



PROCEEDINGS OF THE **V ODONTOMEETING** AND **XI CEAJO**

2025



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Dental Science**

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UNIVERSIDADE ESTADUAL PAULISTA
"JÚLIO DE MESQUITA FILHO"

Instituto de Ciência e Tecnologia
Campus de São José dos Campos



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Words from the President

It is with great pride and a profound sense of academic responsibility that we present the Proceedings of the V Odontomeeting and XI CEAJO, now published in the Brazilian Dental Science.

This edition consolidated our commitment to scientific excellence, critical thinking, and the integration of teaching, research, and extension within our academic community. Throughout the event, undergraduate and postgraduate students, researchers, and clinicians shared knowledge, discussed emerging evidence, and strengthened interdisciplinary dialogue in Dentistry.

The abstracts compiled in these proceedings represent not only the scientific production of our institution and collaborating centres, but also the dedication of students and mentors who continuously pursue innovation, methodological rigour, and social impact in oral health research.

By publishing these works in the Brazilian Dental Science, we reinforce our institutional mission of disseminating high-quality scientific knowledge and fostering academic visibility for young researchers. Each contribution reflects effort, resilience, and a genuine commitment to advancing evidence-based Dentistry.

I extend my sincere gratitude to the scientific committee, organising team, speakers, sponsors, reviewers, and especially to the authors who entrusted us with their research.

May these proceedings serve as a record of excellence and as inspiration for future scientific achievements.



Rayana Duarte Khoury
President, V Odontomeeting and XI CEAJO
São José dos Campos – Brazil



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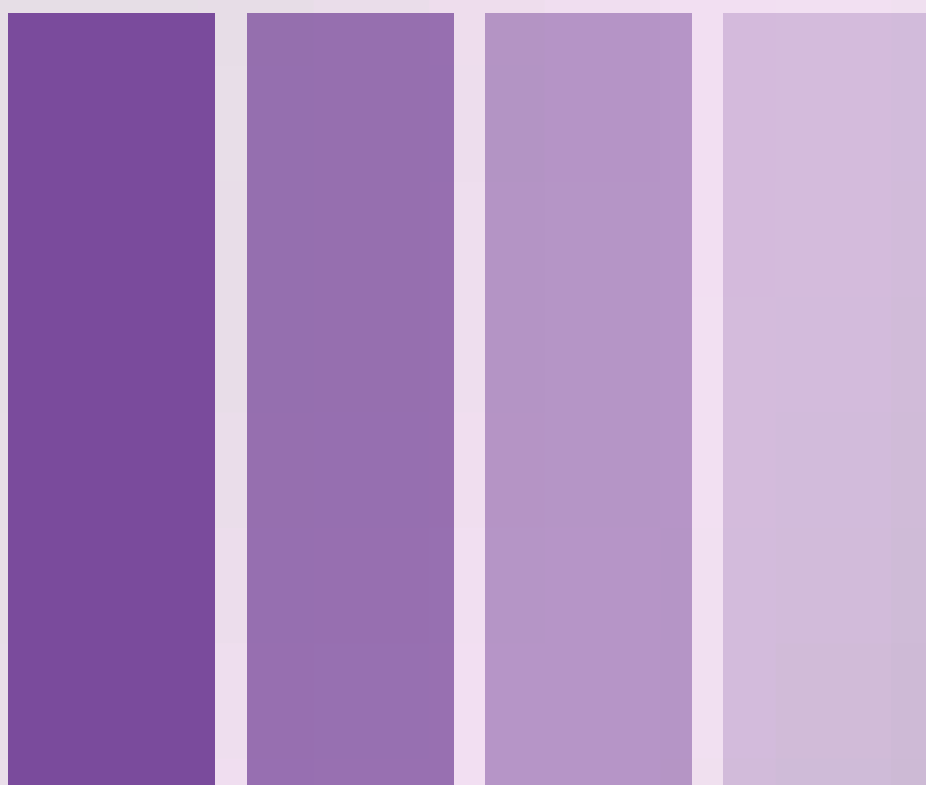
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Section 1

BASICS – UNDERGRADUATE





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BASICS – UNDERGRADUATE

Antibiofilm action of a triple combination of plant extracts on *Acinetobacter baumannii*

Montilha G, Cintra TMF, Tediole GT, Ribeiro MCM, de Oliveira LD, Domiciano VMM

Acinetobacter baumannii is at the top of the WHO list (2024) as a critical priority pathogen for the development of new treatments. The combination of plant extracts may be promising, but there is little evidence on the multiple combinations of these compounds. The objective of this study was to evaluate the antibiofilm action of the hydroalcoholic extracts of rosemary (EHA), cinnamon (EHC), and guava (EHG) combined against standard and clinical multidrug-resistant strains of *A. baumannii*. The plant extract was prepared from cinnamon bark and dried rosemary and guava leaves (30g/100mL; 50:50 EtOH:H₂O). Biofilms were formed for 48 h in microtiter plates and placed in contact with the combined extracts for 5 or 15 min, with 0.12% chlorhexidine as the positive control. The extract concentrations previously determined by a multidrug combination assay were used: 3.44 mg/mL (CMMt 1x) and 6.44 mg/mL (CMMt 2x), considering a 1:1:1 ratio in relation to the liquid volume, between the different plant extracts. The evaluation of biofilm cell viability was performed using the MTT test. Data were analyzed by ANOVA and Tukey's test ($p < 0.05$). The combination of extracts promoted a percentage reduction in viability ranging from 9.08 to 80.9% ($p < 0.05$), in several cases, statistically similar to the performance of 0.12% chlorhexidine. The extracts exhibited antibiofilm activity against *A. baumannii*, demonstrating promising potential for the development of compounds to treat and combat *A. baumannii* infections.

Keywords: *Acinetobacter Baumannii*; Biofilm; Phytotherapeutics; Pharmacological Synergism; Bacterial Drug Resistance.



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BASICS – UNDERGRADUATE

The anti-endotoxin action of associations of N-acetylcysteine, calcium hydroxide, and chlorhexidine against *Fusobacterium nucleatum* LPS

Amaral VG, Nascimento MFR, Silva SMS, Silva ACF, Carvalho LS, Hasna AA

This in vitro study aimed to evaluate the anti-endotoxin activity of intracanal medication (ICM) combinations of N-acetylcysteine (NAC), calcium hydroxide [Ca(OH)₂], and chlorhexidine (CHX) against lipopolysaccharide (LPS) from *Fusobacterium nucleatum*. Fifty human teeth were irradiated and fixed in 24-well plates. The specimens were contaminated with a standardized inoculum for 28 days, with Brucella broth enriched with sheep blood being replaced every two days. Afterwards, the specimens were instrumented using the R25 reciprocating file and then treated with different medications for 14 days: I) control group (pyrogen-free water), II) NAC + Ca(OH)₂, III) NAC + CHX, IV) Ca(OH)₂ + CHX, and V) NAC + Ca(OH)₂ + CHX. Samples were collected using 1 mL syringes at three time points: after contamination (S1), after biomechanical preparation (S2), and after intracanal medication (S3). LPS quantification was performed using the chromogenic LAL test. Data were analyzed using Kruskal-Wallis and Dunn tests ($\alpha=0.05$). After S3, a statistically significant difference was observed between the experimental groups and the control ($p=0.05$), indicating that all tested combinations were effective in reducing *F. nucleatum* LPS. It was concluded that combinations of NAC, Ca(OH)₂ and CHX show promising anti-endotoxin activity.

Keywords: N-Acetylcysteine; Chlorhexidine; Calcium Hydroxide; Lipopolysaccharide; *Fusobacterium Nucleatum*.



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BASICS – UNDERGRADUATE

Gestational protein malnutrition and its morphometric and mechanical bone repercussions on offspring aging

Breanza GV, Calsa B, Marinho RMM, Santamaria Júnior M

The concept of fetal programming refers to exposures during critical periods of development that can induce long-lasting effects on health and increase the risk of chronic disease later in life. This study aimed to evaluate the long-term effects of gestational protein restriction on morphometric and mechanical parameters of bone physiology in offspring during aging. Pregnant mice were randomly assigned to two groups (n=5 per group): the Control Group (NP): fed a standard diet containing 17% casein, and the Experimental Group (LP): fed a low-protein diet containing 6% casein. Postnatal assessments were conducted to evaluate the effects of protein restriction on femoral bone architecture. Bone morphometry was analyzed using micro-computed tomography; bone strength was assessed via three-point bending tests; and qualitative ultrastructural analysis was performed using scanning electron microscopy. At 18 months of age, microtomographic analysis revealed that gestational protein restriction led to significant reductions in bone mineral density, trabecular number, and trabecular thickness in the femoral metaphysis ($p < 0.05$). Mechanical testing showed decreased bone strength in the LP group, as indicated by a lower maximum fracture force ($p < 0.05$). These findings demonstrate that maternal protein malnutrition adversely affects bone microarchitecture in offspring over the long term, supporting the hypothesis that such nutritional deficits may contribute to bone loss and accelerate the onset of osteoporosis during aging.

Keywords: Malnutrition; Aging; Bone Development; Femur.



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BASICS – UNDERGRADUATE

Evaluation of the effectiveness of hydrogels with bioglass and strontium ranelate in bone neoformation and remodeling in osteopenic rats

Toledo JLSF, Vieira MN, Grisante LAD, Oliveira EFS, Silva LAA, Souto JCRA

Osteoporosis increases the risk of fractures, and its systemic treatment presents relevant side effects. In this context, biomaterials have been investigated as local drug delivery systems capable of acting directly at the bone site and stimulating regeneration. This study evaluated 3D-printed hydrogels incorporating bioglass functionalized with strontium ranelate on bone biomarkers in ovariectomized rats. A total of 24 rats were used, distributed into two groups: bilateral ovariectomy (OVX) and sham surgery (Sham). After eight weeks, bone defects were created in the femoral heads, which were filled with hydrogels containing only the bioglass or the bioglass functionalized with the drug. Four weeks later, the animals were euthanized, and the samples were submitted to immunohistochemistry for osteocalcin and TRAP, which were qualitatively evaluated in 40x photomicrographs of the interface between mature and newly formed bone. All groups showed positivity for both markers. Osteocalcin was detected in the mineralized bone matrix, in the newly formed trabeculae, in osteocytes, in osteoblasts, and in the extracellular matrix, while TRAP evidenced osteoclasts in the newly formed trabeculae of the defect filled with hydrogel, indicating bone remodeling. Such staining patterns indicated that all groups promoted bone neoformation and remodeling. Further tests will be necessary to assess the safety of the hydrogels and reinforce the feasibility of the system, which proved promising for local drug delivery.

Keywords: Biomaterials; Hydrogel; Drug Delivery Systems; Osteoporosis; Bone Regeneration; Immunohistochemistry.



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BASICS – UNDERGRADUATE

Mucoepidermoid carcinomas: clinicopathological correlations

Corrêa AGS, Felipini RC, Prado RF

Macrophages, when recruited to the tumor microenvironment, become tumor-associated macrophages (TAMs), with an M2 polarization profile. In this context, they may prevent tumor cells from being eliminated and promote tumor dissemination by contributing to neovascularization. The aim of this study was to evaluate the amount and polarization of TAMs in correlation with angiogenesis in biopsies of Mucoepidermoid Carcinomas. 22 cases were selected from the Oral and Maxillofacial Pathology Laboratory of ICT-Unesp. Survival analysis was performed. An immunohistochemistry protocol was carried out using the following antibodies: CD68, CD163, CD105, VEGF, and D2-40. Slides were photographed with an Axiophot 4 microscope equipped with a digital camera. The stained area was assessed either by automated counting with Leica software or manually by a calibrated examiner. Results were submitted to descriptive and inferential statistical analysis using Spearman's correlation coefficient, with a significance level of 5%. The sample showed equal distribution between men and women. Palate was the most frequently affected site, the mean lesion size was 2.56 cm, and the average evolution time was 1 year and 2 months. Nearly 60% of patients were alive 22 years after diagnosis. A significant positive correlation was found between CD163 and D2-40, and between CD163 and CD105. The positive correlation between CD68 and VEGF showed a tendency toward significance. Thus, the results of this study indicate a correlation between the presence of M2 macrophages and both angiogenesis and lymphangiogenesis, which may potentially favor tumor dissemination.

Keywords: Mucoepidermoid Carcinoma; Angiogenesis; Macrophages.



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BASICS – UNDERGRADUATE

Antibiofilm action of the combination of jaboticaba and carqueja extracts against *Acinetobacter baumannii*

Monteiro VSL, Dias SO, Lage LMA, Menezes RT, Domiciano VMM, Oliveira LD

Acinetobacter baumannii is at the top of the WHO's list of priority pathogens in the search for antimicrobial agents due to its microbial resistance profile, and it is of interest to study herbal medicines as an alternative therapy. The objective of this study was to evaluate the antibiofilm action of the combination of carqueja (*Baccharis trimera*) and jaboticaba (*Myrciaria cauliflora*) extracts on the standard strain of *A. baumannii*. The extracts of carqueja (EHC) and jaboticaba (EHJ) were prepared and the biofilms of *A. baumannii* ATCC 19606 were formed in microplate backgrounds for 48 hs (37°C). Afterwards, the treatment was performed by the extracts, divided into groups (n=12): a) HE 0.5%; b) EHC 0.4%; c) EHJ 0.2% + EHC 0.02%; d) EHJ 0.02% + EHC 0.01%; e) EHJ 0.2% + EHC 0.006%; f) CLX 0.06% (positive control); g) without treatment. The treatments were performed in 2 time periods: 5 min and 15 min and the antibiofilm activity was evaluated by the MTT test. The results were analyzed by ANOVA and Tukey's test, $p=0.05$. The Soluble Solids Content was 1.9% for EHC and 2.2% for EHJ. The extracts and all combinations promoted a significant reduction in biofilms at 5 min and 15 min compared to the group without treatment ($p<0.05$). The synergistic combination of 0.2% EHJ + 0.006% EHC promoted the greatest reductions in biofilms, being statistically similar to chlorhexidine ($p>0.05$). It was concluded that the combination of jaboticaba and carqueja extracts present antibiofilm activity on *A. baumannii*, at treatment times of 5 and 15 min.

Keywords: Biofilm; Phytotherapy; *Acinetobacter Baumannii*; *Baccharis Trimera*; *Myrciaria Cauliflora*.



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BASICS – UNDERGRADUATE

Titanium implants coated with polycrystalline diamond film using the chemical vapor deposition (CVD) technique: an *in vivo* study

Almeida AMP, Mello FZD, Edmundo DA, Mello DG, Souza T, Vasconcellos LMR

Titanium dental implants are widely used in clinical practice, and surface modifications have been shown to enhance cellular responses at the bone–implant interface. This study aimed to evaluate the effect of a polycrystalline diamond film coating, applied via Chemical Vapor Deposition (CVD), on bone neoformation around commercially pure grade 2 titanium (Ti-G2) implants. Implants (2 × 4 mm; Titaniumfix®) were divided into two groups: control (untreated surface) and experimental (CVD diamond-coated surface). Following sterilization and cytotoxicity testing, the implants were surgically placed in the tibia of 14 Wistar rats—control implants in the right tibia and experimental implants in the left. After four weeks, the animals were euthanized, and histomorphometric analysis was performed. Although the experimental group showed a larger area of new bone formation, the difference was not statistically significant ($p > 0.05$). These findings suggest a potentially positive effect of CVD diamond coatings on osseointegration, warranting further investigation.

Keywords: Implants; Bone Neoformation; Coating.



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BASICS – UNDERGRADUATE

Histological and histomorphometric evaluation of the effect of low-level laser therapy on bone remodeling in induced tooth movement: an experimental study in rats

Alves KO, Ferreira CL, Nunes CMM, Junior MS, Mendes MSS, Jardini MAN

Orthodontic treatment is a complex biological process involving repeated mechanical stimuli through force reactivations on the teeth, inducing bone remodeling and tooth movement. Among the methods proposed to accelerate this process, photobiomodulation (PBM) stands out as a non-invasive approach with anti-inflammatory effects, stimulation of healing, and cellular bio-stimulation, but its effects during force reactivations remain unclear. This study performed histological and histomorphometric evaluations of alveolar bone on the tension and compression sides, associating force reactivation with PBM. Forty male Wistar rats ($n = 10$ per group: GM, GR, GL, GRL) from the UNESP Botucatu vivarium were used. The orthodontic apparatus consisted of a stainless steel coil spring between the left maxillary first molar and the incisors, promoting mesial movement. In groups GL and GRL, a low-level GaAlAs diode laser was applied according to previous protocols. Force was reactivated on day 10, and euthanasia was performed on day 21. Histomorphometric analyses were carried out by a blinded examiner. In the coronal region, GL showed greater bone quantity compared with GRL, and in the apical region GM exceeded GRL. No statistical difference was found in the middle region. PBM did not increase bone quantity; however, histological analysis revealed greater osteoclastic and osteoblastic activity in the laser groups, suggesting a possible protective effect on bone tissue. Complementary molecular studies are recommended.

Keywords: Bone Remodeling; Orthodontic Tooth Movement; Photobiomodulation.



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BASICS – UNDERGRADUATE

Antimicrobial activity of blackberry extract against *Streptococcus mutans* biofilm

Sauer LZ, Nazario LM, Carvalho LS, Lage LMA, Domiciano VMM, Oliveira LD

The main microorganism associated with dental caries is *Streptococcus mutans*. Herbal medicines with antimicrobial potential emerge as a promising alternative in the control of this disease. Objective: To produce and phytochemically evaluate the extract of *Rubus subg. rubus* (blackberry) and to assess the antimicrobial and antibiofilm action against an ATCC strain and a clinical strain of *S. mutans*. Material and Methods: The hydroethanolic extract was obtained from blackberry leaves, and the antioxidant activity as well as the phenolic and flavonoid content were determined. The Minimum Bactericidal Concentration (MBC) was determined by broth microdilution (CLSI M7-A9). *S. mutans* biofilms were formed on the bottom of microplates for 48 h (37°C), and different concentrations of the extract were used for a 10-min treatment. Antibiofilm activity was evaluated using the MTT assay, and results were statistically analyzed (ANOVA and Tukey's test, $p=0.05$). Results: The extract showed antioxidant activity of 10.39 $\mu\text{g/mL}$, eliminating 50% of free radicals; soluble solids content 1.94%; flavonoids 0.368 mg/mL; phenols 1.122 mg/mL. The MBC was 0.60 mg/mL. In biofilms, after 10 min of contact, there was a significant reduction in bacterial viability, statistically different from the untreated control group ($p<0.05$) and similar to 0.6% chlorhexidine ($p>0.05$), at extract concentrations of 19.4 mg/mL and 4.8 mg/mL. Conclusions: Mulberry extract shows antimicrobial and antibiofilm action against *S. mutans*, being a promising candidate for the development of phytotherapeutic approaches to caries control.

Keywords: *Streptococcus Mutans*; *Rubus Subg*; *Rubus*; Phytotherapy; Caries; Biofilm.



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BASICS – UNDERGRADUATE

Antibiofilm activity of the combination of clove and cinnamon extracts against *Pseudomonas aeruginosa*

Nascimento BP, Oliveira MVF, Menezes RT, Oliveira JA, Nazario LM, Oliveira LD

Pseudomonas aeruginosa is an opportunistic pathogen with the ability to acquire resistance to several antimicrobial agents, making it necessary to search for therapeutic alternatives such as medicinal plants. The objective was to evaluate the antibiofilm activity of the combination of *Cinnamomum verum* (cinnamon) and *Syzygium aromaticum* (clove) extracts against multidrug-resistant strains of *P. aeruginosa*. Hydroethanolic extracts of clove (HECl) and cinnamon (HECv) were prepared, and the soluble solids content was quantified. Monomicrobial biofilms of 4 multidrug-resistant strains and 1 reference strain of *P. aeruginosa* were formed in microplate wells for 48 h (37 °C). Afterwards, treatments were carried out with the extracts alone and in two synergistic combinations per strain. Positive control (chlorhexidine) and negative control (untreated) were included. Treatments were performed at two time points: 5 min and 24 h, and antibiofilm activity was evaluated by the MTT assay. Results were statistically analyzed (ANOVA and Tukey's test, $p = 0.05$). The soluble solids content was 3.4% for HECl and 3.5% for HECv. The isolated extracts and the synergistic combinations promoted a significant reduction of biofilms at both 5 min and 24 h, compared with the untreated group ($p < 0.05$), with the synergistic combinations HECv 0.05% + HECl 0.1% and HECv 0.02% + HECl 0.05% being the most effective. It was concluded that the synergistic combinations of clove and cinnamon extracts present antibiofilm activity against *P. aeruginosa* at treatment times of 5 min and 24 h.

