

01

Case report

**ORAL SPINDLE CELL LIPOMA: A CASE REPORT*****Lipoma de células fusiformes em mucosa jugal: relato de caso***

Milhan NVM, Cavalcante ASR, Marques YM, Freire Soares, Carvalho YR, Prado RF, Anbinder AL  
e-mail: noalinha@gmail.com

Spindle cell lipoma is a histological variant of lipoma that primarily affects older men and usually occurs in the neck, back, and shoulder. It follows a benign clinical course, and local recurrence is rare. This lesion rarely occurs in the oral cavity, and only 35 well-documented cases of oral spindle cell lipoma have been published between 1984 and 2012. Here we report a case involving a 64-year-old caucasian man who presented with a 1 cm asymptomatic nodule with a smooth surface in the buccal mucosa for 4 years. Fibroma was suspected and excisional biopsy performed. Histopathological examination revealed spindle cells, mature adipose tissue in occasional slices, and mast cells in a stroma of connective tissue with bundles of rope-like collagen fibers. These findings indicated differential diagnoses of fibroma, neurofibroma, and spindle cell lipoma. Then, immunohistochemical analysis revealed negative staining for S-100 and smooth muscle actin and positive staining for CD34, Bcl-2, and vimentin in the spindle cells. Furthermore, mast cell staining confirmed the presence of these cells. A final diagnosis of spindle cell lipoma was made on the basis of the histological and immunohistochemical findings.

Keywords: Spindle cell lipoma; Oral pathology.

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02

Case report

**CASE REPORT: CHRONIC KIDNEY DISEASE AND PERIODONTAL DISEASE*****Relato de caso: insuficiência renal crônica e doença periodontal***

Moretto CM, Bernardo DV, Ferreira CL, Kerbauy WD, De Marco AC, Santamaria MP, Jardini MAN  
e-mail: camilla.moretto@fosjc.unesp.br

Chronic kidney disease promotes a reduction on kidneys filterability and nitrogen products accumulation on blood, electrolyte and system endocrine functions imbalance. Among many clinical manifestations of this illness, on mouth, it can be observed: dry mouth, uremic stomatitis, radiographic changes on maxillary bones and accumulation of calculus on the teeth that increases levels of periodontopathogens able to lead a periodontal tissue destruction. With medicine improvement and increased survival rate in patients with chronic renal failure, these patients are frequently seen in the dental office. The aims of this case report are evidencing the improvement

obtained on periodontal clinical conditions and aware dentists about the important role of Dentistry on treatment of patients with chronic kidney disease. For this, a periodontal treatment was accomplished that included approach on oral hygiene and bidirectional relationship between kidney disease and periodontal disease, scaling and root planing sessions. The result was periodontal disease process resolution or stabilization. It was concluded that well thought out periodontal treatment and patient compliance were crucial for the improvement of periodontal clinical conditions enabling a future successful renal transplantation.

Keywords: Renal insufficiency; Periodontal disease; Dental care.

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**03**  
**Case report**

**EXTENSIVE AMELOBLASTOMA IN THE MANDIBLE: A CASE REPORT THAT EMPHASIZES THE IMPORTANCE OF IMMEDIATE AND PROPER TREATMENT**

***Ameloblastoma extenso em mandíbula: relato de caso que enfatiza a importância do tratamento imediato e adequado***

Geraldo BMC, Milhan NVM, Guimarães R, Carvalho YR  
e-mail: barbara.geraldo@fosjc.unesp.br

The objective of the present study is reporting the case of a male patient who had a multilocular radiolucent lesion in the mandible on the right and was diagnosed by biopsy, with ameloblastoma. After the biopsy, the patient did not appear for the complete removal of the lesion. Ten years later, the patient returned presenting an extensive multilocular radiolucent lesion in the body and branch of the jaw, extending to the condyle region. Hemi-mandibular resection was performed, followed by rehabilitation. Microscopic examination revealed benign odontogenic tumor fragments, characterized by the formation of multiple cystic cavities coated with odontogenic epithelial cells, sometimes columnar, sometimes cubic, arranged in palisade, sometimes delimiting the inner layers of cells arranged loosely, similarly to the starred reticulum of the enamel body. The diagnosis was then confirmed as ameloblastoma. With this case, the importance of prompt and appropriate treatment is emphasized. Although it is a benign tumor, ameloblastoma is locally invasive, and can reach large proportions, and has high rate of local recurrence if not removed properly. Thus, immediate surgery with safety margins should be performed soon, after diagnosis.

Keywords: Ameloblastoma; Odontogenic tumor.

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**Case report**

**DENTAL PULP CAVITY OBLITERATION AFTER TRAUMA**

***Obliteração do compartimento pulpar pós-trauma***

Costa LKV, Marin MCC, Salgado MAC, Spalding M  
e-mail: luan\_vieiralkvc@hotmail.com

The continuous deposit of dentin is a physiological process due to aging which is a characteristic of secondary dentin. However, deposition can also develop in a pathological way in response to injury at the dentin-pulp complex. In this case, it can occur in the form of reactionary or reparative dentin (tertiary), such as nodular or diffuse pulpal calcifications, or also as tissue metaplasia, which can cause complete pulp canal obliteration. The present paper has the aim to present a case report of pulp canal obliteration on two teeth after trauma and to discuss several processes that can be involved with this phenomenon as well. A 25-year-old patient, male, came over to the dental office for a clinical examination. It was observed a slight darkening on 21 and 22 teeth. The patient reported he had suffered a trauma at this region 10 years ago. At the time of the trauma, the dentist who took care of him suggested an endodontic treatment, which was not carried out. At the present moment, a negative response to the vitality test on both teeth was verified. The radiographic exam evidenced a radiopaque image of the whole dental pulp cavity. Teeth's darkening occurred due to greater thickness of mineralized tissue which obliterates the pulp chamber. On this case report, we got the conclusion that it might have happened tissue metaplasia of the pulp. The trauma can trigger reactions at the dentin-pulp complex leading to complete obliteration of the dental pulp cavity.

Keywords: Dental pulp; Trauma; Pulp canal.

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05

**Laboratory Assays - Undergraduate Students**

**EFFECT OF FELDSPATHIC CERAMIC MACHINED DISPOSED IN MULTILAYERS BY FINITE ELEMENT ANALYSIS**

***Efeito da cerâmica feldspática usinada disposta em multicamadas pela análise de elementos finitos***

Nogueira AS, Archangelo KC, Tribst JPM, Dal Piva A, Borges ALS  
e-mail: andreasouza\_66@hotmail.com

Despite of the improvement of properties, dental prostheses are still vulnerable to wear and fracture due to brittle nature of these materials. In order to improve the mechanical properties, it was developed fine grain blocks condensed into a pore-free structure to be milled, which reaches

higher flexural strength values. The aim of this study was evaluating the stress dissipation in feldspathic ceramic machined arranged in multilayer, varying the material thickness. Using Rhinoceros software (version 4.0), discs models were designed ( $\varnothing$  12 mm) and allocated into 6 groups: F1 (monolayer 1.3 mm), F2 (2 layers 0.55 mm + layer of cement 0.2 mm), F3 (3 layers 0.3 mm + 2 layers of cement 0.2 mm), F4 (monolayer of 1.6 mm), F5 (2 layers 0.7 mm + layer of cement 0.2 mm), F6 (3 layers 0.4 mm + layer of cement 0.2 mm). The materials were considered as homogeneous, isotropic and linear and the interfaces between the layers were considered ideals with perfect union, and the mesh was formed by quadrangular tetrahedral elements. The maximum principal stress was calculated for the load applied on simulated samples (150 N). It was observed that the ceramic monolayer 1.3 mm showed higher stress dissipation than the ceramic monolayer 1.6 mm thickness. The arrangement of ceramic multilayer showed higher stress dissipation in all thickness. The use of higher thicknesses ceramic showed greater resistance to smaller thicknesses. It was concluded that the disposal of the ceramic multilayer influence the maximum stress dissipation observed.

Keywords: Ceramics; Elastic modulus; Finite element analysis.

### **STRUCTURAL CHARACTERIZATION AND FLEXURAL STRENGTH OF RESIN CEMENTS SUBJECTED TO IONIZING RADIATION THROUGH Y-TZP CERAMICS**

#### ***Caracterização estrutural e resistência a flexão de cimentos resinosos submetidos a radiação ionizante***

Fonseca JA, Silva PNF, Tango RN  
e-mail: jujuamalfi@hotmail.com.

The objective of this study was analyzing the effects of ionizing radiation on microstructure and flexural strength of resin cements irradiated through Y-TZP. Mini-bars - 12x2x2mm were prepared with RelyX ARC (3M ESPE) and U200 RelyX (3M ESPE), according to the manufacturer's specifications and light-cured through YZ (Vita) and Cercon (DENTSPLY Ceramco). After curing, the samples were irradiated with 70 Gy (78 Eldorado, Atomic Energy of Canadian Limited, 60Co gamma radiation) according to groups (n=8): UYZ $\gamma$ - RelyX U200 irradiated through the YZ; Ucer $\gamma$ - RelyX U200, radiated by Cercon, UYZC $\gamma$ - RelyX U200, beamed directly; UcerC $\gamma$ - RelyX U200, beamed directly; UYZC- RelyX U200, non-irradiated; UCerC- RelyX U200, non-irradiated; AYZ $\gamma$ - RelyX ARC, radiated through YZ; Acery $\gamma$ - RelyX ARC, radiated through the Cercon; AYZC $\gamma$ - RelyX ARC, beamed directly; AcerC $\gamma$ - RelyX ARC, beamed directly; AYZC- RelyX ARC, non-irradiated; ACerC- RelyX ARC, not irradiated. The samples were subjected to mini-3-point bending flexural test on a universal testing machine (50 kgf, speed of 5 mm/min). Data were analyzed by 3-way ANOVA 3 HSD Tukey's test ( $\alpha=0.05$ ). The samples of RelyX ARC showed higher resistance values compared to RelyX U200

( $p < 0.0001$ ). For RelyX U200 irradiated without ceramics protection, the strength values were lower when compared to the radiation through ceramic ( $p = 0.002795$ ), while for RelyX ARC there were no significant differences. It was concluded that the type of cement and exposure to radiation influence on the flexural strength of cements.

Keywords: Ceramic; Resin cements; Radiation.

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07

Laboratory Assays - Undergraduate Students

### **INFLUENCE OF WETTABILITY AND MODULUS OF ELASTICITY OF DIFFERENT TITANIUM ALLOYS IN BONE NEOFORMATION**

*Influência da molhabilidade e do módulo de elasticidade de diferentes ligas de titânio na neoformação óssea*

Manoel A, Ramos LSB, Cairo CAA, Vasconcellos LGO, Carvalho YR, Vasconcellos LMR  
e-mail: ap-manoel@uol.com.br

Currently, implant dentistry focuses on studies that drive and enable faster osseointegration of surgical implants. The aim of this study was comparing the mechanical properties of porous samples made from different alloys of titanium (Ti). They were prepared by powder metallurgy, porous samples, which were divided into 5 groups: a) Group 1: control - cpTi (commercially pure); b) Group 2: alloy Ti-6Al-4V (titanium - aluminum -vanadium); c) Group 3: alloy Ti-13Nb-13Zr (titanium – niobium - zirconium); d) Group 4: alloy Ti-35Nb (niobium); e) Group 5: alloy Ti-35Nb-7Zr-5Ta (titanium - zirconium – niobium - tantalum). Five samples from each group were submitted to chemical, morphological and mechanics. The morphological characterization confirmed porosity about 40% with an average diameter of 100  $\mu\text{m}$ . SEM images revealed porous surface with open and interconnected pores, integrated into a dense core. In the EDS analysis, it was observed characteristic peak of each specific chemical element of the alloys used. The result of the modulus of elasticity test showed that the alloy Ti35Nb (G3) shows lower elastic modulus and the Ti-6Al-4V (G2) has the highest value, but showed no statistical difference between all groups. It was concluded that the samples made with the experimental alloys exhibit appropriate mechanical property, with great potential for use in biomedical implants.

Keywords: Titanium; Elasticity.

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08

Laboratory Assays - Undergraduate Students

## **LONG-TERM FREQUENCY-DEPENDENT EFFECT OF ETHANOL CONSUMPTION IN THE ALVEOLAR BONE OF ADULT RATS**

### ***Efeito frequência-dependente do consumo de etanol em longo prazo no tecido ósseo alveolar de ratos adultos***

Silva AA, Rodrigues VA, Souza DM, Gonsalves VS, Pereira KA, Nishioka RS, Carvalho C  
e-mail: alan\_aquino\_arq@hotmail.com

Ethanol consumption is associated with changes in alveolar bone loss. The objective of this study was evaluating the effect of frequency of continuous and social consumption in long period of time of the alveolar bone in adult rats. Thirty six mice were divided into 3 groups: control (water daily, n = 12) Daily Intake (20% ethanol, n = 12) and casual intake (20% ethanol, twice a week, n = 12). After 90 days, the rats were sacrificed and the right jaw removed and dissected. Initially, a random piece of each group was analyzed by SEM (scanning electron microscope) to evaluate the surface topography. Later, all the pieces were stained with methylene blue 1% and photographed in stereomicroscope with 10X magnification and was measured the distance between the cemento-enamel junction and bone crest in each root for cleft. SEM demonstrated qualitatively flat bone surface, in control the surface with a few minor hollows in social intake and increased quantity and diameter of the wells in the daily intake. The results showed higher ( $p < 0.05$ ) bone loss with both the social as the daily intake, compared to control, but the bone loss was worse ( $p < 0.05$ ) with the constant consumption in relation to the journal. It follows that the long-term ethanol consumption can cause alveolar bone loss frequency-dependent manner.

Keywords: Periodontitis; Rat; Ethanol.

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09

Laboratory Assays - Graduate Students

## **NEUTRALIZATION OF LIPOTEICHOIC ACID CYTOTOXIC EFFECTS BY INTRACANAL MEDICATIONS: IN VITRO STUDY**

### ***Neutralização dos efeitos citotóxicos do ácido lipoteicoico por medicações intracanaís: estudo in vitro***

Silva FC, Xavier ACC, Leão MPV, Jorge AOC, Valera MC, Oliveira LD  
e-mail: fernanda.carv@bol.com.br

The aim of this study was evaluating, *in vitro*, the ability of different intracanal medications to neutralize the effects of lipoteichoic acid (LTA) from *Enterococcus faecalis* to induce production of IL-1 $\beta$ , TNF- $\alpha$ , MIP-1 $\alpha$ , IP-10, G-CSF, IL -6 and nitric oxide by macrophages. Forty-eight root canals were used and divided into 4 groups according to the intra-canal medication: CLX- chlorhexidine

gel 2%; HC+CLX- calcium hydroxide + chlorhexidine gel 2%; HC- calcium hydroxide + saline solution and CONT- saline solution (control). After 14 days, sample collections were performed. Macrophages were activated with these samples and its supernatants used to verify the cytokines and nitric oxide production. The results were analyzed by the Kruskal-Wallis and Dunn tests. Compared to the group CONT, HC showed lower values ( $p < 0.05$ ) than TNF- $\alpha$ , IL-1 $\beta$ , IL-6, G-CSF, MIP-1 $\alpha$  and nitric oxide; CLX + HC induced lower production ( $p < 0.05$ ) in majority the cytokines except MIP-1 $\alpha$  and IL-1 $\beta$ ; and CLX results showed lower values ( $p < 0.05$ ) to IL-6, G-CSF and nitric oxide. It was concluded that all intra-canal medications neutralized the cytotoxic effects of LTA, but HC and HC + CLX were more effective.

