

# **NAPOCA BIODENT SYMPOSIUM 2017**

**7<sup>th</sup> Edition**

## **Research in Dentistry - Quo Vadis**

**Editors:**

**Diana Dudea, Mihaela Băciuț  
Alexandra Irimie, Cristina Gasparik**

The authors have the responsibility for the content of these paper abstracts

**Editor**

Dan L. Dumitraşcu

**Editorial office**

Mihaela Băciuț  
Cristian Bârsu  
Simona Clichici  
Horațiu Colosi  
Ofelia Crișan  
Daniela Fodor  
Daniel Leucuța  
Ioana Robu

**Editorial secretary**

Dorina Sorcoi

**Desktop publishing**

Mihai-Ioan Lazăr

**”Clujul Medical”****Editorial Office**

Str. Moșilor, nr. 33  
RO-400609 Cluj-Napoca,  
România  
Tel/fax: +40-264-596086

**E-mail**

clujulmedical@umfcluj.ro

**Site**

www.clujulmedical.umfcluj.ro

**Indexed**

PubMed  
PubMed Central  
SCOPUS  
EBSCO  
Index Copernicus  
getCited  
JournalSeek  
Open Access Directory  
InfoBase  
SCIPPO

**Printing house**

UMF “Iuliu Hațieganu”  
Cluj-Napoca

C	O	P	E	COMITEE ON PUBLICATION ETHICS
---	---	---	---	-------------------------------

# - Clujul

## Medical - Journal of Medicine and Pharmacy

Supplement No. 1, Vol. 90, 2017

p-ISSN 1222-2119, e-ISSN 2066-8872

---

### CONTENTS

**Conferences**.....S7-S29

**Oral Presentations**.....S33-S48

**Poster Presentations**.....S51-S58

# - Clujul

# Medical - Journal of Medicine and Pharmacy

Supplement No. 1, Vol. 90, 2017

p-ISSN 1222-2119, e-ISSN 2066-8872

---

## Editorial board

Ludovico Abenavoli (Catanzaro)  
Monica Acalovschi (Cluj-Napoca)  
Andrei Achimaş (Cluj-Napoca)  
Istvan Altorjay (Debrecen)  
Dinu Antonescu (Bucureşti)  
Mîndra Badea (Cluj-Napoca)  
Radu Badea (Cluj-Napoca)  
Jürgen Barnert (Augsburg)  
Adriana Băban (Cluj Napoca)  
Grigore Băciuş (Cluj-Napoca)  
Ioana Berindan-Neagoe  
(Cluj-Napoca)  
Marius Bojiţă (Cluj-Napoca)  
Ion I. Bruckner (Bucureşti)  
Anca Buzoianu (Cluj-Napoca)  
Radu Câmpănu (Cluj-Napoca)  
Constantin Ciuce (Cluj-Napoca)  
Douglas Drossman (Chapel Hill)  
Sorin Dudea (Cluj-Napoca)  
Dorin Farcău (Cluj-Napoca)  
Ioan Ştefan Florian (Cluj-Napoca)  
Ion Fulga (Bucureşti)  
Jean-Paul Galmiche (Nantes)  
Alexandru Georgescu  
(Cluj-Napoca)  
Liana Gheorghe (Bucureşti)  
Mircea Grigorescu (Cluj-Napoca)  
Anca Grosu (Freiburg)  
Waseem TY Hamoudi (Amman)  
Nicolae Hâncu (Cluj-Napoca)  
Laszlo Herszenyi (Budapest)  
Alexandru Irimie (Cluj-Napoca)  
Cornel Iancu (Cluj-Napoca)  
Nikolai Lazarov (Sofia)  
Leonid Lazebnik (Moscow)  
Felicia Loghin (Cluj-Napoca)  
Mihai Lucan (Cluj-Napoca)  
Sorin Man (Cluj-Napoca)  
Peter Manu (New York)  
Traian Mihăescu (Iaşi)  
Petru Mircea (Cluj-Napoca)  
Adriana Mureşan (Cluj-Napoca)  
Dafin Mureşanu (Cluj-Napoca)  
Laurenţiu Nedelcu (Braşov)  
Radu Oprean (Cluj-Napoca)  
Alina Pârvu (Cluj-Napoca)  
Virgil Păunescu (Timişoara)  
Aurel Popa-Wagner (Rostock)  
Mihai Popescu (Bucureşti)  
Paul J. Porr (Sibiu)  
Piero Portincasa (Bari)  
Liliana Rogozea (Braşov)  
Vlaicu Sandor (Cluj-Napoca)  
Adrian Săftoiu (Craiova)  
Florin Stamatian (Cluj-Napoca)  
Luminiţa Stanciu (London)  
Radu Tutuiian (Zürich)

# CONFERENCES



---

## THE ASSESSMENT OF DE- AND REMINERALISATION ON THE DENTAL HARD TISSUES

SORIN ANDRIAN, ANDREI GEORGESCU, SIMONA STOLERIU

Department of Odontology-Periodontology, Fixed Restorations, Faculty of Dental Medicine, "Grigore T. Popa"  
University of Medicine and Pharmacy, Iași, Romania

\*Corresponding author: *Sorin Adrian, e-mail: sorinandrian@yahoo.com*

---

Dental hard tissues can be demineralized by acids with no bacterial involvement having exogenous or endogenous origin or by acid etching. Exposure of enamel prisms and the loss of interprismatic and prismatic substance were showed by SEM evaluation of enamel when acidic beverages, mouthwashes or etching acid were investigated. When 37% phosphoric acid was used for enamel etching for 15 or 30 seconds, SEM evaluation showed that the major pattern of enamel dissolution was represented by interprismatic substance loss and very rare patterns of intraprismatic enamel demineralization.

As a result of different acidic attacks, high enlargement of the dentinal tubules due to the demineralization of the inorganic part of the dentine and exposure of the collagen matrix were also observed by SEM evaluation. Saliva provide a good protection of dental hard tissues in direct relation to an optimal supply of mineral ions. In our studies morphological assessment of enamel and dentine surface by SEM investigation showed that the severity of demineralization was lower when saliva was present at the moment of aggressive contact with acidic beverages. Products that contain calcium, phosphate and fluoride also provided good remineralization capacity.

Our studies demonstrated an increased gain of calcium and phosphate ions in enamel, dentine and cement when these products were used before or after the acid challenge (by SEM and EDX evaluation). Also, investigation of dental surface roughness (by AFM and profilometry analysis) and surface hardness suggested that the remineralization products increase the resistance of enamel and dentine to erosive attacks.

## BIOCERAMICS IN DENTISTRY - FROM MATERIALS SCIENCE TO CLINICAL APPLICATIONS

IULIAN ANTONIAC

Faculty Materials Science and Engineering, University Politehnica of Bucharest, Romania

*\*Corresponding author: Iulian Antoniac, e-mail: antoniac.iulian@gmail.com*

---

During the past years there has been a major advance in the development of biomaterials and this has been in the innovation of bioceramic materials for dentistry. The materials within this class of medical implant are often referred to as “Bioceramics” and the expansion in their range of dental applications has been characterized by a strong increase in the number of publications in the field.

Bioceramics are now used in a number of different applications throughout the dentistry. According to the type of bioceramics used and their interaction with the host tissue, they can be categorized as either bioinert or bioactive and the bioactive ceramics may be resorbable or non-resorbable.

The materials used as bioactive ceramics include polycrystalline materials like calcium phosphates, and glass ceramics like Bioglass. Also, the bioactive ceramics could be used as filler for dental composites. The bioactive ceramics may be manufactured either in porous or in dense form in bulk, as granules or in the form of coatings. Also, the increase in the biomedical application of bioactive ceramics is occurring simultaneous with the growth of interest in tissue engineering, where cells are delivered to a particular clinical treatment site using different scaffolds.

For the future, it is clear that if we were able to fully understand the fundamentals of dental tissue response to specific ions and the signals they activate, then we would be able to design better bioceramics for dental application.

---

## ECLIPSE RESIN SYSTEM – ANALYTIC AND EXPERIMENTAL STUDIES FOR COMPLETE DENTURES

CRISTINA MARIA BORTUN<sup>1</sup>, NICOLAE FAUR<sup>2</sup>, ANGHEL CERNESCU<sup>2</sup>, MEDA LAVINIA NEGRUȚIU<sup>1</sup>

<sup>1</sup>”Victor Babeș” Univeristy of Medicine and Pharmacy Timișoara, Romania

<sup>2</sup> Politehnica University Timișoara, Romania

\*Corresponding author: *Cristina Maria Bortun, e-mail: cristinabortun@yahoo.com*

---

**Introduction.** Complete dentures are used in social assistance of elderly patients. These deteriorate by fracturing, because of handling disabilities, anatomical configuration of prosthetic field, ratio support/ forces application and low mechanical resistance of the materials used for these prosthetic restoration.

**Objectives.** The objective was to carry on a multidisciplinary research for determining durability of complete dentures.

**Material and methods.** For testing we choose Eclipse Resin System (DENTSPLY International Inc. - DeguDent GmbH, Hanau Germany), light curing resins, from which there were made full dentures and samples. For testing the mechanical properties of the material Eclipse Base Plate we used the equipment Zwick Roell (Zwick GmbH & Co. KG, Ulm, Germany). The noninvasive experimental study of complete dentures was performed with finite elements method. In this respect we used: 3D LPX 1200laser scanner of Roland company and soft: Pixform Pro Program and Abacus. 6.6.1.

**Results.** The mechanical parameters of light curing diacrylic resin used for testing were: Young's modulus of elasticity: 2908.42 MPa, tensile strength  $R_m=59.49$  MPa; total elongation  $A_t=4,582$ . Tension and total deformation analysis of dentures subjected to different loadings is underlined through fields of chromatic spectra. Warm colours indicate zones with problems, with fracture risk. Eclipse is a polymer that distorts less than classical resins.

**Conclusions.** Noninvasive experiments reveal the denture's zones with fracture risk and allow correction of some defficiencies.

## INTERRELATION BETWEEN BODY POSTURE AND OCCLUSION

ALEXANDRA BOTOȘ

Department of Prosthetic Dentistry and Dental Materials, Faculty of Dental Medicine, Iuliu Hatieganu University of Medicine and Pharmacy, Cluj-Napoca, Romania

*\*Corresponding author: Alexandra Botoș, e-mail: alexandrabotosch@gmail.com*

---

**Objectives.** Given that it is situated on the very top of the musculo-skeletal system, the maxillo-facial complex is exposed to numerous modifications due to posture alterations of the body. All the alterations are at a certain balance one with the other and one-sided medical interventions, that address only one of the issues can do more harm than good. That is why, when presented with an orthodontic patient, one should examine the patient as a whole and include the postural evaluation in the patient's diagnosis. The aim of this presentation is to illustrate the interdisciplinary treatment of patients with malocclusions, facial asymmetries and postural alterations.

**Material and methods.** A number of patients addressed the orthodontist for temporomandibular (TMJ) and occlusal disturbances, either as a primary concern or as a referred consult from an osteopath – kinetotherapist. Interdisciplinary treatment of these patients was indicated.

**Results.** The patients were pain free after the first few osteopathic appointments, body posture started to improve and the patients reported improved body tone and better body mobility. TMJ symptoms decreased but occlusion became even more dysfunctional. All patients were provided first with an occlusal splint to stabilize centric relation and later provided with braces in order to adjust occlusion to the new body posture- centric relation situation.

**Conclusion.** Interdisciplinary management of patients with obvious or hidden posture alterations that seek orthodontic treatment is compulsory in order to offer them the best care which assures long term stability and lack of pain symptoms.

---

## OCCLUSAL SOLUTIONS FOR INTERDISCIPLINARY ORTHODONTIC AND PROSTHODONTIC CASES

SMARANDA BUDURU<sup>1</sup>, DANIEL TALMACEANU<sup>2</sup>, ELA TATARU<sup>2</sup>, MARIA URECHE<sup>1</sup>

<sup>1</sup>Department of Prosthetic Dentistry and Dental Materials, Faculty of Dental Medicine, Iuliu Hatieganu University of Medicine and Pharmacy, Cluj-Napoca, Romania

<sup>2</sup>Stomestet Clinic

\*Corresponding author: *Smaranda Buduru, e-mail: smarandabuduru@yahoo.com*

---

Our patients' wishes are often focused on the aesthetic issues but often there are functional issues which are not obvious or important for the same patients.

There are clinical situations when, at the initial consultation, the dentist observed the presence of generalized problems of the arches. The modifications implied the need of complete rehabilitation of the mouth and forbade the application of, let say, six veneers on the upper frontal teeth.

The ample teeth modifications (for example generalized wear with position changes both in horizontal and vertical planes) may be so aggravated that even the complete prosthodontic reconstructions are not able to solve the aesthetical and occlusal needs (especially).

In these situations the orthodontic treatment should offer the preliminary pre prosthetic conditions in order to optimize the desired prosthodontics result.

Sometimes, on the contrary, there are situations in which the orthodontic treatment in adults ended in an improper manner and consequently the prosthodontic treatments try to compensate the occlusal and esthetic discrepancies.

This paper presents the protocol applied in different clinical situations in order to obtain the functional and aesthetic results of complex cases.