Keywords: Biofilm; *Cinnamomum Verum*; *Pseudomonas Aeruginosa*; *Syzygium Aromaticum*.



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BASICS – UNDERGRADUATE

Antimicrobial activity of marjoram extract (*Origanum majorana*) against *Acinetobacter baumannii*, *Klebsiella pneumoniae*, *Pseudomonas aeruginosa* and *Staphylococcus aureus*

Boock RCSV, Lage LMA, Nazario LM, Cordeiro MFL, Domiciano VMM, Oliveira LD

Antimicrobial resistance poses a major threat to the treatment of common infectious diseases and demands efforts toward the development of new medicines and complementary therapies to overcome this challenge. *Klebsiella pneumoniae*, *Acinetobacter baumannii*, *Staphylococcus aureus* and *Pseudomonas aeruginosa* are listed as priority pathogens by the 2024 list of OMS. Objective: To evaluate the antimicrobial activity of marjoram hydroethanolic extract (MHE) against planktonic cultures of *K. pneumoniae*, *A. baumannii*, *S. aureus* and *P. aeruginosa*. Materials and Methods: The hydroethanolic extract of marjoram (MHE) was obtained, and the soluble solids content was quantified. Minimum Inhibitory Concentration (MIC) and Minimum Bactericidal Concentration (MBC) were determined using the broth microdilution method (CLSI M7-A6). Results: The soluble solids content of the extract was 3.38%. MIC and MBC values were 0.42 mg/mL for *K. pneumoniae*, 0.21 mg/mL for *A. baumannii*, 0.84 mg/mL for *P. aeruginosa*, and 0.84 mg/mL for *S. aureus*. Conclusion: Marjoram extract demonstrated antimicrobial activity against *A. baumannii*, *K. pneumoniae*, *P. aeruginosa* and *S. aureus*.

Keywords: Antimicrobial; Multidrug-Resistant Bacteria; Phytotherapy; Marjoram; *Origanum Majorana*.



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BASICS – UNDERGRADUATE

Antimicrobial synergism between pomegranate and cinnamon extracts against multidrug-resistant strains of *Acinetobacter baumannii*

Gomes NO, Pereira TC, Lage LMA, Carvalho LS, Domiciano VMM, Oliveira LD

Antibiotic resistance in pathogens such as *Acinetobacter baumannii* poses a threat to global health, requiring alternative or complementary therapeutic strategies. The objective was to evaluate the synergistic effect of the combination of hydroalcoholic extracts of pomegranate (*Punica granatum*) and cinnamon (*Cinnamomum verum*) on multidrug-resistant strains of *A. baumannii*. For this, the hydroethanolic extracts of pomegranate and cinnamon were prepared and the soluble solids content was quantified. The Minimum Bactericidal Concentration (MBC) was determined by the broth microdilution method (CLSI M7-A6) for the 4 multidrug-resistant strains and 1 standard strain of *A. baumannii*. To evaluate the combination of extracts, the checkerboard technique was used and the fractional bactericidal concentration index (ICBF) was adopted to determine the synergistic, additive, indifferent or antagonistic effects. The extracts showed bactericidal action for all strains, with the MBC of cinnamon extract being 3.3. mg/mL and pomegranate extract between 1.5 mg/mL to 6.1 mg/mL. 12 combinations with synergistic effects were obtained, promoting reductions in relation to the MBC of the isolated extracts of up to 4 times for cinnamon extract and up to 1220 times for pomegranate extract. It is concluded that the combination of pomegranate and cinnamon extracts present important synergistic antimicrobial effects on multidrug-resistant strains of *A. baumannii*, with potential to be explored in Dentistry and Medicine, in the search for new antibacterial agents.

Keywords: *Acinetobacter Baumannii*; *Punica Granatum*; *Cinnamomum Verum*; Antibacterial; Synergism.



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BASICS – UNDERGRADUATE

Antibiofilm activity and cytotoxicity of rosemary and jabuticaba extracts against microorganisms associated with endodontic infection

Silva BBVS, Oliveira JAO, Gimenez MG, Hasna AA, Oliveira LDO, Carvalho CAT

The aim of this study was to evaluate the antibiofilm activity of *Rosmarinus officinalis* (rosemary) and *Plinia cauliflora* (jabuticaba) extracts, as well as their cytotoxic effects on a human keratinocyte cell line. The effective concentrations of the extracts were determined by Minimum Inhibitory Concentration (MIC) and Minimum Microbicidal Concentration (MMC), and their action was evaluated on biofilms formed in 96-well plates. Biofilms were exposed for 5 minutes and 24 hours, with $n=10$ for each experimental group. Saline solution (0.9%) and sodium hypochlorite (NaOCl) at 2.5% were used as controls. Subsequently, cytotoxic activity was assessed using the MTT assay. Statistical analysis was performed using ANOVA and Dunn's test (significance level of 5%). Rosemary extract showed good reduction in the viability of *Enterococcus faecalis*, with a biofilm reduction of 40% to 52%. For *Fusobacterium nucleatum* strains, jabuticaba extract reduced viability by up to 73%. For *Porphyromonas gingivalis*, jabuticaba extract caused a reduction of up to 41%, while rosemary extract achieved up to 57% reduction. Regarding cytotoxicity, after treatment with different extract concentrations, both extracts showed cytotoxicity statistically similar to 2.5% sodium hypochlorite. Therefore, it can be concluded that the antibiofilm action was effective against *E. faecalis*, *F. nucleatum*, and *P. gingivalis*, and that the cytotoxicity of the extracts was statistically similar to 2.5% NaOCl.

Keywords: Biofilm; *Fusobacterium Nucleatum*; *Plinia Cauliflora*; *Porphyromonas Gingivalis*; *Rosmarinus Officinalis*.



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BASICS – UNDERGRADUATE

Antioxidant activity and antibacterial action of the hydroalcoholic extract of *Matricaria recutita* on *Acinetobacter baumannii*

Borges AS, Cintra MFC, Tediole GT, Ribeiro MCM, de Oliveira LD, Domiciano VMM

Bacterial multidrug resistance is a global problem that limits therapeutic efficacy. Among the critical pathogens listed by the WHO (2024), *Acinetobacter baumannii* stands out for its association with severe hospital-acquired infections and high mortality. In this context, herbal remedies such as chamomile (*Matricaria recutita*) extract have been investigated, demonstrating potential as a therapeutic alternative against multidrug-resistant bacteria. The objective of this study was to analyze the antioxidant and antibacterial activity of *M. recutita* extract against *A. baumannii* strains in planktonic cultures. The plant extract was prepared from dehydrated chamomile flowers in a ratio of 100g/1000mL of vehicle (50:50 EtOH:H₂O). The soluble solids content and antioxidant activity (through DPPH reduction) of the extract were determined. The Minimum Inhibitory Concentration (MIC) and Minimum Bactericidal Concentration (MBC) were tested on *A. baumannii* strains (ATCC 19606 and multidrug-resistant clinical strains 56006 and H557) using the broth microdilution method according to CLSI M7-A6. The extract contained 2.39% soluble solids, and the concentration that eliminates 50% of free radicals (EC₅₀) was 12.38 µg/mL. The MIC could not be evaluated due to the pigmentation of the extract, but the MBC was 5.97 mg/mL for all tested strains. The chamomile extract showed antioxidant and bactericidal activity against *A. baumannii* strains, which reveals potential for the development of herbal products that act on multidrug-resistant *A. baumannii* infections.

Keywords: *Acinetobacter baumannii*; *Matricaria*; Plant Extracts; Drug Resistance; Antioxidants.



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BASICS – UNDERGRADUATE

Synergistic activity of fig tree and cashew tree extracts on multidrug-resistant strains of *Acinetobacter baumannii*

Santos LA, Tediole GT, Cruz GM, Cintra TMF, Oliveira LD, Domiciano VMM

The rise of antimicrobial resistance is an emerging and highly impactful problem for global public health. *Acinetobacter baumannii* is an opportunistic microorganism of significant clinical importance, with a high capacity to acquire resistance to antimicrobials. In this context, combating *A. baumannii* is considered a global priority, reinforcing the need to investigate alternatives, such as phytotherapy, which appears to be a promising strategy. The objective of this study was to evaluate the synergistic potential of the combination of hydroalcoholic extracts of *Ficus carica* L. (fig tree) and *Anacardium occidentale* L. (cashew tree) on planktonic cultures of three multidrug-resistant clinical strains (566006; H557; 50098) and one reference strain (ATCC 19606) of *A. baumannii*. The hydroalcoholic extracts of fig and cashew tree were prepared from 60 g of dried leaves, subjected to extraction in 300 mL of a hydroalcoholic solution (EtOH:H₂O, 50:50). The extracts were analyzed for soluble solids content. The synergistic effect of the combination of extracts was evaluated by the checkerboard technique. The extracts presented soluble solids contents of 2.55% (fig tree) and 3.2% (cashew tree). Five additive points were identified in the reference strain, seven in strain H557, and four in strain 50098, in addition to one point of synergism. The additive and synergistic effects between the extracts reinforce their potential for the development of phytotherapeutics against multidrug-resistant *A. baumannii* infections.

Keywords: *Acinetobacter baumannii*; *Anacardium occidentale*; Phytotherapy; Drug Synergism.



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BASICS – UNDERGRADUATE

Antimicrobial activity of hydroalcoholic fig tree extract against multidrug-resistant *Acinetobacter baumannii* strains

Souza BR, Santos LA, Tediole GT, Cruz GM, Oliveira LD, Domiciano VMM

Antimicrobial resistance has become a critical global public health problem. One of the main agents associated with this situation is *Acinetobacter baumannii*, which exhibits significant resistance to several classes of antibiotics. Given the difficulty in treating resistant infections, phytotherapeutics emerge as promising alternatives for the development of new therapeutic agents. The objective of this research was to produce a hydroalcoholic extract of *Ficus carica* L. (fig tree) and evaluate its phytochemical composition and antimicrobial potential on planktonic cultures of three multidrug-resistant clinical strains (566006; H557; 50098) and one ATCC strain (19606) of *A. baumannii*. The plant extract was obtained from fig tree leaves, in a ratio of 60 g to 300 mL of a hydroalcoholic solution (EtOH:H₂O, 50:50). The extract was characterized by its soluble solids, total flavonoids, and total phenols. The minimum inhibitory concentration (MIC) was determined by broth microdilution, and the minimum microbicidal concentration (MMC) by agar plating. The extract had 2.55% soluble solids, 0.546% total flavonoids, and 1.125% total phenols. The extract demonstrated bactericidal activity against the analyzed strains, with a minimum concentration of 0.63%. These results reinforce the potential of herbal medicines as promising sources for developing new strategies to combat antimicrobial resistance.

Keywords: *Acinetobacter Baumannii*; *Ficus*; Phytotherapy; Plant Extract; Drug Antimicrobial Resistance.



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BASICS – UNDERGRADUATE

Synergistic potential of hydroalcoholic extracts of cashew tree, clove and onion against *Acinetobacter baumannii* strains

Lourenço DO, Tediole GT, Cintra TMF, Ribeiro MCM, Oliveira LD, Domiciano VMM

The inappropriate use of antimicrobials has led to the emergence of resistant microorganisms, a public health challenge. In this context, phytotherapy emerges as a promising alternative in the search for new compounds. The WHO (2024) classifies *Acinetobacter baumannii* as a critical priority multidrug-resistant pathogen due to its clinical importance. The objective of this study was to analyze the synergistic potential of combinations of *Anacardium occidentale* L. (cashew tree) with *Syzygium aromaticum* (clove), and of *Allium cepa* (onion) with *S. aromaticum* on planktonic cultures of a multidrug-resistant clinical strain (H557) and an ATCC standard strain of *A. baumannii*. Plant extracts were prepared from cashew tree leaves, clove buds, and onion peels at proportions of 60 g/300 mL, 30 g/100 mL, and 15 g/400 mL, respectively, using a hydroalcoholic solution (EtOH:H₂O, 50:50). The soluble solids content was determined. The synergistic effect of the extract combination was evaluated using the checkerboard technique. The extracts presented soluble solids contents of 3.2% for cashew tree, 6.58% for clove, and 0.70% for onion. In the H557 strain, one additive point was observed for the combination of clove and cashew tree and three for clove and onion; in this combination, one additive point was also observed in the standard strain. The additive interaction observed between the extracts indicates promising potential for the formulation of phytotherapeutics aimed at combating multidrug-resistant infections caused by *A. baumannii*.

Keywords: *Acinetobacter Baumannii*; *Anacardium Occidentale*; *Allium Cepa*; *Syzygium*; Phytotherapy.



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BASICS – UNDERGRADUATE

Impact of microplastics on the action of mouthwashes on microcosm biofilms: a pilot study

Shimazu MAG, Silva FAS, Godoy LGR, Junqueira JC, dos Reis AG, Garcia MT

This pilot study evaluated whether exposure to microplastics (MPs) alters the resistance of microcosm biofilms to mouthwashes. Three individual samples of supragingival biofilm (CEPh document number: 4.098.658) were activated in pure BHI broth or BHI broth enriched with polystyrene microplastics (600 μm , 10 mg/L) and incubated in 5% CO₂ for 24 h. The suspensions were distributed into 96-well plates (200 μL /well) and allowed to form biofilms before treatment with chlorhexidine, sodium fluoride, essential oils, amine fluoride, or saline solution (control). Each treatment was applied twice, at 24 and 48 hours of biofilm formation, for 30 seconds, followed by medium replacement with or without MPs according to the experimental group. Total biomass and biofilm metabolic activity were assessed after the treatments. The presence of MPs increased the biomass in all samples, although this increase was statistically significant only in sample 2. Metabolic activity was also higher in the MP groups across all samples, with sample 2 again showing the most pronounced susceptibility to exposure. The results indicate that exposure to microplastics may promote biofilm formation and reduce the efficacy of mouthwashes, suggesting potential implications for oral health.

Keywords: Microcosm Biofilm; Microplastics; Mouthwashes; Microbial Resistance; Oral Health.



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BASICS – UNDERGRADUATE

Antibacterial synergistic effect of clove and cinnamon extracts on multi-resistant strains of *Pseudomonas aeruginosa*

Souza GP, Oliveira MVF, Menezes RT, Oliveira JA, Nazario LM, Oliveira LD

Pseudomonas aeruginosa is an opportunistic pathogen related to nosocomial infections of difficult treatment and high mortality rate, being important to seek pharmacological alternatives, such as phytotherapeutics. The objective was to evaluate the synergistic effect of the combination of hydroalcoholic extracts of clove (*Syzygium aromaticum*) and cinnamon (*Cinnamomum verum*) on multi-resistant strains of *P. aeruginosa*. For this, the hydroethanolic extracts of cloves and cinnamon were prepared and the content of soluble solids was quantified. The Minimum Bactericidal Concentration (MBC) was determined by the broth microdilution method (CLSI M7-A6) for the 5 strains of *P. aeruginosa*. To evaluate the combination of the extracts, the “checkerboard” technique was used and the fractional bactericidal concentration index (FBCI) was adopted to verify the synergistic, additive, indifferent or antagonistic effects. As a result, the MBC of clove extract varied between 0.1% and 0.8% and cinnamon extract between 0.1% and 0.5% for all strains. 19 combinations with synergistic effects and 2 combinations with additive effects were obtained, promoting reductions in the concentrations of the extracts between 2.5 and 100 times in relation to the MBC of the isolated extracts. It is concluded that the combination of clove and cinnamon extracts has antibacterial synergistic effects on multi-resistant strains of *P. aeruginosa*, with potential for the development of new alternative or complementary antimicrobial agents in the fight against bacterial resistance.

Keywords: *Pseudomonas Aeruginosa*; *Cinnamomum Verum*; *Syzygium Aromaticum*; Synergy; Antibacterial.



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BASICS – UNDERGRADUATE

Antibacterial and antibiofilm effects of the hydroalcoholic extract of *Origanum vulgare* against *Streptococcus mutans*

Avelino PS, Lage LMA, Carvalho LS, Nazario LM, Domiciano VMM, Oliveira LD

Streptococcus mutans is the main etiological agent of dental caries, standing out for its ability to form biofilm and promote enamel demineralization. Although antiseptics such as chlorhexidine assist in control, their adverse effects encourage the search for natural alternatives. In this context, *Origanum vulgare* (oregano), rich in phenolic compounds and flavonoids, shows antimicrobial and antibiofilm potential. Objective: This study evaluated the hydroalcoholic extract of *O. vulgare* (HAE) against *S. mutans* ATCC 35688. Materials and Methods: The extract was obtained by maceration in a hydroethanolic solution and presented a soluble solids content of 3.15%. The minimum inhibitory concentration (MIC) and minimum microbicidal concentration (MMC) were determined using the broth microdilution method (CLSI M7-A9). The antibiofilm activity was assessed using the MTT assay at different concentrations (MIC, 2× MIC, and 4× MIC) for both the prevention of biofilm formation and the treatment of pre-formed biofilms, with a 15-minute exposure. Data were analyzed using ANOVA and Tukey's test, with a significance level of 5%. Results: The MIC and MMC were both 0.098%. In the biofilm prevention assays, HAE showed 97.20% inhibition, while in the treatment of pre-formed biofilms (48 h), HAE demonstrated 94.35% reduction at 0.78 mg/mL compared to the control group. Conclusion: The oregano extract exhibited significant antimicrobial and antibiofilm activity against *Streptococcus mutans*.

Keywords: Dental Caries; *Origanum Vulgare*; Phytotherapy; *Streptococcus Mutans*.



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BASICS – UNDERGRADUATE

Histological and histomorphometric evaluation of injectable and 3D hydrogels with functionalized bioactive glass in bone defects

Garcia EF, Grisante LAD, Vieira MN, Souto JCRA, do Prado RF, de Vasconcellos LMR

Osteoporosis is characterized by the loss of bone mass and quality, commonly affecting postmenopausal women due to estrogen deficiency, which compromises the balance between bone resorption and formation, increasing the risk of fractures. Biomaterials such as hydrogels and bioactive glasses have been investigated as systems for local drug delivery. Raloxifene stimulates osteoblasts and reduces osteoclasts, while strontium ranelate promotes bone formation and inhibits resorption, enhancing bone repair without systemic side effects. The aim was to compare, through histomorphometric analyses, the performance of injectable and 3D-printed hydrogels in bone regeneration. Injectable and 3D alginate hydrogels containing glasses functionalized with raloxifene or strontium ranelate were prepared and stored. Rats received bone defects in the femurs, filled with injectable hydrogels on the left side and 3D hydrogels on the right side. After four weeks, femurs were collected, decalcified, embedded in paraffin, stained, and analyzed by digital histomorphometry. Histology revealed bone remodeling with newly formed trabeculae, voluminous osteocytes, organized osteoblasts, and active osteoclasts. Histomorphometric analysis indicated no significant differences ($p > 0.05$) between injectable, 3D hydrogels, and controls, confirming consistent bone regeneration. Injectable and 3D hydrogels promoted adequate bone remodeling, with preservation of tissue structure and biocompatibility. Bone neoformation did not differ between groups, indicating the safe potential of these materials.