Keywords: Lipoteichoic acid; cytokines; Intra-canal medications.

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Laboratory Assays - Graduate Students

## EFFECT OF DIFFERENT SURFACE TREATMENTS ON THE ADHESION BETWEEN PEEK AND VENEERING RESIN

### *Efeito de diferentes tratamentos de superfície na adesão entre poli-éter-éter-cetona à resina de cobertura*

Rocha RFV, Campos TMB, Melo RM, Soares LFV, Bottino MA  
e-mail: reginavillefort@gmail.com

Polyetheretherketone (PEEK) cannot be used for dental prosthesis without resin coverage. However, its high resistance to etching agents and its low surface energy, can impair the adhesion process between one and another. The aim of this study was to evaluate the effect of different surface treatments on wettability and the bond strength between PEEK and veneering resin. Fifty PEEK specimens were embedding in resin and randomly divided into the five pretreatment groups: sandblasting with 45  $\mu$  aluminum oxide, silica coating (Rocatec Pre 45  $\mu$ m + Rocatec Plus 110  $\mu$ m), etching with 98% sulfuric acid for 5 seconds, etching with 98% sulfuric acid for 30 seconds, and silica coating (Rocatec Pre 45  $\mu$ m + Rocatec Plus 110  $\mu$ m) + heated silane to 79°C. Eleven specimens were not embedding in resin and one was subjected to analysis by energy-dispersive X-ray spectroscopy. Ten were subjected to the surface treatments and subjected to goniometry (n=5) and scanning electron microscopy (n=5). Shear bond strength (SBS) was tested and failure types were assessed. Data were analyzed using 1-way ANOVA, followed by the Tukey and Duncan test. Treatment with Al<sub>2</sub>O<sub>3</sub> and silica coating had the lowest SBS means and sulfuric acid for 5 seconds showed the highest mean, followed by sulfuric acid for 30 seconds and Rocatec + heated silane. All failures were classified as adhesive. The lowest mean contact angle was found for the polished (control) and etched group with 98% sulfuric acid for 30 s, while the Al<sub>2</sub>O<sub>3</sub> sandblasted group showed the highest values. Etching with 98% sulfuric acid for 5 seconds increased the SBS between resin and PEEK; however, handling of this material implies the adoption of specific training and new

biosecurity measures.

Keywords: PEEK; Shear Strength; Composite Resins; Sulfuric acid.

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Laboratory Assays - Graduate Students

**ANALYSIS OF TORQUE MAINTENANCE AFTER RETORQUE OF ABUTMENT SCREWS WITH DIAMOND-LIKE CARBON COATING**

***Análise da manutenção do torque após retorque de parafusos de pilares protéticos com recobrimento de carbono tipo diamante***

Canavezi RC, Figueiredo VMG, Lapesqueur LSS, Nogueira-Júnior L  
e-mail: rafaella\_canavezi@hotmail.com

This study analyzed torque maintenance of the screw abutments, with coating of diamond-like carbon (DLC) and doping of diamond (CD-DLC), submitted to retorque in external hexagonal (EH) and internal (IH) connections after mechanical fatigue. HE and HI implants and different treatments of the abutments screws were divided into experimental groups (n = 5): untreated and not subjected to fatigue (EH-CON) (IH-CON); fatigued untreated (EH-CONF) (IH-CONF); fatigued with DLC (EH-DLCF) (IH-DLCF) and fatigued with CD-DLC (EH-CD-DLCF) (IH-CD-DLCF). DLC and CD-DLC coating was deposited by plasma, PECVD method. Samples (Implant + abutment screw + metal crown), which had been exposed to 1 million fatigue cycles were adjusted to the torque recommended by the manufacturer: 30N (HE) and 20N (HI), and submitted again to 1 million mechanic cycles. At the end of fatigue, the screws were checked to verify the maintenance of torque. Screws from each experimental group were selected for observation by SEM. Statistical analysis was performed by ANOVA 2 factors test ( $\alpha=0.05$ ). There was no interaction among the factors studied ( $p = 0.765$ ); the treatment of screws ( $p = 0.638$ ) and the connection type ( $p = 0.615$ ) showed no statistical difference. The microscopy images showed damage the threads and covering the presence of HI connections. Changes such as damage on the screws threads and film removal were observed among the experimental groups. The coating groups showed little or no damage on the screws threads. The DLC and CD-DLC coating did not interfere in the screw adaptation on the implant.

Keywords: Dental Implants; Dental Prosthesis; Torque.

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Laboratory Assays - Graduate Students



**INFLUENCE OF DIFFERENT PHYSICAL AND CHEMICAL TREATMENTS IN ADESION OF PERIODONTAL LIGAMENT FIBROBLASTS TO THE ROOT SURFACE SIMULATING AVULSED TEETH**

***Influência de diferentes tratamentos físico-químicos na adesão de fibroblastos de ligamento periodontal à superfície radicular simulando dentes avulsionados***

Cardoso AM, Moreira CS, Camargo CHR  
e-mail: lemanchini@hotmail.com

Delayed reimplantation of avulsed teeth is a reality in dental offices. In an attempt to restore architecture and function of the periodontal ligament, avoiding ankylosis, preventing or modulating the replacement resorption, avulsed teeth root surface may be treated with various substances including EDTA (ethylenediaminetetraacetic acid) to 17%, always seeking a lower chance of occurring inflammatory or replacement resorption. Thus, the aim of this study was evaluating the effectiveness of the treatment with cut discs from vestibular surface of bovine teeth roots with EDTA 17%, Emdogain®, hyaluronic acid and collagen through cell viability tests, quantification of cytokines IL-1 $\beta$ , IL-6, IL-8, IL-10 and TNF- $\alpha$  by ELISA assay and, in addition, illustrations by scanning electron microscopy of the accession of fibroblasts on the dentin disks were taken. A hundred and twenty five dentin discs with 4,5 mm diameter were cut from vestibular surface of bovine teeth root, previously scraped or not with periodontal curette. The discs were regularized, cleaned and autoclaved. Specimens were treated with the substances advocated and placed in 96-well plates in which primary cell cultures of human periodontal ligament and fibroblasts were in contact with the discs during 48 hours. The survival and cell viability on the surface of the discs were evaluated by XTT assay. Scanning electron microscopy were used to verify adherence of fibroblasts to the surface of the discs. Detection and quantification of cytokines were performed through ELISA assay. Data were statistically analyzed by ANOVA and Tukey ( $p < 0.05$ ).

Keywords: Tooth Avulsion; Ensaio de Enzyme-Linked Immunosorbent Assay.

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Laboratory Assays - Graduate Students

**EFFECT OF SILICA INFILTRATION ON BOND STRENGTH BETWEEN RESIN CEMENT AND Y-TZP ZIRCONIA**

***Efeito da infiltração de sílica na resistência de união entre o cimento resinoso e zircônia***

Ramos NC, Campos TMB, Machado JP, Bottino MA, Souza ROA, Melo RM  
e-mail: nathalia.carvalhramos@gmail.com

The aim of the study was evaluating the effect of silica infiltration in a dental zirconia on the bond strength to resin cement. Infiltration was accomplished by immersion of the ceramic specimens

pre-sintered zirconia silica sols for 5 days. After the immersion process, the specimens were sintered. The infiltrated samples were etched with 2% HF for 10 or 15 seconds. Resin cement cylinders on ceramic specimens using silane with MDP or not and submitted to shear bond strength test were built. The results of uninfiltrated and infiltrated groups were analyzed separately. All groups had half the samples thermally cycled (6,000 cycles) and half tested after 24 hours of cementation. The uninfiltrated groups were thermalcycled (TC) showed bonding strength values (BS) and lower high failure rate during cycling. The infiltrated and conditioned group (2% HF for 15 s) lost many specimens for TC, but the group MDP with no TC obtained higher bonding values (mean  $17.65 \pm 8.01$  MPa). Two-Way Anova of the infiltration group and conditioned with HF 2% for 10 seconds showed significant interaction between TC and the presence of MDP ( $p = 0.03$ ). The group MDP and no TC showed higher BS values (average  $11.64 \pm 5.31$  MPa), being statistically significant. The infiltration of zirconia with silica by the sol-gel method created a ceramic etchable with HF 2%, generating the best bond strength after acid etching in combination with a primer containing MDP.

Keywords: Zirconium; Bond strength; silica.

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Laboratory Assays - Graduate Students

#### **EFFECT OF WHITENING MOUTHWASH ON COLOR CHANGE OF COMPOSITE RESINS SUBJECTED TO STAINING**

##### ***Efeito de enxaguatórios branqueadores sobre a alteração de cor de resinas compostas submetidas a mancha***

Crastechini E, Oliveira JBS, Torres CGR, Caneppele TMF, Borges AB  
e-mail: ericacrastechini@gmail.com

This study aimed to compare the effectiveness of whitening mouthwashes (WM) on the color change of composite resins (CR) submitted to staining. Composite resin disks, shade A2, were made with the aid of a metal mold, with the following CR: Admira Fusion (AF), Filtek Z350 (Z350), TPH3 (TPH) and Beautifil II (B). The specimens ( $n=60/CR$ ) were stored in a staining broth for 14 days. Color reading was performed using a spectrophotometer, CIE  $L^*a^*b^*$ . The groups were divided into the following four subgroups ( $n= 15$ ), according to WM: Listerine Whitening (L); Plax Whitening (P); Experimental bromelain and papain solution 0.1% (BP) and deionized water (control - C). The bleaching cycle was performed with 1 min by immersion into WM/30 min in artificial saliva for 84 times, in order to simulate 12 weeks. Then, new color reading was performed. Data were analyzed by ANOVA and Tukey test (5%). There was a significant difference for  $\Delta E$  values for all factors with  $p=0.001$ . The mean  $\pm$  SD data and results for Tukey test for CR factor were: TPH ( $1.79 \pm 0.65$ )a, Z350 ( $2.38 \pm 0.73$ )b, AF ( $2.40 \pm 0.93$ )b, B ( $2.87 \pm 0.76$ )c. For WM factor were: C ( $1.93 \pm 0.74$ )a, BP ( $1.97 \pm 0.74$ )a, P ( $2.60 \pm 0.72$ )b, L ( $2.94 \pm 0.79$ )c. It was concluded that the whitening mouthwash L had the greatest whitening potential and the highest color change after exposure to WM was observed for

the composite resin B.

Keywords: Composite resins; Dyes; Mouthwash; Whitening; Hydrogen peroxide.

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Laboratory Assays - Graduate Students

**EVALUATION OF ORAL HYGIENE IN COMPLETE DENTURES USERS ASSOCIATED WITH THE PREVALENCE OF DIAGNOSES OF ORAL LESIONS**

***Avaliação dos hábitos de higiene bucal em usuários de prótese total associados à prevalência de hipóteses diagnósticas de lesões bucais***

Barcellos ASP, Faria JCB, Kimpara ET  
e-mail: alinebarcellosodonto@hotmail.com

Oral rehabilitation of patients held with denture aims to return esthetics and function. But they are considered potential facilitators for various oral pathologies. Several functional aspects are associated with these factors and qualitative aspects of the conditions of oral hygiene and prosthetic maintenance found in the edentulous. In order to obtain a successful treatment and maintain health, it is necessary that these individuals are guided by the dentist to reach proper oral hygiene and their dentures. The objective of this study was understanding the habits of hygiene of denture wearers, the condition, and relation with the oral lesions and provide orientation at the prostheses cares. Sixty patients from the discipline of Denture, FO-UFJF were interviewed, had their dentures hygiene and conservation evaluated and a general clinical examination of the mucosa. It was found that 96,7% of the subjects had not received guidance from the dentist, the mechanical method was mostly used to sanitize the prosthesis at a frequency of three times a day (36,7%). The hygiene of the prosthesis was moderate and most of the functional features had become unsatisfactory. Angular cheilitis showed borderline level significance ( $p=0,08$ ), associated with a poor level of hygiene, lack of retention and static stability was associated with lesions in the mandible ( $p=0,02$ ). No vertical dimension of occlusion had a marginal association with denture stomatitis ( $p=0,09$ ). It could be concluded that disabled features of the prosthesis represent a trend to the occurrence of oral lesions and that the study participants did not know the ideal way of cleaning their dentures and had not received guidance that the prostheses could cause oral lesions.

Keywords: Complete denture; Oral pathology; Oral hygiene.

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Laboratory Assays - Graduate Students

**ANTIMICROBIAL ACTION AND EFFECT AGAINST ENDOTOXIN OF GEL AND LIQUID CHLORHEXIDINE AND SODIUM HYPOCHLORITE ASSOCIATED WITH SURFACTANT**

***Ação antimicrobiana e efeito sobre endotoxinas da clorexidina gel e líquida e do hipoclorito de sódio associado ao surfactante***

Cavalli D, Cardoso FGR, Ferreira NS, Albuquerque MTP, Rocha VC, Oliveira LD, Valera MC  
e-mail: daiana.cavalli@ict.unesp.br

The aim of this study was evaluating the antimicrobial effects and action against endotoxins from different auxiliary chemical substances used during biomechanical preparation (BMP). Fifty human single-rooted teeth were contaminated with *Candida albicans*, *Enterococcus faecalis*, *Escherichia coli* and divided into 5 groups (n=10) according to the auxiliary chemical substance used in the BMP with the rotatory system Mtwo: NaOCl – sodium hypochlorite 2%; NaOCl + S – NaOCl 2% + surfactant; CLX gel – gel chlorhexidine 2%; CLX Liq – liquid chlorhexidine 2%; SS – saline solution (control). Collection (Col) was carried out from the root canal: 28 days after contamination (confirmation Col), immediately after instrumentation (1<sup>st</sup> Col) and after 7 days (2<sup>nd</sup> Col). Results were submitted to statistical analysis of *Kruskal-Wallis* and *Dunn* (p<05). The antimicrobial activity between the 1<sup>st</sup> and 2<sup>nd</sup> Col showed no statistical difference. Endotoxin levels, after the 1<sup>st</sup> Col, NaOCl, NaOCl + S and CLX liq groups showed the best results. In the 2<sup>nd</sup> Col, there was an increase in the endotoxin amount, but no statistical difference was found between groups. It was concluded that all the substances were effective against microorganisms and that NaOCl, NaOCl + S and CLX + Liq were the most effective in removing endotoxin from root canal.