## SENSOR NETWORK ANALOG FRONT-ENDS FOR MONITORING SYSTEMS IN DENTAL MEDICINE

PAUL FARAGÓ, RAMONA GĂLĂTUȘ

Bases of Electronics Department, Technical University of Cluj-Napoca, Cluj-Napoca, Romania

\*Corresponding Author: *Paul Faragó, e-mail: Paul.FARAGO@bel.utcluj.ro*

---

Latest trends in biomedical electronics target battery-operated, or even battery-less, wearable sensor networks for portable and autonomous medical monitoring in a ubiquitous healthcare scenario [1–3]. This imposes severe design specifications, expressed in terms of low-voltage supply, low-power consumption, linearity, low noise, etc. [1,5]. In the field of dental medicine, sensor networks account for example for stress monitoring in dental implants [6], intraoral tongue drive systems [7], etc. One step forward, the advent of a variety of biomedical sensors, each with its own specific interfacing, led to the development of Universal Intelligent Sensor Interfaces (UISI) [8].

Most signal processing in biomedical sensor networks is performed in a digital fashion. Yet, consistent analog-specific functionality is present for sensor interfacing. Indeed, sensors monitor the desired indicators in an analog fashion, in order to convert the physiological phenomenon into a measurable electrical signal, i.e. voltage or current. Signal conditioning, prior to analog-to-digital (ADC) conversion, generally accounts for gain and filtering [1,9]. This must exhibit wide-range parameter programmability to have the processing parameters adapted to the specifics of the monitoring conditions [1,9–12].

The active element for signal conditioning is the operational transconductance amplifier (OTA). Low-voltage, low-power and highly linear OTA design is addressed by subthreshold operation, bulk input and combinations of linearization techniques [13]. Programming the analog processing parameters translates to programming the amplifier gain.

This presentation illustrates a highly-linear wide-range programmable OTA and its employment in sensor interface analog front-ends. For validation, transistor-level simulation is presented.

---

## CLINICAL APPLICATIONS OF BONE REGENERATION MATERIALS IN ORAL IMPLANTOLOGY

NORINA FORNA

**Implantology, Removable Prosthesis and Technology Department, Dental Medicine Faculty, “Grigore T. Popa” University of Medicine and Pharmacy, Iasi, Romania**

*\*Corresponding Author: Norina Forna, e-mail: profforna@gmail.com*

---

With the improvement of the general health of the population in countries with a high standard of economic and social development and increased longevity of the general population, materials with biomedical applications elicit a strong interest. There is currently a higher demand for materials that can be implanted in the human body. The range of applications is extremely broad, from total joint prosthesis systems for controlled drug release and tissue regeneration assisted systems.

Any material for surgical implantation into the body should not be toxic to cells in proximity (locally) or systemically. In addition, it is not enough for a biomaterial to be inert in relation to the environment in which it is located, it should also determine a positive response from it. Accelerated generation of extracellular matrix of hard or soft tissue is the result of increased cell productivity. In the case of the hard tissue implants, bioactive materials are preferred, which cause bone formation and attachment of the implant to the newly formed bone. Of major importance at the tissue-implant interface are the chemical or micro-mechanical phenomena and the relationship between surface morphology and chemical composition.

An important feature is the longevity of the implant. Corrosion and degradation are of great importance especially if they are responsible for the generation of toxic species at the implant site. For example, wear resistant surfaces are recommended to be used in situations where forces responsible for this phenomenon are acting. In addition, any residue which may result from the process of attrition should be non-toxic. There are situations where controlled degradation is a goal. For instance, resorption of inorganic materials enables the controlled release of ionic or molecular species that stimulate tissue regeneration. If the implants material can be absorbable, a second surgical operation may be avoided implying removal. Beneficial organic molecules can also be delivered by means of degradable matrices. Pre and pro implants preparation plays an essential role in the ultimate success of the therapy, these steps are particularly important to be detailed in the practice guidelines.

## VISUAL AND INSTRUMENTAL SHADE MATCHING IN DENTISTRY: NEW INSIGHTS

RAZVAN GHINEA<sup>1</sup>, OSCAR PECHO<sup>2</sup>, ALVARO DELLA BONA<sup>2</sup>, MARIA DEL MAR PÉREZ<sup>1</sup>

<sup>1</sup>Department of Optics, Faculty of Science, University of Granada, Campus Fuente Nueva, Granada, Spain

<sup>2</sup>Post-Graduate Program in Dentistry, Dental School, University of Passo Fundo, Brazil

\*Corresponding author: Razvan Ghinea, e-mail: rghinea@ugr.es

---

The results of visual and instrumental shade matching using two commercially available shade guides and three different color difference formulas are reported. One hundred dental students (DS) matched 4 extracted human upper central incisors (UCI) with tabs from Vita Classical (VC) and Vita Toothguide 3D-Master (3D) shade guides. Color coordinates ( $L^*$ ,  $a^*$ ,  $b^*$ ,  $C^*$  and  $h$ ) of both teeth and shade tabs were measured using a spectroradiometer (SP) and a spectrophotometer (EA) in standardized conditions. Three color difference metrics (CIELAB, CIEDE2000(1:1:1) and CIEDE2000(2:1:1)) were used to calculate the best instrumental shade matching based on minimum color difference. SP showed better agreement (25–75%) between visual and instrumental shade matching when compared to EA (0–25%). The percentage of best match for the visual assessment was more consistent using VC (23–55%) than 3D (19–34%).

Considering the best performance (using SP and VC), the CIEDE2000(2:1:1) color difference formula proved to be a better estimate to the visual perception. The visual shade matching was driven by lower color changes in chroma and hue, especially when using VC shade guide. The visual perception of DS is most closely represented using VC shade guide and CIEDE2000(2:1:1) color difference formula, which contemplates the rotation of chromatic discrimination ellipsoids. The majority of best visual matches were near the tolerance ellipsoid centered on tooth shade. Irrespective of the color difference metric, the most prevalent shade as selected by females showed greater success (CIELAB: 50%; CIEDE2000(2:1:1): 100%) than males (CIELAB: 25%; CIEDE2000(2:1:1): 50%).

## ADVANCED GLYCATION END PRODUCTS (AGES) IN ORAL PATHOLOGY – QUO VADIS?

ARANKA ILEA<sup>1</sup>, BIANCA BOȘCA<sup>2</sup>, MARIA CRIȘAN<sup>2</sup>, ANIDA BĂBȚAN<sup>1</sup>, NAUSICA PETRESCU<sup>1</sup>, RADU SEPTIMIU CÂMPIAN<sup>1</sup>

<sup>1</sup>Department of Oral Rehabilitation, Oral Health and Dental Office Management, Faculty of Dentistry, Iuliu Hatieganu University of Medicine and Pharmacy, Cluj-Napoca, Romania

<sup>2</sup>Departament of Histology, Faculty of Medicine, Iuliu Hatieganu University of Medicine and Pharmacy, Cluj-Napoca, Romania

\*Corresponding author: *Aranka Ilea, e-mail: arankailea@yahoo.com*

AGEs result from the Maillard reaction which consists in the non-enzymatic reduction of sugars (glucose and fructose). Reduced sugars will bind to the amino groups in the structure of proteins, peptides, amino acids, nucleic acids and lipids. AGEs encompass the products of glycoxidation and lipid peroxidation. Intermediary products of AGEs are 1-DG (1-deoxyglyoxal), 3-DG (3-deoxyglyoxal) and MG (methylglyoxal), and the end products are: CML (carboxymethyllysine) and pentosidine. All these intermediary and end products are increased in hyperglycemia, oxidative stress (endogenous sources), and in the ingestion of food prepared at high dry temperature (exogenous sources). Exogenous and endogenous AGEs exert a negative effect on the human body by the alteration of structure and function of proteins and by the action on receptors called mRAGE (membrane-bound receptor of AGE), and thus intracellular chain reactions will generate ROS (Reactive Oxygen Species) and proinflammatory cytokines. AGEs may also exert their intracellular effects by non-receptor mechanisms.

AGEs are involved in many conditions with multifactorial determinism which are based on low intensity chronic inflammatory processes. AGEs (endogenous or exogenous origin) can accumulate in excess in dentin by binding to the collagen I. This process is more intensive with aging. Thus, they may influence the strength of dental structures and may promote the progression of caries. AGEs can also inhibit the bone turnover which will influence the bone osseointegration of dental implants.

It seems that RAGE have important role in pulpitis process in mediating the immune response to infectious agents. Coexpression RAGE and AGEs in endothelial cells may explain periapical granulation surrounding tissue destruction. Also RAGE gene polymorphisms and their interaction with environmental conditions may be predisposing factors for oral cancer promotion. RAGE interaction with S100A7 proteins (with a role in cancer progression and metastasis) are involved in local invasion and metastasis of osteosarcoma.

AGEs are involved in the pathogenesis of metabolic syndrome diseases and aging processes evidenced by the accumulation of these products into the skin and dentine.

What sort of therapeutic challenges must we have to block AGEs action? Do these therapies have the expected effects on bone healing? What about the periodontal disease?

## **BONDING EVOLUTION OF LITHIUM DISILICATE CERAMICS: FOR MORE ESTHETIC AND MORE NATURAL RESTORATIONS**

**JEAN-FRANÇOIS LASSERRE**

**Faculty of Dental Sciences, College of Dental Sciences, University of Bordeaux, Bordeaux - France**

\*Corresponding author: Jean-François Lasserre, e-mail: [lasserre.jean-francois@wanadoo.fr](mailto:lasserre.jean-francois@wanadoo.fr)

---

Novelty in our practice comes from the field of “Bionics”, science that inspires from nature by coping, in technical achievements, structural models and functional processes of human beings.

This is the case of ceramic bonding techniques that surpass simple aesthetical mimetics, by reproducing the structure as well as the biomechanics of natural tooth. These ceramic “laces”, feldspathic or enriched with lithium disilicate, which we are capable to bond as hard as the natural dentin-enamel junction is, are reinforcing the tissues by restoring the initial strength of the tooth.

New recommendations are appearing, developed in the concept of non-invasive and minimally invasive tooth preparation techniques, systematizing the use of dental magnifiers and of the micro-rotary and micro-ultrasonic instrumentation.

In the ceramic bonding technique we are assisting to a simplification of the procedures, especially the elimination of hydrofluoric acid, too dangerous during handlings in the dental office. Moreover, we are assisting to a generalization of dentin/enamel adhesives, so called universal bonding agents, which could replace the classical fourth-generation adhesives in the bonding of ceramic restorations.

## “SENSORY-ADAPTED” DENTAL ENVIRONMENT LOWERS ANXIETY LEVEL OF DENTAL PATIENTS

ONDINE LUCACIU<sup>1</sup>, RALUCA TRIFU<sup>2</sup>, ROXANA BORDEA<sup>1</sup>, NAUSICA PETRESCU<sup>1</sup>, ANDREEA POP<sup>1</sup>, ALEXANDRU MESTER<sup>1</sup>, ARIN SAVA<sup>1</sup>, ANCA SERBAN<sup>3</sup>, RADU SEPTIMIU CÂMPIAN<sup>1</sup>

<sup>1</sup>Department of Oral Rehabilitation, Iuliu Hatieganu University of Medicine and Pharmacy, Cluj-Napoca, Romania

<sup>2</sup>Department of Clinical Psychology and Mental Health. Iuliu Hatieganu University of Medicine and Pharmacy, Cluj-Napoca, Romania

<sup>3</sup>Art of Manners SRL, Cluj-Napoca, Romania

\*Corresponding author: Ondine Lucaciu, e-mail: [ondineluc@yahoo.com](mailto:ondineluc@yahoo.com)

**Objective.** The main objective of this study was to target ambient key elements able to influence anxiety in dental care patients.

**Material and method.** 100 patients, age between 14-65, 50 coming from private practice office and 50 from medical clinic, were asses using 2 different instruments: Norman Corah' questionnaire for level of anxiety and a special design questionnaire able to asses key elements in ambient. The relation was tested using specific statistical analysis.

**Results.** Socio-demografic distribution was marked by 54% men and 46% women in medical clinic and 56% women and 44% men in private practice dental office. Anxiety level is lower in patients from medical clinic (90%-moderate, 10%-high and 0%-severe) comparing with the patients from privat practice office (82% moderate, 8% hight and 10% severe). Patients with anxiety prefer light color and luminosity in contrast with dark color. Patients from privat practice, with high level of anxiety prefer a wider range of colors and musical styles. Both groups detect a paricular smell entering the dental unit, but patients from private practice were affected in a positive way (72%) comparing to those from medical clincic (44%). Information materials are prefer by patients with low level of anxiety (86%) comparing with high level (82%) due to coping strategies, such as rationalization.

**Conclusions.** Ambient rise importance in dental clinical setting and patients pay a special attention to this element.

## THE CHOICE OF MATERIALS FOR IMPLANT SUPPORTED PROSTHETIC RESTORATIONS

**HORIA MANOLEA, VERONICA MERCUȚ, FLORIN OBĂDAN,  
SANDA MIHAELA POPESCU, MONICA SCRIECIU, RADU RÎCĂ, ALEX ȘTEFĂRȚĂ**

**Faculty of Dentistry, University of Medicine and Pharmacy Craiova, Romania**

*\*Corresponding author: Horia Manolea, e-mail: [horia.manolea@umfcv.ro](mailto:horia.manolea@umfcv.ro)*

---

The lack of periodontium for a dental implant may lead to high stress concentration at the bone level when the implants are prosthetic loaded.

This presentation discusses the current possibilities in choosing the most appropriate materials for the implant supported prosthesis, in order to reduce the impact of occlusal forces. The cement layer may serve as an absorber for the strain, but its role is reduced and poses the risk of excessive cement retained in the peri-implantar tissue.