Keywords: Biomaterials; Drug Delivery; Hydrogels; *In Vivo*; 3D Printing.



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BASICS – UNDERGRADUATE

Injectable and 3D hydrogels containing bioactive glass and drugs: histological and histomorphometric comparison

da Silva MF, Grisante LAD, Vieira MN, Souto JCRA, Spalding M, de Vasconcellos LMR

Osteoporosis is a systemic disease characterized by bone mass loss and microarchitecture destruction, increasing the risk of fractures, especially in postmenopausal women due to estrogen deficiency, which compromises the balance between bone resorption and formation. Biomaterials such as hydrogels and functionalized bioactive glasses emerge as promising alternatives to stimulate bone regeneration, allowing local drug delivery, improving tissue integration, and reducing the systemic adverse effects of conventional therapies. The aim of this study was to compare the histomorphometry of injectable and 3D hydrogels. Alginate hydrogels containing bioactive glasses functionalized with raloxifene or strontium ranelate were prepared, either 3D-printed or maintained in injectable form, and applied to bone defects in the femurs of bilaterally ovariectomized rats. After four weeks, the bones were processed histologically and evaluated by histomorphometry to quantify new bone formation. Histology revealed bone remodeling with newly formed trabeculae, voluminous osteocytes, organized osteoblasts, and active osteoclasts. Histomorphometric analysis showed no significant differences in new bone formation among groups ($p > 0.05$), suggesting preservation of bone structure and material biocompatibility. The hydrogels demonstrated biocompatibility and tissue preservation, promoting bone remodeling. Future studies may investigate strategies to enhance the osteogenic effect and optimize bone repair in osteoporosis models.

Keywords: Hydrogels; Ovariectomy; Osteoporosis; Raloxifene.



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BASICS – UNDERGRADUATE

PLA nanofibers associated with borate bioactive glass: in vitro osteogenesis analysis

Brito AA, de Oliveira EFS, Borges VRS, Grisante LADG, Souto JCRA, de Vasconcellos LMR

Synthetic biopolymers have shown great relevance in the field of tissue engineering. Among them, poly(lactic acid) (PLA) stands out due to its biodegradability and adjustable mechanical properties. Its association with bioactive substances, such as bioactive glass, represents a promising strategy for the development of cellular scaffolds. In this study, PLA nanofiber scaffolds containing 2.5% or 5% of borate bioactive glass (45B5) were produced by electrospinning in order to evaluate the osteoblastic activity of the MG63 cell line. The groups PLA, PLA 2.5% and PLA 5% were characterized by scanning electron microscopy (SEM) and subjected to in vitro assays of cell viability (MTT on days 1, 3, and 5), total protein content (10 days), alkaline phosphatase activity (10 days), and mineralization with calcium quantification (14 days). SEM analysis revealed effective fiber formation in all groups. Biological results showed cell viability greater than 70% in all groups, with a significant difference only on day 5 for PLA 2.5% and 5% compared with the control ($p < 0.05$). Protein content and ALP activity did not show statistical differences among the groups ($p > 0.05$), while mineralized nodules were observed in all of them. Calcium quantification showed no significant difference compared with the control ($p > 0.05$). In conclusion, PLA scaffolds containing borate bioactive glass 45B5 demonstrated cytocompatibility with MG63 cells, representing a promising alternative for applications in tissue engineering.

Keywords: Nanofibers; Bone Regeneration; Tissue Scaffolds; Biocompatible Materials; Tissue engineering.



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BASICS – UNDERGRADUATE

Biological analysis of combeite incorporated into MTA cement: in vitro study

Mello DG, Vieira MN, Almeida AMP, Ferreira LS, Campos TMB, de Vasconcellos LMR

The choice of cement may influence the success of endodontic treatments. The MTA cement is used in endodontic treatment because of its favorable biocompatibility and physicochemical properties. The antimicrobial and bioactive properties of combeite may be associated with materials, helping to prevent infections and contribute to tissue regeneration. The objective of this study is to evaluate in vitro osteogenesis of combeite, obtained by Sol-Gel method, incorporated into commercial MTA in concentrations of 1%, 3% and 5%, being pure MTA used as control group. The materials were characterized, compressed into pellets and subjected to trials assays with pulp dental stem cells. After 3 days, the MTT cytotoxicity test was conducted, and after 10 days, the total protein (PT) and Alkaline Phosphatase (ALP). The statistics analysis (ANOVA/Turkey $p < 0,05$) didn't reveal differences on MTT test. For PT, the pure MTA group presented superior values, with statistic differences compared to the others experimental groups. In ALP, the combeite 5% group showed bigger values than 1% group, also with statistic differences. It was concluded that all groups were considered safe and the 5% combeite experimental group showed favorable performance behavior for in vitro osteogenesis.

Keywords: Biomaterials; Cell Differentiation; Biocompatibility; Mineral Trioxide Aggregate; Endodontics.



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BASICS – UNDERGRADUATE

Bioactive hydrogels with drug delivery system for bone remodeling in ovariectomized rats: an *in vivo* study

Souza AG, Vieira MN, Lupp JS, Grisante LAD, Souto JCRA, Vasconcellos LMR

Osteoporosis is a disease characterized by an imbalance in bone metabolism, mainly affecting postmenopausal women. In the search for strategies to promote bone repair under osteopenic conditions, tissue engineering has developed biomaterials that combine structural properties, bioactivity, and controlled drug release. Objective: To assess bone remodeling mediated by bioactive hydrogels incorporated with bioactive glass functionalized with Strontium Ranelate, using OPG and RANK-L biomarkers in an osteoporosis animal model. Materials and Methods: Hydrogels based on alginate, porcine gelatin, and calcium chloride were produced, 3D printed, and characterized. After approval by the Ethics Committee (n° 03/2021), 24 Wistar rats were divided into two groups: ovariectomized (OVX, n=12) and Sham (n=12). Eight weeks after surgery, femoral bone defects were created and filled with clot, pure hydrogel, hydrogel with bioactive glass, or hydrogel with bioactive glass plus Strontium Ranelate. After four weeks, animals were euthanized and samples analyzed immunohistochemically for OPG and RANK-L expression. Results: Positive labeling for both biomarkers was observed in all groups, confirming bone remodeling activity. The groups containing bioactive glass and Strontium Ranelate showed enhanced responses compatible with stimulated bone repair. Conclusion: Bioactive hydrogels demonstrated promising potential as local drug delivery systems, supporting their application in bone regeneration under osteopenic conditions.

Keywords: Biomaterials; Pharmaceutical; Osteogenesis; Osteoporosis; Scaffolds.



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BASICS – UNDERGRADUATE

Anti-inflammatory effect of the pomegranate, cinnamon, and propolis extracts on macrophages stimulated by *Escherichia coli* LPS

Manfre HA, Menezes RT, Carvalho LS, Nazario LM, Oliveira JR, Oliveira LD

Natural extracts possess diverse biological activities that need to be further explored in dentistry. The objective of this study was to evaluate the anti-inflammatory potential of a combination of pomegranate (*Punica granatum*), cinnamon (*Cinnamomum verum*), and green propolis extracts on macrophages stimulated by *E. coli* lipopolysaccharide (LPS) through the quantification of the pro-inflammatory cytokines IL-6 and TNF- α . Pomegranate, cinnamon, and propolis extracts were prepared. Mouse macrophages (RAW 264.7) were distributed into microplates (1x10⁵ cells/well) and incubated for 24 hours (37°C, 5% CO₂). Subsequently, the macrophages were activated by *E. coli* LPS and received the following treatments: a) Pomegranate; b) Cinnamon; c) Propolis; d) Pomegranate + Cinnamon; e) Pomegranate + Propolis; f) Cinnamon + Propolis; g) Control (no treatment). After 24 hours, the supernatant was collected, and cytokine production was assessed using the enzyme-linked immunosorbent assay (ELISA) method. The results were analyzed (ANOVA and Tukey's test, 5%). All extracts promoted a significant reduction in cytokines (IL-6 and TNF- α) compared to the control ($p < 0.05$). For IL-6, the mean production in the control (LPS) group was 129.57 ± 37.77 pg/mL, while with the treatments, production ranged from 0.31 to 0.95 pg/mL ($p < 0.05$). For TNF- α , production in the control (LPS) group was 824.30 ± 95.98 pg/mL, and with the treatments, it ranged from 26.89 to 67.49 pg/mL ($p < 0.05$). In conclusion, pomegranate, cinnamon, and propolis extracts, both individually and in combination, exhibit anti-inflammatory activity in LPS-stimulated macrophages, demonstrating significant therapeutic potential.

Keywords: Anti-Inflammatory Agents; Cytokines; Phytotherapy; Propolis; Macrophages.



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BASICS – UNDERGRADUATE

Brazilian boldo vs. chilean boldo: comparative antimicrobial activity against *Acinetobacter baumannii*

Chin GC, Nazario LM, Manfre HA, Menezes RT, Lage LMA, Oliveira LD

Acinetobacter baumannii is a highly relevant multidrug-resistant opportunistic pathogen, capable of biofilm formation, dissemination, and persistence in hospital settings. Given the urgent need for novel therapeutic alternatives, plant-derived compounds with antimicrobial potential represent a promising strategy against microbial resistance. Objective: To compare the antibacterial activity of hydroethanolic leaf extracts of *Plectranthus barbatus* (Brazilian boldo) and *Peumus boldus* (Chilean boldo) against the ATCC reference strain and multidrug-resistant clinical strains of *A. baumannii*. Materials and Methods: Hydroalcoholic extracts of Brazilian boldo (BB) and Chilean boldo (CB) were prepared, and total soluble solids content (TSS) was determined. Minimum Inhibitory Concentration (MIC) and Minimum Bactericidal Concentration (MBC) of each extract were assessed by broth microdilution (CLSI M7-A9) and BHI agar plating. Results: TSS was 1.87% for BB extract and 8.76% for CB extract. All extracts were microbicidal against all tested strains, with MBC values of 0.23% for BB and 0.27% for CB. Conclusions: Although the Chilean boldo extract exhibited higher soluble solids content, both hydroalcoholic extracts of *P. barbatus* and *P. boldus* demonstrated antimicrobial activity against ATCC and multidrug-resistant clinical strains of *A. baumannii*, supporting further investigation of phytotherapeutics as promising alternatives in the fight against microbial resistance.

Keywords: *Acinetobacter Baumannii*; *Peumus Boldus*; *Plectranthus Barbatus*; Phytotherapy; Bacterial Drug Resistance.



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BASICS – UNDERGRADUATE

Synergistic effects of jaboticaba and carqueja extracts on multidrug-resistant *Acinetobacter baumannii* strains

Bacarin VAJ, Lage LMA, Dias SO, Menezes RT, Domiciano VMM, Oliveira LD

The bacterium *Acinetobacter baumannii* is a major global public health problem because it resists several classes of antibiotics and herbal medicines may be a promising antimicrobial alternative. The objective was to evaluate the synergistic effect of the combination of hydroalcoholic extracts of carqueja (*Baccharis trimera*) and jaboticaba (*Myrciaria cauliflora*) on multidrug-resistant strains of *A. baumannii*. For this, the hydroethanolic extracts of carqueja (EHC) and jaboticaba (EHJ) were prepared and the soluble solids content was quantified. The Minimum Bactericidal Concentration (MBC) was determined by the broth microdilution method (CLSI M7-A6) for the 3 strains of *A. baumannii*. To evaluate the combination of extracts, the checkerboard technique was used and the fractional bactericidal concentration index (ICBF) was adopted to determine the synergistic, additive, indifferent or antagonistic effects. As a result, the MBC of the carqueja extract ranged between 0.2% and 0.4% and of the jaboticaba extract was 0.5% for all strains. Fifteen combinations with synergistic effects were obtained, promoting reductions in the concentrations of the extracts between 2.5 and 133 times in relation to the MBC of the isolated extracts. It is concluded that the combination of carqueja and jaboticaba extracts presents synergistic antimicrobial effects on multidrug-resistant strains of *A. baumannii*, demonstrating great potential for the development of new alternative antimicrobial and antiseptic formulations.

Keywords: *Acinetobacter baumannii*; Anti-Bacterial Agents; Drug Synergism; Phytotherapeutic Drugs.



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BASICS – UNDERGRADUATE

Action of different concentrations of sodium hypochlorite associated with Er:YAG laser in the decontamination of root canals

Cabral B, Gagliardi CF, Khoury RD, Guerrero GG, Santos AC, Valera MC

The Er:YAG laser is an alternative for disinfection and has been little explored as an adjunct therapy in endodontic treatment (ET). The objective of this study was to evaluate in vitro the antimicrobial activity (CFU/mL) and the effect on endotoxins (EU/mL) of different concentrations of sodium hypochlorite (NaOCl), with or without association with the Er:YAG laser, in root canals contaminated with *Enterococcus faecalis* and *Escherichia coli*. Eighty extracted human tooth roots (Ethics Committee approval: 74671723.7.0000.0077) were contaminated for 28 days and divided into eight groups (n=10), according to the irrigation protocol: Control (saline solution – SS); Er:YAG (SS + Er:YAG laser); NaOCl 1%, NaOCl 2.5%, NaOCl 5.25%; Er:YAG + NaOCl 1%, Er:YAG + NaOCl 2.5%, and Er:YAG + NaOCl 5.25%. Microbiological samples of colony-forming units (CFU/mL) and endotoxins (EU/mL) were collected at three time points: before biomechanical preparation (BMP) (S1), after BMP (S2), and seven days after BMP (S3). CFU/mL and EU/mL data were analyzed using statistical tests ($p < 0.05$). The protocols with different concentrations of NaOCl promoted significant reductions ($p < 0.05$) in CFU/mL from S1 to S2 (97.85–100%) and from S1 to S3 (91.43–100%). There was a decrease in EU/mL from S1 to S2 (97.25–99.97%) and from S1 to S3 (98.89–99.84%), with no statistically significant differences among the concentrations. The association with the Er:YAG laser did not result in statistically significant differences in disinfection or endotoxin reduction. It was concluded that the use of Er:YAG did not enhance the antibacterial or endotoxin-reducing effects in root canals.

Keywords: *Enterococcus Faecalis*; Er:yag; Sodium Hypochlorite; *Escherichia Coli*; Disinfection.



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BASICS – UNDERGRADUATE

Synergistic potential of hydroalcoholic extracts of *Matricaria recutita* and *Anacardium occidentale* on *Acinetobacter baumannii*

de Oliveira P, Cintra TMFC, Tediole GT, Ribeiro MCM, de Oliveira LD, Domiciano VMM

Bacterial multidrug resistance is a global challenge, compromising therapeutic efficacy against difficult-to-manage infections. Among the pathogens listed by the WHO (2024), *Acinetobacter baumannii* stands out for its association with serious hospital infections. The combination of plant extracts can help combat infections caused by multidrug-resistant strains. The objective of this study was to analyze the synergistic potential of hydroalcoholic extracts of *M. recutita* (HEM), popularly known as chamomile, and *A. occidentale* (HEA), popularly known as cashew, against the standard strain (ATCC 19606) and clinical multidrug-resistant *A. baumannii* in planktonic cultures. The plant extracts were prepared from dried chamomile flowers and dried cashew leaves, respectively, in the proportions of 100g/1000mL and 30g/100mL of vehicle (50:50 EtOH:H₂O). The soluble solids content of the extracts was determined. The synergistic potential of the extracts was assessed using the checkerboard method, which is based on the Minimum Microbicidal Concentration (MMC) values of the isolated extracts. The extracts presented 2.39 and 3.22% soluble solids for HEM and HEA, respectively. Synergistic and additive points were found for the tested strains, with reduction rates ranging from 2- to 33.7-fold for HEA, and from 2- to 4-fold for HEM when compared to the MMC of the isolated extracts. The combination of extracts has potential for the development of herbal products that act on multidrug-resistant *A. baumannii* infections.

Keywords: *Acinetobacter baumannii*; *Anacardium*; *Matricaria*; Drug synergism; Phytotherapy.



Section 2

BASICS – GRADUATE



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BASICS – GRADUATE

Antioxidant and synergistic activities of hydroalcoholic extracts of clove and fig tree against *Acinetobacter baumannii*

Tediole GT, Cintra TMF, Cruz GM, Ribeiro MCM, Oliveira LD, Domiciano VMM

Antimicrobial resistance (AMR) represents a growing threat to global public health. In this context, *Acinetobacter baumannii* stands out for its ability to acquire resistance to multiple classes of antibiotics. It is urgent to seek alternatives that restore the effectiveness of antimicrobials, with phytotherapeutics standing out as promising sources of bioactive compounds with clinical potential. The objective of this study is to evaluate the antioxidant and synergistic activity of the combination of extracts from *Syzygium aromaticum* (clove) and *Ficus carica* L. (fig tree) on planktonic cultures of a multidrug-resistant clinical strain (H557) and an ATCC standard strain of *A. baumannii*. The soluble solids content of the extracts was determined. Antioxidant activity was assessed by the DPPH reduction method. The synergistic effect of the combinations was assessed using the checkerboard method. The extracts presented soluble solids contents of 6.58% for clove and 2.55% for fig tree. The effective concentrations to eliminate 50% of free radicals (EC₅₀) were 2.40 µg/mL and 50.21 µg/mL, respectively. Synergistic and additive effects were identified in the evaluated strains, with reductions of 2- to 125-fold for clove and 2-fold for fig tree compared to isolated extracts. The extracts demonstrated antioxidant activity, as well as additive and synergistic effects against the tested strains of *A. baumannii*, evidencing their potential for the development of phytotherapeutics aimed at treating multidrug-resistant infections.

Keywords: *Acinetobacter Baumannii*; *Ficus*; *Syzygium*; Phytotherapy; Antioxidants.



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BASICS – GRADUATE

Synergism between barbatimão and thyme extracts against multidrug-resistant *Acinetobacter baumannii* and *Pseudomonas aeruginosa*

Cordeiro MFL, Canettieri DL, Menezes RQ, Cintra TMF, Domiciano VMM, Oliveira LD

The bacteria *Acinetobacter baumannii* and *Pseudomonas aeruginosa* are on the WHO list of microorganisms with priority in the search for new antibacterials due to their resistance capacity, and herbal medicines are a possible therapeutic alternative. The objective was to evaluate the synergistic effect of the combination of hydroethanolic extracts of barbatimão (*Stryphnodendron barbatimam*) and thyme (*Thymus vulgaris*) on multidrug-resistant strains of *A. baumannii* and *P. aeruginosa*. The Minimum Bactericidal Concentration (MBC) was determined by the broth microdilution method (CLSI M7-A6) for the 3 strains of *A. baumannii* and 3 strains of *P. aeruginosa*. To evaluate the combination of extracts, the Checkerboard technique was used, adopting a fractional bactericidal concentration index (ICBF) to determine synergistic and additive effects. As a result, the MBC of barbatimão extract was 0.03% and thyme was 0.12% for all strains. For *A. baumannii*, 8 combinations with synergistic effects were obtained, reducing the concentrations of the extracts between 3 and 120 times in relation to the MBC of the isolated extracts. For *P. aeruginosa*, 2 synergistic combinations and 6 additives were obtained, reducing the MBC of the extracts between 2 and 30 times. It is concluded that the combination of barbatimão and thyme extracts has synergistic antimicrobial effects on multidrug-resistant strains of *A. baumannii* and *P. aeruginosa*, with potential to be used in the medical and dental fields.

Keywords: *Acinetobacter Baumannii*; *Pseudomonas Aeruginosa*; *Stryphnodendron Barbatimam*; *Thymus Vulgaris*; Synergism.



