procedures are faster, more efficient and minimally invasive.

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ABSTRACT - POSTER PRESENTATIONS

01. The Efficiency of Photodynamic Therapy in the Bacterial Decontamination of Periodontal Pockets and Its Impact on the Patient

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Purpose: Periodontitis is an infection with multiple bacteria involvement that affects the tooth-supporting tissues destroying connective tissue and alveolar bone, and may eventually lead to loss of teeth. The microbial plaque and the host immune responses are considered to be important causative factors that are highly responsible for the progression of this disease. The purpose of this paper is to compare a possible reduction in the number of specific periodontopathogenic pathogens in two test groups after different therapeutic approaches to periodontal disease and to demonstrate possible differences.

Material and methods: This article is based on a prospective clinical study involving eighteen subjects with forty-four average periodontal pockets assigned to study groups treated by two different methods, SRP and SRP followed by a single PDT application. Efficiency in removing specific bacterial species was evaluated by PCR testing, at baseline and immediately after treatment.

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Results: The hypothesis that using SRP + aPDT results in an increased decontamination potential was confirmed statistically, when all five specific bacterial pathogens were investigated together. When the pathogens were considered separately, two of the five microorganisms tested were significantly lower in the SRP + PDT group ($p < 0.00$), and important germ counts reductions were also observed for the other three. There is also a statistically significant relation between the pain at 48 h postoperatively and the type of treatment the patients received, as resulted from the Questionnaire Form.

Conclusion: Research in the field of periodontal disease continues to focus on disease-associated microorganisms, as the microbial plaque and the host immune responses are considered to be important causative factors, that are highly responsible for the progression of this disease. The present results show that PDT as a supplement to conservative mechanical cleaning of dental and root surfaces in sites affected by periodontitis, has a positive effect on the success of the therapy in terms of reducing periodontopathogenic germs. Using this method, the side effects of adjuvant drug treatments can be significantly reduced, the need for which can be drastically reduced.

Keywords: photodynamic therapy; non-surgical periodontal therapy; PCR; clinical study

02. Dental-Plaque Decontamination around Dental Brackets Using Antimicrobial Photodynamic Therapy: An In Vitro Study

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Oral Rehabilitation & Dental Emergencies "Victor Babes" University of Medicine and Pharmacy of Timisoara, Romania

Background: In orthodontic therapy, the enamel around brackets is very susceptible to bacterial-plaque retention, which represents a risk factor for dental tissues. The aim of this study was to evaluate the effect of methylene blue and a chlorophyllin–phycocyanin mixture,

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used with and without light activation, in contrast with a 2% chlorhexidine solution, on *Streptococcus mutans* colonies. Methods: Twenty caries-free human extracted teeth were randomized into five groups. A *Streptococcus mutans* suspension was inoculated on teeth in groups B, C, D, and E (A was the positive-control group). Bacterial colonies from groups C, D, and E (B was the negative-control group) were subjected to photosensitizers and 2% chlorhexidine solution. For groups C and D, a combined therapy consisting of photosensitizer and light activation was performed. The *Streptococcus mutans* colonies were counted, and smears were examined with an optical microscope. Two methods of statistical analysis, unidirectional analysis of variance and the Tukey–Kramer test, were used to evaluate the results. Results: A statistically significant reduction in bacterial colonies was detected after the combined therapy was applied for groups C and D, but the most marked bacterial reduction was observed for group D, where a laser-activated chlorophyll–phycocyanin mixture was used. Conclusions: Photodynamic therapy in combination with methylene blue or chlorophyllin–phycocyanin mixture sensitizers induces a statistically significant decrease in the number of bacterial colonies.