The use of resin materials for the implant supported prosthetic restorations veneering has been suggested for many years, but their role is important especially in cases of full-arch fixed implant-supported prosthesis with cantilever distal extensions and less in single implant restorations. Nowadays, new materials such as fiber-reinforced composites and high-performance polymers as PEEK may be used for the framework of the implant supported prosthetic restorations, but also for the implant or the prosthetic abutment.

## THE WEAR BEHAVIOR OF RESTORATIVE DENTAL MATERIALS

**VERONICA MERCUȚ, HORIA MANOLEA, SANDA MIHAELA POPESCU, MONICA SCRIECIU,  
MONICA CRĂȚOIU, MARINA AMĂRĂSCU, PETRE MĂRĂȘESCU**

**Faculty of Dentistry, University of Medicine and Pharmacy Craiova, Romania**

*\*Corresponding author: Veronica Mercuț, e-mail: veronica.mercut@yahoo.com*

---

Using of the dental materials requires a great selection, each restoration seeking for aesthetic harmony, the correct anatomical shape, biomechanical stability and avoiding relapses. To this purpose, biocompatible materials with suitable mechanical properties are recommended. The conditions of the oral cavity may affect the behavior of dental materials.

Some materials are influenced by the multitude of forces applied on them, by prosthetics tipping, by temperature change or by acidic attacks. These conditions may be worsened by the presence of some parafunctions or by pathologies as xerostomia and other changes in the composition of saliva. Pathologies that accelerate dental wear as bruxism, bulimia, gastroesophageal reflux, or drinking acidic or high sugar content beverages causes dental wear and affects also the restorative materials.

This presentation describes the selection criteria of dental materials and analyzes the mechanisms of dental wear and degradation that can affect restorative materials, focusing on patients with bruxism.

## ORTHODONTIC MATERIALS: BETWEEN ESTHETICS AND PERFORMANCE

ANCA MESAROȘ

Department of Prosthetic Dentistry and Dental Materials, Iuliu Hatieganu University of Medicine and Pharmacy,  
Cluj-Napoca, Romania

*\*Corresponding author: Anca Mesaroș, e-mail: ancames@yahoo.com*

---

Orthodontics and dento-facial orthopedics is one of the dental specialties involved in treating the aesthetics of the smile. More and more patients address themselves to the orthodontist with the demand for an aesthetic treatment, with a treatment period as short as possible, with the best possible aesthetic outcome and with the special mention of using the most aesthetic appliance available.

In order to satisfy patient's demands, the technological development has brought more aesthetic techniques into practice, as well as the use of more physiognomic materials. The question that arises is whether their use is as efficient as the use of the classical techniques and materials. The presentation wishes to address the advantages, disadvantages and therapeutic limits of each of these newer methods and materials available on the orthodontic market.

The first part of the exposé will consist in a review of the most used nowadays techniques in the orthodontic practice and will argue on the need to use them by presenting clinical cases. The second part will present data from the orthodontic literature regarding the performances and limits of these techniques. Lingual orthodontics, aligners, aesthetic ceramic or hybrid buccal braces or aesthetic archwires are some of the subjects on which the presentation emphasizes and their characteristics are constantly compared with the therapeutic performances achieved by classical means.

Certainly, the development of aesthetical therapeutic methods represented an advantage for the patients' psychological comfort and their use on a large scale has allowed to address a more complex pathology but also has changed the average age for the orthodontic practice.

---

## ALTERNATIVE METHODS FOR ORAL CANCER IDENTIFICATION

MEDA LAVINIA NEGRUTIU<sup>1</sup>, COSMIN SINESCU<sup>1</sup>, S. CANJAU<sup>1</sup>, A. MOGA<sup>1</sup>, MIHAI ROMÎNU<sup>1</sup>,  
CARMEN D. TODEA<sup>1</sup>, CRISTINA MARIA BORTUN<sup>1</sup>, A. G. H. PODOLEANU<sup>2</sup>

<sup>1</sup>Faculty of Dentistry, “Victor Babeş” University of Medicine and Pharmacy, Timișoara, Romania

<sup>2</sup>Applied Optics Group, School of Physical Sciences, University of Kent, Canterbury, UK

\*Corresponding author: Meda Lavinia Negrutiu, e-mail: meda\_negrutiu@yahoo.com

---

Oral cancer is one of the most common neoplasms and it is responsible for 2-3% of the total of human malign tumors. Early diagnose represents an advantage for improving the survival rate by reducing the diagnostic time.

**Materials and methods.** Spectral Domain Optical Coherence Tomography (SDOCT) was employed to evaluate the squamous cellular carcinoma. The system was working at 870 nm and it is completely noninvasive.

The validations were performed by VELscope® Vx Handpiece which emits a safe, visible blue light into the oral cavity, that excites the oral tissue and causes it to fluoresce. Abnormal fluorescence patterns help the clinician in detecting unhealthy mucosal tissue that sometimes cannot be seen with the naked eye. Such patterns arise from a variety of causes, including: an increase in metabolic activity in the epithelium; a breakdown of the fluorescent collagen cross-links in the connective tissue layer beneath the basement membrane; an increase in tissue blood content, either from inflammation or angiogenesis (hemoglobin strongly absorbs fluorescence excitation [blue] and emission light [green]); the presence of pigments (melanin or amalgam particles) which absorb light.

**Results.** Three out of 20 potential oral cancers were identified by SDOCT and validated first with the VELscope systems and finally by histology. Direct eye evaluation of those lesions failed.

**Conclusions.** SDOCT could act as a valuable tool in identification in a noninvasively manner the squamous cellular carcinoma. The validation performed by the VELscope system or other methods is still need it till the complete optimization of the optical method.

## ORTHODONTIC ANCHORAGE ON MINI –IMPLANTS, BEETWEN MYTH AND REALITY

MARIANA PĂCURAR<sup>1</sup>, ALEXANDRU VLASA<sup>2</sup>

<sup>1</sup>Orthodontic Department, Faculty of Dentistry, University of Medicine and Pharmacy Tg. Mureș, Romania

<sup>2</sup>Periodontology Department, Faculty of Dentistry, University of Medicine and Pharmacy Tg. Mureș, Romania

\*Corresponding author: Mariana Păcurar; e-mail: marianapac@yahoo.com

---

**Introduction.** Anchorage, term derived from the Navy is defined as a stable element of a body to travel; in orthodontics it is the key element that ensures the stability of a tooth, a group of teeth, quadrants or arches to move other teeth, groups of teeth, arches. Skeletal anchorage in orthodontics started more than 70 years ago when Gainsforth and Higley (1945) implemented vitallium screws in the vertical ramus of the mandible in dog and applied elastic from these hooks to the spring of the maxillary arch, for distalization; later, many researchers have expanded and diversified orthodontic anchorage on mini-implants. Birte Melsen et al. (1998) Bae et al, Hugo de Clerk (2008) coined the term BAMP (Bone Anchored maxillary protraction using this device in orthopedic correction of malocclusion Class III Angle.

**Aim.** The authors have proposed to assess the quality of anchorage by two types of mini-implants (alloy Cr-Co and nickel- titanium alloy), especially since the majority of adult patients seeking orthodontic treatment were edentulous in the lateral regions of the dental arch, which implies an additional anchorage with various devices, or obtaining a stable skeletal anchorage.

**Materials and methods.** The presentation includes some of the design features of orthodontic implants: thread length, thread pitch and diameter, implant surface design, insertion mode, as well as the correlations of these features with stability of the mini-implants. The rate of stability for the two types of mini-implants was evaluated by measuring the tensile force with a traction machine and the tensions that occur in orthodontic conditions.

**Conclusions.** The most reliable types of orthodontic mini-implants are cylindrical-conical screw-type Ni-Ti, with the optimal size of between 8-10 millimeters, one step thread ranging from 0.75 mm 0.80 mm. Using orthodontic implants as temporary anchorage devices (TDA) has revolutionized the biomechanical orthodontic treatment planning, eliminating the problem of losing mechano orthodontic anchorage. Due to the new type of anchorage, the results are more predictable, the treatment duration can be shortened and therapeutic directions diversified.

## TITANIUM-ALLOYED BIOMATERIALS USED IN COMPLEX ORAL REHABILITATIONS – CLINICAL PERSPECTIVES

ION PATRASCU

**Department of Dental Prostheses Technology and Dental Materials, Dental Medicine Faculty, Carol Davila University of Medicine and Pharmacy, Bucharest, Romania**

\*Corresponding Author: Ion Patrascu, e-mail: dr.ipatrascu@gmail.com

---

The development of dental biomaterials utilized in the fabrication of dental implants used for oral rehabilitations is in continuous evolution. Among these, pure titanium and titanium alloyed with aluminum and vanadium (Ti-6Al-4V) are the most commonly used. Because pure titanium is characterized by low resistance to loading, and Ti-6Al-4V may release metallic ions with consecutive immunologic and adverse reactions, in our research will be presented technological aspects and experiments regarding the corrosion resistance of titanium alloyed with zirconium (Ti-10Zr). The *in vitro* evaluation of Ti-10Zr corroborated with its surface characteristics (obtained by molding, corrosion and anodizing) was performed on human osteoblasts G292. The results confirm the biocompatibility of the Ti-10Zr alloy through its ability to support the attachment and proliferation of human osteoblasts offering a viable solution to mechanical loading.

## THE ENDO-PROSTHETIC CONTINUUM. RESTORATION OF THE ENDODONTICALLY TREATED TOOTH: ENDODONTIC HERMETICITY

JEAN-FRANÇOIS PELI, DOMINIQUE ORIEZ

Faculty of Dental Sciences, College of Dental Sciences, University of Bordeaux, Bordeaux - France

*\*Corresponding Author: Jean-François Peli, e-mail: jean-francois.peli@u-bordeaux.fr*

---

The aim of the endodontic treatment is to keep on the arcade a tooth whose pulp tissue is not healthy and therefore not functional.

The notion of « devitalized » tooth is false as the dental organ (tooth and periodontium) endodontically treated can be preserved due to the supporting tissues which remain vascularized and therefore vital.

When the tooth must have a root canal treatment followed by a prosthetic restoration, it is important that the treatment isolates the supporting tissues and protects them from bacterial attacks from the oral cavity. Therefore, the quality of the root canal treatment is the first guarantee of the endo-prosthetic continuum. It must be obtained during the two stages of the treatment: preparation and filling.

The complexity of the endodontic system is not limited to a main canal and therefore the shaping must be tridimensional. It relies on chemo-mechanical technics associating a mechanic instrumentation and an adapted irrigation. The use of Nickel-Titanium rotary instruments as well as optimized irrigation systems have considerably enhanced the quality of root canal treatments.

If cleaning and shaping remains the most important step, the filling will allow to maintain the result thus having an important role in the endo-prosthetic continuum. Compacted gutta-percha technics associated to a root canal cement are since a long time the gold standards.

Enhancing the sealing by bonding intra-canal polymer materials has not been as successful as expected. But, bioactive cements have proved their biocompatibility and efficiency concerning the adhesion to dentin and could, in the future, modify and simplify our procedures.

These modern procedures and the respect of the endo-prosthetic continuum allow the root canal treatment to perfectly ensure the basement of prosthetic restorations.

---

## DIFFERENT MATERIALS FOR PROVISIONAL RESTORATIONS IN PERIODONTAL TISSUE CONDITIONING

ADRIAN PETRUȚIU<sup>1,2</sup>, DARIUS TOMINA<sup>2,3</sup>, CRISTINA DINU<sup>2</sup>, HORATIU ROTAR<sup>2,4</sup>,  
CRISTIAN DINU<sup>2,4</sup>

<sup>1</sup>Department of Periodontology, Iuliu Hatieganu University of Medicine and Pharmacy, Cluj- Napoca, Romania

<sup>2</sup>MedArtisDent Clinic, Cluj-Napoca, Romania

<sup>3</sup>Iuliu Hatieganu University of Medicine and Pharmacy, Cluj-Napoca, Romania

<sup>4</sup>Department of Oral and Maxillofacial Surgery, Iuliu Hatieganu University of Medicine and Pharmacy, Cluj-Napoca, Romania

\*Corresponding Author: Adrian Petruțiu, e-mail: [Petrutiu.stefan@umfcluj.ro](mailto:Petrutiu.stefan@umfcluj.ro)

---

**Introduction.** An esthetic smile needs healthy and inflammation-free periodontal tissues. The invasion of biological width can induce chronic inflammation. When that occurs there is a need to properly restore its dimension. The provisional step plays an important role in the treatment process. The materials used for this type of restorations should be able to perfectly integrate with the soft tissues in order to obtain the desired results.

**Objective.** The main objective was to observe the periodontal healing obtained after the application of provisional prosthetic restorations made of different materials.

**Methods.** A clinical evaluation of the periodontium was performed before and after removing the local irritation factors. We applied provisionals made of different materials (PMMA, composite fused to metal and bis-acrylic resin) according to the clinical situation.

Other clinical evaluations were performed after the application of the provisional prosthetic restorations, periodically, until the final restorations were delivered.

**Results.** We observed a decrease of the inflammation index in all cases with better values for the PMMA CAD-CAM provisionals followed by the composite fused to metal and by the bis-acrylic resin.