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BASICS – GRADUATE

Integration of 3D-Printed hydrogel with functionalized bioactive glass: characterization and micro-CT

Grisante LAD, Borges VRS, Vieira MN, Souto JCRA, Borges ALS, Vasconcellos LMR

Evaluation Advances in medicine have extended life expectancy, but not always with quality, leading to a higher incidence of bone diseases such as osteoporosis. Raloxifene and strontium ranelate can prevent them, but their use is limited by adverse effects. Thus, biomaterials emerge as safe alternatives, combining biocompatibility, regenerative properties, and controlled drug release. Among them, polymeric hydrogels, combined with 3D bioprinting and bioactive glasses, enable structural and functional customization. The aim was to evaluate the morphology and composition of 3D-printed hydrogels containing 45S5 bioactive glass functionalized with raloxifene or ranelate, using SEM-EDS, FTIR, and micro-CT, to assess their potential for bone regeneration. The 45S5 glass was functionalized with drugs and incorporated into alginate hydrogels, stored at -80 °C and characterized by SEM-EDS and FTIR. Ovariectomized rats received bone defects filled with the hydrogels, and after 4 weeks the femurs were evaluated by micro-CT. The hydrogels exhibited well-defined layers, interconnected pores, and homogeneous particles confirmed by SEM-EDS, with preservation of alginate bands and Ca²⁺ crosslinking in FTIR. Three-dimensional reconstruction of the defect region and micro-CT analysis revealed new bone formation without statistical differences ($p > 0.05$) between groups. Thus, 3D hydrogels with functionalized glasses maintain structure, porosity, and uniform distribution. Functionalization promoted subtle changes without compromising the material, showing promise for local drug delivery and bone regeneration in critical defects.

Keywords: Biomaterials; Bioactive Glass; Hydrogel; 3D Printing; Osteoporosis.



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BASICS – GRADUATE

Antifungal and antiparasitic action of photodynamic therapy mediated by cisplatin-functionalized porphyrins

Santos MCF, Marcolino LMC, Lima PMN, Bernardo AI, Strixino JF, Junqueira JC.

The treatment of candidiasis and leishmaniasis has been challenging due to the emergence of resistant microorganisms. Thus, antimicrobial photodynamic therapy (aPDT) has emerged as a potential adjuvant treatment. This study aimed to evaluate the effects of aPDT mediated by cisplatin-functionalized porphyrins, 3CisPt (3-H₂TPyP) and 4CisPt (4-H₂TPyP), against *Candida albicans* and *Leishmania amazonensis*. For this purpose, aPDT using LED irradiation was applied to *C. albicans* strain SC5314 in planktonic cultures and to *L. amazonensis* strain M2269 in promastigote forms and intracellular amastigotes within macrophages. The antifungal effects on *C. albicans* were assessed by determining the minimum inhibitory concentration (MIC) and by performing a kill-curve analysis through colony-forming unit (UFC log₁₀) counts. The antiparasitic effects on *L. amazonensis* were evaluated using the trypan blue exclusion assay for cell viability. Following aPDT on *C. albicans*, MIC values were 13.15 μ M for 3CisPt and 6.57 μ M for 4CisPt. The 3CisPt treatment resulted in a 2-log reduction in UFC, whereas 4CisPt achieved complete eradication of fungal cells. In *L. amazonensis*, both 3CisPt and 4CisPt significantly reduced the viability of promastigotes. In amastigotes, both porphyrins induced parasite mortality; however, 4CisPt also exhibited cytotoxic effects on macrophages. These findings demonstrate that cisplatin-functionalized porphyrins are effective in aPDT against *C. albicans* and *L. amazonensis*, with 3CisPt standing out for its lack of cytotoxicity toward macrophages.

Keywords: *Candida Albicans*; Cisplatin; *Leishmania Amazonensis*; Photodynamic Therapy; Porphyrins.



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BASICS – GRADUATE

Antifungal action of gold nanoparticles functionalized with the natural polyphenol gallic acid against *Candida albicans*

Pedroso LLC, Lage ACP, Garcia MT, Silva NS, Carmo PGF, Junqueira JC

Gallic acid (GA) is a polyphenol with antifungal activity, but its low bioavailability limits clinical use. In addition, it acts as a metal reducer, enabling a sustainable synthesis of metal nanoparticles. Thus, in this study, gold nanoparticles were employed as a delivery system for GA. The aim was to evaluate the effects of gold nanoparticles associated with GA against *Candida albicans*. Pure gold nanoparticles (AuNp) and GA-associated gold nanoparticles (AuNpGA) were previously synthesized, exhibiting sizes of 56.8×27.0 nm and 66.2×33.1 nm, respectively. Reference strains (SC 5314 and 18804) and a clinical strain (Ca 60) were exposed to AuNpGA, AuNp, or GA to determine the minimum inhibitory concentration (MIC) and minimum fungicidal concentration (MFC). Subsequently, the physiological, molecular and structural effects of AuNpGA on *C. albicans* cells and in its pathogenicity, as well as toxicity in *Galleria mellonella*, were evaluated. The results showed MIC values of $1.23 \mu\text{g/mL}$ for AuNpGA, $2.46 \mu\text{g/mL}$ for AuNp, and $128\text{--}256 \mu\text{g/mL}$ for GA. MFC values ranged between 1.23 and $2.46 \mu\text{g/mL}$ for AuNpGA, indicating fungicidal activity. AuNpGA reduced filamentation, biofilm formation and ergosterol levels; increased reactive oxygen species production and lipid peroxidation; downregulated the genes BCR1, EFG1, ERG11, CDR1 and SAP9; and induced alterations in the cell wall and membrane observed by transmission electron microscopy. Finally, AuNpGA were not cytotoxic to *G. mellonella*. It was concluded that AuNpGA exhibit fungicidal activity against *C. albicans* through multiple targets of action.

Keywords: Gallic Acid; Metal Nanoparticles; Green Chemistry; *Candida Albicans*.



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BASICS – GRADUATE

Chitosan/PCL hydrogels associated with phytotherapeutics: in vitro evaluation of cellular activity

Lupp JS, Mello DCR, Sato TP, Silva LAA, de Oliveira LD, de Vasconcellos LMR

The combination of chitosan with polycaprolactone (PCL) enables the production of hydrogels with potential application in wound dressings. The incorporation of phytotherapeutic agents may enhance cellular and anti-inflammatory activity, representing a promising alternative for the prevention of pressure ulcers. The aim of this study was to develop chitosan hydrogels (CH) with polycaprolactone (PCL) fibers associated with phytotherapeutic agents for the preventive management of pressure ulcer lesions. Hydrogels of CH with glycerophosphate (GP) and with xanthan (X), both combined with PCL, were produced. The experimental groups were: chitosan-xanthan (CHX, control), CHX + propolis (CHXP), CHX + ginger (CHXG), and CHX + propolis + ginger (CHXPG), all combined with PCL. The hydrogels were characterized by wettability tests and scanning electron microscopy (SEM). Subsequently, they were cultured with human keratinocytes (HaCaT) and human fibroblasts (HFF-1), and evaluated through cell viability assays and quantification of inflammatory cytokines. All hydrogels exhibited cell viability above 70% compared with the control group, with no evidence of cytotoxicity. Higher IL-6 production was observed in the CHX group in both cell lines, whereas IL-10 production showed no statistically significant differences among the groups. The hydrogels demonstrated promising results, particularly due to the innovative association of biopolymers and phytotherapeutics, reinforcing their potential and justifying further investigations.

Keywords: Chitosan; Hydrogel; Phytotherapy; Fibroblasts; Keratinocytes.



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BASICS – GRADUATE

Alizarin: possible antifungal with effects on growth, pathogenicity and proteomic profile of *Candida dubliniensis*

Cruz GM, Arumugam G, Borges BM, Barcick U, Pereira AZP, Junqueira JC

The aim was to investigate the potential of alizarin, a natural anthraquinone extracted from plants, on the growth, virulence and proteomic profile of *C. dubliniensis*. From reference strains and clinical isolate of oral candidiasis, the values of inhibitory concentration (MIC) in microdilution assays, synergistic effects with antifungals in checkerboard test and filamentation capacity in fetal bovine serum were determined. A study was conducted in the *in vivo* model *Galleria mellonella* to investigate cytotoxicity in animal cells and treatment efficacy in experimental candidiasis. Finally, the proteomic profile of *C. dubliniensis*, before and after exposure to alizarin, was determined by Shotgun proteomics via liquid chromatography coupled to mass spectroscopy. The results demonstrated antifungal activity for both strains studied, with MIC of 16 $\mu\text{g/mL}$. In combination with fluconazole, alizarin had a synergistic effect, reducing fluconazole concentrations by up to 99%. Alizarin also reduced the occurrence of filamentation to ~6%, compared to ~66% in the untreated group. In *G. mellonella*, alizarin did not show toxicity and increased the survival of the animals by reducing the circulating fungal cells. Alizarin treatment significantly modulated the protein expression profile of *C. dubliniensis*, downregulating proteins involved in cell wall synthesis and integrity. It was concluded that alizarin may be a promising antifungal agent against *C. dubliniensis* infections.

Keywords: Antifungal; *Candida*; Phytotherapy; Proteomics; Synergism.



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BASICS – GRADUATE

Antibacterial action of calcium hydroxide, chlorhexidine and N-acetylcysteine, and their associations against *Parvimonas micra* and *Prevotella intermedia*

Oliveira JA, Carvalho LS, Oliveira LD, Khoury RD, Carvalho CAT, Hasna AA

The aim of this study was to evaluate the effectiveness of calcium hydroxide, chlorhexidine, and N-acetylcysteine, and their combinations, against anaerobic bacteria in an in vitro study. Two strains of *Parvimonas micra* and *Prevotella intermedia* were inoculated, standardized, on Brucella agar enriched with lamb's blood and incubated in an anaerobic chamber. Then, the Minimum Inhibitory Concentration (MIC) and Minimum Microbicidal Concentration (MMC) were determined, as well as antibiofilm activity by the MTT test and biomass assessment by the crystal violet test. The data were statistically analyzed, adopting a significance level of 5%. For MIC and MMC, concentrations ranged from 500 mg/mL to 3.9 mg/mL. Regarding bacterial viability, the groups that incorporated NAC mostly presented the lowest mean number of viable bacteria, with a statistical difference from the control group in the presence of both bacteria. In the biomass evaluation, the results showed that all groups with NAC presented a statistically significant difference in relation to the control group, except for the NAC + Ca(OH)₂ group on *P. micra*. This study concluded that the combination of NAC with Ca(OH)₂ and/or CHX, or also Ca(OH)₂ with CHX, demonstrated effective antibacterial action against *P. intermedia* and *P. micra*.

Keywords: Acetylcysteine; Anaerobic Bacteria; Antibacterial Agents; Calcium Hydroxide; Chlorhexidine.



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BASICS – GRADUATE

Surface plasmon resonance biosensor for analysis of cellular osteoblastic activity induced by biomaterials

Silva LAA, Brasil RF, Schatkoski VM, Lupp JS, Vasconcellos LMR, Tada DB

The use of biomaterials in bone repair requires an *in vitro* biological evaluation. However, conventional analytical methods compromise cells to provide single-point results that do not reflect the dynamic and continuous *in vivo* interactions. Surface plasmon resonance (SPR) biosensors can simulate an *in vitro* microenvironment more closely resembling *in vivo* physiological conditions. Thus, the objective was to develop an SPR biosensor to analyze osteocalcin expression by osteoblastic cells under the influence of a biomaterial. MG-63 cells were cultured with wollastonite for 14 days, after which the culture medium was collected and stored at -20 °C. The biosensor surfaces were then cleaned, functionalized with anti-Concanavalin-A antibodies at 100 µg/mL (biological control) and anti-Osteocalcin antibodies at 10 mM, and blocked with 1% bovine serum albumin (physical control). Finally, the sensors were integrated into the SPR system, and the media, diluted at 1:500 and 1:1000 in saline buffer, were injected to monitor antigen-antibody interactions, with regeneration after each injection. Data were analyzed using one-way ANOVA, with a significance level of $p < 0.05$. The evaluation indicated that the 1:1000 dilution resulted in signals similar between the target and the controls, whereas at the 1:500 dilution it was possible to observe an increased signal in the functionalization with anti-Osteocalcin compared to the controls ($p > 0.05$). These results point to the capacity for specific target detection and the potential applicability of the biosensor for *in vitro* evaluations.

Keywords: Biosensors; Surface Plasmon Resonance; Bone Regeneration; Osteocalcin; Biomaterials.



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BASICS – GRADUATE

Activated carbon fiber with metal ions by sputtering: evaluation of osteogenic potential in vitro – partial results

Melo BE, Schiavo MR, Silveira MI, Nunes CMM, Marco AC

Objectives: This study evaluated the cellular activity of carbon fiber obtained from polyacrylonitrile (PAN) textile fibers in the forms of non-activated felt, activated felt, and felt incorporated by sputtering with silver, gold, copper, palladium, and platinum ions, in the osteogenesis of mesenchymal cells. **Materials and Methods:** The specimens were prepared as three-dimensional scaffolds (5 × 2 mm), sterilized, and divided into eight groups: control (C), non-activated felt (FFCNA), activated felt (FFCA), and felt incorporated with silver (FFCAA_g), gold (FFCAA_{Au}), copper (FFCACA_u), palladium (FFCAP_d), or platinum (FFCAP_t). Mesenchymal stem cells from the bone marrow of Wistar rats were isolated, cultured in supplemented α-MEM, and plated in osteogenic medium (10,000 cells per well). The following tests were performed: cell proliferation (3 days), cell viability (7 days), total protein content, and alkaline phosphatase activity (10 days). **Results:** The control group (C) showed a higher proliferation rate than FFCA ($p = 0.0012$) and FFCAA_g ($p = 0.0052$). FFCAA_{Au} also showed a higher proliferation rate than FFCA ($p = 0.0013$) and FFCAA_g ($p = 0.0059$). All groups demonstrated cell viability at 7 days. At 10 days, all groups demonstrated metabolic activity and the synthesis of osteogenic protein expression (alkaline phosphatase). **Conclusion:** All biomaterials demonstrated potential osteogenic activity; however, FFCAA_{Au} showed a higher cell proliferation rate, highlighting this biomaterial as particularly promising for bone regeneration.

Keywords: Carbon Fiber; Cell Viability; Osteogenesis; Tissue Engineering.



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BASICS – GRADUATE

Immunization of *Galleria mellonella* with inactivated microorganisms generates hemolymph with antibiofilm activity against *Staphylococcus aureus*

Silva FAS, Costa MES, Lima PMN, Pedroso LLC, Junqueira JC, Garcia MT

Antimicrobial resistance constitutes a global threat and drives the search for new therapeutic strategies. In this sense, in the present study we evaluated the antimicrobial potential of the hemolymph of *Galleria mellonella* previously immunized *Staphylococcus aureus* or *Candida albicans* by heat inactivated, on the formation of *S. aureus* biofilms. For this, larvae were immunized and after 24, 48 or 72 h, hemolymph free of hemocytes (HL) or isolated hemocytes (HI) were obtained. The antimicrobial activity was determined by the count of colony-forming units (CFU/mL) in *S. aureus* biofilms established from three initial concentrations of bacterial inoculum (10⁶, 10⁵ and 10⁴ cells/mL). Results: 48-h HL showed the highest inhibitory activity, reducing up to 3.95 Log₁₀. On the other hand, the HI showed significant effects at all times with reductions greater than 6 Log₁₀, with the IM Ca group standing out for 72 h, where the inhibition reached 8.51 Log₁₀. These findings indicate that the immunization of *G. mellonella* modulates the larval immune response, resulting in components capable of significantly inhibiting *S. aureus* biofilms, including at different initial inoculum densities.

Acknowledgments: FAPESP 2024/04696-4.

Keywords: *Galleria Mellonella*; Immune System; Antimicrobial Resistance; *Staphylococcus Aureus*.



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BASICS – GRADUATE

Osseointegration of titanium implants coated with polycrystalline cvd diamond film

Mello FZD, Almeida AMP, Edmundo DA, Vieira MN, Souza TM, Vasconcellos LMR

The coating of biomaterials with CVD diamond films has attracted increasing interest due to their physicochemical properties and biocompatibility. This study aimed to evaluate the osseointegration of titanium implants coated with polycrystalline CVD diamond. Fourteen Wistar rats received control implants (without coating) in the right tibia and experimental implants (with coating) in the left tibia. Fluorescent markers were administered on days 7 (calcein) and 21 (alizarin) to identify bone apposition lines, which were visualized by fluorescence microscopy. The bone area fraction occupancy (BAFO) was quantified using ImageJ software by evaluating the mesial and distal fields of each implant. Histomorphometric analyses showed good bone formation in both groups, with no statistically significant differences. It is concluded that the polycrystalline CVD diamond coating induced bone formation, confirming its biocompatibility and potential as an alternative surface modification for implants.

Keywords: Osseointegration; Biomaterials; Dental Implants; CVD Diamond; Biocompatibility.



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BASICS – GRADUATE

Synergistic potential of hydroalcoholic extracts of rosemary, cinnamon, and guava on acinetobacter baumannii strains

Cintra TFM, Carvalho LS, Menezes RT, Oliveira LD, Ribeiro MCM, Domiciano VMM

The objective of this study was to evaluate the synergistic potential of the triple combination of hydroalcoholic extracts of rosemary (EHA), cinnamon (EHC), and guava (EHG) on standard and clinical strains of *Acinetobacter baumannii*. Plant extracts were prepared from cinnamon bark and dried rosemary and guava leaves (30g/100mL; 50:50 EtOH:H₂O). Antimicrobial analysis of the isolated extracts (to obtain the Minimum Inhibitory and Microbicidal Concentration MIC and MMC) was performed using the broth microdilution method according to CLSI standards. Triple combination analysis was performed using the multidrug combination method. Microplates were prepared with extract concentrations based on the MIC and triple combination of extracts in a 1:1:1 ratio by volume. The well contents were diluted and plated for CFU/mL counting. Data were analyzed using CompuSyn software, employing the "Chou-Talalay" technique. By inserting the dose-effect curve data, it was possible to evaluate the interaction of the extracts according to the Combination Index (CI), where $CI < 1$ indicates a synergistic effect, $CI = 1$ an additive effect, and $CI > 1$ an antagonistic effect. The extracts showed synergistic action on the standard strain (ATCC 19606) and an antagonistic effect on the clinical strain (566006). Therefore, it is concluded that the evaluated plant extracts present bioactive compounds with bactericidal efficacy for bactericidal activity, and that the combination of these extracts can potentiate the antimicrobial effects in some cases.

Keywords: *Acinetobacter Baumannii*; *Cinamomum Verum*; *Psidium Guajava*; *Rosmarinus Officinalis*; Phytotherapeutics.



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BASICS – GRADUATE

Antibiofilm activity of *Origanum majorana* (Marjoram) extract against *Acinetobacter baumannii*, *Pseudomonas aeruginosa*, and *Klebsiella pneumoniae*

Lage LMA, Carvalho LS, Nazario LM, Tediole GT, Domiciano VMM, Oliveira LD

The irrational and indiscriminate use of antibiotics contributes to the rise of microbial resistance, underscoring the urgent need to investigate unconventional therapies effective against multidrug-resistant bacterial strains. Objective: To evaluate the antibiofilm activity of the hydroethanolic extract of *Origanum majorana* L. (marjoram) against *Acinetobacter baumannii*, *Pseudomonas aeruginosa*, and *Klebsiella pneumoniae* strains. Materials and Methods: The hydroethanolic extract of marjoram (HEM) was obtained, and the soluble solid content was quantified. The Minimum Inhibitory Concentration (MIC) and Minimum Bactericidal Concentration (MBC) were determined by the broth microdilution method (CLSI M7-A6). To assess antibiofilm activity, cell viability was measured using the MTT assay. Extract concentrations tested were MIC, 2×MIC, and 4×MIC of each strain, in two conditions: (a) biofilm formation prevention; (b) treatment of preformed biofilms (48 h) for 15 min. Data were analyzed using ANOVA and Tukey's test, with a significance level set at 5%. Results: The soluble solid content of HEM was 3.38%. The MIC values determined for *A. baumannii*, *K. pneumoniae*, and *P. aeruginosa* were 0.21 mg/mL, 0.42 mg/mL, and 0.84 mg/mL, respectively. Antibiofilm activity showed inhibition greater than 96% for all strains at 3.38 mg/mL. Conclusion: HEM demonstrated significant antibiofilm activity against standard strains of *Acinetobacter baumannii*, *Klebsiella pneumoniae*, and *Pseudomonas aeruginosa*.