Keywords: Endotoxin; Sodium hypochlorite; Chlorhexidine.

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Laboratory Assays - Graduate Students

**IMPACT OF PREPARATION DESIGN, CERAMIC AND OCCLUSAL CONTACT ON THE STRESS DISTRIBUTION IN LAMINATE VENEERS**

***O impacto do preparo, da cerâmica e do contato oclusal na distribuição de tensões em facetas***

Meirelles LCF, Borges ALS, Pagani C  
e-mail: laurameirelles@gmail.com

The purpose of this study was verifying the stress distribution in the ceramic veneers made with 2 types of porcelain: feldspathic and lithium disilicate in 4 different design types limited to dental enamel: (1) buccal preparation, (2) buccal preparation with incisal reduction, (3) buccal preparation with coverage incisal and (4) extended preparation in two different occlusal situations: load on the incisal third and the middle third palatine, through mathematical finite element method. Three-

dimensional CAD models were performed in CAD Rhinoceros 4.0® using a stl file of a maxillary central incisor with average dimensions found in the literature, where conditions used for conducting an experimental test. The models were composed of enamel, dentin, pulp, polyether (to simulate the periodontal ligament), and ceramic base and underwent loads of 100 N under an angle of 45 degrees to the occlusal plane in the incisal and middle thirds of the palatal tooth region. Preprocessing and post processing by ANSYS® version 13.0 finite element program were performed. The results were presented in plots by principal maximum stress with their respective numerical values represented by the color scale. The finite element analysis showed that for the most conservative designs present a better stress distribution on veneers of lithium disilicate, nevertheless, the higher tensile stresses concentrations were found on veneers of same material for group subjected to palatal chamfer design when subjected to load in the middle third palate. The type of occlusal contact contact caused different distribution of tension among the different types of preparations design, and the incisal contact promoted higher stress concentration in both facets except the extended preparation performed with porcelain lithium disilicate.

Keywords: Finite element analysis; Ceramics; Dental veneers.

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Laboratory Assays - Graduate Students

#### **EFFECTS OF CLEANING METHOD AND SIMULATED RADIOTHERAPY ON OPTICAL AND MECHANICAL PROPERTIES OF Y-TZP CERAMICS**

##### ***Efeitos do método de limpeza e radioterapia simulada sobre propriedades ópticas e mecânicas de cerâmicas Y-TZP***

Silva PNF, Manea S, Gonçalves OL, Tango RN  
e-mail: pnfsilva\_@hotmail.com

Objectives: The aims were evaluating the effect of different types of washes and exposure to ionizing radiation (gamma rays), the flexural strength of 4 points, crystal phase transformation and color change of the polycrystalline ceramic Y-TZP. Materials and Methods: Y-TZP 114 bars were made Y-TZP - Cercon® Zirconia and InCeram 2000 YZ cubes according to ISO 6872. Half of Y-TZP samples were irradiated with gamma radiation  $Co_{60}$ , in a single step of 70 Gy. It was held the flexural strength test in a universal testing machine (1 mm/min 1000 kg) and the change of Y-TZP color was used CIELAB system using the Easyshade Compact. The strength data (MPa) and color data were submitted to ANOVA and Tukey's test. Parts of Y-TZP samples (n=3) were subjected to XRD measurement of the crystalline phases and SEM for surface topography. Results: ceramics ( $p = 0.00$ ), the cleaning method ( $p = 0.02$ ) and radiation ( $p = 0.01$ ) and significantly affected the result, and the interaction between the ceramic and washing, as well ceramics and radiation, and the interactions among all parameters. For coloring the ceramics both parameters ( $p = 0.00$ ) and the wash ( $p = 0.00$ ), as well as the interaction Ceramics and wash ( $p = 0.00$ ) significantly influenced  $\Delta E$ ,

$\Delta L$ ,  $\Delta a$  and  $\Delta b$ . Conclusion: It was concluded that ionizing radiation influences the optical and mechanical properties as well in the cleaning method.

Keywords: Flexural strength; Radiation; Resin cement.

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Laboratory Assays - Graduate Students

### **SYNTHESIS AND CHARACTERIZATION OF POLYMETHYLMETHACRYLATE NANOFIBERS**

#### ***Síntese e caracterização de nanofibras de polietilmetacrilato***

Archangelo KC, Quishida CCC, Marciano FR, Lobo AO, Borges ALS  
e-mail: karenarchangelo@yahoo.com.br

The electrospinning process occurs when a polymer solution is exposed to a constant electrical field to create an electrified fluid jet. The jet is elongated and collected as an interconnected web of small fibers, named nanofibers (NF). The aim of this study was synthesizing and morphologically characterize the polymethylmethacrylate NF (PEMA) produced by electrospinning. For the electrospinning, PEMA was diluted in dimethylformamide and 1,1,2,2-tetrachloroethane, a high voltage source was used, and a glass syringe with a straight needle tip ( $\varnothing$  0,7 mm<sup>2</sup>). Fibers were collected on a grounded metal screen 10 cm distant from the tip of the needle for 2 minutes. The voltage applied was 17 kV and flow ratios was 0.05 and 0.1 mL/h. Morphological characterization of NF was obtained by Scanning electron microscopy (SEM) images and the diameter of NF was measured using Image J software. The technique applied resulted in misaligned NF synthesis. The flow rate of 0.05 mL/h produced NF with a diameter of  $758.21 \pm 66.81$  nm and morphologically observed NF without defects ("beads"). NF obtained using the flow rate of 0.1 mL/h presented a diameter of  $109.7 \pm 1569.05$  nm, with a dense fibers network and some clusters suggesting boundary condition for the formation of flaws. Thus, 0.05 mL/h flow ration associated with the other parameters was effective for synthesis of PEMA NF. It was concluded that the technique is promising for synthesis of nanometer scale fibers.

Keywords: Polymethylmethacrylate; Electrospinning; Nanofibers.

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Laboratory Assays - Graduate Students

### **STUDY OF MICRODEFORMATIONS AROUND INTERNAL HEXAGON IMPLANTS AND IMPLANTS WITH PLATEAU, UNDER VERTICAL LOAD APPLICATION**

***Estudo das microdeformações ao redor de implantes de hexágono interno e implantes com platôs sob aplicação de carga vertical***

Tribst JPM, Nishioka GNM, Santis LR, Rodrigues VA, Kojima AN, Nishioka RS  
e-mail: João.tribst@fosjc.unesp.br

This study aimed to evaluate, *in vitro*, with strain gauges, the microdeformations generated around 2 distinguished Implant Systems (internal hexagon with conventional threads and Cone Morse plateau); in 2 vertical levels. It was made a silicone matrix and obtained 10 blocks of polyurethane and the drilling were made on the center of minor face, performed by a single operator. The abutment, which had 10 mm, was seated on the System Cone Morse implant with the gavel, while the Internal Hex Implant used the prosthetic 10 mm abutment screwed with the manual torque wrench in 20 N.cm. The strain gauges tangent each of implants and were placed in the cervical, middle and apical regions of the screw. A load of 30 kg was applied for a period of 10 seconds. The systems had greater microstrain on gauges in horizontal to ratio vertical each implant; the data submitted to statistical analysis ANOVA and there was a significant difference from the type of implant and region (horizontal and vertical) with  $P = 0.0259$ . It was concluded that the implant plateau presented greater microdeformation than the internal hexagon implant; the cervical region had increased stress concentration in relation to middle region and the apical; the type of connection abutment/implant influences the microstrain distributed around the implant

Keywords: Microdeformations; Vertical load application.

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Laboratory Assays - Graduate Students

**EVALUATION OF THE INFLUENCE OF CONVERSION DEGREE, ELASTIC MODULUS AND VOLUMETRIC SHRINKAGE IN SHRINKAGE STRESS OF COMPOSITE RESINS**

***Avaliação da influência do grau de conversão, módulo de elasticidade e contração volumétrica na tensão de contração de resinas compostas***

Santos JD, Tango RN, Costa AKF, Souza ACO, Komori de Carvalho PC, Borges ALS  
e-mail: jediassantos@gmail.com

The aim of the study was evaluating the relation between degree of conversion, volumetric shrinkage and filler content in shrinkage stress of five composites. Resins were evaluated with different viscosities (Estelite Flow Quick, Permaflo, Estelite Flow Quick High Flow, Filtek Z350 Flow, Tetric Evo Ceran Bulk Fill) (N=5). Twenty-four hours after curing, the degree of conversion was measured (FTIR), and the volumetric shrinkage video-image technique (Acuvol, Bisco). The elastic modulus was obtained by the acoustic excitation pulse (Sonelastic, Engineering Physical PTCA) and shrinkage stress in a tensiometer (ADA Foundation) of the cantilever type. For all experiments, 16J

of energy (Ratii Plus, SDI) were used. The results showed that PermaFlo had the highest shrinkage stress values (4,67 MPa), while Tetric Evo Ceran Bulk Fill presented the lowest values for both: shrinkage stress (2,30MPa) and for volumetric shrinkage parameter. However, the shrinkage stress was not influenced by volumetric shrinkage, the degree of conversion or the elastic modulus in all studied resins.

Keywords: Composite resin; Shrinkage stress.

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Laboratory Assays - Graduate Students

### **INFLUENCE OF OCCLUSAL GEOMETRY AND RESTORATIVE MATERIALS ON LOAD-TO-FRACTURE AND STRESS DISTRIBUTION IN TOTAL CROWNS**

#### ***Influência da geometria oclusal e material restaurador na carga para fratura e distribuição de tensões em coroas totais***

Lima AL, Rodrigues FP, Costa AKF, Borges ALS  
e-mail: alineodontoufpb@yahoo.com.br

This study assessed the influence of different cuspal patterns of total restorations provided by the database CEREC CAD/CAM system on load-to-fracture(LF) and stress distribution of two types of restorative materials: one with a low-elastic modulus ( $6 \pm 0.5\text{GPa}$ ) CAD-Waxx resin (R) and another with a high-elastic modulus ( $63 \pm 0.5\text{GPa}$ ) VITA Mark II ceramic (C). Sixty anatomic total crown preparations in G10 were scanned with CEREC and divided into 3 groups according to the occlusal pattern from CEREC database with different cusp heights: Young (Y), Asian (As) and Adult (Ad). All crowns were cemented with resinous dual-cure cement. Specimens were load to fracture. LF means were analyzed with ANOVA and Tukey's tests (5%). ANOVA two-way showed significant differences for the tested factors and for their interaction ( $p < 0.05$ ). Means  $\pm$  SD and results of Tukey's test were: R/Y-  $2007.0 \pm 345.0^a$ , R/As  $742.6 \pm 142.0^b$ , R/Ad  $1139.0 \pm 132.0^c$ , C/Y-  $454.2 \pm 77.5^d$ , C/As  $590.9 \pm 94.3^b$ , C/Ad  $1149,4 \pm 201.0^c$  in Newton. The Maximum Stress Principal and for von Mises Stress showed difference on stress distribution for Y and Ad pattern independent of elastic modulus of restorative material when showed for occlusal and internal surface. The occlusal pattern and the type of material influenced the LF values. For C, the Ad occlusal pattern showed the high LF values and Y occlusion pattern in R was higher than the others. The lowest values of tensile stress were R group, which has lower elastic modulus due to its better absorption of stresses, so it may show a lower risk of fracture.

Keywords: Crowns; Cuspid; Material resistance; Finite element analysis.



**BOND STRENGTH BETWEEN ZIRCONIA (YTZ-P) AND RESIN CEMENT: EFFECT OF SANDBLASTING AND DIFFERENT APPLICATION SOLUTIONS**

***Resistência de união entre zircônia (YTZ-P) e cimento resinoso: efeito do jateamento e aplicação diferentes soluções***

Dal Piva AMO, Perdigão KCA, Campos F, Pereira LL, Souza ROA  
e-mail: dalpiva.amanda@yahoo.com.br

The purpose of this research was evaluating whether universal primers alone can reach similar levels of adhesion of resin cement to zirconia ceramic when compared to their application with airborne-particle abrasion. Sintered zirconia blocks (N = 180) (Lava, 3M ESPE), (5.25 × 5.25 × 3 mm<sup>3</sup>) were embedded in acrylic resin, polished, and randomly distributed into 18 groups (n = 10), according to the factors "solution" (8 levels) and "sandblasting" (2 levels): Ctr: control, without application of a universal primer; AP: Alloy Primer; MP: Monobond Plus; MZP: Metal Zirconia Primer; MZ: MZ Primer; Rex- Relyx Primer for ceramic; Sg: Signum Zirconia Bond; SbU: Scotchbond Universal; ZP: Z Prime Plus. Universal primers were also used after air abrasion (S) of zirconia to form the following 9 groups: Ctr.S, AP.S, MP.S, MZP.S, MZ.S, ReX.S, Sg.S, SbU.S, and ZP.S. After ultrasonic cleaning, air abrasion was performed using Al<sub>2</sub>O<sub>3</sub> particles (110 μm, 2.5 bar, 20 s at 10 mm) in a chairside air-abrasion device. After ultrasonic cleaning again, universal primers were applied according to each manufacturer's recommendation. Resin cement (RelyX ARC, 3M ESPE) was built up incrementally and photopolymerized on the zirconia surface using a silicone mold (O = 3.5, height = 3 mm). All specimens were stored in distilled water (60 days at 37°C) and then subjected to shear bond strength testing (SBS) in a universal testing machine (1 mm/min). Data were submitted to ANOVA (two-factors) and Tukey's test (α = 5%). Factors "blasting" (p = 0.0001) and "solution" (p = 0.0001) were statistically significant (ANOVA). SbU solution (142.91 MPa) promoted greater adhesion between resin cement/ceramic. Except for SbU, Al<sub>2</sub>O<sub>3</sub> blasting followed by solution implementation increase the bond strength to zirconia.

Keywords: Adhesion; Aluminum oxide; Shear bond strength; Yttria stabilized tetragonal zirconia.