**Conclusions.** A better healing was observed after the application of the PMMA CAD-CAM provisionals. It is very important to choose the proper provisional restoration for tissue conditioning according to the time the provisional needs to be in use until the next prosthetic steps. Whenever possible we should use the material that provides us the best finished and polished surface in order to prevent plaque retention.

## DEVELOPMENT AND CHARACTERIZATION OF NEW PRE-REACTED GLASS CONTAINING COMPOSITES (GIOMERS) WITH IMPROVED PROPERTIES

CRISTINA PREJMEREAN<sup>1</sup>, DOINA PRODAN<sup>1</sup>, TINCA BURUIANA<sup>2</sup>, MIHAELA VLASSA<sup>1</sup>, LAURA SILAGHI-DUMITRESCU<sup>1</sup>, CODRUTA SAROSI<sup>1</sup>, IOANA HODISAN<sup>3</sup>, LOREDANA COLCERIU<sup>3</sup>, MIHAELA STREZA<sup>4</sup>, VASILE PREJMEREAN<sup>1</sup>, MARIOARA MOLDOVAN<sup>1</sup>

<sup>1</sup>Babes-Bolyai University, Cluj-Napoca, Romania

<sup>2</sup>Petru Poni Institute of Macromolecular Chemistry, Iași, Romania

<sup>3</sup>Iuliu Hatieganu University of Medicine and Pharmacy, Cluj-Napoca, Romania

<sup>4</sup>National Institute for Research and Development of Isotopic and Molecular Technologies, Cluj-Napoca, Romania

\*Corresponding Author: Cristina Prejmarean, e-mail: cristina.prejmarean@gmail.com

---

**Objectives.** The aim of the present work was to prepare a series of dental giomers and to investigate the morphology, the physico-chemical properties (degree of conversion (DC), radiopacity, fluoride releasing), mechanical strength (flexural strength) and adhesion to dental tissues.

**Materials and methods.** The pre-reacted glasses were synthesized using fluoroaluminosilicate superficially active glasses and polyalkenoic acids based on acrylic acid / itaconic acid / N-acryloyl amino acid modified with methacrylic groups. The experimental giomers were prepared as monopastes by blending the resin matrices, the pre-reacted glasses, a radiopaque glass and nano-fluorhydroxyapatite. The resin matrices were prepared using commercial Bis-GMA monomer (Bis-GMAcom), experimental Bis-GMA urethane analogue (Bis-GMAexp), triethyleneglycol dimethacrylate and 2-hydroxyethyl methacrylate. Commercial Beautifil II product was used as a control.

**Results.** Beautifil II presents a DC value (61%) between the DCs measured for the experimental giomers based on Bis-GMAcom (50%) and the DC values for the experimental giomers based on Bis-GMAexp (78%). The radiopacity and flexural properties values for the experimental giomers were higher than the limit imposed by the ISO 4049/2000. The fluoride release after the first day of storage ranged from 0.25 to 0.47 ppm for the experimental giomers compared to 0.07 ppm for the commercial material and from 3.52 to 9.26 ppm for the new giomers compared to 2.56 ppm recorded for the commercial one, after seven days.

**Conclusions.** The original giomers based on Bis-GMA urethane analogue could be good candidates for dental applications.

## YESTERDAY, TODAY, AND TOMORROW CERAMICS, NI-CR AND CO-CR ALLOYS IN DENTAL PROSTHETIC APPLICATION

LUCIEN RECLARU

**Corrosion & Biocompatibility Department, VVSA, Branch of Richemont International SA Varinor Innovation, Switzerland**

*\*Corresponding Author: Lucien Reclaru, e-mail: lreclaru@gmail.com*

A wide range of ceramics, metals and their alloys are used in surgically implanted medical devices, prostheses and dental materials. The classes of metals and alloys used in dental prosthetic applications include nickel-chromium alloys, cobalt-chromium alloys, titanium (as alloys and unalloyed), precious metals alloys and stainless steels in orthodontics field.

Ceramics: The zirconium Y-TZP is a material very well tolerated by soft tissues, allowing to obtain a stability of peri-implantary soft tissues in long term. The adhesion of fibroblasts and osteoblasts and on proliferation to zirconia proved the integration with bone and soft tissue cells.

In general, ceramic materials are inert in the corrosion process, compared with most of the other materials. There are still no results of large-scale research on the behaviour of zirconia ceramic in the corrosion. It will be necessary to consider two aspects:

- The stability of zirconium versus time, the tetragonal stable phase is transformed in unstable monoclinic phase;
- The multitude of the manufacturing processes, with diverse additives of sintering, the processes of mixture for oxides, impurities, gaseous phases in the joints of grains, and the porosities influence strongly the behaviour in the corrosion and the chemical degradation.

Metals: Pd alloys, Ni-Cr and Co-Cr

In the last ten years the alloys market for medical devices in Europe has undergone dramatic changes :

a) Palladium alloys: Removing palladium from dental alloys due to allergic reactions generated by Pd-Cu-Au alloys. Durosaro and el Azhary revealed that in the United States, among 910 patients tested by a palladium- patch-test, positive result was noted in 100 patients (12.1%) [1]. In addition nickel allergy was found in 57% of the patients sensitized to palladium [1-3]. In particular, many manufacturers of noble dental alloys dedicated themselves to the development of gold-based or platinum-based noble alloys, without palladium, called « bio ».

b) Precious alloys: Nowadays, due to financial reasons, even in countries where precious alloys are traditionally used, nickel-based alloys are found. In certain countries, nickel-based, cheaper alloys have increasingly been subjected to more and more regulations or even banned (Sweden and Denmark).

c) Ni-Cr alloys: In Europe, the main threat to health is nickel allergy (10-15% for female adults and 1-3% for male adults). 40-70% of nickel contact dermatitis develop hand eczema, acute or chronic. The European Union has accordingly decreed two directives:

- the nickel release from devices in direct and prolonged contact with the skin must be lower than 0.5 microgr /cm<sup>2</sup>/week [4] - and into pierced ears and other parts of the human body lower than 0.2 microgr/cm<sup>2</sup>/week [5]

Despite the restrictions imposed by the UE for the protection of the population to contact dermatitis, the use of Ni-Cr dental alloys is increased.

Wiltshire and Noble [6] revealed that in dentistry, allergies to metals are also frequently reported. In particular, allergy to nickel in females is reported to vary from 9-20%, and in orthodontic patients with pierced ears, 30% are allergic to nickel, copper and chromium. Oral piercings have put susceptible patients to a greater risk of developing metal allergies. Gutsche and al. [7] concluded that with different locations for oral piercings there are short- and long-term clinical complications.

According to a recent questionnaire study in 5000 patients in Germany (from dental and dermatological practices), 84% of women and 22% of men had ear piercings. However, piercing of other parts of the body has increased in the last years [8].

d) Cobalt-chromium based alloys are known to have excellent corrosion resistance. Because of their outstanding mechanical properties (e.g. high stiffness) these alloys are mainly used for the fabrication of removable partial dentures, but also for metal ceramic prostheses, where fine frameworks constructions are needed. Unfortunately, they are difficult to treat and to process for the dental technician and for the dentist in traditional casting technique because of high hardness. Handling is considerably improved in the new technologies:

- Milling process (origin: bulk metal)
- CAD/CAM sinter process (origin: powder).
- 3D Printing Technology (origin: powder):
- Selective laser sintering (SLS), developed by Dr. Carl Deckard in Austin USA
- Direct metal laser sintering (DMLS), developed by the EOS of Munich, Germany
- Selective laser melting (SLM), started at Fraunhofer Institute ILT Aachen, Germany
- Electron beam melting (EBM), developed by ARCAM AB in Sweden
- Laser Concept Laser GmbH (SLS) 96215 Lichtenfels Germany.

## NEW TRENDS IN DENTISTRY: WHAT IS THE FUTURE HOLDING?

COSMIN SINESCU, MIHAI ROMINU, MEDA LAVINIA NEGRUTIU

Faculty of Dentistry, "Victor Babeş" University of Medicine and Pharmacy, Timișoara, Romania

\*Corresponding Author: *Cosmin Sinescu, e-mail: minosinescu@yahoo.com*

---

Dentistry confronts a deep transformation process in our country. The population is aging and becoming more diverse and demanding.

**Materials and methods.** A comprehensive literature review and relevant reports and interviews with organizations throughout the Europe and United States were used for this evaluation.

The findings are organized in five key themes to capture the trends in dental profession. The five themes, however, are interrelated and should be viewed collectively. The themes are: people; providers, payments, policies and practice implications.

**Results.** The population is getting older and more diverse, leading to different disease patterns, care seeking behaviour and ability to pay. With the changing patterns of dental decay, comes a shift in services from traditional restorative care to cosmetic and preventive services. Because a higher proportion of the population is keeping its teeth as it ages there may be an increased need for periodontal care; treatments generally provided by dental hygienists rather than dentists. The changing utilization patterns are predicted to drive down overall dental spending due to the divergent mix of procedures between adults and children.

**Conclusions.** The changing nature of dental consumers and their providers, along with altering patterns of demographics and government policies, will have significant effects on dental practice all over the world. This could be a critical moment for the dental profession. Changes in medical practice and the health coverage system will take place in dentistry.

---

## A RESEARCH TOPIC IN DENTAL MEDICINE - SALIVARY FLUORIDE ANALYSIS

MELINDA SZÉKELY

**Department of Morphology of Teeth and Dental Arches; Technology of Dental Prosthesis and Dental Materials,  
Faculty of Dental Medicine, University of Medicine and Pharmacy of Tîrgu-Mureş, Romania**

*\*Corresponding Author: Melinda Székely, e-mail: [szekely.melinda@umftgm.ro](mailto:szekely.melinda@umftgm.ro)*

---

Saliva is used to monitor diseases and conditions, due to the simple and inexpensive sampling methods that cause minimal subject discomfort. A review of the value of saliva as a medium to scrutinize the health status and the scientific rationale for such use will be presented briefly.

The use of fluoridated toothpastes has been associated with the decrease in dental caries prevalence due to their ability to increase intraoral fluoride (F) content. We therefore thought it is worthwhile to assess the effect of toothpastes to keep ionized F at sufficient level in the oral cavity to inhibit demineralization and promote remineralization of enamel. Studies using ion-specific electrode and F-meter were conducted to investigate the salivary F concentration as indicator of intraoral F level after the use of different dentifrices: 1.) low-fluoride and conventional toothpastes; and 2.) fluoride-free (placebo), conventional and high-fluoride toothpastes, respectively. Salivary fluoride concentration was monitored in young adults in order to assess whether there is a dose-response relationship with respect to the F content of the toothpastes and the different time points of saliva sample collections after toothbrushing. These interdisciplinary studies were carried out by a research team from the University of Medicine and Pharmacy Tîrgu-Mureş, România, in collaboration with the Bauru Dental School, University of Sao Paulo, Brazil.

The aim of the presentation is to give an overview of our research activities in this domain performed over the last years, supported through a research grant by 'The Borrow Foundation' (UK).



# ORAL PRESENTATIONS



## ALVEOLAR RECONSTRUCTION AND PROSTHETIC REHABILITATION IN EXTENSIVE BONY DEFECTS

GABRIEL ARMENCEA<sup>1</sup>, SIMION BRAN<sup>1</sup>, ILEANA MITRE<sup>1</sup>, CRISTIAN DINU<sup>1</sup>, MĂDĂLINA LAZĂR<sup>1</sup>,  
SERGIU VACARAȘ<sup>1</sup>, RADU-SEPTIMIU CÂMPIAN<sup>2</sup>, GRIGORE BĂCIUȚ<sup>1</sup>, MIHAELA BĂCIUȚ<sup>3</sup>,  
LUCIA HURUBEANU<sup>1</sup>

<sup>1</sup>Department of Oro-Maxillo-Facial Surgery, Iuliu-Hatieganu University of Medicine and Pharmacy, Cluj-Napoca, Romania

<sup>2</sup>Department of Oral Rehabilitation, Iuliu-Hatieganu University of Medicine and Pharmacy, Cluj-Napoca, Romania

<sup>3</sup>Department of Implantology, Iuliu-Hatieganu University of Medicine and Pharmacy, Cluj-Napoca, Romania

\*Corresponding author: Gabriela Armencea, e-mail: garmencea@gmail.com

Alveolar bone defects reconstruction represents an ongoing challenge in OMF surgery. Autologous bone is the golden standard in bone reconstruction, for its osteogenic properties. Surgical techniques development, new fixation devices makes this graft to be the best treatment option, having a low postoperative complication rate. The disadvantages concerns the limited amount available, donor site morbidity, impossibility of geometric and volumetric restoration of the defect.

These drawbacks can be solved by the use of biomaterials, that have osteoconductive properties and no donor site morbidity, thus they can be the perfect solution in bone defect treatment.

The present paper follows the advantages of autografts in comparison with biomaterials, and investigates the postoperative complication rate.