Keywords: *Streptococcus mutans*; bracket; antimicrobial photodynamic therapy; methylene blue; chlorophyllin–phycocyanin

03. Pain in Dental Medicine Laser Therapy

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Endodontic therapy has seen an evolution due to the new techniques for preparation and cleaning the root canals. Pain associated with these therapies is an element that must be controlled. The aim of this review is to evaluate the effects of laser therapy in the retreatment of teeth with periapical periodontitis for surgical and non-surgical therapy. Material and method: The following topics were considered: 1. Can the association of LLLT with endodontic treatments lower the level of post-treatment pain; 2. Does this association influence the healing of periapical lesions; 3. Does the sterilization of the root canal by combining the laser reduce the pain;

The research of the speciality literature used the Science Direct and PubMed databases by applying the following search items: laser therapy, dental pain, endodontic treatment. As specific time range were chosen studies from the last 10 years 2013-2023. Data processing considered two phases: content analysis in relation to the objective of the study and relevance of to the questions for the study. Results and discussions: Association of laser therapy to various treatments that are accompanied by pain such as endodontic treatment brings multiple benefits. Laser stimulation of the healing process and pain relief are advantages that recommend the technique and increases the life quality of patients.

Conclusions: There is an increase use of low-level laser therapy in clinical dentistry, in the management of pain associated with endodontic surgical and non-surgical retreatments.

Key words: low energy laser therapy, pain, endodontic treatment

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04. 3D printing

Ebru Ertan, Christian Breyer, Carina Sonia Neagu, Andreea Codruta Novac, Cosmin Sinescu, Meda Lavinia Negrutiu, Carmen Todea

*Victor Babes University of Medicine and Pharmacy of Timisoara,
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Introduction: Lasers have a variety usage in dental medicine to treat dental problems, due to the benefits like quicker healing and recovery times, less risk of infections, minimized discomfort for the patient and more. Another usage of lasers in dentistry is 3D printing.

Aim: 3D printing is used in dentistry to obtain accurate images and models of the anatomy of a patient's teeth and jaws. An intraoral scanner captures the exact anatomy of a patient's mouth. The data from the scan is then used to construct a 3D-CAD model of the desired anatomy.

Methods: The presented material represents conducted research regarding the 3D printing. For this systematic review, we employed three different search engines: Google Scholar (6 articles), PubMed (7 articles) and ScienceDirect (7 articles). From those 20 articles, we used 13 different articles regarding information about the usages of lasers in 3D printing. The inclusion criteria for the articles were articles regarding dentistry, 3D printing and laser technology.

Results: The most commonly used procedures for 3D printing are: removable oral devices, including clear aligners, retainers, and nightguards; restorative dental treatments; including crowns, bridges, denture bases, and implants; surgical instruments, including try-ins and surgical guides; dental models, for either thermoforming or as diagnostic aids for cosmetic dentistry procedures, orthodontic treatment or oral surgery.

Conclusions: To conclude, dental 3D printing has become a popular solution for dentists and patients to better treatment and hygiene. They use this technology to create highly customized restorations tailored to the needs and preferences of particular patients. Dental 3D printing is a transformative technology that promises to improve the dental industry.
Key words: 3D printing, laser technology, dentistry.

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05. Laser usages on soft tissues

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Faculty of Dentistry*

Introduction: Lasers are widely used in medicine, and since the early 1960s. Several dental procedures involve lasers, which are noted for their simplicity, efficiency, comfort and superiority over older methods. Some of uses for lasers are identifying small carries to planning and treating more severe lesions or cancers. Aim: Now days lasers are used to treat hypersensitivity, treat tooth decay, remove tumors, increase wound healing, reduce pain, treat some forms of gum disease and to whiten the teeth. Methods: The presented material represents conducted research regarding the laser usages on soft tissues. For this systematic review, we employed three different search engines: Google Scholar (5 articles), PubMed (9 articles) and ScienceDirect (6 articles). From those 20 articles, we used 13 different articles regarding information about the usages of lasers on soft tissues. The inclusion criteria for the articles were articles regarding dentistry, laser surgery and soft tissue. Results and Discussion: Tooth decay, gum disease, biopsy or lesion removal and other procedures are performed using lasers. Lasers are frequently utilized because they cause less pain, require less anesthesia and void anxiety in patients who are afraid of dental drills and instruments. Conclusions: Laser technology in clinical dentistry practice is currently at an advanced stage of development and has a bright future. With the expanding use of lasers soft tissue in clinical dentistry, treatment, planning and prognosis have significantly improved. The introduction of this technology has turned into a painless, bloodless industry with better predictability and instant outcomes. Laser encourages a faster and effortless operation with little to no discomfort, resulting in reduced tissue damage. Further research could be done added to the already advanced research.