**SURFACE ROUGHNESS OF DENTAL MATERIALS AFTER TOOTHBRUSH ABRASION WITH DIFFERENT DENTIFRICES**

***Rugosidade de superfície de materiais dentários após abrasão por escovação com diferentes dentífricos***

Kamozaki MBB, Santos LFTF, Pagani C, Marinho RMM, Garakis MCV , Bresciani E  
e-mail: bia.kamozaki@gmail.com

This study evaluated the surface roughness (SR) of nanoparticulated, nanohybrid and microhybrid composites resins (CR) and resin-modified glass ionomer (RMGI) under simulated brushing with different dentifrices. Fifteen samples were made for each group (6 mm diameter x 3 mm height). CR specimens were made by incremental technique and RMGI specimens, according to the manufacturer instructions, with a commercial syringe (centrix). Samples were identified and stored in distilled water at 37°C. After 24 h, the samples were polished with a serie of abrasive disks (FEPA-P 1200, 2400 e 4000) and diamond polishing paste (6-, 3- and 1- $\mu$ m). After 7 days, each group was divided according to the dentifrice that was applied. The samples were submitted to 15,000 cycles of simulated brushing. Surface roughness of the samples was measured using a contact type profilometer (Maxsurf XCR 20), prior to simulated brushing, and after the brushing cycles. Two-way ANOVA repeated measures showed statistically significant differences among dental materials groups ( $p < 0.05$ ) as well as difference between initial and final roughness. However, there were no significant differences among the dentifrices ( $p = 0.149$ ). Nanoparticulated and nanohybrid composites showed the lowest roughness, microhybrid composite showed roughness higher than nanoparticulated, however similar to nanohybrid. The resin-modified glass ionomer, Vitremer, presented the highest superficial roughness when compared to all the composite resins. Tukey's test showed that there were significant differences between resin-modified glass ionomer and composite resins groups ( $p < 0.05$ ). It can be concluded that the different materials showed distinct behavior under the brushing cycles. However, there were no significant differences among the dentifrices.

Keywords: Roughness; Abrasion; Dental Materials.

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Laboratory Assays - Graduate Students

**INFLUENCE OF DIFFERENT TREATMENTS IN THE ERODED DENTINE ADHESION EVALUATED BY MICROTENSILE BOND TEST**

*Influência de diferentes tratamentos na adesão à dentina erodida avaliada pelo teste de microtração*

Augusto MG, Torres CRG, Pucci CR, Borges AB  
e-mail: marina.augusto@ict.unesp.br

Erosive challenges promote changes in tooth structure and may lead to enamel loss and exposure of underlying dentine. Frequent contact of exposed dentine with an acidic substance leads to demineralization of its surface layer, leaving, at least under *in vitro* conditions, a mesh rich in

collagen fibrils with considerably thickness. This study intended to verify the effects of abrasion by brushing and the application of sodium hypochlorite 10% on the organic matrix of eroded dentine, in order to determine the consequences of such conditions on the bond strength of a universal adhesive, immediately and after artificial aging. Specimens of bovine dentin were divided into 5 groups according to the organic matrix treatment (n=30): Control (CT); Erosion (ER); Erosion + Abrasion (ER + AB); Erosion + Sodium hypochlorite (ER + HIP); Erosion + Abrasion + Sodium hypochlorite (ER + AB + HIP). Groups were further divided (n=15) according to the application of a Universal Adhesive System (total etching or self etching). Composite resin blocks were built on the tested surfaces and sticks were obtained for microtensile bonding test. Statistically significant differences were observed for the type of treatment and application technique of adhesive system ( $p < 0.05$ ), but not for the interaction between them. Mean values of bond strength to type of treatment were: ER + HIP ( $29.60 \pm 3.99$ ) = ER + AB + HIP ( $28.79 \pm 4.26$ ) = CT ( $28.06 \pm 4.73$ ) > ER ( $23.31 \pm 5.05$ ) > ER + AB ( $19.81 \pm 4.10$ ); and for the application technique of the adhesive system were: total etching ( $27.01 \pm 6.09$ ) > self-etching ( $24.82 \pm 5.27$ ). It was concluded that erosive challenges and the toothbrush abrasion decreased bond strength. The application of sodium hypochlorite 10% promotes similar bond strength values to the control group. Total etching technique promoted increased bond strength values than self etch technique.

Keywords: Eroded dentine; Organic matrix; Union resistance; Adhesive systems; Toothbrushing; Sodium Hypochlorite.

**ROUGHNESS AND ATOMIC FORCE MICROSCOPY OF COMPOSITE RESINS SUBMITTED TO DIFFERENT POLISHING METHODS**  
*rugosidade e microscopia de força atômica de resinas compostas submetidas a diferentes métodos de polimento*

Alves LMM, Goyatá F, Marinho RMM  
e-mail: larissammalves@gmail.com

This study evaluated the surface topography and roughness of composite resins submitted to different polishing methods. Five resins were used (Filtek Z350, Master Fill, Venus, Charisma and Durafill VS) and ninety test pieces were made and then distributed into 6 groups (n=15): GI: no polishing, GII: abrasive rubber point; GIII: sanding disc in 3 grits; GIV: felt disc with diamond paste; GV: silicon carbide brush; GVI: abrasive silicon tip. After polishing, analyses of roughness and topography were made. The values were tabled and analyzed by Kruskal-Wallis and ANOVA test ( $\alpha = 0,05$ ). The averages ranged between  $0,01 \mu\text{m}$  (Filtek Z350 – GII) and  $0,27 \mu\text{m}$  (Charisma – GV). For all the tested resin, the best polishing method was the felt disc with diamond paste (GIV).

Keywords: Operative dentistry; Dental materials; Dental polishing.

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Clinical / Epidemiologic study

### HOMELESS PEOPLE: DRUG ADDICTION, ORAL HEALTH CONDITION AND IT'S IMPACT ON QUALITY OF LIFE

*População em situação de rua: drogadição, condição de saúde bucal e seu impacto na qualidade de vida*

Braz TL, Paulino KR, Orenha ES, Tengan C, Ramos CJ, Nicodemo D, Feitosa FA, Teixeira SC  
e-mail: taiane.lima@fosjc.unesp.br

The problem of drugs is an important issue in public health today, due to the increase of drug use. Drug addiction constitutes one of the reasons that lead people to the streets. The street sets conditions harmful to health of those who live in it. And access to health care, particularly to dental, for this population is extremely difficult. **Objectives:** The purposes of this study are to evaluate the oral health status of 60 addicts homeless people in recovery process in the Comunidade Terapêutica Nova Esperança (CTNE) in Sao Jose dos Campos, trace the sociopsicodemográfico profile of these individuals, as well as its about perception of their oral health and the presence of psycho-emotional disorders, and and possible correlations of these data, so that they can contribute to the multidisciplinary treatment of CTNE, for the study of epidemiology for this type of patient and to offer subsidies to health care professionals and professionals management of social programs. **Methodology:** Data were collected by applying form of interviews on questionnaires containing demographic questions, the SRQ-20 (Self-Reporting Questionnaire) and the OHIP-14 (Oral Health Impact Profile). Oral examinations were conducted at the premises of Therapeutic Community, under natural light, using calibrated and students trained under the supervision of two teachers. The survey of oral conditions was conducted by evaluating the DMFT (Decayed Teeth, Orders and filled), CPI (Community Periodontal Index), IDD (Tooth Wear Index) and Edentulism. Were used in the medical record the codes and criteria as those set out in SB Brazil 2010. The association analysis was performed using Fisher's exact test. **Results:** The participants' age ranged from 20 to 60 years. The average time of habitation on the streets was 5.2 years (SD±9.2). The predominant low schooling, 50% of the individuals had incomplete elementary education. 56,66% if declared non-whites. 76.66% said they have started the use of drugs among 11 and 20 years and 11.67% started before 10 years of age. 56,67% said associate illicit drugs with alcohol. The main complaints were related to pain and the need of prosthesis. In accordance with the test SRQ-20, 33% of interviewees had some disorder mental-emotional. Second the OHIP-14, only 25% of those interviewed realized some impact of oral health on quality of life. The dimensions of the OHIP-14 that more scored were "psychological distress" first and "physical pain" and "psychological incapacity" in second place. Drug addicts street residents have variety of amendments and buccal diseases, but were not found a mean DMFT and IPC discrepant the national average. On clinical examination it was observed a

mean DMFT average 10.8(SD  $\pm$ 8.0), only 4 (6.66%) presented themselves free of caries and 76.66% presented mean DMFT equal to or greater than 5,0. The DMFT was 0 (zero) minimum and maximum was equal to 32. The average of decayed teeth found was 3.1 (SD  $\pm$ 3.2), of teeth obturated 2.8 (SD  $\pm$ 3.2) and tooth loss by caries 4.9 (SD  $\pm$ 7.1). In the age range from 35 to 44 years were found the highest indices of bleeding, dental calculus and presence of deep and shallow periodontal pockets. From 20 to 34 years was found a mean rate of bleeding of 34,61% against 94,87% in the age range from 35 to 44 years and 66,31% in the age range of 45 to 60 years. With regard to the presence of dental calculus, we found average indices of 50,12%, 80,03% and 78,75% for the age 20 to 34 years, 35 to 44 years and 45 to 60 years respectively. Already with relation to the presence of periodontal pockets, the shallows are more prevalent in the group studied than the deep, representing 2.38%, 46,47% and 18.77% for the age 20 to 34 years, 35 to 44 years and 45 to 60 years respectively against 1.17%, 0% and 10.97% for periodontal pockets profound for the same age ranges. They found that large losses dental restorations, however, only 4(6.66%) of the 60 injection drug addicts were edentulous totals in both maxillas. The remaining two (3.33%) were totally toothless only in a maxillary, 42 (70%) had partial loss that could be resolved with fixed prostheses, removable prostheses or the combination of the two and 12 individuals (20%) did not need any type of prosthesis. Of the 60, only 13 individuals already were in use of some type of prosthesis. In a simple analysis using the Fisher exact test, for  $p < 0.05$ , was observed a likely correlation between the OHIP-14 and the SRQ-20 showing that, people more depressive tend to realize a greater impact of their oral health on their quality of life. There was a statistically significant association between the Edentulism and the group of drugs, the use of illicit drugs seems to be related with dental losses.

**Conclusion:** The average DMFT, periodontal problems and dental wear remained without significant relationship with modifiers factors as use, type or frequency of drug use. In the meantime the edentulism was greater among users of illicit drugs. There was no correlation between the self-perception of oral health on quality of life or presence of disorders mental-emotional with the buccal health problems found. The actuation of the dental surgeon in addition to eliminate pain, the main complaint, operates in psychological dimensions, more scored in the lifting of the OHIP mean-14, contributing to rehabilitation of these individuals in society. The group studied showed small associations statistics. More detailed studies are required with a larger sample group to perform the analyzes of the association.

Keywords: People homeless; Drug addiction; Oral health condition; Quality of life.

**PRIMARY ENDODONTIC INFECTION: QUANTIFICATION OF ENDOTOXINS AND THEIR RELATION WITH SIGNS/SYMPTOMS AND VOLUMETRY OF THE LESION AND ROOT CANAL**

*Infecção endodôntica primária: quantificação de endotoxinas e sua relação com sinais/sintomas e volumetria da lesão e do canal radicular*

Cardoso FGR, Souza NF, Manhães-Júnior LRC, Martinho FC, Rocco MA, Valera MC  
e-mail: fgoulartcardoso@hotmail.com

The objectives of the present study were: a) to quantify the amount of endotoxins (End) and microbial load (ML) in teeth with primary endodontic infection (PEI) before and after bio-mechanical preparation (BMP) and use of intra-canal medications (ICMs); b) to relate the levels of End, culturable microorganisms (CM) and clinical signs and symptoms to the volumetry of the periapical lesion (VPL) by using cone-beam computed tomography (CBCT); and c) to relate the levels of End and CM to the volumetry of root canals (VRC). Thirty teeth with PEI were submitted to CBCT. After opening them, an initial collection (C1) was performed, and a second collection (C2) after BMP by using 2.5% NaOCl. The samples were divided into 3 groups depending on the ICM used: 1) Ca(OH)<sub>2</sub> + saline solution; 2) Ca(OH)<sub>2</sub> + 20% ginger glycolic extract; and 3) Ca(OH)<sub>2</sub> + 2% chlorhexidine gel. The 3<sup>rd</sup> collection (C3) was performed after 14 days of ICM. The antimicrobial action *per* culture was evaluated in all collections, including quantification of End. VPL and VRC were performed by using CBCT. The results showed the following: in C1, the levels of MC and End were, respectively, 0 – 8.16 x 10<sup>6</sup> UFC/mL and 1.75 – 149 EU/mL, with significant reduction in C2 and C3; there was positive correlation (+) between VPL and levels of End and presence of pain; there was strong correlation between anaerobic microorganisms and End as well as positive correlation between VRC and MC. It was concluded that: a) the effectiveness of ICMs on microorganisms is similar to that of BMP, with Ca(OH)<sub>2</sub> rendering greater reduction of End; b) high levels of End are correlated with greater VPL; and c) presence of MC is correlated with greater VRC.

Keywords: Endotoxins; Microorganisms; Cone-Beam Computed Tomography.

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Clinical / Epidemiologic study

**EVALUATION OF CLARITHROMYCIN AS AN ADJUNCT TO ULTRASONIC DEBRIDEMENT FOR THE TREATMENT OF AGGRESSIVE PERIODONTITIS: A PILOT STUDY**

***Avaliação da utilização da claritromicina como adjuvante ao debridamento periodontal no tratamento de periodontite agressiva generalizada: estudo piloto***

Andere NMRB, Dos Santos NCC, Kerbauy WD, De Marco AC, Melo-Filho AB, Jardini MAN, Santamaria MP  
e-mail: nairaandere@hotmail.com

The aim of this study was evaluating the clinical response and possible adverse effects in the use of clarithromycin associated to one-stage full-mouth ultrasonic debridement (FMUD) in the treatment of generalized aggressive periodontitis. Twenty patients presenting generalized aggressive periodontitis were selected and randomly distributed in 2 groups: test group FMDU associated with clarithromycin (500 mg – 12/12 h) for 3 days; control group FMDU associated with placebo. Clinical

measures, such as Probing Depth (PD), Clinical Attachment Level (CAL), Gingival Recession (GR), Gingival Index (GI), Plaque Index (PI) and Bleeding on Probing (BP), were collected and compared at baseline (BL) and 90 days. After 90 days, both therapies presented statistically significant reduction in number of pockets with  $PD \geq 5$  mm per patient, which changed from  $34 \pm 22.8$  to  $11.7 \pm 10.3$  in test group and from  $39.4 \pm 13.4$  to  $14.2 \pm 8.81$  in control group, with no statistically significant difference between groups ( $p > 0,05$ ). There was statistically significant reduction in the number of sites with  $PD \geq 5$  mm from 63.95% in test group and 65.5% in control group. However, the difference between groups was not significant. Control group presented a reduction in Gingival Index from  $68 \pm 30$  at baseline to  $21 \pm 4$  at 90 days and from  $57 \pm 18$  to  $19 \pm 4$  in test group, with no statistically significant difference between groups. It can be concluded that both treatments presented similar results. A longer follow-up and a greater sample are necessary.

Keywords: Aggressive periodontitis; Clarithromycin; Ultrasonic debridement.