## THE DIFFERENTIATION CAPACITY OF PERIODONTAL TISSUE-DERIVED MESENCHYMAL STEM CELLS

ANIDA MARIA BĂBȚAN<sup>1</sup>, MINODORA MOGA<sup>1</sup>, BIANCA ADINA BOȘCA<sup>2</sup>, ARANKA ILEA<sup>1</sup>,  
OLGA SORIȚĂU<sup>3</sup>, PIROSKA VIRÁG<sup>3</sup>, EVA FISHER<sup>3</sup>, MIHAI CENARIU<sup>4</sup>, EMOKE PALL<sup>4</sup>,  
NAUSICA PETRESCU<sup>1</sup>, RADU SEPTIMIU CÂMPIAN<sup>1</sup>

<sup>1</sup>Department of Oral Rehabilitation, Oral Health and Dental Office Management, Faculty of Dentistry, Iuliu Hatieganu University of Medicine and Pharmacy, Cluj-Napoca, Romania

<sup>2</sup>Department of Histology, Faculty of Medicine, Iuliu Hatieganu University of Medicine and Pharmacy, Cluj-Napoca, Romania

<sup>3</sup>Radiotherapy Laboratory, Radiology and Tumour Biology, “Ion Chiricuță” Oncological Institute, Cluj-Napoca, Romania

<sup>4</sup>Department of Reproduction, Obstetrics and Veterinary Gynecology, Faculty of Veterinary Medicine, University of Agricultural Sciences and Veterinary Medicine, Cluj-Napoca, Romania

\*Corresponding author: *Anida Maria Băbțan*

---

**Objective.** Mesenchymal stem cells (MSC) have the property of self-differentiation and also the ability to differentiate into various cell types, with the clinical applicability in organ repair and regeneration. The present study aims to point out the multilinear (osteogenic, neural, chondrogenic) human MSC differentiation capacity, harvested from periodontal human tissues (circular gingival ligament, periodontal ligament, interradicular alveolar bone and gingival tissue).

**Material and method.** Periodontal tissues were harvested from orthodontic purpose extracted molars, afterwards MSC were isolated using explant culture technique. The 4 tissue types isolated MSC were characterized by immunohistochemistry, flow-cytometry and genic expression (through RT-PCR) techniques. For the periodontal tissue-derived MSC differentiation capacity analysis, cells were incubated in specific osteogenic, chondrogenic and neural differentiation environments. These types of differentiation were assessed by cellular specific coloration and immunohistochemistry technique using specific antibodies.

**Results.** All 4 cell lines expressed MSC specific markers and a negative response for hematopoietic cells (CD45<sup>-</sup>). Differences in the intensity of the positivity of the „stemness” markers were noted

Periodontal tissue-derived MSC have presented various differentiation capacity to the osteogenic, chondrogenic and neural cell lines, depending of the tissue provenience. Regarding the differentiation towards the osteogenic line, MSC harvested from circular gingival ligament and periodontal ligament have shown an intense expression of anti-osteopontin and anti-alkaline phosphatase antibodies.

Specific neural markers: GFAP, p-Nestin and neurofilaments (NF) had shown the best expressions in MSC derived from gingival tissue, periodontal ligament and interradicular alveolar bone.

Chondrogenic differentiation (for 2A Collagen) was optimum expressed by circular ligament MSC. Positive cells were centered in a single chondrogenic nodule, the rest of the cells were negative for 2A Collagen.

**Conclusions.** Periodontal tissue-derived MSC have differences in what concerns genic and phenotype expression of “stemness” markers, which may influence their physiology (differentiation capacity and immunogenic prospective). Due to their ability to produce and discharge neurotrophic factors, these MSC can be useful precursors in neural regeneration and neurodegenerative diseases.

## METHODS FOR INCREASING THE BIOAVAILABILITY OF THE PHYTOCHEMICALS ON HUMAN PERIODONTAL STEM CELLS IN CULTURE

ADINA BIANCA BOȘCA<sup>1</sup>, ARANKA ILEA<sup>2</sup>, OLGA SORIȚĂU<sup>3</sup>, EVA FISCHER-FODOR<sup>3</sup>, ALINA PORFIRE<sup>4</sup>, GABRIELA CHERECHEȘ<sup>3</sup>, PIROSKA VIRAG<sup>3</sup>, ALINA ELENA PÂRVU<sup>5</sup>

<sup>1</sup>Department of Histology, Faculty of Medicine, Iuliu Hatieganu University of Medicine and Pharmacy, Cluj-Napoca, Romania

<sup>2</sup>Department of Oral Rehabilitation, Oral Health and Dental Office Management, Faculty of Dental Medicine, Iuliu Hatieganu University of Medicine and Pharmacy, Cluj-Napoca, Romania

<sup>3</sup>Radiotherapy, Tumor and Radiobiology Laboratory, “Ion Chiricută” Institute of Oncology, Cluj-Napoca, Romania

<sup>4</sup>Department of Pharmaceutical Technology and Biopharmaceutics, Faculty of Pharmacy, Iuliu Hatieganu University of Medicine and Pharmacy, Cluj-Napoca, Romania

<sup>5</sup>Department of Physiopathology, Faculty of Medicine, Iuliu Hatieganu University of Medicine and Pharmacy, Cluj-Napoca, Romania

\*Corresponding author: Adina Bianca Boșca, e-mail: biancabosca@yahoo.com

Current trends in medicine focus on the prophylactic and the therapeutic potential of the phytochemicals. Recent clinical and experimental studies have demonstrated the efficacy of curcumin and epigallocatechin-3-gallate (EGCG) in various pathologies, including the periodontal disease.

Curcumin (diferuloyl methane) is a low-molecular-weight natural polyphenol isolated from the rhizomes of *Curcuma longa*; due to its hydrophobic nature and the poor aqueous solubility, curcumin cellular uptake is low. Epigallocatechin-3-gallate (EGCG) is the most potent polyphenol obtained from *Camellia sinensis*; the EGCG disadvantage resides in the short half-life and the low stability that limit its biological effect. Therefore, the development of novel pharmaceutical products and synthetic derivatives is needed, in order to increase the bioavailability and the therapeutic potential of curcumin and EGCG.

This literature review discusses the advanced drug-delivery systems for optimizing therapeutic efficiency of phytochemicals. Additionally, the ongoing research performed by the authors presents the effect of liposomal curcumin, EGCG-loaded liposomes and the synthetic curcuminoids obtained by Knoevenagel condensation on human periodontal stem cells in culture.

**Acknowledgement.** This paper was published under the frame of the Internal Grant financed by the “Iuliu Hatieganu” University of Medicine and Pharmacy, no. 4944/16/8.03.2016.

## THREE-DIMENSIONAL COMPARISON OF STUDY MODELS PRODUCED BY THREE ADDITIVE MANUFACTURING METHODS

ALEXANDRU-VICTOR BURDE<sup>1</sup>, CRISTINA GASPARIK<sup>1</sup>, SORANA BACIU<sup>1</sup>, MĂRIOARA MOLDOVAN<sup>2</sup>, DIANA DUDEA<sup>1</sup>, RADU-SEPTIMIU CÂMPIAN<sup>3</sup>

<sup>1</sup>Department of Prosthetic Dentistry and Dental Materials, Iuliu Hatieganu University of Medicine and Pharmacy, Cluj-Napoca, Romania,

<sup>2</sup>Department of Polymer Composites, Babes Bolyai University, Raluca Ripan Chemistry Research Institute, Cluj-Napoca, Romania

<sup>3</sup>Department of Oral Rehabilitation, Iuliu Hatieganu University of Medicine and Pharmacy, Cluj-Napoca, Romania

\*Corresponding author: *Alexandru-Victor Burde, e-mail: burde.alexandru@umfcluj.ro*

---

**Purpose.** The main objective of this study was to test the clinical-feasibility of additive manufacturing by comparing the accuracy of three different manufacturing methods for study models (fused-deposition modeling and inverted-stereolithography) with a professional material jetting (MJ) printer.

**Methods.** Twenty mandibular and maxillary plaster casts from randomly chosen subjects were selected. The casts were digitized using a 3D scanner and the obtained virtual models were adjusted for reconstruction. The reconstruction was performed using a 3D fused deposition modeling (FDM) printer, a RepRap FDM printer, an inverted stereolithography (SLA) printer and a professional material jetting (MJ) printer. The reconstructed models were digitized using a blue light scanner and the resulting mesh datasets were compared with the virtual models using inspection software. Univariate ANOVA test was performed to evaluate statistically significant differences between the groups and multiple comparisons were adjusted by the Bonferroni method.

**Results.** The mean systematic differences for the 3D comparison of the reconstructed models were 207  $\mu\text{m}$  (SLA), 156  $\mu\text{m}$  (FDM), 128  $\mu\text{m}$  (RepRap) and 95  $\mu\text{m}$  (MJ). A significant statistical difference was found between the systems ( $p < 0.05$ ). Moreover, the pairwise comparison analysis showed significant differences between all four systems ( $p < 0.05$ ).

**Conclusion.** The MJ printer demonstrated the smallest dimensional deviation of the reconstructed models. FDM printers may have indications in the clinical practice, providing more dimensionally accurate models than low-cost SLA printers.

## QUANTIFICATION MONOMERS ELUTION AND RESIDUAL DUBLE BONDS OF SOME LIGHTCURING DENTAL COMPOSITES USING HPLC AND FTIR SPECTROSCOPY

MIUȚA FILIP, MIHAELA VLASSA, LAURA SILAGHI-DUMITRESCU, DOINA PRODAN, MARIOARA MOLDOVAN

"Babes-Bolyai" University, "Raluca Ripan" Institute for Research in Chemistry, Cluj-Napoca, Romania

\*Corresponding Author: Marioara Moldovan, e-mail: mmarioara2004@yahoo.com

**Objectiv.** The present study reports the evaluation of residual monomers and residual double bonds of some commercial and experimental dental composites by using HPLC-DAD chromatography and FTIR-ATR spectroscopy.

**Method.** Some lightcuring dental composites: experimental composites (PM, P2S, P14M) and commercial composites (Charisma A3; Genial anterior JE and B2; Enamel plus UD1 and UD0) were evaluated. Quantitative HPLC-DAD analyses of residual monomers were carried out on a HPLC Agilent 1200 chromatograph. Separation was carried out on a Lichrosorb RP-C18 column at 21 °C column temperature, the mobile phase was a mixture of acetonitrile and water and a gradient elution was applied. The flow rate was 0.9 mL•min<sup>-1</sup> and the injector volume was 20 µL. DAD detection was performed at 195 nm for Bis-GMA and 203 nm for TEGDMA and UEDMA to monitoring the elution of the analytes. The disc samples were weighed and the residual monomers were extracted by boiling in chloroform for 8 hours. Then, the chloroform extracts were evaporated in vacuum, and the residue was re-suspended in 2 mL of acetonitrile and was injected in HPLC chromatograph.

The residual double bonds (RDB) and degree of conversion (DC) of the dental composite samples were determined by using FTIR-ATR data measurements.

**Results.** Both in experimental and commercial composites the amount of residual monomers is below 1.46%. The monomer conversion to polymer was observed by FTIR-ATR, by decrease or even disappearance of the band corresponding to aliphatic double bond at 1637 cm<sup>-1</sup> and 1608 cm<sup>-1</sup> in cured composite samples. The RDB of experimental composites varied between 13.99% for P2S samples and 25.52% for PM samples, and DC varied between 86.02% for P2S and 74.48% for PM. For commercial composites the Enamel sample have RDB in the smallest amount of 27.68% and therefore most conversion degree of 72.32%.

**Conclusion.** The polymerization in the case of experimental composites was more efficient than polymerization of commercial composites. The amount of the residual monomers released from the dental composites depend on the endogenous factors caused by the degree of conversion of the monomers, the methods and conditions of polymerization, amount and chemical nature of the components released, etc.

**Acknowledgments.** This work was financially supported by the Romanian Programme for Research, Development and Innovation PNCDI II Contract no. 230 / 2014.

## THE ORAL HEALTH IMPACT PROFILE-49: CONCEPTUAL VALIDITY OF THE ROMANIAN VERSION

ALEXANDRU-GRATIAN GRECU<sup>1</sup>, DIANA DUDEA<sup>1</sup>, ROBERT BALAZSI<sup>2</sup>, DAN LUCIAN DUMITRASCU<sup>3</sup>

<sup>1</sup>Department of Prosthetic Dentistry and Dental Materials, Iuliu Hatieganu, University of Medicine and Pharmacy, Cluj-Napoca, Romania,

<sup>2</sup>Department of Psychology, Faculty of Psychology and Educational Sciences, Babes-Bolyai University, Cluj-Napoca, Romania

<sup>3</sup>2nd Medical Department, Iuliu Hatieganu University of Medicine and Pharmacy, Cluj-Napoca, Romania

\*Corresponding Author: *Grecu Alexandru, e-mail: Grecu.Alexandru@umfcluj.ro*

---

**Objective.** One of the most frequently used measures for Oral Health is represented by the Oral Health Impact Profile-49 (OHIP-49). The purpose of the present study was to test the fit between the OHIP dimensions and Locker's theoretical model of Oral Health, in order to investigate the conceptual validity of the questionnaire.

**Material and method.** the Romanian version of OHIP-49 (OHIP-49Ro) was applied to N=340 patients of the Second Medical Clinic of Internal Medicine, Cluj-Napoca (59.6% females), mean age 54.08 years (Sd=17.21), and with an educational level ranging between middle school level and bachelor level. After receiving the informed consent, data was collected through the method of the interview, in order to reduce the rate of missing data.

**Results.** Data was analyzed using univariate and bivariate descriptive statistics, with the scope of verifying the necessary assumptions of the main analytical tool used, the Path Analysis. The model fit of the Model 1, which was specified based on the Locker's Oral Health theoretical framework, revealed an unacceptable fit to the data:  $\chi^2=128.18$  ( $p=.001$ ), CFI=.926, TLI=.779, SRMR=.062 and RMSEA=.226. After analyzing the residuals and modification indices, the initial model was respecified, the results for Model 2 rendering an improved approximation of the data:  $\chi^2=12.25$  ( $p=.031$ ), CFI=.996, TLI=.981, SRMR=.0167 and RMSEA=.226.