Keywords: *Origanum Majorana*; Phytotherapy; *Acinetobacter Baumannii*; *Klebsiella Pneumoniae*; *Pseudomonas Aeruginosa*.



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BASICS – GRADUATE

Phytochemical characterization and antimicrobial evaluation of *Rosmarinus officinalis* L. and *Plinia cauliflora* in endodontic microorganisms

Gimenez MG, Carvalho LS, Menezes RT, Hasna AA, Oliveira LD, Carvalho CAT

With the increase in resistant microorganisms and the depletion of antibiotic use in root canals, studies of plant extracts with antimicrobial activity have increased, aiming at alternative therapies. The objective of this study was to evaluate the phytochemical characteristics and phytochemicals of hydroethanolic extracts of *Rosmarinus officinalis* L. (rosemary) and *Plinia cauliflora* (jabuticaba), as well as their synergistic and antimicrobial effects on *Enterococcus faecalis*, *Enterococcus faecium*, *Candida albicans*, *Fusobacterium nucleatum*, and *Porphyromonas gingivalis*. The Minimum Inhibitory Concentration (MIC) and Minimum Microbicidal Concentration (MMC) were determined by broth microdilution, and the Fractional Inhibitory Concentration Index and Fractional Microbicidal Concentration Index were determined by checkerboard microdilution. Statistical analysis was performed using ANOVA and Dunn's test (5% significance level). Both extracts demonstrated phenolic and flavonoid phytochemicals and antioxidant activity. The extracts exhibited antimicrobial activity against the studied strains, and when combined, they presented additive concentrations against the *E. faecalis* strain. Therefore, it was concluded that both extracts exhibited antioxidant and antimicrobial activity in planktonic cultures. Regarding the combined extracts, there was no synergistic effect, but additive results were obtained against the clinical *E. faecalis* strain 2.

Keywords: Herbal Extracts; Antibacterial Activity; Endodontic Infection; Synergism.



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BASICS – GRADUATE

The effect of photobiomodulation in combination with orthodontic force reactivation on root resorption during tooth movement

Rodrigues RB, Calsa B, Mendes MSS, Jardini MAN, Ferreira CL, Santamaria Junior M

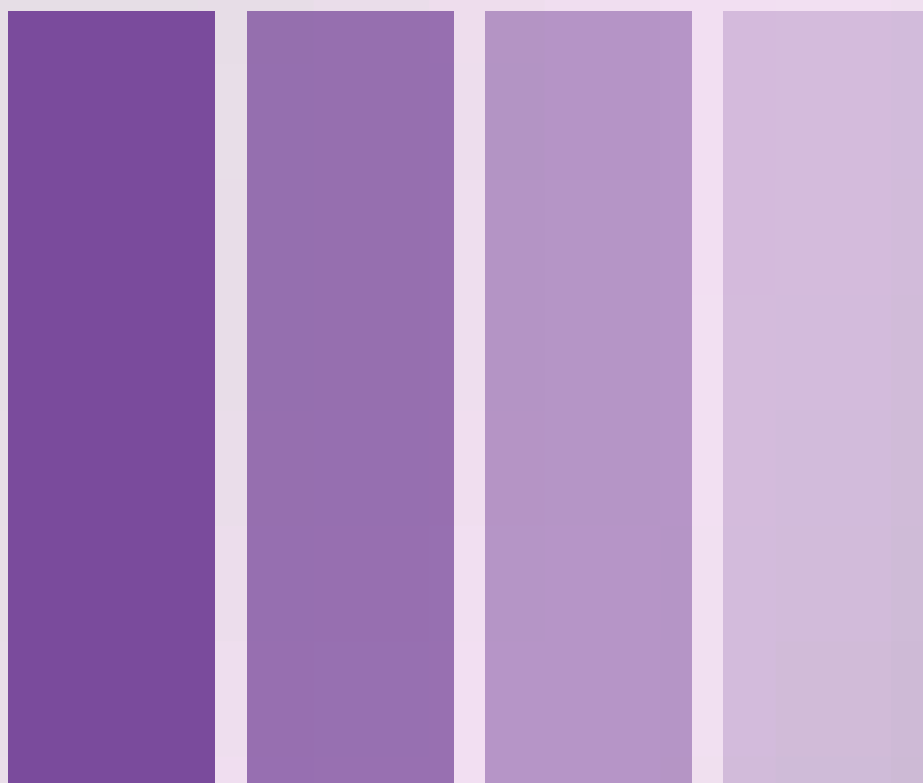
Induced tooth movement can trigger inflammation and tooth resorption, which are aggravated by mechanical reactivations. The use of therapeutic laser has been proposed as a strategy to modulate these effects. This study evaluated root resorption and hyalinized area via histomorphometry, as well as the gene expression of inflammatory and osteoclastic markers in the alveolar bone and first molar of mice subjected to tooth movement, considering device reactivation and low-level laser application. Wistar rats were divided into four experimental groups: control group (GM), reactivation group (GR), laser group (GL), and reactivation + laser group (GRL). After 21 days, the alveolar bone and the moved first molar were dissected. The gene expression of *Ctsk*, *Rankl*, *Nfkb*, *Il1b*, *Il6*, and *Tnfa* was assessed by RT-qPCR. Data were analyzed by ANOVA with Tukey's post-hoc test ($p < 0.05$). In the moved first molar, the GRL group showed a significant reduction in the expression of *Ctsk*, *Rankl*, *Il6*, and *Tnfa*, suggesting lower osteoclastic activity and inflammation. The GL group demonstrated an increase in *Rankl* and *Il1b* in the alveolar bone, suggesting stimulation of bone remodeling. The GRL group also exhibited lower expression of *Tnfa* in the alveolar bone, reinforcing the anti-inflammatory effect of the laser in combination with reactivation. The therapeutic laser modulated the inflammatory and osteoclastic response in the orthodontic tooth movement microenvironment, especially when associated with reactivation. These findings indicate a possible protective effect of the laser against tooth resorption associated with orthodontic tooth movement.

Keywords: Orthodontic Tooth Movement; Low-Level Light Therapy; Inflammation; Tooth Resorption; Bone Remodeling.



Section 3

LABORATORY – UNDERGRADUATE





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LABORATORY – UNDERGRADUATE

Enamel wettability after treatment with aminomethacrylate and fluoride-based anti-erosive solutions

Azevedo JP, Prado TP, Torres CRG, Scaramucci T, Aoki IV, Borges AB

The investigation of the anti-erosive effect of polymers and fluorides contributes to identifying effective combinations against dental erosion. This study evaluated the potential interaction between aminomethacrylate copolymer, sodium fluoride, and the acquired pellicle in modifying the enamel surface using goniometry. Bovine enamel specimens were flattened and polished. Half were immersed in human saliva (5 min) for initial pellicle formation, while the other half remained pellicle-free. Treatments were applied using the following solutions (1 min, n=5/group): C (ultrapure water – negative control), F (sodium fluoride 225 ppm F⁻), and F+AMC (sodium fluoride 225 ppm F⁻ + aminomethacrylate 2%). The contact angle was measured by applying a 0.5 μ L drop of ultrapure water perpendicular to the enamel surface, recording images at 20 fps for 30 s. Three readings per specimen were performed. Data were analyzed by two-way ANOVA and Tukey's test ($p < 0.05$). Significant differences were observed for both factors. For the presence of the acquired pellicle, means ($\pm$ SD) were: with pellicle (39.6 ± 21.5)A and without pellicle (35.5 ± 23.5)B. For treatment: C (26.3 ± 4.8)B, F (18.6 ± 3.2)A, F+AMC (67.8 ± 3.5)C. It was concluded that AMC was able to form a film on the enamel surface, regardless of the presence of the acquired pellicle, altering its wettability pattern and rendering it more hydrophobic, showing promise for anti-erosive formulations.

Keywords: Dental Erosion; Dental Enamel; Polymers; Sodium Fluoride.



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LABORATORY – UNDERGRADUATE

Effect of pulsed electromagnetic field on periodontal ligament cell sheets

Santos MD, Malara ME, Cobbos PS, Rovai ES, Nunes CMM, Jardini MAN

Objectives: This study compared cellular biological events by evaluating the in vitro behavior of periodontal ligament mesenchymal stem cells (PDLSCs) in the formation of cell sheets, associated or not with pulsed electromagnetic fields (PEMF). **Materials and Methods:** Human PDLSCs were isolated (CAAE 84105024.8.0000.0077) and seeded into 24-well plates containing a-MEM culture medium supplemented with fetal bovine serum, antibiotics, and ascorbic acid to induce cell sheet formation. The cellular properties assessed in the groups, with and without PEMF exposure, included cell proliferation and viability at 3, 7, and 10 days; alkaline phosphatase (ALP) activity and total protein content (TPC) at 7 and 10 days; and calcium deposition in mineralized nodules at 10 and 14 days. **Results:** Cell proliferation was significantly higher at 7 and 10 days in both groups compared to day 3 ($p < 0.05$). Cell viability was greater at 10 days in both groups ($p < 0.05$). Alkaline phosphatase activity peaked at 7 days in both groups ($p < 0.05$), and total protein content was significantly higher at 10 days ($p < 0.05$). Calcium deposition in mineralized nodules was reduced only at 14 days in the PEMF group ($p < 0.0001$). **Conclusions:** The association of PDLSC-derived cell sheets with PEMF resulted in more favorable outcomes in the evaluated cellular properties, particularly at 10 days of culture.

Keywords: Mesenchymal Stem Cells; Electromagnetic Fields; Guided Tissue Regeneration.



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LABORATORY – UNDERGRADUATE

Effect of coloring substances and uv light on color change and surface roughness of a monochromatic composite resin

Vieira GH, Ciciliati BD, Lessa FV, Tango RN

Objective: To evaluate the color change and surface roughness of Vittra APS Unique resin after different exposure intervals to staining solutions and UV light. **Materials and Methods:** Sixty-four specimens, 32 of each material (Vittra APS Unique and Vittra APS), were fabricated, polished, and subjected to baseline color and surface roughness evaluation using a spectrophotometer and a surface profilometer. The specimens were then divided into two groups according to resin type and further subdivided into four subgroups ($n=8$): deionized water (control), coffee, red wine, and UV aging. Color changes (E_{ab} and E_{00}) and roughness (R_a) were measured after these processes at two time points: 2.5 days (T1) and 5 days (T2). For statistical analysis, the E_{ab} , E_{00} , and R_a values were tabulated and subjected to analysis of variance (ANOVA) and Tukey's test for group comparisons, both at a significance level of $\alpha = 0.05$. Color differences of $E_{00} = 0.8$ and $= 1.8$ were used to interpret the results. **Results:** Vittra APS Unique resin showed greater color change (E_{ab}) compared to Vittra APS resin ($p < 0.001$). Sample roughness decreased at T1 and increased at T2 ($p < 0.001$). Apparently, no correlation was observed between color change and surface roughness. **Conclusion:** The color stability and surface roughness of the monochromatic resin were influenced by exposure time to different staining solutions. Vittra APS resin showed the most satisfactory performance regarding the analyzed parameters.

Keywords: Staining Agents; Aging; Spectrophotometry; Surface Properties; Composite Resin.



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LABORATORY – UNDERGRADUATE

Optical properties of 3D-printed dental resins with inorganic fillers for long-term clinical use three-dimensional printing

Costa GC, Souza LS, Rebelo EA, Canappele TMF, Bresciani E

This study investigated the translucency, gloss, and fluorescence of 3D-printed dental resins containing inorganic fillers, with the aim of identifying materials that balance durability and esthetics. Five printed resins were evaluated: Voxelprint Ceramic A1 FGM (VP), High Impact Denture Teeth A1 SprintRay (DT), VarseoSmile TriniQ A1 BEGO (TQ), Ceramic Crown SprintRay (CC), and VarseoSmile Crown A1 BEGO (T, negative control), in addition to a composite resin, Vittra A1 FGM (RC, positive control). Disc-shaped specimens ($n = 10$; $6\text{mm} \times 2\text{mm}$) were designed in SprintRay software, sliced, and printed on the SprintRay 95S (DT, TQ, CC, T) or Elegoo Mars 4 (VP) at 0° . After printing, specimens were washed in 90% isopropyl alcohol (30s) and UV-cured (± 20 min). The positive control was light-cured for 40s (Quazar FGM). All specimens were polished with silicon carbide papers on a polishing unit (600 rpm) under water cooling and subsequently cleaned in an ultrasonic bath (10 min). Gloss (Novo-Curve), translucency (CM-5), and fluorescence (RF-5301 PC) were measured, with three readings averaged per specimen. Gloss values showed normal distribution (one-way ANOVA), with no significant differences among groups ($p = 0.102$). All materials exhibited low translucency (< 5), indicating opacity; VP and TQ values were closest to RC, while CC showed the lowest translucency, attributed to its ceramic particle content. Regarding fluorescence, DT showed no detectable emission compared with T, whereas TQ demonstrated a pattern similar to RC. Among the printed resins, TQ displayed optical properties most comparable to the positive control. Within the study's limitations, careful material selection may enhance esthetic integration in long-term 3D-printed restorations.

Keywords: Three-Dimensional Printing; Dental Materials; Materials Testing; Resins; Synthetic; Fluorescence.



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LABORATORY – UNDERGRADUATE

Craniometric analysis and logistic regression in sex estimation in a brazilian sample

Oliveira RAA, Bittencourt GM, Francesquini MA, Júnior LF, Neto JSP, Barbieri AA

This study aimed to investigate sexual dimorphism in cranial measurements with the purpose of developing a logistic regression statistical model for sex estimation. A total of 200 skulls from the Osteological and Tomographic Biobank Prof. Dr. Eduardo Daruge (FOP/UNICAMP), all with previously known sex and age, were analyzed. The basion–glabella, right meatus–bregma, left meatus–bregma, left–right meatus, and right–left zygion measurements were obtained using a digital caliper, following intra-examiner calibration on 25 skulls, which showed over 95% agreement and was classified as excellent according to Szklo and Nieto (2000). The variables presented symmetrical distribution and good homogeneity ($SD < 6\%$), and Levene's test confirmed homoscedasticity ($p > 0.05$). All measurements showed statistically significant differences between sexes ($p < 0.001$), with higher values in the male group. The logistic model demonstrated excellent discriminatory power ($AUC = 0.86$), with an accuracy of 81%, specificity of 76%, and sensitivity of 83%, highlighting basion–glabella and right–left zygion as the most robust predictors. The findings confirm the presence of sexual dimorphism across all analyzed variables and demonstrate that the proposed statistical model has high discriminatory capacity, approaching near-perfect models. These results underscore the importance of validating regional models in forensic anthropology to enhance the accuracy of human identification.

Keywords: Craniometric Analysis; Sex Estimation/Sexual Dimorphism; Logistic Regression Models; Human Identification; Forensic Anthropology.



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LABORATORY – UNDERGRADUATE

Influence of ultraviolet light wavelength on the fluorescence intensity emitted by composite resins

Rossini CP, Costa M, Borges AB, Torres CRG

The aim of this study was to analyze the influence of ultraviolet light wavelength on the fluorescence intensity emitted by composite resins. Materials and Methods: Cylindrical specimens (5 mm in diameter $\times$ 2 mm in thickness) were fabricated with 29 types of composite resins from different manufacturers ($n=5$). As a control, 5 sound human teeth were used. Fluorescence was measured by two methods. In the first, specimens were excited in a spectrofluorophotometer at 365 and 395 nm, with emission data collected. In the second, they were photographed in a standardized light chamber under UV at 365 and 395 nm, and the images analyzed in Adobe Photoshop to obtain the L^* coordinate. Data were subjected to ANOVA and Tukey's test. Results: ANOVA showed significant differences for all factors ($p>0.05$). Tukey's test results in the first method were: 365 nm – 154.19a, 395 nm – 560.2b. In the second: 365 nm – 34.10 (10.88)a, 395 nm – 58.39 (26.02)b. Different resins showed varied fluorescence levels, some higher and others lower than natural teeth. Conclusion: The fluorescence of composite resins varies with UV wavelength. Most tested materials showed fluorescence lower or similar to natural teeth under 365 nm excitation. However, at 395 nm, emission was significantly higher, often exceeding that of natural teeth.

Keywords: Fluorescence, Composite Resins, Ultraviolet.



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LABORATORY – UNDERGRADUATE

Texture analysis of the mandibular condyle in magnetic resonance imaging as a forensic tool for sex and chronological age determination

Bittencourt GM, Feitosa FA, Lopes SLPC, Barbieri AA

This study aimed to investigate the potential of texture analysis applied to magnetic resonance imaging (MRI) of the mandibular condyles for predicting biological sex and estimating chronological age in Brazilian individuals. A total of 49 MRIs of temporomandibular joints (TMJs), acquired using a specific protocol, were analyzed. The sample included individuals aged 16 to 74 years (mean age: 41 years), with 70% being female. Eleven texture parameters were extracted using MaZda® software, considering twelve directions per parameter. Due to the large number of variables, Spearman's correlation analysis was performed between directions, allowing the use of mean values for 10 out of 11 parameters, with the exception of "Correlat," which remained separate due to lower correlation values. Comparison between sexes revealed a statistically significant difference in the parameter SumAverg, with higher values in males ($p = 0.030$), while the remaining parameters showed no relevant differences. In the analysis across age groups, no statistically significant differences were observed in any of the texture parameters. The findings indicate that, although texture analysis of MRI of the mandibular condyles shows limited potential for age estimation, the parameter SumAverg may represent a promising marker for sex differentiation, suggesting that further approaches with larger sample sizes and multivariate statistical methods may enhance its applicability in forensic identification.

Keywords: Magnetic Resonance Spectroscopy; Forensic Anthropology; Forensic Dentistry; Age Determination by Skeleton; Sex Determination Analysis.



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LABORATORY – UNDERGRADUATE

Effect of staining on the color stability of resin composites with simplified shade systems

Rocha ACMF, Fernandes JB, Mailart MC, Torres CRG, Borges AB

The aim of this study was to evaluate the color stability of resin composites with simplified shade systems after staining and their recovery after repolishing. Cylindrical specimens (6 mm × 1 mm) were prepared from ten composites (n=15): conventional (positive control) – Grandioso (Gnd, Voco); single-shade – Vittra Unique (Vit, FGM), Omnichroma (Omn, Tokuyama), Charisma Diamond One (Char, Kulzer); and simplified shade systems – Admira Fusion 5 (Ad5, Voco), Tetric Prime (Tet, Ivoclar), Spectra ST HV (Spt, Dentsply), G-ænial A'Chord (G-ae, GC), Filtek Universal (Fil, 3M/ESPE). Baseline color was evaluated using a spectrophotometer (CM-5, Konica Minolta) according to the CIELAB system. Specimens were then subjected to 14 days of staining and re-evaluated. Afterwards, repolishing was performed followed by a third color assessment. Color variations (L, a, b) and overall color changes relative to baseline (E00T1 after staining and E00T2 after repolishing) were calculated. Data were analyzed using ANOVA/Tukey (5%). Means (±SD) for ?E00T1: Gnd(1.5±0.6)a; G-ae(1.7±0.4)a; Spt(1.7±0.9)a; Ad5(1.9±0.3)a; Omn(3.6±0.6)b; Tra(3.8±1.2)b; Fil(4.0±0.5)bc; Char(4.5±0.6)bc; Tet(4.9±1.8)c; Vit(5.0±1.0)c. ?E00T2: Spt(0.9±0.5)a; Gnd(1.0±0.5)a; G-ae(1.1±0.5)a; Ad5(1.2±0.4)a; Fil(1.3±0.8)a; Tra(2.7±1.2)b; Tet(2.9±1.4)bc; Omn(3.4±0.7)bc; Vit(3.6±0.8)c; Char(3.7±0.7)c. Color stability was material-dependent. Greater stability after staining and repolishing was observed for Grandioso, G-ænial, Spectra, and Admira Fusion 5.