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Clinical / Epidemiologic study

**PREVALENCE OF THE REASONS RELATED TO THE REPLACEMENT OF RESTORATION IN DENTISTRY**  
***Prevalência dos motivos relacionados à substituição de restaurações em dentística***

Barbezani B, Gonçalves LL, Silva TM, Gonçalves SEP  
e-mail: bih\_19\_92@hotmail.com

Objective: Analyzing the reason for the high frequency of replacements of restorations in Dentistry clinic of Institute of Science and Technology of Sao Jose dos Campos (ICT).

Method: We selected 902 patients screened, in need of some care in Dentistry discipline. Students who underwent the procedure filled out a form with the characteristics of the patient. After that, a data survey was conducted with percentage of the following topics: what should be done, size of the restoration and cavities (before and after the procedures), how many surfaces involved, which restorative material the tooth had (if already restored) and, finally, if restoration replacement was necessary and the reason of its replacement should be registered.

Results: 902 sheets were collected, being only used 814 who filled out; 88 were dispensed by inadequate completion. The most selected topic was to "replacement", demonstrating the large amount of replaced restorations, being the percentage for this according to the gender: 53.33% for men and 53.8% for women. Conclusion: There is a high prevalence of replaced restorations in clinical specialty of Dentistry of Institute of Science and Technology of São José dos Campos. The main reasons are reproduction of incorrect color, marginal discoloration, secondary caries, inappropriate contour restoration, lag integrity marginal and restorations fracture.

Keywords: Restoration of trade; Replacement restoration.

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Clinical / Epidemiologic study

**EVALUATION OF KNOWLEDGE OF DENTAL STUDENTS AND DENTISTS REGARDING TOBACCO CONSUMPTION AND THEIR BEHAVIOR TOWARD SMOKERS**

***Avaliação do conhecimento sobre o consumo de tabaco e comportamento dos estudantes de odontologia e cirurgiões-dentistas perante pacientes tabagistas***

Ferreira FHA, Rodrigues LMB, Teixeira SC, Carta CFL, Tengan C, Almeida JD, Nicodemo D  
e-mail: fhaferreira@hotmail.com

Smoking is strongly linked with many diseases and a detrimental factor to many dental treatments. This work aims to evaluate knowledge about tobacco use and behavior of dental students and dentists towards smokers. To get those informations was distributed a questionnaire to participants completed graduation or in progress in dentistry. The descriptive analysis of the questionnaire evaluated participants' knowledge in relation to tobacco, the questionnaire had 11 questions about tobacco, most part of the participants hit between 7-9 questions. The behavior of professionals towards patients who declare smoking during anamnesis showed that 23,92% of the professionals are uncomfortable to advise patients to quit the habit. When asked about the success of treatment with smokers, 82,16% of respondents claim that realize more success in treatments performed with nonsmokers. Regarding the question of the perception of lack of knowledge about smoking, 73,84% of the respondents indicated "yes". A very significant percentage, 98,8%, says they misses information about the risks of smoking and ways to address the smoking patient. Based on the results obtained it is concluded that despite the knowledge about smoking and the need for motivation of the smoker patient, dentists and dental students do not feel safe to perform approach. This study highlights the need of incorporating in their curricula clinical intervention training for resolving difficulties related to the approach of smokers.

Keywords: smoking; Oral Health; Smoking Cessation.

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Clinical / Epidemiologic study

**COMPARATIVE STUDY USING ELECTROMYOGRAPHY ACTIVITY OF MASSETER AND TEMPORAL MUSCLES AFTER USE OF MUSCLE RELAXANT AND STEROIDAL ANTI- INFLAMMATORY IN SINGLE DOSE DURING INCLUDED THIRD MOLARS EXTRACTION**

***Estudo comparativo por eletromiografia da atividade dos músculos masséter e temporal após uso de miorrelaxante e anti-inflamatório esteroidal em dose única na extração de terceiros***



### ***molares inclusos***

Silva Junior MA, Nascimento RD, Raldi FV, Moraes MB  
e-mail: marcosjunior15@gmail.com

The objective of this study was to compare the influence of the use of the following medications: muscle relaxant Miosan<sup>®</sup> (10 mg) and steroidal anti-inflammatory dexamethasone (8 mg), both administered in a single dose (oral) in the electrical activity of the masseter and anterior temporalis muscle in patients submitted to the extraction of third molar and thus contribute to the discussion of the diagnosis of stomatognathic system dysfunctions forward to long lasting surgical procedures. Thirty patients who needed surgical treatment for impacted and included third molar tooth avulsion coming from the Department of Oral and Maxillofacial Surgery of the Institute of Science and Technology of São José dos Campos (ICT - SJC / UNESP) were selected, treated and evaluated. Randomly, participants were randomized to one of the following groups: group 1 (control): received no medication (10); Group 2 patients received Miosan<sup>®</sup>, 1 hour prior to surgery (10); Group 3 patients received dexamethasone 1 hour prior to surgery (10). In order to obtain the muscular electrical activity, it was used EMG800C electromyography (EMG System of Brazil Ltda) in the conditions of mandibular rest and maximal voluntary contraction (CMV) and concurrently assessed the range of mouth opening (electronic goniometer coupled to the system). Disposable electrode Ag/AgCl was used (Meditrace<sup>®</sup> Kendall-LTP, model Chicopee MA01) whose protocol of acquiring the electromyography data followed the guidelines of SENIAM Group (EMG Surface is non-invasive assessment of muscles) during the periods: pre-surgical, post-anesthesia, immediate postoperative and 7, 15 and 30 days postoperatively. Electromyography data were submitted to ANOVA and Tukey's test at 5% significance level for comparison between the operated sides versus the non-operated side. During CMV, the muscles evaluated showed no significant difference in electromyography recordings. Now, regarding the operated side, it was observed electrical activity of downward trend in both experimental groups studied in the masseter muscle while the anterior temporal muscle did not differ significantly when compared to the control group. Regarding the range of mouth opening, the chemicals agents promoted interincisal distance in all periods ( $p < 0.05$ ) compared with the control group. The VAS analysis has shown no difference between the groups. Concluding, the study suggest that Miosan may be useful as an adjuvant in preventing currents from motor dysfunction surgical procedure for extraction of impacted and and included third molars.

Keywords: Muscle relaxants; Steroidal anti-inflammatory; Third molars; Electromyography.

***níveis de citocinas inflamatórias de indivíduos com síndrome de down com doença periodontal antes e depois do tratamento periodontal***

Rodrigues FSC, Rodrigues TO, Câmara NOS, Giro EMA, Gomes MF, Tanaka MH  
e-mail: fernanda.scr@hotmail.com

Individuals with Down syndrome (DS) have an increased prevalence of periodontal disease (PD) compared with otherwise chromosomally normal (euploid). The aim of this study was determining if the levels of IFN $\gamma$  and IL-10 in gingival crevicular fluid (GCF) differed between subjects with Down syndrome (DS) and healthy subjects, both with periodontal disease (PD), in response to non-surgical periodontal therapy. Thirty individuals were divided into 2 groups (G1: 20 with DS and G2: 10 control). All participants of the study received non-surgical periodontal treatment, oral hygiene orientation and follow-up for 45 days. Samples of gingival fluid were collected from disease and healthy sites, before and after treatment. The quantification of IFN- $\gamma$  protein, and IL-10 was performed by Luminex technology. The results confirmed that periodontal therapy effectively reduces clinical parameters in the DS group and in the control group, independently on the genetic background. In the diseased sites, increased levels of IFN- $\gamma$  and IL-10 were detected in individuals with DS compared with the control group before and after the periodontal therapy. In healthy sites, IFN- $\gamma$  was more abundant in DS before the periodontal therapy. So, increased inflammatory mediator levels in CGF in DS individuals, suggest that these patients might have a propensity to overproduce these cytokines, and may, in part, explain the higher prevalence of Down syndrome to periodontal diseases.

Keywords: Down syndrome; Periodontitis; Immune system.

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Clinical / Epidemiologic study

**COMPARISON BETWEEN TWO SURGICAL FLAP DESIGNS ASSOCIATED WITH CONNECTIVE TISSUE GRAFT FOR THE TREATMENT OF GINGIVAL RECESSION. PILOT STUDY**

***Comparação entre dois desenhos de retalho cirúrgico associados ao enxerto de tecido conjuntivo para o tratamento de recessões gengivais. Estudo piloto***

Neves FLS, Silveira CA, Dias SBF, Jardini MAN, Santamaria MP  
E-mail: felipe.neves@fosjc.unesp.br

The objective of this study was comparing from clinical and patient-centered parameters, two different flap designs for connective tissue graft in the treatment of gingival recession. We selected 20 patients with gingival recession which were randomized into one of the following groups: Group 1 (test): periodontal surgery for root coverage through tunnel flap and connective tissue graft; Group 2 (control): Periodontal surgery for root coverage by trapezoidal flap and connective tissue

graft. Clinical and patient-centered were assessed at baseline, 3 and 6 months after the procedure. After 6 months, the mean values for gingival recession were  $0.99 \pm 0.71$  mm in the test group and  $0.42 \pm 0.76$  mm in the control group, with no significant difference between them ( $p > 0.05$ ). There was no difference ( $p > 0.05$ ) in the percentage of root coverage that was  $81.66 \pm 31.75\%$  for the test group and  $82.25 \pm 28.41\%$  for the control group. The control group was more effective in reducing dentin hypersensitivity when compared with the test group ( $p = 0.02$ ). In the other parameters, there were no significant differences. Within the limitations of this study, it can be concluded that both flap designs were effective in promoting root coverage, being the trapezoidal flap the most effective in reducing dentin hypersensitivity.

Keywords: Gingival recession; Plastic surgery; Aesthetics

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Clinical / Epidemiologic study

**AESTHETIC ASSESSMENT OF GINGIVAL RECESSION TREATED WITH CONNECTIVE TISSUE GRAFT ASSOCIATED WITH LOW-LEVEL LASER THERAPY ON SMOKERS**

*Análise do resultado estético do tratamento de recessão gengival com enxerto de tecido conjuntivo associado à laserterapia em indivíduos fumantes*

Araujo CF, Fonseca MVA, Dias SBF, de Marco AC, Jardini MAN, Santamaria MP  
e-mail: cassia.araujo@gmail.com

The presence of the gingival recession (GR) may lead to the development of other complications, such as tooth sensitivity, radicular decay, non-carious cervical lesions and aesthetic complaint. Coronally positioned connective tissue graft technique (CTG) is effective on the treatment of GR. Studies report that smokers are subject to worse prognosis on GR treatment. Therefore, the aim of this study was to evaluate the influence of low-level laser therapy (LLLT) associated with connective tissue graft technique to obtain root coverage on smokers, from an aesthetic point of view, and compare to non-smokers. To this end, 12 smokers and 20 non-smokers with GR were allocated into test group (CTG + LLLT on smokers) and control group (CTG + LLLT on non-smokers). The aesthetic result was assessed by a before–after panel (baseline and 6 months post operative) using the root coverage esthetic score (RES) and a qualitative cosmetic evaluation (QCE), with no statistically significant difference between groups (RES  $p = 0.242$ ; QCE  $p = 0.515$ ). The patient also evaluated the final aesthetic result through a VAS scale, showing statistically significant improvement in both groups after 6 months ( $p < 0.05$ ). RES results were correlated with patient-related factors and it was observed in control group that age was statistically significant associated with moderate and negative coefficient of correlation ( $p = 0.03$ ;  $R = -0.47$ ). Based on the results, it can be concluded that LLLT may compensate the negative smoking effect on the aesthetic result of gingival recession treatment.

Keywords: LLLT; Gingival recession; Plastic surgery.

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Clinical / Epidemiologic study

**COMPARISON OF LOCAL THERAPIES FOR THE TREATMENT OF CHRONIC PERIODONTITIS IN TYPE 2 DIABETIC PATIENTS: PILOT STUDY**

***Efeito de terapias locais para o tratamento de periodontite crônica em pacientes diabéticos tipo 2: estudo piloto***

Santos NCC, Andere NMRB, Araujo CF, Marco AC, Melo-Filho AB, dos Santos LM, Jardini MAN, Santamaria MP

e-mail: nidia.castro@ymail.com

Background: The aim of this study was to compare the local effect of two different approaches for the treatment of moderate to severe generalized chronic periodontitis in type 2 diabetic patients. Methods: Twelve type 2 diabetic patients with moderate to severe generalized chronic periodontitis were selected. Two periodontal pockets with Probing Depth and Attachment Loss  $\geq$  5mm received ultrasonic debridement only (Control Group) or ultrasonic debridement with adjunct antimicrobial Photodynamic Therapy (aPDT – Test Group). Clinical measures, such as Probing Depth (PD), Clinical Attachment Level (CAL), Gingival Recession (GR), Bleeding on Probing (BP), Gingival Bleeding Index (GBI), and Plaque Index (PI), were collected and compared at baseline, 90, and 180 days. Results: After 180 follow-up days, clinical measures showed that both therapies were efficient for the treatment of chronic periodontitis in type 2 diabetic patients. There was statistically significant reduction in PD from  $6.08 \pm 0.90\text{mm}$  to  $3.64 \pm 0.92\text{mm}$  in Control Group and from  $6.50 \pm 1.51\text{mm}$  to  $3.91 \pm 2.2\text{mm}$  in Test Group. However, intergroup analysis did not reveal any statistically significant difference ( $p > 0.05$ ). Control Group presented mean CAL gain of  $1.95 \pm 0.80\text{mm}$  and Test Group of  $1.92 \pm 0.92\text{mm}$ , with no intergroup difference. Conclusion: It can be concluded that adjunct aPDT to ultrasonic debridement did not seem to have additional benefits for PD reduction and CAL gain in the treatment of chronic periodontitis in type 2 diabetic patients.

Keywords: Periodontitis; Diabetes; Photodynamic therapy; Debridement.

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Clinical / Epidemiologic study

**INFLUENCE OF AREAS OF RECESSION, PAPILLAE AND PERIODONTAL BIOTYPE IN THE OUTCOME OF ROOT COVERAGE WITH OR WITHOUT LLLT APPLICATION**

***Influência das áreas da recessão, papilas e biótipo periodontal no resultado do recobrimento radicular com ou sem aplicação III***

Ferreira CL, Calamari RC, Ferreira CL, Dias SBF, Kerbauy WD, De Marco AC, Jardini MAN, Santamaria MP

e-mail: camila\_clf@yahoo.com.br

Gingival recession (GR) is defined as the location of marginal tissue apical to the cemento-enamel junction with consequently exposed roots. Its adverse effects are: aesthetics concern, hypersensitivity, tooth wear and higher risk of root caries. The treatment of GR is a common requirement and coronally advanced flap (CAF) associated with connective tissue graft (CTG) is considered gold standard due to provide high rate of root coverage and an increase in the thickness of keratinized tissue. The aim of this study was to evaluate the influence areas of gingival recession, adjacent papillae and periodontal biotype in the outcome of root coverage by CAF+CTG, associated with or without LLLT. Forty patients were divided in two groups: Control group (n=20) treated with CAF+CTG and Test group (n=20) treated with CAF+CTG and was applied LLLT too. Were evaluated Plaque index (PI), Bleeding index (BI), height and area of GR, area of adjacent papillae and periodontal biotype were evaluated. Then, the data were measured in the preoperative and six months post-surgery using multiple linear regression analyses. The mean root coverage was  $91,84 \pm 22,5\%$  to the Test group and  $89,38 \pm 22,38\%$  to the Control group ( $p > 0,05$ ). The variation relative gingival recession ( $\Delta RGR$ ) was  $2,85 \pm 0,95$  mm and  $2,88 \pm 0,74$  mm, respectively. Within the limits of the present study, it can be concluded that the area of adjacent papillae to gingival recession and periodontal biotype, when measured by height/width from crown, may be a predictive factor for root coverage obtained by the technique of CAF+CTG.