**Conclusion.** The conceptual dimensions measured by the scales of OHIP-49Ro have a good fit into the theoretical framework defined by Locker. These results contribute to the conceptual validity of the OHIP 49-Ro.

## IN VITRO STUDY ON TWO FLOWABLE COMPOSITES USED TO BOND A FIXED ORTHODONTIC RETAINER IN SIMULATED BRUXISM CONDITIONS

ANCA LABUNET<sup>1</sup>, GABRIEL FURTOS<sup>2</sup>, ADRIANA OBJELEAN<sup>1</sup>, ALEXANDRA VIGU<sup>1</sup>,  
MINDRA EUGENIA BADEA<sup>3</sup>

<sup>1</sup>Department of Dental Materials, Faculty of Dental Medicine, Iuliu Hatieganu University of Medicine and Pharmacy, Cluj-Napoca, Romania

<sup>2</sup>Department of Polymeric Composites, Raluca Ripan Institute of Research in Chemistry, Babes-Bolyai University, Cluj-Napoca, Romania

<sup>3</sup>Department of Preventive Dentistry, Faculty of Dental Medicine, Iuliu Hatieganu University of Medicine and Pharmacy, Cluj-Napoca, Romania

*\*Corresponding author: Anca Labunet, e-mail: labunet@yahoo.com*

**Objective.** The purpose of this study is to quantitatively evaluate marginal infiltration of an ormocer Admira flow (Voco) and a flowable composite resin - Gradia flow (GC) used to bond a fixed orthodontic retainer in conditions of simulated bruxism.

**Materials and methods.** Forty human lower incisors were randomly divided in two groups and embedded in acrylic blocks while also simulating periodontal tissues. They were bonded in pairs of two, using a flexible retainer wire with the two materials. A chewing simulator was used for creating bruxism conditions for a six month time interval. Specimens were immersed in 2% basic fuchsin solution and 1 mm bucco-lingual section of each tooth was observed under a stereomicroscope at 4X and 40 X magnifications. The microinfiltration was calculated and the results were statistically interpreted.

**Results and conclusions.** Conditions of simulated bruxism affect breakage of samples prepared when periodontal ligament is also simulated. A statistically significant difference between the two groups was obtained, showing higher microleakage for the composite group. The mean value of microinfiltrations for the composite group (0.31) is twice the mean value of microinfiltrations for the ormocer group (0.15). Both dental materials may be used for retention fixation, as most of the samples' resistance surpassed de 6 month testing equivalent for bruxism. Differences between microleakage in bruxism versus normal masticatory patterns should be investigated further.

## BONE RECONSTRUCTION - MIGHT COMPOSITES BE A GOOD CHOICE?

MĂDĂLINA ANCA LAZĂR<sup>1</sup>, MIHAELA BĂCIUȚ<sup>1</sup>, GRIGORE BĂCIUȚ<sup>2</sup>,  
ALEXANDRU HORĂȚIU ROTARU<sup>2</sup>, CĂLIN RAREȘ ROMAN<sup>2</sup>, GABRIEL ARMENCEA<sup>2</sup>,  
CRISTIAN BERCE<sup>3</sup>, BIANCA BOȘCA<sup>4</sup>, DOINA PRODAN<sup>5</sup>, CRISTINA PREJMEREAN<sup>5</sup>

<sup>1</sup>Department of Implantology and Maxillofacial Surgery, Iuliu Hatieganu University of Medicine and Pharmacy, Cluj-Napoca, Romania

<sup>2</sup>Department of Oral and Maxillofacial Surgery, Iuliu Hatieganu University of Medicine and Pharmacy, Cluj-Napoca, Romania

<sup>3</sup>Laboratory Animal Facility, Iuliu Hatieganu University of Medicine and Pharmacy, Cluj-Napoca, Romania

<sup>4</sup>Department of Morphological Sciences, Iuliu Hatieganu University of Medicine and Pharmacy, Cluj-Napoca, Romania

<sup>5</sup>“Babeș Bolyai” University, “Raluca Ripan” Institute for Research in Chemistry, Cluj-Napoca, Romania

\*Corresponding author: Mădălina Anca Lazăr; e-mail: madilazar@yahoo.com

---

**Aims.** This study aimed to assess the biological behaviour of new advanced biomaterials based on fiber-reinforced composite (FRC) that will be used to produce custom-made cranial implants.

**Material and methods.** A new FRC based on monomers bis-GMA, TEGDMA, UEDMA and E-glass woven rovings was produced. Subcutaneous, intramuscular and intrabony implantation tests were carried out following the guidelines of the Ethics Committee of “Iuliu Hatieganu” University of Medicine and Pharmacy. Thirty male Wistar Rats were randomly divided into 3 groups of 10 animals for each implantation test. After 30 days and 90 days respectively, soft and bony tissues were collected for biopsy, fixed and processed for histologic evaluation. Intensity of the inflammatory reaction, tissue repair status and presence of the capsule were the main criteria assessed. For intrabony implantation, presence of osteoblasts and cortical bone formation on the surface of FRC samples were also studied.

**Results.** Around the implants, the inflammation was kept under physiological limits. The intensity of the inflammatory reaction was mild, the repair process was advanced and the capsule was completely formed. When intrabony implantation was performed, the capsule formed around FRC samples underwent an ossification process, and vital cortical bone with lamellas was deposited on the surface.

**Conclusion.** The new composite biomaterial developed may constitute an optimized alternative of the similar nowadays available materials used for the reconstruction of the bone defects in the cranio-maxillofacial area.

**Acknowledgement.** The research was supported by Romanian Executive Unit for Financing Higher Education, Research Development and Innovation, code PN-II-PCCA 2013-4-0917, grant no. 115/2014.

## TOOTH-BRUSHING EFFECT ON ENAMEL APPEARANCE - IN VITRO ANALYSIS

ALEXANDRINA MUNTEAN<sup>1</sup>, ANCA STEFANIA MESAROS<sup>1</sup>, MARIOARA MOLDOVAN<sup>2</sup>,  
LAURA SILAGHI-DUMITRESCU<sup>2</sup>

<sup>1</sup>Faculty of Dental Medicine, Iuliu Hatieganu University of Medicine and Pharmacy, Cluj-Napoca, Romania

<sup>2</sup>Babes Bolyai University, "Raluca Ripan" Chemistry Research Institute, Cluj-Napoca, Romania

\*Corresponding author: Alexandrina Muntean, e-mail: ortoanda@yahoo.com

**Introduction.** The preference for bright white teeth and great appeal for aesthetics in the media have contributed to increase the patient interest for healthy and beautiful teeth. During adolescence, whitening procedures must be used with caution and for this reason, the oral hygiene routine with specific dentifrice and accurate brushing technique can be recommended in order to preserve enamel appearance.

**The aim** of this in vitro study was to assess the colour changes after brushing with different dentifrices.

**Material and methods.** 25 teeth extracted for orthodontic purpose were used for this in vitro study. The teeth were recently extracted, caries free, without stains, fissures, filling or hypoplasia observed at inspection, in standard condition. Roots were embedded in acrylic resin and teeth were brushing for 2-3 min, twice a day, for 21 days, with five different toothpastes: Lacalut Extra Sensitive, Lacalut White and Repair, Biomed Sensitive, Aslamed for Sensitive Teeth and a toothpaste containing nano hydroxyapatite. Enamel vestibular surfaces were examined by one examiner, in order to reduce inter-human variation, using a spectrophotometer (Vita EasyShade - CIE L\*a\*b\*). The values were measured on each tooth at the beginning of the study and after 21 days.

**Results.** Differences were not statistically significant in colour appearance between toothpaste that claim a whitening effect and toothpastes containing elements used for enamel remineralization that can be recommended for adolescents.

**Conclusion.** Oral hygiene correct algorithm preserve enamel characteristics and toothpaste with specific formula can represent a balance between aesthetic and mineralization.

## THE FORMULATION AND CHARACTERIZATION OF TWO MONOMER MIXTURES, AS PRECURSORS OF THE ENDODONTIC SEALERS MATERIALS

DOINA PRODAN<sup>1</sup>, MARIOARA MOLDOVAN<sup>1</sup>, MIUTA FILIP<sup>1</sup>, MIHAELA VLASSA<sup>1</sup>,  
VIOLETA POPESCU<sup>2</sup>, CRISTINA PREJMEREAN<sup>1</sup>

<sup>1</sup>Babes Bolyai University- "Raluca Ripan" Chemistry Research Institute, Composite Materials Department, Cluj-Napoca, Romania

<sup>2</sup>Physics and Chemistry Department, Faculty of Materials Engineering and the Environment, Technical University Cluj-Napoca, Romania

\*Corresponding author: *Marioara Moldovan, e-mail: mmarioara2004@yahoo.com*

---

**Objectives.** The formulation and characterization of two monomer mixtures with different systems for polymeric initiation; they constitute the organic phase as a component in getting a root canal sealer.

**Materials and methods.** The two organic matrices have in their composition: Bis-GMA: 2,2-bis [p- (2'-hydroxy-3'-methacryloxy-propoxy) phenyl] propane, TEGDMA: triethylene glycol dimethacrylate, UDMA: Urethane dimethacrylate PCLdiol: polycaprolactone diol. We used two types of initiation systems: chemical and dual.

Determination of the residual monomer was carried out by extraction in chloroform, for 8 hours at the chloroform boiling point. The analysis of the residual monomer was carried out using a high performance liquid chromatograph HPLC Agilent 1200.

Determination of the conversion of monomers: The IR spectra for the mixture of monomers and for the cured samples were recorded on a FTIR spectrometer, model Perkin-Elmer Spectrum provided with a ATR device.

**Results.** The results obtained for the conversion of the polymerization after seven days for the copolymers mixture with chemical initiator system, and for those with a dual initiation system are 96.55% and 97.6% respectively.

For the sample with the chemical initiator system, the overall quantity of residual substances extracted is: 0.0023% and for the sample with an dual polymeric initiator system is 0.00078%.

**Conclusions.** The amount of extracted residual substances is low enough to conclude that for the both mixtures of monomers, the polymerization went efficiently.

**Acknowledgment.** This work was funded by the Romanian Ministry of Education and Research, National project PNII no: 127/2014 and PNII no: 115/2014.

## MECHANICAL PROPERTIES OF EXPERIMENTAL COMPOSITE CEMENTS WITH GRAPHENE OXIDE

CODRUTA SAROSI<sup>1</sup>, STELA PRUNEANU<sup>2</sup>, CRISTINA GASPARIK<sup>3</sup>, CRISTINA PREJMEREAN<sup>1</sup>, LAURA SILAGHI-DUMITRESCU<sup>1</sup>, DOINA PRODAN<sup>1</sup>, MARIOARA MOLDOVAN<sup>1</sup>

<sup>1</sup>Departament of Polymer Composites, Babes Bolyai University - Raluca Ripan Chemistry Research Institute, Cluj-Napoca, Romania

<sup>2</sup>National Institute for Research and Development of Isotopic and Molecular Technologies, Cluj-Napoca, Romania

<sup>3</sup>Department of Prosthetic Dentistry and Dental Materials, Iuliu Hatieganu University of Medicine and Pharmacy, Cluj-Napoca, Romania

\*Corresponding author: *Codruța Sarosi, e-mail: codruta.sarosi@gmail.com*

**Objectives.** Since the most common mechanical stress in the oral cavity that act upon the hard dental tissues are compression and traction, the purpose of this study is to investigate the performance of graphene oxide (OG)-SiO<sub>2</sub>-Ag in improving of the mechanical properties of cementing materials, by determining the compressive strength (CS), diametral tensile strength (DTS) and flexural strength (FS).

**Materials and methods.** Five cementing materials, four experimental based on dimethacrylate polymers (Bis-GMA + TEGDMA) bioglasses, colloidal silica, nanoparticles of graphene oxide (GO)-SiO<sub>2</sub>-Ag and a commercial cement Fuji Ortho (GC Corporation, Tokyo, Japan) used as reference were studied. Ten specimens of each material dual-cure (chemical and photochemical) were polymerized at 23 °C for 180 s with LED lamp Woodpecker in teflon molds (CS - 3x6 mm; DTS - 6x3 mm; FS - 2x2x25 mm) according to ISO 4049/2000 and international standards "American Dental Association's Specification" No.27. The specimens were mechanical tested with an Loyd LR5K (Lloyd Instruments) testing machine and mean values and standard deviations were calculated by Student's t Tests (P <0.05).

**Results.** Measured values of compressive strength highlights that introducing GO-SiO<sub>2</sub>-Ag nanofiller in the composite cements gives better mechanical properties compared to those of commercial cement. Values for diametral tensile strength of experimental cements range between the accepted limits 30-55 MPa. Regarding the flexural strength, the commercial cement indicated better values than the experimental cements.

**Acknowledgements.** This work was funded by the Romanian Ministry of Education and Research, National project PN-III-P2-2.1-PED-2016-1907, 101PED/2017.