Keywords: Composite Resins; Dental Restoration; Permanent; Dental Materials; Color.



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LABORATORY – UNDERGRADUATE

Effects of corrosive substances on teeth and restorative materials: forensic relevance in human identification

Moises TA, Feitosa FA, Barbieri AA

Objective: This study aimed to analyze, from a macroscopic perspective, the structural changes in sound human teeth and those restored with silver amalgam, composite resin, and glass ionomer cement when exposed to readily accessible corrosive substances, with a focus on forensic applications in human identification. **Materials and Methods:** Following approval by the Research Ethics Committee involving Human Subjects (CAAE: 80587424.8.0000.0077; Approval No. 6.951.345), twelve human teeth were divided into groups according to the type of restorative material and individually immersed in containers containing distilled water (control), hydrochloric acid, or sodium hydroxide. The samples were evaluated every 12 hours over a 48-hour period, with standardized photographic documentation. **Results:** The group exposed to hydrochloric acid showed rapid degradation: significant morphological loss was observed within 12 hours, and by 24 hours only the restorative materials remained visible. The group subjected to sodium hydroxide exhibited slight demineralization and a fracture in the tooth restored with glass ionomer cement after 24 hours. **Conclusion:** It is concluded that hydrochloric acid severely compromises dental structure in a short period, rendering dental identification unfeasible, whereas sodium hydroxide, although aggressive, preserves anatomical features that remain useful in forensic contexts.

Keywords: Forensic Anthropology; Forensic Dentistry; Hazardous Substances; Victims Identification; Tooth Demineralization.



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LABORATORY – UNDERGRADUATE

Analysis of the survival of direct and semi-direct occlusal composite resin restorations

Gouveia YKN, Gomes APA, Casarini CM, Borges ALS

This study evaluated, in vitro, the longevity and mechanical behavior of direct and semi-direct composite resin restorative techniques, aiming for efficient rehabilitation within the public healthcare system. For the fatigue life test, MOD inlays were prepared in 30 extracted human molars, divided into two groups (n=15): Group RD – direct technique, and Group RS – semi-direct technique. The stepwise methodology was employed, subjecting all specimens to 1,200,000 cycles at 200 N to assess failure occurrence. Additionally, an in silico test was performed using finite element analysis to evaluate stress distribution in the crown, resin cement, and remaining tooth structure, enabling a more comprehensive interpretation of the results. Wear was assessed using GOM Inspect software (GOM, Braunschweig, Germany), which quantified volumetric loss of the composite resin through 3D model superimposition. Both techniques demonstrated fracture resistance during testing, confirming the restorative material's efficiency in terms of mechanical properties. The semi-direct technique, after cementation and resin cement polymerization, exhibited lower tensile stress concentrations on cusps and the cavity floor compared to the direct approach, resulting in reduced wall deformation. It can be concluded that both techniques offer satisfactory mechanical performance; however, the semi-direct approach presents additional advantages over the direct technique, representing a promising alternative for posterior restorations.

Keywords: Finite Element Analysis; Fatigue; Composite Resin; Service Life; Prosthesis.



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LABORATORY – UNDERGRADUATE

Effect of pulsed electromagnetic field on periodontal ligament mesenchymal stem cells: an in vitro study

Malara ME, Nunes CMM, Silveira MI, Santos MD, Cobbos PS, Jardim MAN

The periodontal ligament, composed of connective fibers and periodontal ligament stem cells (PDLSCs), plays a key role in supporting and regenerating periodontal tissues, which are often compromised by periodontitis affecting a large portion of the global population. Given the need for effective and minimally invasive regenerative therapies, the use of pulsed electromagnetic fields (PEMF) has emerged as a promising approach capable of stimulating cell differentiation and promoting biostimulation. This study aimed to evaluate the effects of PEMF on the proliferation, differentiation, and biological properties of PDLSCs, seeking to validate its therapeutic potential in periodontal regeneration. For this purpose, third molars were extracted, the periodontal ligament was isolated, and PDLSCs were cultured until confluence. The cells were plated in triplicate and analyzed for proliferation (DAPI on days 3, 7, and 10) and viability (MTT on days 7 and 10). The results demonstrated that PEMF exerted a more pronounced bio-stimulatory effect at later periods, with day 7 standing out as the point of greatest cellular response in the parameters evaluated, suggesting that the combination of PEMF and PDLSCs may represent a relevant therapeutic strategy for periodontal regeneration.

Keywords: Periodontitis; Mesenchymal stem cells; Electromagnetic fields; Tissue regeneration; Biostimulation.



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LABORATORY – UNDERGRADUATE

Evaluation of the optical properties of a leucite-reinforced glass-ceramic by using different mouthwashes

Zanotelo TM, Gonçalves NMF, Assis RASS, Rodrigues CS, Bottino MA

The aim of this study was to evaluate the effects of mouthwashes, both with and without whitening agents, on the optical properties and surface characteristics of a leucite-reinforced glass-ceramic. 60 samples were obtained from IPS Empress CAD blocks and polished under continuous irrigation. They were evaluated for color, translucency, gloss, whiteness, and roughness. Then, all samples were immersed in mouthwashes (n=12: chlorhexidine with alcohol, chlorhexidine without alcohol, Colgate Luminous White, Colgate Luminous White with activated charcoal, and distilled water [control group]). The immersions lasted 60 and 120 hours, simulating clinical use of one and two years, respectively. The data were analyzed using repeated-measures ANOVA followed by Tukey's post hoc test. The mouthwashes affected the color, translucency, whiteness, and gloss of the material. Color differences classified as clinically unacceptable were observed after immersion in Colgate Luminous White. The translucency of the material was affected by the use of the mouthwashes ($p=0.010$) and by time ($p<0.01$). The use of an activated charcoal-based mouthwash resulted in whitening of the material. Gloss was affected by time ($p<0.01$), mouthwash ($p=0.020$), and the time $\times$ mouthwash interaction ($p=0.010$). A significant increase in roughness was observed over time ($p<0.01$), regardless of the type of mouthwash used. Mouthwashes, with and without whitening agents, affected the optical properties of glass-ceramic over time.

Keywords: Ips Empress Cad; Mouthwashes; Leucite-Reinforced Glass-Ceramic; Thermal Aging.



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LABORATORY – UNDERGRADUATE

Analysis of the influence of light-curing unit type on the depth of cure of composite resins

Rebello EA, Souza LS, Costa GC, Caneppele TMF, Bresciani E

The aim of this study was to evaluate the depth of cure of different photoinitiator systems combined with distinct light-curing units, assessing their effectiveness and potential advantages over camphorquinone (CQ). Composite resin specimens measuring 4 mm ($n=12$) were fabricated in a bipartite mold in two 2-mm increments. Resins containing an alternative UV-dependent photoinitiator system (Vittra APS, FGM, Santa Catarina, Brazil) and a conventional resin not requiring this wavelength (Opallis, FGM, Santa Catarina, Brazil) were tested to assess photoinitiator dependence on violet light. Polymerization was performed for 40 s using either Radii-Cal (blue light, 860 mW/cm²) or Quazar (blue + violet light, 1200 mW/cm²). Depth of cure was evaluated by Knoop microhardness testing (25 g/10 s) at intervals from 1 to 4 mm. Data were analyzed by two-way ANOVA and Tukey's test (5%). Statistical analysis showed that depth significantly influenced nearly all groups, with progressive reduction in microhardness from the surface to the base of the specimens. This pattern confirmed that, even with 2-mm increments, light attenuation compromises monomer conversion in deeper layers. Significant reductions were observed in groups VR, OQ, and OR, whereas the Vittra + Quazar (VQ) group maintained stable microhardness across all depths. This performance can be attributed to the APS system in Vittra and the violet light emitted by Quazar, favoring a more uniform polymerization in depth.

Keywords: Composite Resins; Photoinitiators; Microhardness.



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LABORATORY – UNDERGRADUATE

Masking ability of a polycrystalline ceramic with microstructural gradient

Batista FLS, Lima RACS, Neto AJT, de Assis RASS, Rodrigues CS

Zirconia-based ceramics with microstructural gradation have been developed to combine high mechanical strength with a translucency gradient, mimicking natural teeth. However, shade selection remains a significant challenge, particularly in discolored substrates. This study evaluated the effectiveness of microstructure-gradient zirconia, in different thicknesses, for masking substrates while considering distinct resin cement shades. Specimens with two thicknesses (0.5 mm and 1.0 mm) were obtained from a zirconia disc (Zr Line 3D Multi, shade A1). Translucency was measured using the Easyshade (CIEDE2000 – TP00). Composite resin substrates (A1, A2, and A3) received the specimens cemented with either translucent or A1 resin cement. Color readings (Lab*) were taken in three regions: opaque, transition, and translucent. The color difference (ΔE_{00}) was calculated in relation to the reference set (zirconia + A1 cement + A1 substrate). Masking ability was analyzed by comparing discolored substrates (A2 and A3) and the different cements. Statistical analysis was performed using ANOVA and Tukey's test. The masking ability of zirconia, after two-way ANOVA (substrate and cement), was not significant ($p > 0.05$). Therefore, it was observed that zirconia does not exhibit masking ability over different substrates in thinner thicknesses.

Keywords: Ceramic; Zirconia; Color; Translucency; Easyshade.



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LABORATORY – UNDERGRADUATE

Micro-shear bond strength of resin infiltrant to resin composite after different surface treatments

Schmidt B, Pereira TP, Torres CRG, Borges AB

The aim of this in vitro study was to evaluate the micro-shear bond strength of demineralized enamel treated with a resin infiltrant (Icon®, DMG), considering different surface preparation protocols and the prior application of two agents before resin infiltration (RI). Artificial caries lesions were induced in 20 bovine teeth using a lactic acid demineralizing solution (pH 4.7; 45 days). The teeth were divided into four groups: C.RC (untreated), IC.NA (37% phosphoric acid + Icon Dry + RI/resin composite), IM.SA (phosphoric acid + Icon Prime containing 10-MDP + RI/resin composite), IM.UA and IC.UA (aluminum oxide sandblasting + universal adhesive + resin composite). Sound teeth served as controls (n=5). Resin composite cylinders (Ecosite, DMG) were placed on the treated surfaces and tested in a universal testing machine (DL-200, EMIC) at 1 mm/min. Data were analyzed using one-way ANOVA ($\alpha=0.05$). Sound enamel exhibited micro-shear bond strength values comparable to those of demineralized enamel ($p=0.156$). After infiltration, there was an increase in micro-shear bond strength with both Icon Dry and Icon Prime, although this was not significant ($p>0.05$). Sandblasting combined with adhesive also resulted in higher values, but without statistical significance ($p=0.07$ and $p=0.06$). Within the limitations of this study, it can be concluded that different surface treatments of the resin infiltrant, as well as the prior application of conditioning agents, did not significantly influence the micro-shear bond strength of resin composite to enamel.

Keywords: Micro-Shear Bond Strength; Caries Lesion; Resin Composite; Resin Infiltration; Adhesion.



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LABORATORY – UNDERGRADUATE

Effect of an anionic polymer on the antierosive capacity of remineralizing agents

Maciel LSL, Bottesini VC, Torres CRG, Borges AB

The search for alternatives to fluoride with effective antierosive action has encouraged the investigation of agents with remineralizing potential and polymers. This study evaluated the protective potential of the anionic copolymer methyl methacrylate (MMC) associated with calcium- and phosphate-based compounds against hydroxyapatite (HAp) dissolution. Solutions containing Calcium Lactate – CL (2% and 4%) and Sodium Phosphate – SP (8% and 16%), with or without MMC (2%), were prepared. Deionized water (DW) was used as the negative control. Solutions of MMC, sodium fluoride (F – 225ppm F), and MMC+F were also tested. HAp crystals (25 mg) were treated with the solutions (1 min), washed, and centrifuged (2 x 5 min - 10000 rpm). HAp was immersed in 0.3% citric acid (pH 3.8) and subjected to titration with hydrochloric acid (0.1 N). The volume of HCl used to stabilize the pH for 5 min was converted into mg of HAp dissolved. Data were analyzed by ANOVA/Tukey (5%). Significant differences were observed ($p = 0.001$). The CL and SP groups promoted intermediate dissolution, lower than DW and higher than F, and were not enhanced when associated with MMC. It was concluded that calcium- and phosphate-based agents protected hydroxyapatite from acid dissolution but were not superior to fluoride. MMC did not enhance the effect of the active agents.

Keywords: Tooth Erosion; Anionic Polymer; Hydroxyapatite; Fluoride.



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LABORATORY – UNDERGRADUATE

Texture markers as a means of evaluating the effects of variations in phosphorus plate reading parameters on radiographic images

Correa VAA, Santos LF, de Oliveira VGB, Jardini MAN, Rovai ES, Lopes SLPC

This study aimed to evaluate the influence of ambient light exposure and delayed scanning time of digital phosphor plates on the quality of radiographic images obtained with the VistaScan Mini View system, using texture analysis (TA) as a quantitative method. Radiographs of a five-step aluminum step wedge (increments of 0.5 mm) were taken, considering two groups: different scanning times (immediate, 10, 30, 60, and 120 min) and different exposure times to light before scanning (0, 5, 10, 30, 60, and 90 s). For each condition, ten images were obtained, exported in bitmap format, and processed with MaZda 4.60 software, defining three regions of interest (ROI) corresponding to the 1st, 3rd, and 5th steps. TA was performed using the co-occurrence matrix, comparing groups with the Mann-Whitney test and assessing correlations with Spearman's coefficient (5% significance). The results indicated that both light exposure and delayed scanning promoted progressive alterations in texture parameters, revealing a loss of contrast and image homogeneity. Significant differences emerged from 30 minutes of delay and 30 seconds of exposure, confirming the sensitivity of TA in detecting subtle degradations. It was concluded that TA proved effective as a quantitative marker of image quality, highlighting the need for immediate scanning and minimal exposure of plates to ambient light in order to preserve the diagnostic integrity of digital radiographic images.

Keywords: Digital Dental Radiography; Image Processing; Texture Analysis.



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LABORATORY – UNDERGRADUATE

Incorporation of curcuma into an adhesive system: laboratory analysis

Mascarenhas CMHM, Gomes NM, de Souza ACP, Chagas GS, Rocha MB, Pucci CR

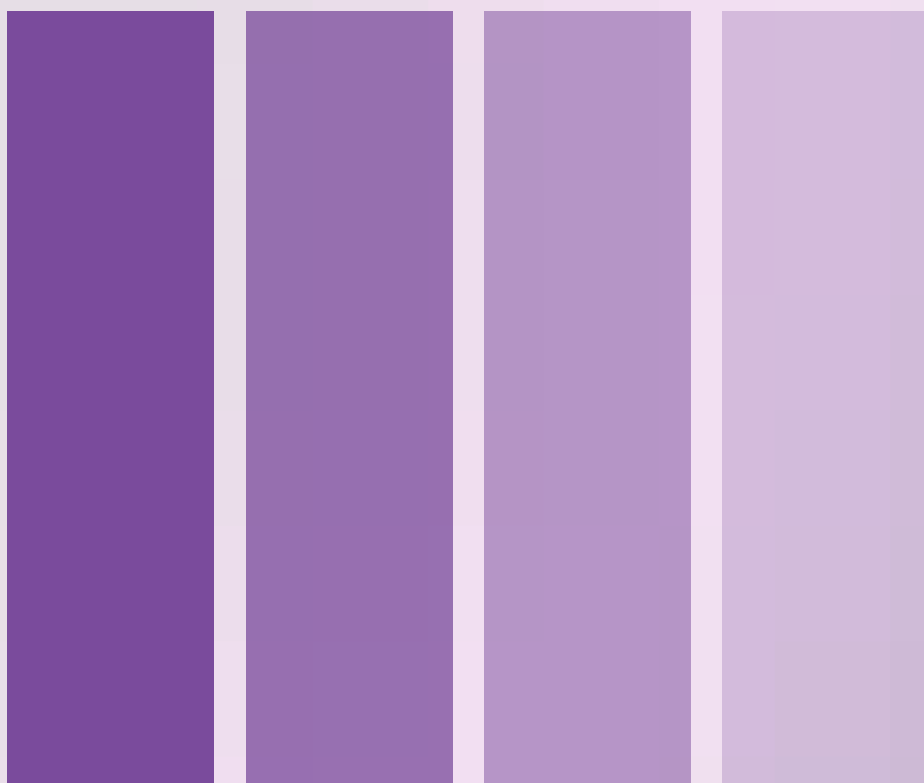
This study aimed to evaluate the bond strength and the degree of conversion of an universal adhesive system after the incorporation of curcumin. Three experimental groups were defined, according to the concentration of curcumin incorporated into the Futurabond M+ adhesive system: Control (without incorporation), Cur 0.1% (0.1% curcumin) and Cur 0.5% (0.5% curcumin). The concentrations were obtained by mass proportion (weight/weight). For bond strength, thirty healthy human molars were sectioned for dentin exposure. For the restoration of teeth subjected to microtensile, the adhesive was applied in dentin under friction for 20s and light-cured, followed by two increments of composite resin. The restored teeth were sectioned into 1.0mm² sticks, subjected to microtensile bond strength in the universal testing machine and analyzed for the fracture pattern. The degree of conversion was evaluated by infrared spectroscopy with Fourier transform. The results were submitted to the normality test, followed by one-way ANOVA and, for the degree of conversion, Tukey's post-hoc. For bond strength, there was no difference between the groups ($p > 0.05$), but the degree of conversion significantly reduced in the Cur 0.5% group ($p < 0.05$). As for the failure mode, there were more cohesive failures in resin in the Control and Cur 0.1% groups and adhesive failures in the Cur 0.5% group. It is concluded that the incorporation of curcumin in the different concentrations did not influence the bond strength, but in higher concentration it reduced the degree of conversion.

Keywords: Curcumin; Dentin-Bonding Agents; Matrix Metalloproteinases; Mechanical Tests.



Section 4

LABORATORY – GRADUATE





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LABORATORY – GRADUATE

Effect of surface pretreatment with methacrylic acid and ethyl acrylate copolymer (AME) solution on dentin bond strength

Santos LTP, Bottesini VC, Marinho RMM, Pucci CR

Despite the widespread use of resin composites and adhesive systems, degradation of the hybrid layer remains a limitation of treatment. Cross-linking agents have emerged as an alternative to counteract this degradation. This study evaluated the effect of surface pretreatment with a methacrylic acid–ethyl acrylate copolymer (AME) solution on the bond strength of conventional and universal adhesive systems to dentin. Forty sound human molars were used, with the occlusal surface sectioned to expose dentin, and divided into groups according to adhesive type (etch-and-rinse – ER or self-etch – U) and surface treatment (ethanol or 1% AME solution in ethanol). After conditioning, surfaces received the treatment and the active adhesive for 40 seconds, followed by resin composite build-up in increments. After 24 hours, samples were sectioned into sticks for microtensile bond strength analysis, performed at two time points: immediately and after 6 months of water storage. Results indicated that time was not a significant factor and did not reduce hydrolytic degradation. Most failures were adhesive, and optical and SEM microscopy analyses revealed differences between control and treated groups, with AME pretreatment neither altering immediate bond strength nor reducing hydrolytic degradation after 6 months.

Keywords: Dentin Adhesive; Polymers; Dentin; Scanning Electron Microscopy.