Keywords: gingival recession; retail surgical; Low-level light therapy.

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Clinical / Epidemiologic study

**OBTAINING THE MAXILLO-MANDIBULAR RELATION IN PARTIAL FIXED PROSTHODONTICS WITH ARTICULATED PARTIAL MODELS**

***Obtenção da relação maxilo-mandibular em prótese parcial fixa com modelos parciais articulados e troquelados***

Araújo RF, Beber Kamozaki MB, Pagani C, Meirelles Elia LC, Galera E, Martins Gomes AP  
rose.freitasaraujo@gmail.com

The transfer of labor relationship models in Partial Fixed Prosthesis for articulators is an important step for oral rehabilitation. Maxillo-mandibular relationship reproduced in the models must present fidelity compared to the one found in the mouth, in order to make possible the execution

of a safe laboratory work, with fewer intraoral adjustments. It has been developed a silicon base system (HTV) fixed on the rods of a hinge articulation, facilitating assembly of the models with the possibility of also the obtention of dies and substitution patterns on the same articulator. Eight clinical cases that required single crown, mouldings were made in conventional stock trays, complete molding and molding tray in the two dental arches. With the aid of an especimeter and wax 7, measurements of inter-occlusal space on three conditions evaluated (total models, partial models with Tray-in and inter-occlusal space in the mouths of patients) were made. Data were statistically analyzed. The inter-occlusal surface of the model distances experienced an average increase of 40%, and the partial models (tray-in) by 12% compared with the inter-occlusal distance obtained in the mouths of patients. It can be concluded that with this casting technique, associated with the direct attachment to an articulator, it was possible to decrease the gap of the inter-occlusal height of the tooth prepared, regarding its antagonist, reducing the clinical time used to occlusal adjustments during the test on partial fixed prosthodontics.

Keywords: Partial fixed prosthodontics; Denture, Partial, Fixed; Articulated partial models..

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University extension

**LIVING WITHOUT CARIES PROGRAM - REPORTING 15 YEARS OF EXPERIENCE**  
***Programa viver sem cárie - relato de 15 anos de experiência***

Clemente AF, França MO, Lemos LVFM, Ramos CJ, Myaki SI  
e-mail: anna.clemente@fosjc.unesp.br

The aim of this study was presenting results of 15 years of the extension project of dentistry for babies from ICT/SJC-UNESP, living without caries program. The methodological difference is the introduction of child's oral hygiene orientation by lectures during women's pregnancy, from 24<sup>th</sup> week of pregnancy to 32<sup>nd</sup>. The appointments were carried out by graduation students, dentists and supervised teachers. The treatment protocol was characterized by 3 stages: educational lecture for pregnant women; the baby's first appointment occurred during the 4<sup>th</sup> and the 6<sup>th</sup> month of life, near first teeth eruption; with returns each 2-4 months until they reach 48 months of age. The results (2011-2015) found that 260 children joined the program and 46,15% of them were supervised until their 12<sup>nd</sup> month of age; 16,15% until the 24<sup>th</sup> month; 10,77% until the 36<sup>th</sup> month and 25% until the 48<sup>th</sup> month. From 93 children, which were supervised for 36 and 48 months, 80,65% had their primary dentition development completed without carious lesions and 19,35% developed carious lesions. The failure factors were: poor oral hygiene habits at home, uncontrolled eating habits and not attendance to the program. It was concluded that the program consolidation or the absence of caries development is linked to the rational use of sugars, oral hygiene habits and the continuous attendance to the program.

Keywords: Pediatric Dentistry; Oral prevention; Early attention.

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University extension

**USE OF ORAL REHABILITATION AS A MEANS OF AWARENESS ON GENERAL HEALTH. CASE REPORT: REHABILITATION FOR PROSTHETIC EYE**

***O uso da reabilitação ocular como meio de conscientização em saúde geral. Relato de caso: reabilitação por prótese ocular***

Ramanzini NP, Beraldo JM, Carvalho PCK  
e-mail: naiara\_ramanzini@hotmail.com

Eye loss results on facial asymmetry, compromising its aesthetics and affecting social life of patients. Ocular prostheses are important to re-establish aesthetics; protect the anophthalmic cavity; recover function such as the redirection of lachrymatory liquid; and reintegrate the patient to society. The multidisciplinary approach provide the best possible rehabilitation in order to minimize the impact of this situation. The aim of this study was to describe a case report, demonstrating clinical and laboratorial procedures for confection of ocular prostheses and highlighting their advantages. A female patient who lost her eye was rehabilitated with an individualized artificial eye in acrylic resin restoring patient's aesthetic and facial contour. The patient was satisfied with the treatment.

Keywords: Artificial eye; Acrylic resins; Quality of life.

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University Extension

**EVALUATION OF CYTOTOXICITY BY MTT AND CHARACTERIZATION OF ANODIZED TITANIUM SURFACES WITH PULSED CURRENT AND CONTINUOUS CURRENT**

***Avaliação da citotoxicidade por mtt e caracterização de superfícies de titânio anodizado com corrente pulsada e com corrente contínua***

Beraldo JM, Villaça-Carvalho MFL, Regone NN, Acciari HA, Vasconcellos LMR  
e-mail: ju\_mariano1@hotmail.com

Among the existing surface modification techniques, anodic oxidation can be readily used to deposit an oxide film on the titanium surface using an electrochemical process. The type of electrolyte used and the applied electrical conditions can affect the chemical makeup of the structure, morphology and the crystal formed oxide. The aim of this study was evaluating the morphology and crystallinity of the anodic films formed from two experimental anodizing conditions. Sixty implants were divided into 3 groups: I) control group (machined surface without anodizing); II) nanostructured surface by anodizing with direct current at 30 V; III) nanostructured surface by anodizing with application of current pulses. Then, osteogenic 30 cells of the calvaria of Newborn mice were isolated by sequential enzymatic digestion and plated on implants. Analyses of surfaces were performed by Raman spectroscopy and atomic force microscopy, regarding nano roughness on surfaces of the implants. In the spectra, characteristic bands of anatase regions were identified. In order to analyze cytotoxicity, it was made a quantitative assessment of living cells. It was concluded that the anodizing positively affects the chemical and structural composition of the titanium oxide film. However, only switch the current does not cause significant differences between the two anodized surfaces. Keywords: titanium osseointegration, anatase, nano texturing.

Keyword: Titanium osseointegration; Nano texturing.

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Basic research - Undergraduate students

### **MENTAL NERVE NEURALGIA: A LITERATURE REVIEW**

#### ***Neuralgia do nervo mentoniano: uma revisão bibliográfica***

Ferraz LFF, Lima VCS, Pereira NL, Rossato A, Leite HF  
e-mail: laisinha\_fff@hotmail.com

The mandibular nerve, the second division of the trigeminal nerve, is involved in 30% of cases of essential trigeminal neuralgia. One of its branches, the inferior alveolar nerve, has the mental nerve as terminal branch. This nerve is responsible for exteroceptive innervation of mentum skin, mucosa and lower lip skin and facial gingiva of the anterior teeth. Functional or mechanical changes in the nerve can cause the mental neuralgia (MN). MN is characterized by intense, paroxysmal, chronic or intermittent pain throughout the length of the branches of the mental nerve. There are several possible causes of MN: mechanical irritation of the nerve fibers, narrowing and superficiality of the mental foramen, implant surgeries, tooth extractions poorly performed, incorrect endodontic treatments, local trauma, etc. The trigger zone of this neuralgia is usually on the nerve emergency of mental foramen. The correct differentiation between MN and inferior alveolar nerve neuralgia requires anatomical knowledge and accurate clinical observation. The treatment may be clinical or surgical with ablation of the mental nerve. Sometimes the MN may cause neuralgia of the inferior alveolar nerve or even the mandibular nerve, generating serious repercussions for the patients. A



literature review was conducted in order to know in detail the diagnosis, prevalence and treatments used in MN. The understanding of this type of neuralgia is important and essential for professionals working in this field.

Keywords: Mental foramen; Trigeminal neuralgia; Mental nerve.

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Basic research - Undergraduate students

### **SUPRAORBITAL NERVE NEURALGIA: A LITERATURE REVIEW**

#### ***Neuralgia do nervo supraorbital: Revisão bibliográfica***

Pereira NL, Rossato A, Ferreira Ferraz LF, Da Silva Lima VC, Faig-Leite H  
e-mail: natashalipere@gmail.com

The supraorbital nerve, a branch of the ophthalmic (V1 - trigeminal nerve), leaves the orbit through the supraorbital notch/foramen. This nerve is responsible to innervate the conjunctiva of the eye, lacrimal sac (a part), lacrimal duct, skin in the region of eyelid, eyebrow and forehead. Some of these branches can innervate the frontal sinus. The supraorbital neuralgia (SON) is an uncommon disorder classified as a trigeminal neuralgia, which must be treated like that. SON is characterized for paroxysmal or constant pain, chronically or intermittently, for all the area of supraorbital innervation and localized pain under or above the eyebrow, in the most of times extended for all the region of the parieto-temporal scalp. It is not uncommon the patient relate pain in the orbit and in the frontal sinus. The trigger point of the pain is usually localized in the region of the eyebrow, where the nerve leaves the orbit. Possible causes of the supraorbital neuralgia are: neuralgia of the ophthalmic nerve, narrow caused by the supraorbital foramen, mechanic compression in the region that the nerve leaves the orbit, trauma in this area, intracranial tumors, tumors localized in the ceiling of the orbit, degenerative diseases and others. The treatment can be clinical, using some drugs, or surgical, in the severe cases, when the ablation of the nerve is necessary. In this literature review will be minutely aborted the diagnostic, prevalence and treatments of the SON. This kind of neuralgia must be recognized for the dentists, once they act diagnosing potential neuralgic pain in the face of their patients.

Keywords: Supraorbital nerve; Supraorbital notch; Trigeminal neuralgia.

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Basic research - Undergraduate students

**STUDY OF PROBIOTIC ACTION OF DIFFERENT LACTOBACILLUS SPECIES ON CANDIDA ALBICANS**  
***Estudo da ação probiótica de diferentes espécies de Lactobacillus sobre Candida albicans***

Alvarenga JA, Rossoni RD, Barros PP, Santos JD, Jorge AOC, Junqueira JC  
E-mail: janaina\_2406@hotmail.com

The objective of this study was isolate and identify strains of Lactobacillus spp. from oral cavity of individuals caries free and evaluate their probiotic action in Candida albicans by studies in vitro. Saliva samples were collected and identified by the API50CHL system and confirmed by PCR. Firstly, the effects of all strains identified as Lactobacillus were tested on biofilm and the ability of filamentation of C. albicans. Mixed biofilms were formed on the bottom of 96-well plates for 48 hours. Then, the amount of biofilm were analyzed by counting the colony forming units (CFU/mL). Filamentation assays were performed on 24well plates and analyzed by optical microscopy. Among the 41 volunteers participating of the work, 66% (27) had positive growth of Lactobacillus in the oral cavity. Thirty clinical isolates of Lactobacillus have been identified, including the following species: Lactobacillus crispatus, Lactobacillus paracasei, Lactobacillus rhamnosus and Lactobacillus fermentum. In the biofilm formation assay of C. albicans were studied the action of Lactobacillus cells (direct effect) or its culture filtrate (indirect effect) and there was a reduction in the number of CFU/mL of C. albicans different for each species. L. paracasei was the best specie against C. albicans, with reductions of 78% of C. albicans for the group with Lactobacillus cells and 73% for supernatant group. In general, the filamentation assay of C. albicans associated with Lactobacillus cells (direct effect) or its culture filtrate (indirect effect) was observed that 82% (23) isolates obtained were able to reduce the amount of hyphae of C. albicans variably according to the species and clinical sample tested. Within the parameters of this study, we conclude that the majority of the identified clinical isolates of Lactobacillus from the oral cavity of caries-free individuals have some inhibitory activity against C. albicans morphogenesis that can be changing the hyphae or the inhibition of biofilm formation. The CFU reduction of C. albicans can change according to the species and the clinical isolate. **Keys words:** probiotic, Lactobacillus, Candida albicans

**Keywords:** Lactobacillus; C. albicans; Probiótico.

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Basic research - Undergraduate students

**COMPUTED MICROTOMOGRAPHY *IN VIVO* ANALYSIS IN POROUS SAMPLES MADE WITH DIFFERENT TITANIUM ALLOYS**  
***Análise in vivo por microtomografia computadorizada em amostras porosas confeccionadas com diferentes ligas de titânio***

Pereira VF, Bueno DAG, Villaça-Carvalho MFL, Carvalho YR, Vasconcellos LMR  
e-mail: vanessafpereira@hotmail.com

FAPESP 2012/20118-3

This study aims to evaluate and compare bone response by computed microtomography obtained in porous surface implants, made of Ti-6Al-4V and Ti-35Nb7Zr5Ta alloys. Cylindrical implants were made of dense core integrated to the porous surface, by powder metallurgy technique. The implants were divided into: Group 1 control: cpTi; Group 2: Ti-6Al-4V alloy; Group 3: Ti-13Nb-13Zr alloy; Group 4: Ti-35Nb alloy; Group 5: Ti-35Nb7Zr5Ta alloy. Ten albino rabbits were used for this study, each rabbit received an implant of each group; euthanasia was after 2 and 4 weeks of surgery. The fragments were analyzed by computed microtomography to evaluate the quality and quantity of new bone formation at the bone-implant interface, using the bone volume parameters (BV), number of trabeculae (TN) and ratio of bone volume and trabecular volume (BV/TV). Statistical analysis was performed by ANOVA and Tukey tests (5%). There was a gradual increase in most values over the periods studied. The experimental Ti-35Nb7Zr5Ta (G5) presented the highest rates in the analysis, with statistically significant difference ( $p < 0.05$ ). Sample made with the experimental alloy De-35Nb7Zr5Ta, has great potential for use in biomedical implants.

Keywords: Titanium; Osseointegration; Pores; Microtomography.