## EFFECT OF ARTIFICIAL SALIVA AND WATER ON EXPERIMENTAL RESTORATIVE COMPOSITES

LAURA SILAGHI-DUMITRESCU, DOINA PRODAN, CRISTINA PREJMEREAN, CODRUTA SAROSI, MIUTA FILIP, MARIOARA MOLDOVAN

„Babes-Bolyai” University – “Raluca Ripan” Institute for Research in Chemistry, Cluj-Napoca, Romania

\*Corresponding author: *Marioara Moldovan, e-mail: mmarioara2004@yahoo.com*

---

**Introduction.** The resin matrix used in dental composite materials absorb water or saliva from the environment. Water absorption and solubility of the dental materials are accompanied by dimensional changes, harmful effects on the structure and function of polymer constituents. A large amount of absorbed water favors the hydrolytic degradation of the polymer matrix, resulting in lowering of strength of dental biomaterials. Consequently, a prerequisite for clinical use of a dental composite is its insolubility.

**Objective.** The aim of this study is to track the influence of water absorption and solubility for three experimental composite materials, depending on the composition and the nature of the immersion solution.

**Materials and methods.** Three new experimental light-cured composites were studied (P2S, P14M, PM), which were formulated using standard Bis GMA oligomers synthesized in our laboratory. To determine water absorption and solubility, the tested materials were light cured with a Woodpecker LED lamp (Guilin Woodpecker Medical Instrument Co., Ltd), in a 15x1 mm Teflon mold. Before initial weighing, the specimens were kept in a desiccator (DURAN Produktions GmbH & Co. KG, Mainz, Germany) and weighed daily for the first 7 days and then on days 14, 28, 60 and 90, with storage at 37°C. Water absorption and solubility were determined in accordance with ISO 4049/2000 for water-stored samples.

**Results.** The behavior of the investigated materials in terms of water absorption upon storage in water and in artificial saliva is similar. The PM sample, containing biodegradable monomers, displayed the highest values of absorption and the highest degree of solubility in water and in artificial saliva. The experimental composite that features less filler particles, PM, was found to have the highest degree of solubility in water and in artificial saliva.

**Conclusions.** The samples that contain higher amounts of low-molecular weight components display higher absorption. The solubility in water is different for the two immersion media; the values for the samples immersed in water are lower than those immersed in artificial saliva.

**Acknowledgments.** This work was financially supported by the Romanian Programme for Research, Development and Innovation PNCDI II Contract no. 127/2014 and no.230 / 2014.

## THE MICROLEAKAGE AT THE IMPLANT-ABUTMENT INTERFACE A LITERATURE REVIEW

TAREQ HAJAJ, IRIS LANG, SERBAN TALPOS, MEDA LAVINIA NEGRUTIU, COSMIN SINESCU

Faculty of Dentistry, Victor Babes University of Medicine and Pharmacy, Timișoara, Romania

\*Corresponding author: *Tareq Hajaj*

---

The microleakage phenomenon is a major problem in many restorative procedures in dentistry. Whether it's about the sealing of the endodontic filling or the integrity of the composite restoration, the microleakage that may affect the interfaces is one of the key factors that influence the long term success of the therapy.

Regarding the implant-based dental therapy, a literature review was completed, trying to determine the factors which can reduce the risk of microleakage and thus, increase the rate of success.

Most of the studies in the international literature focused on analyzing the integrity of the implant-abutment connection by immersing the implants in different solutions and checking for modifications inside the implant chamber. There is a noticeable variation in the outcome between the different types of implants and abutment connections, but none of them are immune to the phenomenon.

## ELECTROCHEMICAL CORROSION OF CO-CR AND NI-CR BASED DENTAL ALLOYS

GRAZIELLA L. TURDEAN<sup>1</sup>, DANIELA POPA<sup>2</sup>, ANA ISPAS<sup>2</sup>, MARIANA CONSTANTINIUC<sup>2</sup>

<sup>1</sup>Department of Chemical Engineering, Faculty of Chemistry and Chemical Engineering, Babes-Bolyai University, Cluj-Napoca, Romania

<sup>2</sup>Department of Dental Prosthetics, Faculty of Dentistry, Iuliu Hatieganu University of Medicine and Pharmacy, Cluj-Napoca, Romania

\*Corresponding author: Mariana Constantiniuc, e-mail: mconstantiniuc@umfcluj.ro

---

**Aims.** Co-Cr and Cr-Ni alloys are common materials used in fixed prosthesis and partial removable dental prosthesis frameworks, due to their excellent mechanical properties, corrosion resistance, and biocompatibility. The excessive consumption of citrus maintains an acidic pH level of the oral cavity that could induce a corrosion process of the metallic materials of prosthetics. As consequence the influence of the pH of saliva on the corrosion of the metallic part of prosthesis must be investigated, in view to establish their safety.

**Materials and methods.** Two commercially available alloys were fixed into a Teflon tube, in order to obtain a constant exposed surface. The corrosion behaviors of the studied materials were investigated by performing electrochemical impedance spectroscopy (EIS) measurements in artificial saliva at pH values between 3 and 7, using a computer controlled potentiostat type PGStat 302N (Autolab, The Netherlands).

**Results.** The two studied alloys form a thin passive oxide film, which gives them exceptional corrosion resistance. In view to establish the influence of contact time on the corrosion of alloys, electrochemical impedance spectroscopy measurements each hour during 24 hours were performed. The simple Randles model [ $R_s(CPE_{dl} R_p)$ ] was used for quantitatively estimate the corrosion resistance ( $R_p$ ) and metal oxide double layer capacitance ( $C_{dl}$ ) values.

**Conclusions.** It was demonstrated, that the consumption of food having high acidic components (*i.e.*, citrus), and the time of contact between metal and acidic environment influence the values of corrosion resistance ( $R_p$ ) and of metal oxide double layer capacitance ( $C_{dl}$ ) of both alloys.

## DIFFERENT APPROACHES IN LAYERING COMPOSITE MATERIALS TO ACHIEVE MAXIMUM AESTHETIC FOR INDIRECT PROSTHETIC CONSTRUCTION: INLAY, ONLAY, OVERLAY AND ADHESIVE BRIDGE

WILLI A. URICIUC, ARANKA ILEA, DAN BUHATEL, RADU SEPTIMIU CAMPAN

Oral Rehabilitation Oral Health and Management Department, Iuliu Hatieganu University of Medicine and Pharmacy, Cluj-Napoca, Romania

\*Corresponding author: *Willi A. Uriciuc, e-mail: willidenty@yahoo.com*

**Introduction.** The challenge for every dentist is to create perfectly invisible restorations, which are difficult to achieve in the short time allotted to a dental office meetings. The indirect approach to aesthetic reconstruction is a solution that can be applied.

**Materials and methods.** There were used two types of composite materials, modified to improve both optical and mechanical qualities. First material: G-aenial – GC contains improved filling in order to improve the material's optical qualities. Second material: Essentia – GC contains a micro-hybrid composition with addition of inorganic fillers. Reconstructions were performed on working models in the dental laboratory. The G-aenial stratification method follows the classical option based on the classical VITA shade system. The Essentia stratification method follows the reproduction variant of the natural tooth. Reconstructions were adhesively bonded to the teeth involved when in advance the mating surface was sandblasted.

**Conclusions.** The Essentia duo-Layer Concept (one dentin & one enamel) is more simple than G-aenial Multi-Layer Concept. In this way the Essentia reconstruction can emulate the natural tooth structure. Choosing the shade with the Essentia concept is faster than Vita Classic System Shade that we find in G-aenial materials.

## HYBRID CERAMICS: A LITERATURE REVIEW

ADRIAN MIHAI VARVARĂ<sup>1</sup>, ELENA BIANCA VARVARĂ<sup>2</sup>, ANCA ȘTEFANIA MESAROȘ<sup>1</sup>,  
BOGDAN CULIC<sup>1</sup>, DIANA DUDEA<sup>1</sup>

<sup>1</sup>Department of Prosthetic Dentistry and Dental Materials, Faculty of Dental Medicine, Iuliu Hatieganu University of Medicine and Pharmacy, Cluj-Napoca, Romania

<sup>2</sup>Dentist – private practice

\*Corresponding author: *Adrian Mihai Varvară, email: Varvara.mihai@umfcluj.ro*

---

**Introduction.** In the last 3 decades, exciting new developments in dental materials and computer technology have led to the success of contemporary dental computer-aided design/computer-aided manufacturing (CAD/CAM) technology. Hybrid ceramic, the newest category of materials, has exceptional characteristics and properties.

**Purpose.** To evaluate the evolution of research, the indications and the applications of hybrid ceramics.

**Materials and methods.** An electronic search, regarding hybrid ceramic, from 2012 to present was performed using one database: PubMed. Selected keywords and well-defined inclusion and exclusion criteria, guided the search. All articles were first reviewed by title, then by abstract, and subsequently by a full text reading. Only relevant research was considered.

**Results.** The number of publications regarding hybrid ceramics increased exponentially. For the first materials, Lava Ultimate and Vita Enamic, the research focused on mechanical properties and adhesion to the dental structures. For the newest materials, Cerasmart and Shofu Blocks, the research focused on their behavior and relation with the antagonists and the external factors.

**Conclusion.** The user friendly and easily manufacturing of very precise esthetic restorations in a short period of time, make CAD CAM technology to be an optimal option for prosthetic treatment of all patients. The milling materials available today are in a continue evolution, their properties have been upgraded and the hybrid ceramics are a new chapter in this evolution.

**Acknowledgments.** This study was supported by the Research Project Proiect de Cercetare Doctorală (PCD 2016) Nr.7690/115 from 15.04.2016.

# POSTER PRESENTATIONS



---

## CHARACTERISATION AND BIOCOMPATIBILITY TESTING OF EXPERIMENTAL ENDODONTIC MATERIALS. A COMPARATIVE STUDY

IOANA BALDEA<sup>1</sup>, DIANA ELENA OLTEANU<sup>1</sup>, MIHAI CENARIU<sup>2</sup>, DOINA PRODAN<sup>3</sup>,  
MARIOARA MOLDOVAN<sup>3</sup>, GABRIELA ADRIANA FILIP<sup>1</sup>

<sup>1</sup>Department of Physiology, Iuliu Hatieganu University of Medicine and Pharmacy, Cluj-Napoca, Romania

<sup>2</sup>Department of Biochemistry, University of Agricultural Sciences and Veterinary Medicine, Cluj-Napoca, Romania

<sup>3</sup>Department of Polymer Composites, Babes Bolyai University, "Raluca Ripan" Chemistry Research Institute, Cluj-Napoca, Romania

\*Corresponding author: Ioana Baldea, e-mail: baldeai@yahoo.com

---

The aim of this study was to evaluate the performance of three experimental endodontic materials, relatively to water and artificial saliva (Artisial, Laboratoires Chemineau, Vouvray, France), using *in vitro* tests of absorption and solubility. Furthermore, the biocompatibility of these compounds was tested *in vitro* on dental pulp stem cells with focus on cell viability and the induction of cell death. Real Seal Root Canal Sealant Self-Etch (Catalyst, Spain) was used for positive control.

Setting reaction for these materials was achieved in three ways: photo chemically (E4), chemically (E1) and dual (E5). The values obtained for the absorption in artificial saliva are less for all experimental materials as compared with the same endodontic sealing material immersed in distilled water. Results for solubility were negative for all endodontic materials and did not reach a constant value. Values recorded for solubility in artificial saliva appear to be smaller compared to those evaluated for water. The biological assay showed comparable diminished cell viability with the concentration of the conditioned medium between all tested materials. The endodontic materials induced mostly necrotic cell death as shown by FACS and fluorescence microscopy analysis. The most biocompatible material was E5, followed by Real Seal, E1 and E4.

In our study the duration of the examination, the specific curing system and the filler characteristics influenced water absorption. The studied endodontic sealers revealed an adequate behaviour in terms of absorption and solubility in water and artificial saliva. Moreover, biocompatibility testing showed similar results with the commercial material Real Seal, used as a reference.

## CLINICAL APPLICATIONS OF MODERN TECHNOLOGY IN FIXED AND MOBILE PROSTHESIS

ALIN G. GABOR, CRISTIAN ZAHARIA, ADRIAN STAN, MEDA L. NEGRUȚIU, COSMIN SINESCU

Faculty of Dentistry, Victor Babes University of Medicine and Pharmacy, Timișoara, Romania

---

**Introduction.** Modern technologies in fixed and mobile prosthesis involves a series of steps that facilitates the aesthetic and biofunctional prosthetic restorations with high durability over time. Clinical implications and technological prosthetics through modern technology involves wide clinical and laboratory aspects.

**Materials and methods.** To manufacture the prosthesis was combined the latest technologies namely intraoral scanning technology, CAD / CAM and 3D Printing. So there were made fixed partial denture according to bio-functional and aesthetically criteria, in a very short time. During the clinical stages for manufacturing the prosthesis were met various clinical situations that presented different and individualized therapeutic solutions to each case. There were used multiple digital impression chairside systems to scan the prosthetic field. Prosthetic restorations were made with both CAD / CAM chairside systems and laboratory CAD / CAM.

**Results.** Fixed partial dentures made by optical scanning and CAD / CAM milling technologies can be optimal therapeutic solutions, both provisional and permanent, if the clinical and laboratory manufacturing conditions are met.

**Conclusions.** Using optical impression technology and CAD / CAM milling the treatment plan was optimized for the partial and total edentation, increasing the comfort of the dentist and the patient. The treatment plan duration was decreased and also the clinical and technical steps for manufacturing the prosthesis are fewer. In addition, the quality of the prosthetic restoration is increased having a superior marginal adaptation against to the ones made by conventional processes.