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LABORATORY – GRADUATE

Effect of cationic polymer on the anti-erosive capacity of remineralizing agents

Bottesini VC, Maciel LSL, Torres CRG, Borges AB

This study evaluated the anti-erosive effect of remineralizing agents with aminomethacrylate copolymer (AMC) on hydroxyapatite dissolution. Solutions contained Calcium Lactate (2%, 4%) or Sodium Phosphate (8%, 16%), with/without 2% AMC. Deionized water (DW) was used as the control. Solutions of AMC, sodium fluoride (F⁻ 0.5%), and AMC+F were also tested. Hydroxyapatite crystals (HAp – 25 mg) were treated with the solutions (1 min), washed, and centrifuged (2× – 120 s, 10,000 rpm). HAp was then immersed in 0.3% citric acid (pH 3.8) and analyzed using a potentiometric titrator. HCl aliquots (0.1 N, 28 μ l) were added whenever pH rose >0.01 for 5 min. The volume of HCl used was converted into mg of dissolved HAp. Data were analyzed by ANOVA/Tukey (5%). Significant differences between groups were observed ($p = 0.001$). The DW group showed the highest dissolution (23.61 ± 1.13)a; groups containing fluoride showed the lowest dissolution: [F (12.07 ± 0.2)b and AMC+F (6.83 ± 0.2)c]. Groups with LC and SP presented intermediate values, with no additional effect from AMC. Calcium- and phosphate-based agents showed anti-erosive potential, and fluoride offered the greatest protection, enhanced by AMC.

Keywords: Polymer; Fluoride; Erosion.



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LABORATORY – GRADUATE

Teeth whitening influences the opalescence of composite resins

Louzeiro TLRP, Barbosa TS, Borges AB, Torres CRG

The study evaluated the effect of bleaching on the opalescence of different composite resins. Specimens measuring 0.26 mm in thickness and 5.0 mm in diameter were prepared: A: Tetric Prime (Ivoclar), B: Opallis (FGM), C: Opus Bulk (FGM), D: G-aenial A'chord (GC Corporation), E: Beautifil II (Shofu), F: Filtek Universal (3M), G: Admira Fusion (Voco), H: X-tra fil (Voco), I: GrandioSO Heavy Flow (Voco). Specimens were analyzed by reflectance and transmittance using a colorimetric spectrophotometer (CM-5, Konica Minolta) to obtain L^* , a^* , b^* values. Opalescence was calculated as $OP = ((a^*_t - a^*_r)^2 + (b^*_t - b^*_r)^2)^{1/2}$. Bleaching with 35% hydrogen peroxide was performed for 45 min, color analysis repeated, and OP recalculated. Data were analyzed by repeated-measures ANOVA (Resin $\times$ Time) and Tukey's test ($\alpha=5\%$). ANOVA showed significant differences for all factors and interactions ($p<0.05$). Tukey's results: E:2.44(0.57)a, D:6.39(0.32)b, G:7.46(1.03)bc, I:8.80(0.41)c, F:8.89(1.57)c, A:11.59(0.63)d, H:12.64(2.50)d, B:13.26(0.35)d, C:23.07(1.23)e. Groups with the same letters did not differ. Interaction analysis revealed that bleaching significantly increased opalescence only for resins H and I. In conclusion, the resins tested exhibited different opalescence levels, and the bleaching effect depended on the material type.

Keywords: Resin Composite; Opalescence; Tooth Whitening.



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LABORATORY – GRADUATE

N-acetylcysteine hydrogel: a promising alternative for intracanal disinfection

Barbosa CGC, Santos AC, Fiamini BK, Gagliardi CF, Khoury RD, Valera MC

The present study aimed to analyze the antimicrobial activity of N-acetylcysteine hydrogel (NAC-gel) against *Enterococcus faecalis* and *Escherichia coli* biofilms, comparing it with calcium hydroxide [Ca(OH)₂] + saline solution and with the combinations Ca(OH)₂ + chlorhexidine (CHX), NAC + CHX, and NAC + Ca(OH)₂. Bacterial biofilms were standardized at 10⁷ CFU/ml, cultured in 96-well plates, and incubated for 48 hours. Subsequently, medications were applied for 24 hours and cell viability was assessed using the MTT assay, with readings at 570 nm. For comparison of antimicrobial activity, ANOVA (parametric data) and Kruskal–Wallis (non-parametric data) were used, considering a significance level of 5% ($p < 0.05$). In addition, the pH of the medications was monitored over 7 days. All intracanal medications significantly reduced *E. faecalis* and *E. coli* biofilms compared with the control group (no medication). For *E. faecalis*, NAC + CHX showed the highest reduction (79.24%), followed by Ca(OH)₂ + CHX (75.38%) and NAC hydrogel (74.99%). For *E. coli*, NAC + CHX (67.21%) and Ca(OH)₂ + CHX (66.34%) demonstrated greater efficacy, outperforming Ca(OH)₂ + saline solution (43.72%). No significant changes in pH were observed. It is concluded that all evaluated medications were effective in reducing biofilms, highlighting the performance of NAC-gel and the NAC + CHX combination, which efficiently reduced both microorganisms.

Keywords: Hydrogels; Acetylcysteine; Endodontics; Calcium Hydroxide; Chlorhexidine.



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LABORATORY – GRADUATE

Influence of UV light coupled with high-speed handpiece on the time required and effectiveness of the resin composite removal of orthodontic attachments

De Carvalho LJSG, De Souza LFA, Costa M, Borges AB, Torres CRG

The aim of this study was to evaluate the influence of ultraviolet (UV) light coupled to a high-speed handpiece on the time and effectiveness of removing fluorescent composite resin used for orthodontic aligner attachments. Forty premolars and forty upper right molars were collected and divided into two groups according to the resin: ALF – Aligner Flow LC (VOCO) and GCAC – GC Aligner Connect (GC). Each group was divided into five subgroups according to the tooth and surface: buccal and lingual of the premolar; mesial and distal areas of the buccal surface of the molar; and lingual of the molar. These subgroups were further divided into two according to the use of UV light during removal: with UV and without UV. Ten dentists were invited to perform the resin removal in all groups and subgroups. Time was measured with a stopwatch in seconds, and to compare the removal effectiveness, the initial and final areas occupied by the attachment on each dental surface were measured, and the percentage of remaining resin was calculated. Data were analyzed using three-way ANOVA (resin $\times$ surface $\times$ UV) and Tukey's test (5%). The ANOVA showed significant differences only for the UV factor ($p < 0.05$), both for the percentage of remaining resin and for removal time. Tukey's test results were: percentage of remaining resin – UV: 0.25a; without UV: 14.79b. Removal time – UV: 53.34a; without UV: 90.94b. It can be concluded that the use of UV light coupled to the handpiece significantly reduced both removal time and the percentage of remaining resin, with no significant differences found between surfaces or resin brands.

Keywords: Tooth Aligner; Attachment; Uv Light; Resin Composite; Removal.



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LABORATORY – GRADUATE

Protective effect of fluoride gels associated with a homopolymer on the development of erosive tooth wear

Mantoani JM, Morais GP, Torres CRG, Borges AB, Mailart MC, Ávila DMS

This study evaluated the effect of the association of a cross-linked homopolymer of pentaerythritol alkyl ether, commercially known as Carbopol 980 (Cb), with fluoride formulations containing sodium fluoride (NaF) and stannous chloride (SnCl_2) on the protection against erosive tooth wear (ETW). Polished bovine enamel specimens ($N=60$) were divided into 4 groups: C+ (APF, acidulated phosphate fluoride, 12300 ppm F+, pH 5.0); C- (Cb 0.2 g/L, pH 5.0); NaF+Cb (7500 ppm F+ + Cb, 0.2 g/L, pH 5.0); NaF+ SnCl_2 +Cb (7500 ppm F+ + 15000 ppm Sn + Cb, 0.2 g/L, pH 5.0). Specimens were subjected to a 5-day demineralization/remineralization cycling protocol, consisting of immersion in 1% citric acid (pH 2.3) for 5 minutes, four times per day, interspersed with 2-hour periods in saliva. Treatments were applied once, on the first day, for 1 min. After the experimental period, enamel loss was quantified by contact profilometry, with results expressed in micrometers (μm). Data were analyzed using the Kruskal-Wallis test, which showed significant differences among groups ($p<0.001$), followed by the DSCF multiple comparisons test ($\alpha=5\%$): C+ (APF): $1.62\pm0.09\text{A}$; C- (Cb): $2.04\pm0.10\text{B}$; NaF+Cb: $1.56\pm0.10\text{A}$; NaF+ SnCl_2 +Cb: $1.23\pm0.08\text{C}$. Groups followed by the same letters did not differ significantly. It can be concluded that the association of Carbopol 980 with fluoride formulations provided significantly greater protection than the negative control, and the NaF+ SnCl_2 +Cb association resulted in the lowest ETW values and was significantly different from the positive control.

Keywords: Tooth Erosion; Acidulated Phosphate Fluoride; Sodium Fluoride; Tin Fluorides; Polymers.



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LABORATORY – GRADUATE

Influence of dehydration on the chromatic variations of the dental substrate and composite resin

Carvalho LS, Gonçalves NMF, Barros LS, Mailart MC, Borges AB, Torres CRG

The aim of this study was to evaluate how dehydration affects the color of teeth and composite resin. Specimens with a diameter of 6 mm and a thickness of 2 mm were obtained from bovine incisors ($n=10$), with enamel and dentin thickness standardized at 1 mm. Specimens with the same dimensions were produced using the composite resins BB – Beautiful Bulk and XF – X-tra Fill. The specimens were stored in water for 7 days. Color measurements were then taken immediately after removal from water, at 1-minute intervals until 10 minutes, and subsequently at 5-minute intervals until 55 minutes. Color was evaluated using a reflectance spectrophotometer (CM-2600d, Konica Minolta), adjusted with SAV parameters, D65 illuminant, 100% UV, observer angle of 2° , and SCI. Color differences between the initial reading and all subsequent readings were calculated using the Delta E 2000 formula. Data were submitted to repeated measures analysis of variance (ANOVA) and Tukey's test, adopting a significance level of 5%. Repeated measures ANOVA indicated significant differences for the specimen type factor ($p=0.0001$) and for the reading time factor ($p=0.0001$). Tukey's test results for the specimen factor were: XF – $0.72(0.32)_a$, BB – $1.09(0.46)_a$, Tooth – $5.70(3.51)_b$. For the time factor, increasing time led to color changes. Regarding the interaction of factors, tooth color variation was greater than that of the resins. We can conclude that all materials exhibited color changes over time, but this was approximately 525.52% greater for teeth compared to the two composite resins.

Keywords: Dehydration; Color; Tooth; Composite Resins.



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LABORATORY – GRADUATE

Effect of surface treatments on shear bond strength of composite resin for direct use and artificial teeth

Dinísio TM, Aliberti A, de Carvalho PCK, Ausiello P, Paes Junior TJA, Borges ALS

Objective: This study aimed to investigate the shear bond strength between artificial resin teeth and direct-use composite resin. **Materials and Methods:** Thirty artificial teeth were divided according to material type (G1 = composite resin; G2 = acrylic resin). The flat surface of each tooth was divided into four sections, each receiving a different surface treatment (GA = 600-grit sandpaper; GB = 600-grit sandpaper and adhesive; GC = 600-grit sandpaper and sandblasting; GD = 600-grit sandpaper, sandblasting, and adhesive). Micro-shear strength was measured using a universal testing machine with a wire shear test, employing a 10 kg load cell at a crosshead speed of 1 mm/min. Data were analyzed using analysis of variance (ANOVA) with a significance level of 5%. **Results:** The most effective surface treatment was 600-grit sandpaper followed by sandblasting and adhesive application (36.92 ± 6.16 MPa), followed by 600-grit sandpaper and adhesive (26.09 ± 5.74 MPa), and 600-grit sandpaper and sandblasting (21.31 ± 4.82 MPa). The highest bond strength was observed in G1 with the surface treatment of 600-grit sandpaper, sandblasting, and adhesive (45.93 ± 7.13 MPa), whereas the lowest was in G2 (acrylic resin) with 600-grit sandpaper alone (5.38 ± 0.90 MPa). **Conclusion:** The application of bonding agent resulted in the highest bond strength with composite resin, suggesting that the most effective surface treatment protocol combines sandblasting and adhesive application.

Keywords: Artificial Teeth; Dental Cements; Composite Resins; Shear Strength.



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LABORATORY – GRADUATE

In silico analysis of lateral trusive guidance: stress distribution in different restorative materials

Silva LAS, Queiroz TS, Silva CML, Casarini CM, Borges ALS, da Silva JMF

Tooth wear due to attrition, especially in canines, compromises canine guidance and affects stomatognathic function, aesthetics, and tooth longevity. Thus, it is essential to investigate restorative alternatives that preserve tooth structure, have good biomechanical performance, and maintain occlusal stability. The aim of this study was to evaluate, through in silico analysis, the biomechanical behavior of incisal-palatal restorations in worn canines, made with CAD/CAM nanohybrid composite (CN), 3D-printed resin, conventional composite resin (RC), and lithium disilicate ceramic (DL, control). Three-dimensional models of canines were developed using CAD software and subjected to finite element analysis (FEA). Three occlusal conditions were simulated: maximum habitual intercuspation (MIH), laterality (LAT), and maximum laterality (MAX LAT), applying a load of 100 N at the contact points. The maximum principal stress in the restoration and cement was evaluated, analyzed by color maps and frequency histograms. The results showed that DL concentrated stresses in restricted areas, with less transmission to the adhesive interface. CN and 3D exhibited more distributed stresses, but with greater involvement of the interface, while RC presented greater dispersion and risk of adhesive failure. The findings indicate that CAD/CAM composites, especially CN, demonstrate more favorable performance for lateral guide rehabilitation compared to RC, although DL maintains greater resistance, but with a localized risk of stress concentration.

Keywords: Tooth Wear; Canine Guidance; Composite Resin; Cad/Cam; 3D Printing.



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LABORATORY – GRADUATE

Analysis of optical properties of new cad/cam restorative materials

Silva CML, Silva TR, Silva LAS, Grangeiro MTV, da Silva JMF

Restorative materials are subject to processes that affect longevity and clinical success. This study aims to evaluate the effect of pigmentation, brushing and repolishing on color, brightness and translucency and its maintenance in different restorative materials. Discs of 6 mm in diameter and 1.5 mm in thickness ($n = 10$) were made of different materials, being a lithium disilicate, a high translucency zirconia, a hybrid ceramic, composite resin for CAD-CAM and a composite resin direct. Readings were performed before and after aging by simulated brushing and by a modified staining broth proposed by the ADA, then a new reading after repolishing the samples by spectral brightness with the Novo-Curve device, translucency reading (colorimetric spectrophotometer), and for the color evaluation, the specimens were evaluated in a standardized environment following the CIE L^*a^* color system, also using the spectrophotometer. Data were collected and subjected to appropriate statistical analysis. After the optical readings, it was observed that the translucency values of the resins were higher in relation to the other materials, with a statistical difference for the indirect resin. Among the ceramic materials, only the hybrid ceramic showed a statistical difference for the brightness. In the evaluation of color change, indirect resin and lithium disilicate showed statistical differences. Other materials behaved stably and did not show statistical differences. All materials studied show good long-term behavior and composite resins can optimize their longevity when subjected to appropriate maintenance protocols.

Keywords: Ceramics; CAD/CAM; Brushing.



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LABORATORY – GRADUATE

Evaluation of the longevity of lithium disilicate tabletop restorations: in vitro and in silico study

Gomes APA, Gouveia YKN, de Castro RC, Casarini CM, Borges ALS

This study evaluated the longevity of thin (0.5 mm) and ultrathin (0.3 mm) tabletop restorations in premolars through finite element analysis (FEA) and an in vitro fatigue test. In the FEA, models of both groups were developed using mathematical software and analyzed according to the maximum principal stress criterion, with results presented in stress/strain diagrams, including stress distribution and numerical values. In the in vitro test, 30 human premolars were prepared and divided into two groups: A – ultrathin tabletop (0.3 mm) and B – thin tabletop (0.5 mm), both made of lithium disilicate. A stepwise fatigue protocol was applied, starting with 10,000 cycles at 100 N, followed by progressive increments of 50 N every 10,000 cycles until failure. Data were tested for normality; FEA results were analyzed using Student's t-test, and in vitro outcomes with Kaplan-Meier and log-rank tests. Both methods showed no statistically significant difference between thicknesses. It was concluded that 0.3 mm and 0.5 mm tabletop restorations present similar longevity performance, allowing clinicians to indicate the most appropriate thickness for each case. The resistance under high fatigue loads reinforces their clinical feasibility. Moreover, the validation of the mathematical model supports future predictive computational simulations, with the potential to reduce costs and laboratory testing time, thereby increasing predictability and safety in complex rehabilitations.

Keywords: Ceramics; Dental Prosthesis; Fatigue; Finite Element Analysis; Longevity.



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LABORATORY – GRADUATE

3D-printed perforated resin posts associated with a fiber optic light-transmitting system: evaluation of adhesion and photopolymerization of resin cements

França CG, Gomes LCL, Pereira GM, Paes Junior TJA

The aim of this in vitro study was to evaluate the effect of using perforated, 3D-printed posts associated with a fiber optic light-transmitting device on mechanical and adhesive resistance. The posts were designed with a length of 16 mm and a regular diameter of 1.6 mm to allow the passage of the fiber optic, and printed with Bio Splint resin (Prizma, MakertechLabs). Thirty bovine teeth were endodontically treated, post space prepared, and distributed into three groups (n=10): PF (fiber-reinforced post), PRS (solid 3D-printed resin post), and PRP (perforated 3D-printed resin post). During cementation with the fiber optic, the photoactivation protocol of 80 s was applied to each third of the root canal, while solid posts received a single 45 s activation. After cementation, specimens were sectioned and subjected to push-out testing, flexural testing, and fracture pattern evaluation. In the push-out test, no statistically significant difference was observed ($p>0.05$); however, the means indicated a tendency for higher values in the PRP group in the middle and cervical thirds (20.4 and 21.9 MPa), with mixed failures predominating across groups. In the flexural test, a significant difference was found ($p<0.05$), with the PRS group showing the highest resistance (148.432 MPa). In conclusion, the PRP group showed the best results, as the use of the fiber optic light-transmitting device allowed light to reach regions of difficult access.

Keywords: Adhesion; Adaptation; 3D Printer; 3D Resin; Intraradicular Retainer.



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LABORATORY – GRADUATE

Impact of spectrophotometer type on the ability to detect color variations

Figueiredo JC, Berger F, Azinaro GSS, Silva AS, Borges AB, Torres CRG

The aim of this study was to evaluate the effect of the type of spectrophotometer on the ability to detect color differences in composite resin specimens. Composite resin specimens (Grandioso Flow, Voco) were fabricated in shades A1, A2, A3, A3.5, and A4, with 8 mm in diameter and 2 mm in thickness (n=5). The color of the specimens was measured using different colorimetric spectrophotometers: EO–Easyshade Original (Vita), EV–Easyshade V (Vita), C2–CM2600d (Konica Minolta), and C5–CM5 (Konica Minolta). The L*, a*, and b* values were obtained, and color differences (E00) were calculated between shade A1 and the other colors for each device. Data were analyzed using two-way ANOVA (Device x Color), followed by Tukey's test at a 5% significance level. ANOVA revealed significant differences for all factors and for the interaction between them (p < 0.05). Tukey's test results for the devices were: C2–5.49(4.10)a; C5–5.93(5.03)a; EV–6.84(5.29)b; EO–7.08(5.03)b. For colors: A1/A1–0.31(0.80)a; A1/A2–3.55(1.26)b; A1/A3–5.03(0.67)c; A1/A3.5–10.24(1.26)d; A1/A4–12.55(1.82)e. It was concluded that all spectrophotometers tested were able to detect color differences, with variation only in the absolute values of the calculated color differences.

Keywords: Spectrophotometry; Color; Optical Phenomena; Composite Resins.