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Basic research - Undergraduate students

#### **INFLUENCE OF PARASYMPATHETIC NEUROMODULATION ON BONE TISSUE AND SERUM LEVELS OF RANKL AND OPG IN MICE**

***Influência da neuromodulação parassimpática sobre tecido ósseo e níveis séricos de rankl e opg em camundongos***

Arriel MF, Santana JB, Oliveira FE, Oliveira LD, Anbinder AL  
e-mail: mayfortunato@live.com

Bone remodeling is a process that involves bone resorption and formation and it is regulated by two branches of the Autonomic Nervous System: sympathetic and parasympathetic. The adrenergic activity promotes bone loss, while cholinergic activity favors bone mass accrual. This work aimed to evaluate the influence of two agonists of the parasympathetic nervous system on the femur mechanical properties and serum levels of RANKL and OPG in mice. Thirty mice were divided into 3 groups: Group G - treated with 3 mg/kg/day of Galantamine; Group D - treated with 2 mg/kg/day of Donepezil; Group C - received the drug dissolution vehicle. The treatment was performed by gavage for 6 weeks. During the euthanasia, blood samples were removed for analysis of RANKL and OPG serum concentrations (ELISA). The left femurs were subjected to three-point bending test to determine mechanical extrinsic (strength, deformation, stiffness and energy absorption) and intrinsic (ultimate bending stress) properties. After ANOVA ( $\alpha = 5\%$ ) it was not found any statistical difference between the groups regarding the levels of RANKL and OPG or mechanical properties,

demonstrating that, according to the methods used, these drugs did not affect bone remodeling.

Keywords: Parasympathetic nervous system; Bone remodeling; ELISA.

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Basic research - Undergraduate students

### **INVESTIGATION OF THE ANTIFUNGAL EFFECT OF ESSENTIAL OIL *HYPTIS SPICIGERA* ON *CANDIDA ALBICANS***

#### ***Investigação do efeito antifúngico do óleo essencial de Hyptis spicigera sobre Candida albicans***

Silva CA, Borges AC, Gontijo AVL, Teodoro GR, Salvador MJ, Koga-Ito CY, Tanaka MH  
e-mail: carolineas@yahoo.com.br

In the face of growing resistance to conventional antifungal and recurrences of oral candidiasis, it has become necessary to search for more effective means of treatment. Studies shows that medicinal plants have substances with good potential for therapeutic purposes. Among them we found essential oils isolated from the genus *Hyptis*. The aim of this study was determining the antifungal effect of *Hyptis spicigera* essential oil on *Candida albicans*. The essential oil was obtained commercially and for chemical characterization, it was used gas chromatography with mass spectrometric detection (GC-MS) to determine the percentage of the major constituents. Since it is an oil, it was tested with various solvents (Propylene glycol, Tween and DMSO) that did not interfere in the minimum inhibitory concentration (MIC), whereby DMSO 5% was selected. MIC for *Candida albicans* ATCC 18804 and SC 5413 were obtained by microdilution. The tested concentrations were between 10% and 0.019% v/v (oil/culture medium). Thereafter, subculturing was performed from all wells to determine the minimum fungicidal concentration (MFC). The tests were performed in triplicate in three independent experiments. Statistical analysis was performed in GraphPad Prism by ANOVA and Tukey test (5%). GC-MS pointed out as major components of the essential oil rated the monoterpenes  $\alpha$ -pinene and  $\beta$ -pinene. MIC value was 2.5% v/v for both ATCC and SC values for MFC were 5% v/v to ATCC and 10% v/v for SC. *H. spicigera* essential oil was able to inhibit the growth of *C. albicans* strains, demonstrating a promising future in the search for a new potential antifungal agent.

Keywords: *Candida albicans*; Microbial Sensitivity Tests; *Hyptis spicigera*.

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Basic research - Undergraduate students

**EVALUATION OF IN VITRO CELLULAR METABOLIC ACTIVITY ON DIFFERENT SAMPLES OF POROUS TITANIUM ALLOYS AIMING BIOMEDICAL APPLICATIONS**

***Avaliação da atividade metabólica celular in vitro sobre diferentes amostras porosas de ligas de titânio visando aplicações biomédicas***

Ramos LSB, Cairo CAA, Carvalho LM, Carvalho YR, Vasconcellos LMR  
e-mail: laais.siebra@hotmail.com

The aim of this study was evaluating the pattern of cell differentiation and metabolism of osteoblasts MG63 cell line, opposite the porous samples made from different alloys of titanium, Ti6Al4V and Ti35Nb. Samples made by powder metallurgy were used, which were divided into 3 groups: a) Group 1: control - alloy Ti-6Al-4V (titanium-aluminum-vanadium); b) Group 2: alloy Ti-35Nb (niobium) and group 3: alloy Ti-35NbZr. Cells obtained from the MG63 cell line were cultured for 3 days and on the 10 samples. In each sample, tests were conducted to determine cell viability (MTT), quantification of total protein and alkaline phosphatase activity (ALP). All bioassays were performed in 3 independent experiments. The GraphPadPrism software (GraphPad, San Diego, CA) was used to perform statistical analyzes. Data were analyzed using ANOVA one-factor with Tukey test (5%). The results showed that the values of alkaline phosphatase for 3 and 10 days had no statistical difference in group 1 and 2. We observed statistical difference when comparing the periods of 3 and 10 days ( $p < 0.05$ ) regarding total protein in each group. We concluded that the 3 types of samples of titanium alloy obtained satisfactory results both for the quantification of total protein, which is responsible for cell osteogenesis, such as the activity of alkaline phosphatase (ALP) enzyme essential for physiological bone formation.

Keywords: Titanium alloys; Alkaline phosphatase; Proteins.

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Basic research - Graduate students

**IN VITRO EFFECTS OF DIFFERENT IRRIGANTS AND ENDODONTIC PROTOCOLS IN THE REDUCTION OF LTA CYTOTOXICITY IN MACROPHAGES**

***Efeitos in vitro de diferentes agentes irrigantes e protocolos de tratamento endodôntico na redução da citotoxicidade de lta em macrófagos***

Oliveira FE, Xavier ACC, Marques BCF, Jorge AOC, Leão MVP, Carvalho CAT, Oliveira LD  
e-mail: felipe.eoliveira@ymail.com

Lipoteichoic acid (LTA) is an important virulence factor of Gram-positive bacteria. It was evaluated the action of sodium hypochlorite 1% (HS), chlorhexidine gel 2% (CG) and glycolic extract of propolis 12% (PRO) associated with the rotary instrumentation (IRT) and the action of treatment protocols [IRT, irrigating agents (AIR) and intracanal medication (MIC)] in the reduction of LTA cytotoxicity in

root canals, by analysis of IL-1 $\beta$ , IL-6, IP-10, TNF- $\alpha$ , MIP-1 $\alpha$  and G-CSF production by macrophages. A hundred and eight single-rooted teeth were standardized and 3 LTA inoculations, one every 24 hours were made. Canal preparation (rotary system BioRace) of the specimens were prepared and they were divided into groups, according to the AIR and MIC (calcium hydroxide + saline, calcium hydroxide + CG and CG). Three collections were performed, after: S1) biomechanical preparation, S2) EDTA and S3) MIC for 14 days. The supernatant collected was used to verify the production of cytokines. According to the results of S1 and S2, there was statistical difference between the groups, and HS showed the lowest production of cytokines. For S3, all protocols that used MIC showed low levels of cytokines. It was concluded that HS associated with IRT is the most efficient AIR in the reduction of LTA cytotoxicity.

Keywords: Lipoteichoic acid; Ácido lipoteicóico; Root canal irrigants; Root canal preparation.

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Basic research - Graduate students

**CYTOTOXICITY OF *CYNARA SCOLYMUS* (ARTICHOKE) *SCHINUS TEREBINTHIFOLIUS* (AROEIRA) AND *CAMELLIA SINENSIS* (GREEN TEA) GLYCOLIC EXTRACTS.**

***Citotoxicidade dos extratos glicólicos de cynara scolymus (alcachofra), schinus terebinthifolius (aroeira) e camellia sinensis (chá verde)***

Higa KC, Jorjão AL, Oliveira FE, Back Brito GN, Jorge AOC, Oliveira LD  
e-mail: higa\_ka@hotmail.com

Since the beginning of human existence, the human being seeks, in nature, food and medicine to supply their vital needs. There is a great diversity of plants in nature and few studies on their biological activities. This study aimed to assess the cytotoxic activity of *Cynara scolymus* (artichoke), *Myracrodruon urundeuva* Allem. (aroeira-do-sertão) and *Camellia sinensis* (L.) Kuntze (green tea) glycolic extracts in mouse macrophages (RAW 264.7) by the metabolic activity of MTT test. Macrophages were distributed in 96 wells and exposed to 11 serial dilutions of each extract (200 mg/mL, 100 mg/mL, 50 mg/mL, 25 mg/mL, 12.5 mg/mL, 6.25 mg/mL, 3.13 mg/mL, 1.56 mg/mL, 0.78 mg/mL, 0.39 mg/mL and 0.20 mg/mL), with n=8 for each dilution. After 5 min or 24 h of contact, cell viability was assessed by MTT assay. In the presence of these results with 5 min of exposure time with the extracts, in ascending order of cell viability reduction follows green tea, with increased cell viability, pepper tree and artichoke. In the MTT assay of the extracts by exposure time of 24 h, it was observed that artichoke extract showed greater toxicity, followed by green tea extract and pepper tree. Statistical analysis was performed by ANOVA and Tukey's test, with significance level of 5%. Among the extracts, artichoke was the most cytotoxic to the macrophages in both times (5 min and 24 h).

Keywords: Aroeira; Artichoke; Green tea; cytotoxicity; macrophages

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Basic research - Graduate students

**NOVEL EASY-INTRACANAL-ADAPTABLE 3D-TRIPLE ANTIBIOTIC PASTE MIMIC SCAFFOLD AS AN STRATEGY FOR REGENERATIVE ENDODONTICS**

***Novo scaffold 3d adaptável e incorporado com antibióticos como estratégia para endodontia regenerativa***

Albuquerque MTP, Azabi A, Kamocka MM, Munchow EA, Gregory RL, Valera MC, Bottino MC  
e-mail: terezapedrosa@hotmail.com

A novel three-dimensional triple antibiotic paste mimic scaffold (3D-TAPs) is proposed as a drug-delivery strategy for regenerative endodontics. Polydioxanone (PDS) polymer solution alone and loaded (35 wt.%) with metronidazole, ciprofloxacin and minocycline were electrospun into 3D fibrous scaffolds. The fibers were evaluated via scanning electron microscopy (SEM), mechanical testing, and Fourier-transform infrared spectroscopy (FTIR). *Actinomyces naeslundii* (ATCC 43146) were centrifuged to induce intra-tubular biofilm formation in a human root dentin slice model (1 mm thickness and 2.5 mm<sup>3</sup> canal orifice). The infected slices (n=16) were exposed to 3D-TAPs (~3.3 mg of each drug), TAP solution (50mg/mL of each drug), and pure PDS (drug-free). Biofilm elimination was quantitative and qualitative analyzed by confocal laser scanning microscopy (CLSM) and SEM, respectively. FTIR data demonstrated that the antibiotics were successfully incorporated into the submicron fibers. 3D-TAPs demonstrated significantly lower mechanical properties than PDS (p≤0.040). A dense penetration of *A. naeslundii* biofilm was observed by CLSM throughout the dentinal tubules. 3D-TAPs significantly reduced the percentage of viable bacteria compared to PDS (p<.05). TAP solution completely eliminated viable bacteria without differing from 3D-TAPs. SEM images showed similar results to CLSM. Collectively, the proposed easy-intracanal adaptable 3D-TAPs holds significant clinical potential as a disinfection strategy prior to regenerative endodontics.

Keywords: Biofilm; Regeneration; Pulp; Nanofibers; Scaffold.

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Basic research - Graduate students

**ANTIMICROBIAL ACTIVITY OF DIFFERENT CLINICAL STRAINS OF LACTOBACILLUS RHAMNOSUS ON STREPTOCOCCUS MITIS AND STREPTOCOCCUS SANGUINIS**

***Atividade antimicrobiana de isolados clínicos de Lactobacillus rhamnosus contra Streptococcus mitis e Streptococcus sanguinis***

Garcia MT, Velloso MS, Amêndola I, Strieder L, Santos JD, Rossoni RD, Jorge AOC, Junqueira JC  
e-mail: maa.terra@hotmail.com

Previous studies have shown that some probiotic strains of *Lactobacillus* spp. can be used to reduce the risk of dental caries. However, there are no studies showing probiotic effects of *Lactobacillus* strains against initial colonizers of dental surfaces such as *Streptococcus mitis* and *Streptococcus sanguinis*. Three clinical strains of *L. rhamnosus* (5.2, 13.1 and 19.3), isolated from the oral cavity of caries-free subjects, were evaluated for their antibacterial activity against *S. mitis* and *S. sanguinis* in planktonic cultures. Besides the direct effects of *Lactobacillus* cells, the effects of their culture filtrate were also evaluated in order to verify the effects of secreted metabolites and the formation of an acidic environment. We found that *S. mitis* was not inhibited by the clinical strains of *L. rhamnosus* studied. On the other hand, *S. sanguinis* was inhibited by *L. rhamnosus* strain 5.2, but only when they were placed in direct contact with the *L. rhamnosus* cells. Next, the effects of *L. rhamnosus* strain 5.2 on *S. mitis* and *S. sanguinis* were also tested in biofilms formed in the bottom of 96-well microtiter plates. We verified that *L. rhamnosus* had no inhibitory activity on the *Streptococcus* organized in biofilms. In conclusion, among the *L. rhamnosus* clinical strains tested in this study, only the strain 5.2 showed antibacterial activity on *S. sanguinis*. The biofilms formed by *S. mitis* and *S. sanguinis* were not altered by the presence of *L. rhamnosus*, suggesting that this strain did not present cariogenic effects.

Keywords: *Streptococcus mitis*; *Streptococcus sanguinis*; *Lactobacillus rhamnosus*; Probiotics; Biofilm; Dental caries.

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Basic research - Graduate students

#### **EVALUATION OF THE INFLUENCE OF CURING TIME ON BIOLOGICAL PROPERTIES OF SEVEN ENDODONTIC SEALERS**

***Avaliação da influência do tempo de endurecimento sobre as propriedades biológicas de sete cimentos endodônticos***

França MCM, Camargo CHR, Palo RM, Valera MC  
e-mail: monique-costa@hotmail.com

Objective: The aim of this study was evaluating the influence of curing time on biological properties (XTT, MNT) of seven sealers: Apexit Plus, Real Seal, Endo Rez, Roeko Seal, AH Plus, Endomethasone N, and bioceramic cement iRoot SP. Material and Methods: For the cytotoxicity analysis (XTT), fibroblasts of the human periodontal ligament were used (PDLF). For the number of micronuclei (MNT), this study evaluated cell cultures exposed to dilutions of the sealers, from causing excessive



cytotoxic effects on V79 cells. The tests were evaluated after 24 h, 72 h, 1 week, 1 month, 3 months, 6 months and one year after manipulation. Data were analyzed by Kruskal-Wallis and Dunn test ( $p = 0.05$ ). Results: IRoot SP, Roeko Seal, Apexit Plus, AH plus and Real Seal showed no cytotoxicity in PDLF cells. AH plus, Real Seal, IRoot SP and Endomethasone N showed no genotoxicity. Roeko Seal and Apexit Plus have shown to be genotoxic and EndoRez showed high genotoxicity. Conclusion: It is conclude that compared AH plus and Real Seal were the sealer with lower cytotoxicity and genotoxicity after one year of evaluation.