Key words: laser in dentistry, soft tissue, laser surgery

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06. Laser application in periodontology treatments

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Introduction: Currently, periodontal therapy is complex, it involves an appropriate staging, one staged approach, for effective control of the local microbiome, and implementation laser therapy is beneficial. **Aim:** The aim of the study is to evaluate the changes in the microbiome at the level of the gingival sulcus and to demonstrate the correlation of the association of laser therapy with periodontal treatments.

Methods: A group of 10 patients with an average age of 30 years, diagnosed with gingivitis, were periodontally evaluated based on cytodiagnosis. The work protocol involved two harvests: from the level of the gingival sulcus with a brush and application on the slides, they were allowed to dry at room temperature, after which the smears were stained and mounted with the slides. The staining used for cytodiagnosis was the Babeș-Papanicolau method, a conventional staining used in the evaluation of lesions of the oral mucosa, used to establish the cytodiagnostic criteria in the Bethesda classification of lesions of the oral cavity. The first collection was performed before the periodontal therapy (scaling, brushing, airflooou with sodium bicarbonate), without associated antibiotic therapy. After hygenisation, laser therapy was applied using the Biolase laser. After two weeks, the collection of samples for cytodiagnosis was repeated. Microscopic examination was performed with Leica DM1000 optical microscope at different objectives (10x, 20x and 40x).

Results: Cytodiagnosics allowed the identification of the inflammatory infiltrate, ulceration aspects, a microbial colony, numerous candida hyphae

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and cytolysis. They could be recognized specific and non-specific inflammatory lesions, the presence of inflammatory cells and flora bacterial.

Conclusions: This study confirms the data from the specialized literature, also it is indicated as for establishing the management strategy of periodontal diseases, the pre-existing oral microbiome should be evaluated, because the response to the treatment is also influenced by the microbial flora existing before the start of the procedure. The answer to periodontal laser therapy is plurifactorial, but an important aspect to evaluate is represented by the initial oral flora.

Key words: periodontology, laser therapy, cytodiagnosics

07. Optical coherence tomography study on the biofilm deposition on tubes utilized in dental equipment

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Unlike other medical fields, dentistry does not have a cleaning industry standard for its equipment. Because of this aspect, people may be using suboptimal cleaning methods that may result in deficiencies such as infection caused by improper disinfection. The aim of this work is to approach the first step in this (larger) direction of research, of analyzing

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the efficiency of different cleaning methods. Thus, we utilize a low coherence interferometry-based technique, Optical Coherence Tomography (OCT) in order to investigate the biofilm on different types of tubes employed in dental equipment. Imaging investigations have been performed with an in-house developed Swept Source (SS) OCT system centered at 1300 nm, with an axial resolution of 15 μm . We investigated the inside of three types of tubes, of different diameters. The considered samples have been specifically chosen because of their long usage period in order to generate better imaging results. OCT imaging was performed using different positions of the tubes, and also on sectioned parts of the tubes. We compared the imaging performances of each of such investigation, both on 3D/volumetric OCT reconstructions and on optical cross-sections/OCT B-scans. Therefore, OCT was demonstrated to be a potentially valuable tool in examining such pieces of equipment. A standardized set of guidelines for optimal imaging could be devised in the future.

Keywords: Optical Coherence Tomography (OCT), dental medicine, dentistry equipment, tubes, biomedical imaging, biofilm.

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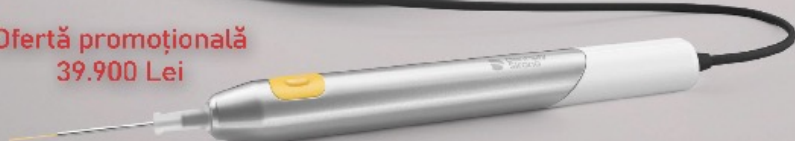
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