---

## THE INFLUENCE OF OBSERVATION TIME UPON VISUAL SHADE MATCHING – A PILOT STUDY

ELENA BEBESELEA<sup>1</sup>, RADU MIHAILESCU<sup>1</sup>, CRISTINA GASPARIK<sup>2</sup>, DIANA DUDEA<sup>2</sup>

<sup>1</sup>Faculty of Dentistry, Iuliu Hatieganu University of Medicine and Pharmacy, Cluj-Napoca, Romania

<sup>2</sup>Department of Prosthetic Dentistry and Dental Materials, Iuliu Hatieganu University of Medicine and Pharmacy, Cluj-Napoca, Romania

\*Corresponding author: Radu Mihailescu, e-mail: rdmhlsc@yahoo.com

---

**Objectives.** To assess whether observation time influences the visual shade matching process of ceramic shade tabs in a laboratory setting

**Materials and methods.** Seven observers (3 males and 4 females) with normal color vision and average or high color discrimination competency were enrolled in the study. The observers were asked to match the color of three shade tabs of a VITA Classical shade guide (A1, B4, C2) with the tabs of another VITA Classical shade guide. The test tabs were masked so that the observers did not see the original designations of the tabs. The observation time was recorded for each participant. The color differences between the test tabs and the selected tabs were calculated using  $\Delta E^*_{00}$  formula.

**Results.** The observation time was different for the shade tabs assessed in the study. The longest time was needed for matching the color of B4 tab (average time per observer: 86.29 seconds). For C2 and A1 tabs a shorter time was recorded (77.14 and 66.71 seconds respectively). The most difficult tab to match was B4 ( $\Sigma \Delta E^*_{00}=7.49$  units), while for A1 and C2 only small color differences were calculated between test and selected shade tabs ( $\Sigma \Delta E^*_{00}=2.2$  units and  $\Sigma \Delta E^*_{00}=0$  units respectively).

**Conclusion.** The darker and more saturated shade tab required a longer observation time, being also the most difficult to match. The brighter tabs were more rapidly and accurately matched.

## THE NATURAL ANTIOXIDANTS EFFECT ON MESENCHYMAL STEM CELLS DERIVED FROM PERIODONTAL TISSUE, PREVIOUSLY EXPOSED TO NICOTINE

NAUSICA PETRESCU<sup>1</sup>, MINODORA MOGA<sup>1</sup>, BIANCA ADINA BOȘCA<sup>2</sup>, ARANKA ILEA<sup>1</sup>,  
OLGA SORIȚĂU<sup>3</sup>, PIROSKA VIRÁG<sup>3</sup>, EVA FISHER<sup>3</sup>, MIHAI CENARIU<sup>4</sup>, EMOKE PALL<sup>4</sup>,  
ANIDA MARIA BĂBȚAN<sup>1</sup>, RADU SEPTIMIU CÂMPIAN<sup>1</sup>

<sup>1</sup>Department of Oral Rehabilitation, Oral Health and Dental Office Management, Faculty of Dentistry, Iuliu Hatieganu University of Medicine and Pharmacy, Cluj-Napoca, Romania

<sup>2</sup>Department of Histology, Faculty of Medicine, Iuliu Hatieganu University of Medicine and Pharmacy, Cluj-Napoca, Romania

<sup>3</sup>Radiotherapy Laboratory, Radiology and Tumour Biology, "Ion Chiricuță" Oncological Institute, Cluj-Napoca, Romania

<sup>4</sup>Department of Reproduction, Obstetrics and Veterinary Gynecology, Faculty of Veterinary Medicine, University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca, Romania

\*Corresponding author: *Nausica Petrescu, e-mail: nausica\_petrescu@yahoo.com*

---

**Objective.** The aim of this study was to evaluate the effects of EGCG (epigallocatechin-3-gallate - a green tea component) and curcumin (diferolmetan - a component of turmeric) on mesenchymal stem cells (MSCs), harvested from human periodontal tissue, previously exposed to nicotine.

**Materials and methods.** Four MSCs lines were used: circular periodontal fibers (GLSCs), oblique dento-alveolar ligament (PDLSCs), gingival tissue (GTSCs) and alveolar bone (ABSCs) that have been characterized and exposed to nicotine (concentration N1=1.245, N2=0.31125, 24h and 48h). Subsequently MSCs were treated with curcumin solution (concentration C1=1μM, C2=1.25μM) and EGCG (concentration E1=2μM, E2=2.5μM). The cell viability was assessed through the following tests: MTT (cell staining reagent 3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazoliumbromide), the cytotoxicity and cell proliferation rate were determined by Alamar Blue staining and the permeability of cell membranes was tested with DC-FDA (2,7-dichlorofluoresceindiacetate).

**Results.** On the MTT test, the 4 cell lines exposed to nicotine had different responses to treatment with EGCG and curcumin. The results were influenced by dose and exposure time.

Alamar Blue test results did not show statistically significant differences in exposure to nicotine or for the treatment with EGCG and curcumin.

DC-FDA test showed increased cell viability for all cell lines.

**Conclusion.** The cytotoxic effect of nicotine on stem cells has been shown to be reversed by the treatment with EGCG and curcumin.

---

## RAMAN SPECTROSCOPY OF SALIVA - A POTENTIAL TOOL IN DETECTING BIOMOLECULAR CHANGES FOLLOWING CONE BEAM COMPUTED TOMOGRAPHY (CBCT) IRRADIATION IN PEDIATRIC PATIENTS

IOANA ȘIMON<sup>1</sup>, MIHAELA BĂCIUȚ<sup>2</sup>, MIHAELA HEDEȘIU<sup>3</sup>, A. FĂLĂMAȘ<sup>4</sup>, RAREȘ ȘTIUFIUC<sup>5</sup>, VLAD IȘTOAN<sup>2</sup>, VIORICA TĂRMURE<sup>1</sup>

<sup>1</sup>Department of Orthodontics, Iuliu Hatieganu University of Medicine and Pharmacy, Cluj-Napoca, Romania

<sup>2</sup>Department of Maxillofacial Surgery, Iuliu Hatieganu University of Medicine and Pharmacy, Cluj-Napoca, Romania

<sup>3</sup>Department of Maxillofacial Surgery and Radiology, Iuliu Hatieganu University of Medicine and Pharmacy, Cluj-Napoca, Romania

<sup>4</sup>National Institute for Research and Development of Isotopic and Molecular Technologies, Cluj-Napoca, Romania

<sup>5</sup>Biophysics Department, Iuliu Hatieganu University of Medicine and Pharmacy, Cluj-Napoca, Romania

\*Corresponding author: Ioana Șimon, e-mail: mariaioana.simon@gmail.com

---

**Objectives.** CBCT is a modern radiological technique used in clinical orthodontics for the tridimensional analysis of the maxillofacial structures. The effective dose of radiation following radiological examinations in the maxillofacial region is relatively small, but the cumulative dose of pediatric patients during childhood and adolescence should be considered, especially because of their higher radiosensitivity. The aim of our study was the identification of cellular and molecular biomarkers after CBCT irradiation of the orofacial region in pediatric patients.

**Materials and methods.** Saliva samples of 22 patients aged 6-18 years were harvested with Saliva Bio Passive Drool devices, before irradiation and 30 minutes after CBCT irradiation. We used Raman spectroscopy for the analysis of the salivary samples. The 785 nm line of a diode laser was used at 300 mW. A 50x objective was used for viewing the samples and acquiring the spectra. Each spectrum was integrated for 10 seconds and 5 acquisitions were acquired from each point.

**Results.** The Raman spectra show bands assigned to the main biomolecules present in saliva, such as proteins, nucleic acids, lipids, and carbohydrates. Raman spectra presented intensity variations of the bands from one acquisition to another, when the signal was collected from the same sample.

**Conclusion.** Raman spectroscopy shows the capacity to identify the biomolecular composition of the salivary samples. However, further research is needed in order to differentiate between the CBCT irradiated and non-irradiated samples and determine possible salivary biomarkers.

## COMPARATIVE STUDY OF MATERIALS USED FOR SEALING DENTAL GROOVES AND PITS

MEDA-ROMANA SIMU, DAPHNE BUCAU, MICHAELA MESAROS

Iuliu Hatieganu University of Medicine and Pharmacy, Cluj-Napoca, Romania

\*Corresponding author: Meda-Romana Simu, e-mail: medaromana@yahoo.com

---

**Objectives.** The aim of this study was to highlight the porosity of some dental materials as flow composites, used for routinely dental sealing and glass ionomer, used for sealing of recently erupted teeth, which due to the proximity of gums do not allow sufficient isolation for using composite materials.

**Methods.** For this study were used 10 premolars extracted for orthodontic purposes, divided into 5 groups of 2 teeth. Since there were slightly colored occlusal grooves they were prepared using a green ring flame diamond bur. Sealing materials used were: glass ionomers Fuji Triage (GC) and Kavitan plus (Spofa) and composites ConSeal F (SDI), Clinpro sealant (3M ESPE), Ultraseal XT hydro (Ultradent). After the coronary grooves filling, the apex of each tooth was hermetically sealed with a composite, and then crown and root surfaces, to a limit of 1.5 mm around the edge of the filling, were covered with two layers of nail varnish. The teeth were immersed 24 hours in methylene blue and then sealing appearance was evaluated using an optical microscope OPMI Pico (Zeiss).

**Results.** Fuji Triage, Kavitan plus and Ultraseal hydro XT showed a high degree of penetration of the dye into the entire surface of the filling, ConSeal F presented the smallest staining and only marginally and Clinpro sealant had only marginal staining but slightly more expressed.

**Conclusions.** The absorption of the dye in the fillings shows hydrophily of the three materials, allowing their use in humidity conditions; according to the literature this does not necessarily affect the integrity of the sealant-enamel junction, but could involve less aesthetic results on long term.

## A COMPARATIVE INVESTIGATION OF CONE-BEAM COMPUTED TOMOGRAPHY AND DIGITAL PERIAPICAL RADIOGRAPHY

ADRIAN TUDOR STAN, LAURA IDORASI, ALIN GABRIEL GABOR, CRISTIAN ZAHARIA,  
COSMIN SINESCU, MEDA LAVINIA NEGRUTIU, MIHAI ROMINU

Faculty of Dental Medicine, Victor Babes University of Medicine and Pharmacy, Timisoara, Romania

*\*Corresponding author: Adrian Tudor Stan, e-mail: stanadrian7@gmail.com*

---

**Purpose.** This study aims to compare how typical, healthy periapical tissues appear on cone-beam computed tomography (CBCT), in contrast with the periapical radiography, to have a better predictability rate of endodontic treatments, measuring the dimension of the lesions in all three dimensions and implementing a periapical index based on radiolucency.

**Materials and methods.** These imaging retrospective analyses were obtained from specialists in endodontics and were acquired with a Planmeca-ProMax-3D, with scanning values of 13 mA, 89 Kv and a 125 lm resolution. The periapical zones of the radiographs and CBCT scans were scored on the measurement criteria corresponding to the radiolucency observed and a periapical index (CBCTPAI) was implemented. The measurements were made with the OnDemand-3D-App in all three dimensions (coronal, sagittal, axial). Moreover, areas of the lesions were outlined and compared between the 2D and 3D scans.

**Results.** Considering the 25 teeth included in this research, with or without endodontic treatment, the CBCTPAI index was higher in 72% of the cases investigated and where the index increased it was with one score higher on the table. The space widening median was 1–2 mm and in some of the cases it could not be calculated because of the expansion and destruction of the periapical cortical bone that cannot be seen on periapical radiography.

**Conclusions.** CBCT is more accurate than periapical radiography in diagnosing periapical diseases and precise in determining the dimension of the lesions. The periapical index contributes greatly to the diagnosis and consequently to improve case prognosis.

## IN VITRO BEHAVIOR OF NEW EXPERIMENTAL ADHESIVE SYSTEMS

DIANA SUCALA<sup>1</sup>, MARIOARA MOLDOVAN<sup>2</sup>, CODRUTA SAROSP<sup>2</sup>, CATALIN POPA<sup>1</sup>

<sup>1</sup>Materials Science and Engineering Department, Technical University of Cluj-Napoca, Cluj-Napoca, Romania

<sup>2</sup>Department of Polymer Composites, Babes Bolyai University - Raluca Ripan Chemistry Research Institute, Cluj-Napoca, Romania

\*Autor corespondent: *Diana Sucala, e-mail: diana.sucala@gmail.com*

---

**Objective.** The infiltration of resin monomers into demineralized dentin lead to the creation of a new structure, hybrid layer. Intertubular and intratubular resin infiltration leads to an increase of the quality regarding the dentinar adhesion. The aim of this study is vitro testing of new experimental adhesives regarding absorption and solubility as well as determining the dentin-resin interfaces trough SEM analysis.

**Materials and methods.** We used 4 experimental adhesives systems A1, A2, A3, A4 and IBond (Heraeus) as reference material. Organic phase adhesive system consists of a mixture of monomers with carboxyl group dimethacrylic urethane type oligomer, Bis-GMA, HEMA and TEGDMA. As filler for these systems, besides hydroxyapatite, we used TiO<sub>2</sub> nanoparticles. The used nanoparticles increase the mechanical properties providing a better performance.

**Results.** The obtained data shows the main advantages and disadvantages of the tested adhesive systems. The SEM analysis indicates a homogeneous hybrid layer at the resin composite interface.

**Acknowledgements.** This work was funded by the Romanian Ministry of Education and Research, National project 142 PED/ 2017.