Keywords: Cytotoxicity; Genotoxicity; Endodontic sealer.

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Basic research - Graduate students

#### **POLYETHERETHERKETONE ADHESION (PEEK) TO HUMAN DENTIN: EFFECTS OF DIFFERENT SURFACE TREATMENTS**

***Adesão do poli-éter-éter-cetona (peek) á dentina humana: efeitos dos diferentes tratamentos de superfície***

Contreras LPC, Bottino MA, Costa Anami L, De Assunção E Souza RO, Marinho RMM, Villefort Rocha R  
e-mail: lpatycc@gmail.com

The polyetheretherketone (PEEK) is a high strength polymer that can be used for making individual copings and dental prosthesis structures. The aim of this study was to evaluate the bond strength to human dentin using different PEEK surface treatments. For this, were used the vestibular dentin of fifty third molars, which were defined two areas of 3 mm diameter which received 35% phosphoric acid and two layers of universal adhesive. 100 cylinders were made (3x3mm) of PEEK, divided into five groups according to the surface treatment: silicatization (Rocatec Pre 45  $\mu\text{m}$  + Rocatec Plus 110  $\mu\text{m}$ , 15 s, 2.8 bar), sandblasting with Al<sub>2</sub>O<sub>3</sub> particles 45  $\mu\text{m}$  (15 s 2.8 bar), etching with sulfuric acid at 98% by 5, 30, or 60 seconds. Samples were luted with resinous agent to dentin and stored in water for 24 h at 37 ° C. The shear strength test was performed on a universal testing machine (0.5 mm / min, 50 kgf load cell). The proportions of the different types of gaps between groups were assessed by Bonferroni method. The strength data (MPa) were analyzed by Kruskal-Wallis test. There were no statistical differences ( $p = 0.187$ ) between the shear strength data and the predominant failure mode was adhesive. It was concluded that chemical and physical treatments were able to promote initial adhesion between PEEK, resin cement and dentin.

Keywords: PEEK; Bond strength; Dentin.

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Basic research - Graduate students

**RELATION BETWEEN CLINICAL AND HISTOPATHOLOGICAL FEATURES ON A CHEMICALLY INDUCED MODEL OF SQUAMOUS CELL CARCINOMA**

***Relação de características clínicas e histopatológicas em modelo carcinoma espinocelular quimicamente induzido***

Pereira AC, Severo MLB, Dias Do Carmo E, Bakke O, Dias Da Silva MA, Blumer Rosa LE  
e-mail: andresa@cstr.ufcg.edu.br

Chemical carcinogenesis in animals' skin not only produces neoplasics lesions similar to humans, but also allows higher control of interferences and, consequently, better analysis of the lesion. The aim of this study was evaluating the relation between clinical and histopathological features of squamous cell carcinoma in hairless mice skin. Chemical skin carcinogenesis (0.5% DMBA) was performed in 40 mice, during 16 weeks. At 17th week, the animals were clinically evaluated regarding size, elevated borders and ulceration in lesions. The clinical lesions were biopsied to histopathological evaluation and vascular quantification. Regarding the size, bigger lesions were related to high invasion pattern, with small groups or isolated cells ( $p=0.0022$ ). Lesions with elevated borders related to deep invasion, reaching muscular layer ( $p=0.0026$ ). After quantification, it was verified higher vascular spaces number in ulcerated lesions ( $p=0.0083$ ). It was concluded that there is a relation between the presence of clinical ulceration and tissue vascularization, between elevated borders and tissue invasion stage and also between lesion size and the pattern of neoplastic invasion, on a chemically induced model of squamous cell carcinoma in hairless mice skin.

Keywords: Squamous cell carcinoma; Pathologic neovascularization; DMBA.

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Basic research - Graduate students

**ANTIFUNGAL EFFECT OF OF ROSEMARY (*ROSMARINUS OFFICINALIS L.*) EXTRACT CHECKED ON BIOFILM OF *CANDIDA ALBICANS***

***Efeito antifúngico do extrato de alecrim (*Rosmarinus officinalis L.*) Verificado sobre biofilme de *Candida albicans****

Amaral SS, Oliveira JR, Martins APR, Jesus D, Jorge AOC, Oliveira LD  
e-mail: jroliveira16@hotmail.com; suelensimoes@live.com

This study verified the antifungal effect of the extract of Rosemary on biofilm of *C. albicans*. For both, the strain ATCC 18804 was cultivated on Sabouraud-dextrose (SD) and then in Yeast Nitrogen broth Base (YNB), both for 24 hours at 37 °C. After, the culture was centrifuged (2000 rpm/10 min), and the pellet was suspended in saline (NaCl 0.9%). Then was adjusted its turbidity in spectrophotometer ( $\lambda = 530$  nm; DO =  $0.381 \pm 0.01$ ) for obtaining  $10^7$  UFC/mL (colony-forming units per milliliter). So, the solution was added in microtitre plate and after incubation (37° C/90 min at 75 rpm) the supernatant was replaced by YNB broth. After formation of the biofilm (48 h), it was exposed to the extract for 5 min, the control group received saline (n=10/group). The biofilm was unpinned with sonicator (30 s to 25% power) and the suspension was diluted serially and seeded in agar SD. After 48 h, the UFC were counted and the values statistically analyzed by T-Test ( $p \leq 0.05$ ). With extract application, biofilm was significantly reduced ( $p < 0.05$ ) 99.76% ( $\pm 0.22$ ) of the biofilm. Control group presented about of  $6,3 \times 10^7$  UFC/mL ( $\pm 1,11 \times 10^7$ ) and the group treated  $1,42 \times 10^5$  UFC/mL ( $\pm 1,02 \times 10^5$ ). With this, it can be concluded that the extract of Rosemary presented antifungal effect on biofilm of *C. albicans*.

Keywords: Rosemary; Biofilm; *C. albicans*.

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Basic research - Graduate students

#### **ANTIMICROBIAL ACTIVITY OF THYME (*THYMUS VULGARIS* L.) EXTRACT ANALYZED ON *PSEUDOMONAS AERUGINOSA* BIOFILM**

##### ***Atividade antimicrobiana do extrato de tomilho (*Thymus vulgaris* L.) analisada sobre biofilme de *Pseudomonas aeruginosa****

Figueira LW, Oliveira JR, Martins APR, Carvalho CAT, Jorge AOC, Oliveira LD  
Email: jroliveira16@hotmail.com, leandrowf@live.com

This study aimed to verify the antibiofilm action of thyme extract on *P. aeruginosa*. *P. aeruginosa* ATCC 15442 strain was grown on Brain Heart Infusion (BHI) agar and in BHI broth for 24 h at 37°C, respectively. After centrifugation (2000 rpm/10 min), the pellet was suspended in saline (NaCl 0.9%) and the turbidity was adjusted to  $10^7$  CFU/mL (colony forming units per milliliter) in a spectrophotometer ( $\lambda=630$  nm; DO= $0.09\pm 0.01$ ). Then, this suspension was added into microtiter plate and after incubation (37°C/90 min and 75 rpm) the supernatant was discarded and fresh BHI broth was added. Biofilm formed for 48 h was exposed to thyme extract (200 mg/mL) for 5 min and saline was used as control (n=10). Then, biofilm was disaggregated with sonication (30 s at 25% power). The suspension was serially diluted and plated on BHI agar. After 48 h, CFU were counted and the values were statistically analyzed by T-test ( $p\leq 0.05$ ). A significant reduction ( $p<0.05$ ) of 87.57% ( $\pm 5.02$ ) was demonstrated after treatment because the control group has presented mean of  $5 \times 10^{12}$  CFU/mL ( $\pm 1.1 \times 10^{12}$ ) and the treated group about  $0.63 \times 10^{12}$  CFU/mL ( $\pm 0.28 \times 10^{12}$ ).

Thus, it was found that thyme extract showed effective action on *P. aeruginosa* biofilm.

Keywords: Antimicrobial activity; *Thymus vulgaris* L.; *Pseudomonas aeruginosa*.

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Basic research - Graduate students

#### **BIOCOMPATIBILITY EVALUATION OF NANOSTRUCTURED TITANIUM AND TITANIUM NIOBIUM ZIRCONIUM SAMPLES FOR BIOMEDICAL USE**

***Avaliação da biocompatibilidade de amostras de titânio e titânio nióbio zircônio nanoestruturadas para uso biomédico***

Reis-Mello DC, Santana-Melo GF, Santo LLE, Franzini DR, Schneider SG, Vasconcellos LMR  
e-mail: daphnereis@yahoo.com.br

The titanium-niobium-zirconium alloy is a promising material to be biocompatible, display properties such as good ductility, high melting point, excellent heat conduction and low modulus of elasticity. The aim of this study was evaluating the influence of nanotubes made in samples of pure titanium and Ti13Nb13Zr alloy in the cytotoxicity of these materials, as well as in cell adhesion of osteoblasts. Cylindrical samples were made of pure Titanium and Titanium 13-Niobium 13-Zirconium, which were submitted to the electrochemical anodization process with 20 Volts and 3 Amps, with the aim of creating nanotubes (NT) in the surface. These anodized samples after sterilization were placed in 24-well plates, to which was added 1 mL of DMEM culture  $2 \times 10^4$  and osteoblastic cells (MG63 Cell line human). After 24 hours of cell culture, adhesion was examined by SEM. After 3 and 7 days was performed MTT cell cytotoxicity assay. The statistical test used was ANOVA and Tukey test (5%). The surfaces were favorable for cell adhesion in both groups. Cell viability results vary according to the period studied, with statistically significant difference between groups in both periods. After 3 days it was found that the Ti13Nb13Zr NT group exhibited greater cell viability than TiCp NT group ( $p < 0.01$ ). However, within 7 days, the result was opposite. Despite this result, the experimental alloy can be considered suitable for biological application.

Keywords: Titanium; Biocompatibility; Nanotubes.

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Basic research - Graduate students

#### **BIOFILM FORMATION OF STAPHYLOCOCCUS AUREUS AND PSEUDOMONAS AERUGINOSA IN**

## DIFFERENT TITANIUM ALLOYS

### ***Formação de biofilme de Staphylococcus aureus e Pseudomonas aeruginosa em diferentes ligas de titânio.***

Reis-Mello DC, Oliveira JR, Ferreira HT, Jorge AOC, Carvalho YR, Oliveira LD, Vasconcellos LMR  
e-mail: daphnereis@yahoo.com.br

This study compared *S. aureus* (Sa) and *P. aeruginosa* (Pa) biofilm formation at different titanium alloys (Ti-35Nb; Ti-35Nb-7Zr-5Ta) with pure titanium grade 2 (control). The bacteria were grown on agar and Brain Heart Infusion broth (BHI) (37°C/24 h). Then, the culture was centrifuged (2000 rpm/10 min) and the pellet suspended in saline (0.9% NaCl). After the suspension was adjusted to 10<sup>6</sup> CFU/mL (colony forming units per milliliter) in a spectrophotometer. The discs of sterile Ti alloy (Ti-35Nb; Ti-35Nb-7Zr-5Ta) and Ti were placed in wells of 24-well microplate (n = 8) and BHI broth with suspension of each bacterium separately. After 48 hours, the biofilm formed was broken by sonication and the suspension diluted and plated on BHI agar. After 48 hours, the CFU were counted and the values analyzed by ANOVA and Tukey test (p ≤ 0.05). Ti group had the highest value of CFU/mL (±1,1x10<sup>10</sup> 0,08x10<sup>10</sup>) to Pa than the Ti-35Nb (2,86x10<sup>9</sup> ± 1,21x10<sup>9</sup>) and Ti-35Nb-7Zr-5T (3,33x10<sup>9</sup> ± 1,21x10<sup>9</sup>) being statistically significant difference (p <0.05). This relationship was also verified to Sa, where CFU/mL for Ti was 3,38x10<sup>8</sup> ± 0,68x10<sup>8</sup> and the Ti-35Nb and Ti-35Nb-7Zr-5T alloys were 2,2x10<sup>8</sup> ± 0,63x10<sup>8</sup> and 2,17x10<sup>8</sup> ± 0,31x10<sup>8</sup> respectively. Both alloys showed less biofilm formation, with similar values (p > 0.05). It was concluded that different titanium alloys can be an alternative to surgical practice since microbial adhesion promoted lower compared to pure Ti.

Keywords: Biofilm; Titanium; Titanium alloys.

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Basic research - Graduate students

## EFFECTS OF CLINICAL ISOLATES OF LACTOBACILLUS SPP. ON STREPTOCOCCUS MUTANS: STUDY OF PROBIOTIC POTENTIAL

### ***Efeitos de isolados clínicos de Lactobacillus spp. sobre Streptococcus mutans: estudo do potencial probiótico***

Velloso MS, Santos JD, Rossoni RD, Garcia MT, Jorge AOC, Junqueira JC  
e-mail: marisol\_velloso2@hotmail.com

Previous studies show that Lactobacillus probiotic strains can inhibit Streptococcus mutans, however, the effects of such strains on the development of caries needs to be investigated. The objective of this study was to evaluate in vitro the effect of Lactobacillus strains isolated from caries-free subjects on *S. mutans*. Initially, 30 Lactobacillus strains were evaluated for antibacterial activity

against *S. mutans* in planktonic growth. Then, 5 strains that presented higher inhibitory activity were tested on biofilms formed by *S. mutans*. In addition to the direct effects of *Lactobacillus* cells were also evaluated the effects of the culture filtrate of *Lactobacillus* on *S. mutans* checking the inhibitory effects related to acid environment and metabolites excreted. As a result we observed that there was inhibitory activity for the most of the tested strains and that in both experiments, the planktonic culture and the formation of biofilms, the results were more favorable in the group interaction with the cells, followed by filtered without adjustment of pH, suggesting that the acidity of the environment also interfered with the growth of *S. mutans*. We conclude that the *Lactobacillus* strains tested that showed inhibitory effect against *S. mutans* can be considered as a microbial control method with probiotic potential in the oral cavity. Key words: *Streptococcus mutans*, *Lactobacillus*, probiotics. PROCESSO FAPESP 2014/11841-9

Keywords: *Streptococcus mutans*; *Lactobacillus*; Probiotics.

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