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LABORATORY – GRADUATE

Impact of thickness on the ability of a spectrophotometer to detect chromatic differences

Berger F, Figueiredo JC, Azinaro GSS, Silva AS, Borges AB, Torres CRG

The objective of this study was to evaluate the influence of composite resin specimen thickness on the detection chromatic differences. Specimens with 8 mm in diameter were fabricated using Grandioso Flow (Voco) composite resin in shades A1, A2, A3, A3.5, and A4. Four thicknesses (1, 2, 3, and 4 mm) were produced for each shade. Color measurements were performed with a colorimetric spectrophotometer (CM2600d, Konica Minolta) using a 4 mm mask and a white background, obtaining the L^* , a^* , and b^* values. The color difference between A1 resin and the other shades was calculated using the CIEDE2000 formula (E_{00}). Data were analyzed using two-way ANOVA (Thickness x Color) followed by Tukey's test ($\alpha = 5\%$). The ANOVA showed significant differences for all factors and for the interaction between them ($p < 0.05$). The results of the Tukey test were: THICKNESS - 1mm-4.98(3.58)a, 2mm-5.49(4.09)b, 4mm-5.89(4.72)c, 3mm-5.98(4.29)c. COLOR - A1/A1-0.17(0.06)a, A1/A2-2.87(0.37)b, A1/A3-4.56(0.56)c, A1/A3.5-9.00(0.80)d, A1/A4-11.34(1.28)e. The groups followed by the same letters did not present significant differences. The interaction analysis showed that for the lighter colors (A1, A2 and A3), the thickness did not influence the color difference, while for the darker colors (A3.5 and A4), the thinner specimens resulted in lower values. We can conclude that thickness only influences the detection of chromatic differences when dark shades are analyzed.

Keywords: Color; Spectrophotometry; Composite Resins.



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LABORATORY – GRADUATE

Influence of whitening mouthwashes on the optical properties of flowable resin composites with or without staining

Meireles PHS, Torres CRG, Ávila DMS, Borges AB, Mailart MC

To evaluate the effect of whitening mouthwashes on the optical properties of flowable resin composites, with or without staining. Cylindrical specimens of two resin composites were prepared: bioactive (BEF – Beautifil Flow, Shofu) and conventional (ZCF – ZirconFlow, Maquira). The specimens were allocated (n=10) according to the mouthwash: hydrogen peroxide-based (LWE – Listerine Whitening Extreme), activated charcoal (CTC – Colgate Total 12 Charcoal), and deionized water (DWA – negative control), and then submitted or not to staining. Color (CIELAB), translucency, and gloss were measured using a reflectance spectrophotometer (CM2600d, Konica Minolta) and glossmeter (NOVO-CURVE). The specimens were immersed in artificial saliva (30 min), followed or not by staining with modified ADA broth (30 min), and in mouthwash (1 min), with 60 cycles. Changes in color (ΔE_{00}), translucency (%TP), and gloss (%GU) were analyzed by three-way ANOVA and Tukey's test ($\alpha=5\%$). Significant differences were observed for resin composite, mouthwash, and staining on ΔE_{00} and %TP ($p<0.001$). The ZCF group showed higher ΔE_{00} values regardless of staining, while CTC promoted greater ΔE_{00} and reduced %TP under staining. Without staining, no significant differences were found between mouthwashes. For %GU, significant differences were detected for mouthwash and staining ($p < 0.001$), with gloss reduction in the CTC and stained groups. In conclusion, the activated charcoal mouthwash showed a lower potential for stain prevention and reduced translucency and gloss of resins. The conventional resin composite showed a higher color change than the bioactive resin composite.

Keywords: Mouthwashes; Activated Charcoal; Hydrogen Peroxide; Composite Resins.



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LABORATORY – GRADUATE

Effect of Er:YAG laser irradiation on bleached dental enamel

Rocha MB, Ferraz ICM, Chagas GS, Gomes NM, Torres CRG, Pucci CP

The aim of this study was to evaluate the impact of Er:YAG laser irradiation on the bleached dental enamel surface and on the bond strength of direct composite resin restorations. For the structural analysis of the substrate by FTIR, SEM, and EDS, circular specimens of bovine incisors were prepared ($n = 18$) and divided into six groups: CN: negative control (no treatment); CP: positive control (bleaching with 35% hydrogen peroxide); CL1: bleaching and Er:YAG laser (250 mJ; 10 Hz; 2.5 W); L1: Er:YAG laser (250 mJ; 10 Hz; 2.5 W); CL2: bleaching and Er:YAG laser (300 mJ; 20 Hz; 6 W); and L2: Er:YAG laser (300 mJ; 20 Hz; 6 W). To evaluate microtensile bond strength, sound bovine incisors ($n=18$) were used and divided into four groups (CN; CP; CL1 and CL2). The fracture pattern was analyzed and SEM images obtained. The bond strength data obtained were subjected to one-way ANOVA and Tukey's test. The results showed significant differences for the tested groups ($p<0.001$). The Tukey's test results were: CN $31.44\pm3.33A$, CL1 $25.25\pm3.83B$, CL2 $21.25\pm4.08C$, CP $14.56\pm2.40D$. EDS and FTIR analyses showed no significant changes in enamel composition, while the images obtained by SEM revealed structural changes that corroborate the results obtained. It is concluded that the application of the Er:YAG laser was able to reduce the deleterious effects of bleaching on bond strength, obtaining better efficacy with the parameters used by group CL1.

Keywords: Enamel; Whitening; Laser; Tensile Strength.



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LABORATORY – GRADUATE

Development of alginate hydrogel composites with chlorinated bioglass for bone regeneration: a customizable method through 3D printing

Rosa PAA, Silva FS, Borges ALS

Biomaterials are essential for bone regeneration. Bioactive glasses such as chloride S53P4 stand out for releasing calcium, forming apatite without altering pH, and maintaining cell viability. With a high silica content, they dissolve rapidly, exhibit antibacterial effects, and are promising for orthopedic and dental implants. 3D printing has transformed tissue engineering by enabling customized scaffolds with complex geometries and controlled porosity, which promote cell integration. Objective: To develop alginate hydrogel composites with chloride S53P4 bioactive glass using 3D printing for bone regeneration. Methodology: The bioactive glass was synthesized via the sol-gel method and incorporated into alginate at 5%, 10%, and 20%. Printed scaffolds were evaluated for printability, mechanical strength, wettability, cell viability, and mineralized matrix formation. Results: The 5% formulation showed ideal viscosity and higher tensile strength (0.59 N) compared to pure hydrogel (0.34 N). The 10% and 20% formulations displayed slower or faster printing and lower strength (0.15 N and 0.16 N). SEM/EDS analysis demonstrated that the incorporation of bioactive glass modified scaffold morphology, resulting in a structure suitable for bone regeneration. Conclusion: The 5% composite proved to be the most promising, with good printability, strength, and hydrophilicity. Higher concentrations reduced performance. Further studies are needed to confirm bioactivity and stability.

Keywords: Bioactive Glass; Alginate Hydrogel; 3D Printing; Bone Regeneration; Scaffolds.



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LABORATORY – GRADUATE

Texture profile analysis of different in-office bleaching gels

Azinaro GSS, Botelho TS, Borges AB, Torres CRG

The aim of this study was to compare the texture profile of different hydrogen peroxide gels recommended for in-office dental bleaching. Five bleaching gels were evaluated: GOPA – Opalescence Boost (Ultradent); GHP – WhitenessHP (FGM); GBLU – WhitenessHP Blue (FGM); GAM – WhitenessHP AutoMixx (FGM); and GPO+ – Pola Office+ (SDI). A standardized amount of 10 g of each gel was placed into 10 ml glass beakers without introducing bubbles. A cylindrical analytical tip (10 mm diameter) attached to a 1 kg load cell of a Texture Analyzer (TX-700, Lamy) was positioned on the gel surface and compressed twice at a speed of 0.5 mm/s, penetrating 5 mm into the sample, with a 15 s interval between compressions. All analyses were performed five times at room temperature to obtain hardness (H), cohesiveness (COH), elasticity (E), and resilience (R). Data for each parameter were analyzed using one-way ANOVA and Tukey's test. Gel viscosity was determined with a rotational viscometer (DV2T, Brookfield). ANOVA test showed significant differences among the groups for all parameters ($p=0.001$). The results of Tukey test were: H: GPO+ -0.017(0.001)a, GHP -0.042(0.004)b, GBLU -0.042(0.003)b, GOPA -0.096(0.009)c, GAM -0.114(0.018)d; COH: GAM -0.53(0.04)a, GOPA -0.53(0.05)a, GHP -0.62(0.009)b, GBLU -0.68(0.06)b, GPO+ -0.87(0.07)c; E: GOPA -0.85(0.09)a, GPO+ -1.09(0.09)b, GHP -1.18(0.08)b, GBLU -1.52(0.24)c, GAM -1.62(0.29)c; R: GAM -0.047(0.004)a, GPO+ -0.082(0.020)b, GHP -0.0914(0.008)bc, GBLU -0.104(0.023)bc, GOPA -0.107(0.022)c. The mean viscosity values were: GBLU – 284.4; GHP – 326.9; GOPA – 335.7; GPO+ – 351.3; GAM – 458.3. The bleaching gels tested showed significantly different texture profile characteristics. GAM exhibited the highest hardness and elasticity but the lowest cohesiveness, while GPO+ presented the opposite behavior.

Keywords: Dental Bleaching; Hydrogen Peroxide; Dental Office.



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LABORATORY – GRADUATE

Evaluation of cell migration and repair capacity in mesenchymal cells of the periodontal ligament under high glucose concentrations

da Silveira MI, Rodrigues ESL, Gonzalez CAS, Jardimi MAN, Nunes CMM, Rovai ES

The present study aims to understand the impact of high glucose levels on the cell migration capacity of periodontal ligament cells (PDLs) through an in vitro experiment. Primary cultures of human PDLs were cultured in different glucose concentrations [5.5 mM (normal control); 8.0 mM (representative of postprandial patients); and 12 mM (controlled diabetes); or 24.0 mM (representative of patients with uncontrolled diabetes)]. Then, assays were performed to evaluate the impact of high glucose levels on the cell viability of these cells through the cell proliferation test (MTT) at 24, 48, and 72 hours, and the scratch test to evaluate the cell migration capacity at 8, 16, and 24 hours of the experiment. None of the groups showed a negative change in cell viability ($p < 0.05$). The 24 mM glucose concentration showed a negative impact on the cell migration potential ($p < 0.05$). It is concluded that high glucose concentrations result in a delay in the repair capacity of PDLs.

Keywords: Periodontal Disease; Diabetes Mellitus; Cell Movement; Periodontitis; Homeostasis.



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LABORATORY – GRADUATE

Influence of irradiance on the physicochemical, mechanical, and optical performance of a light-cured resin cement

Souza LS, Rebelo EA, Costa GC, Osorio SVS, Caneppele TMF, Bresciani E

This study evaluated the physicochemical, mechanical, and optical performance of a light-cured resin cement (Bifix Veneer LC Translucent – VOCO, Germany) polymerized using two curing protocols with different irradiance levels: RADII-CAL (800 mW/cm²) and RADII XPERT (1500 mW/cm²). Discs (15 mm × 1 mm; n=10/group) were prepared for analysis of water sorption, solubility, Knoop microhardness, and translucency, while specific specimens were used for degree of conversion assessment by FTIR spectroscopy. All samples underwent 5,000 thermal cycles (5 °C/55 °C) to simulate oral aging. Water sorption was significantly higher in the lower irradiance group (p=0.037), suggesting a less dense polymeric cross-linking, whereas no significant differences were observed in solubility (p=0.405) or degree of conversion (p=0.645). Microhardness was higher in the RADII XPERT group (p=0.005), though significantly reduced after aging in both groups (p<0.001). Translucency remained stable regardless of curing unit or thermal cycling (p>0.210). In summary, both curing devices achieved adequate chemical conversion, low solubility, and optical stability; however, the higher irradiance protocol provided reduced water sorption and superior microhardness, enhancing mechanical resistance and clinical durability. These findings suggest that high-irradiance curing protocols may optimize the longevity and clinical performance of light-cured resin cements.

Keywords: Dental Materials; Dental Curing Light; Resin Cements.



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LABORATORY – GRADUATE

In vitro evaluation of color stability and surface roughness of printed resin for complete denture bases

da Silva PV, Silva CML, dos Santos LTP, Borges ALS

Currently, complete dentures can be manufactured using new CAD-CAM manufacturing technologies through two techniques: milling (subtractive manufacturing) or printing (additive manufacturing). Objectives: To evaluate the color change and surface roughness of a 3D-printed resin indicated for denture bases after immersion in coloring solutions, comparing it with a heat-activated acrylic resin. Materials and Methods: Thirty discs (6 mm × 1.5 mm) were divided into two groups (n = 15): V-Print® dentbase printed resin (Voco, Germany) (RI) and Clássico heat-cured acrylic resin (São Paulo, Brazil) (RT). Initial roughness was measured with a profilometer (SJ 400, Mitutoyo, Japan) and color stability with a spectrophotometer (CM 2600, Konica Minolta, Japan). The specimens were immersed in artificial saliva, coffee, and wine, stored in an incubator for 24 h (T1), 3 days (T2), and 7 days (T3). After each period, roughness and color were reevaluated. Data were analyzed using descriptive statistics, two-way ANOVA, and Kruskal-Wallis. Results: The mean roughness (Ra) was influenced by the time x material interaction (p=0.003). The same occurred for Rz (p<0.01). There were significant differences between materials (p=0.004), times (p<0.001), and interaction (p=0.003). For color change, there was no significant difference between groups (p=0.619). Conclusion: The staining solutions affected both materials in terms of color and roughness. The thermopolymerizable resin showed greater roughness, while the 3D printed one showed greater color change, although statistically similar in the subsequent periods.

Keywords: Complete Dentures; Cad/Cam; Color; Acrylic Resin.



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LABORATORY – GRADUATE

Evaluation of color differences between two shade guides available in the dental market

da Silva CMA, Silva AS, Barbieri AA, Cançado IM, Teixeira SC, Feitosa FA

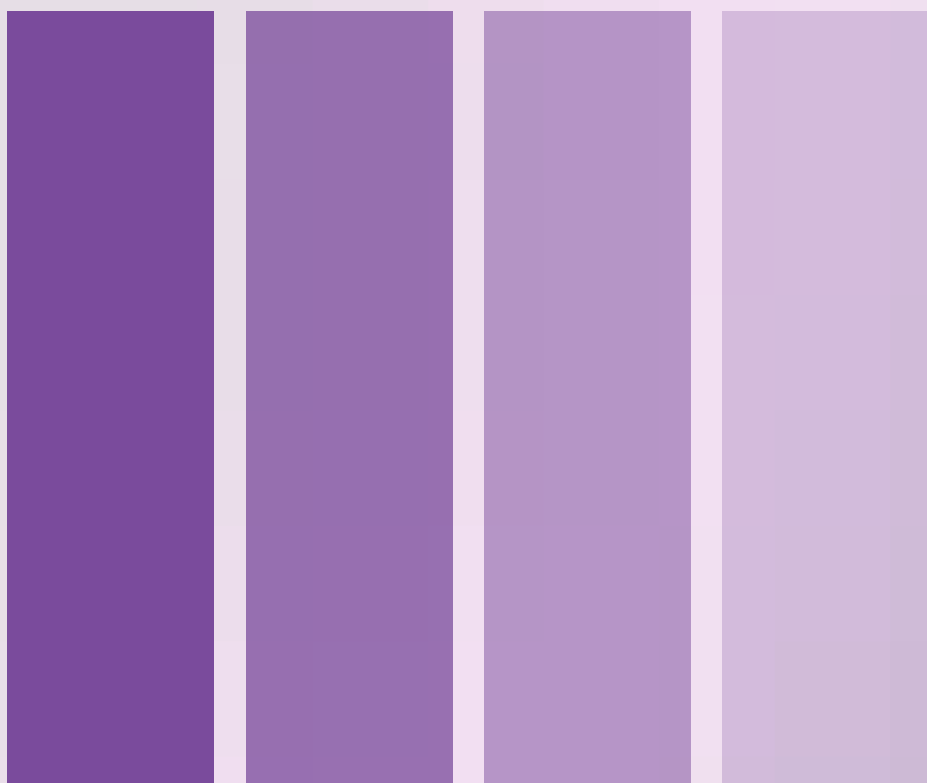
This study aimed to evaluate the color matching between the Vita Classical shade guide (VITA Zahnfabrik, Germany), widely used as a clinical standard for shade selection, and the Vitapan Classical guide, an unofficial version commercially available through e-commerce. The research was motivated by the growing supply of parallel dental materials, often lacking standardization, which may compromise communication between dentists and dental technicians, leading to discrepancies between the selected and reproduced shades in indirect restorations. Measurements were performed using the Easyshade V spectrophotometer (VITA Zahnfabrik) under D65 illumination in a controlled environment. For each shade, three measurements (cervical, middle, and incisal) were taken using a prefabricated matrix to standardize readings. CIE Lab* coordinates were evaluated. Mean values were compared using Student's t-test for independent samples, with analysis conducted in Jamovi software (version 2.3, Sydney). Results showed that all 16 shades presented significant differences ($p < 0.05$) in at least one coordinate. Of these, 11 differed in L^* , a^* , and b^* ; 3 in L^* and b^* ; and 2 only in b^* . Color differences were also calculated using the Delta E00 formula, with a mean of 5.28 and standard deviation of 1.29, all exceeding the perceptibility (0.80) and acceptability (2.30) thresholds: B3 had the lowest (3.55) and C1 the highest (7.75). The findings indicate significant chromatic variations between the shade guides.

Keywords: Colorimetry; Spectrophotometry; Esthetics; Dentistry; Dental Materials.



Section 5

CASE REPORT





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CASE REPORT

Use of the Ribbond system in an endodontically treated tooth with extensive coronal destruction: clinical case report

Ferraz ICM, Maciel ANP, Huhtala MFRL, Kamosaki MBB, Pereira TP

The restoration of endodontically treated teeth with extensive crown loss represents a frequent clinical challenge. In such cases, restorative techniques that reinforce the remaining tooth structure but are conservative in nature are essential. Among the alternatives, Ribbond tape stands out, a polyethylene mesh capable of increasing the strength of structurally compromised teeth. This study presents a clinical case of crown reconstruction of an endodontically treated upper premolar (15) with remnants restricted to the palatal and mesial walls, using Ribbond associated with composite resin. Initially, the temporary material was removed, and the endodontic accesses were sealed with resin-based glass ionomer (Riva Light Cure). After that, selective etching of the enamel was performed with 37% phosphoric acid (Condac), followed by washing, drying, and application of universal adhesive (Single Bond Universal, 3M ESPE), followed by photoactivation for 20 seconds. Ribbond tape was inserted into the cavity, joining the walls, and impregnated with modeling clay (Signum - Zulzerresina) and applied with flowable resin (Filtek Bulk Fill, 3M), which filled the cavity and was photoactivated for 40 seconds. The coronal reconstruction was completed with conventional composite resin (Filtek Z350 XT, 3M ESPE). It is concluded that the combination of Ribbond and composite resin represents a conservative and promising technique for restoring teeth with extensive coronal destruction, contributing to restoring function and increasing the strength of the tooth.

Keywords: Flexural Strength; Polyethylene; Composite Resins; Rehabilitation; Dental Restoration; Permanent.



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CASE REPORT

Orthokeratinized odontogenic cyst: importance of clinicoradiographic and histopathological correlation

Carillo K, Prado RF, Ribeiro JL, Tango EK, Anbinder AL, Alves MGO

Orthokeratinized odontogenic cyst (OOC) is a rare odontogenic cyst microscopically characterized by an orthokeratinized epithelial lining. Clinically, it predominantly affects the posterior mandible and resembles the odontogenic keratocyst (OKC), from which it must be distinguished due to differences in recurrence rates and malignant potential. A 25-year-old leucoderm female patient, after extraction of tooth 48, presented with a whitish membrane in the surgical socket, which was removed and submitted for histopathological analysis, revealing keratin lamellae and mixed inflammatory infiltrate. Panoramic radiography showed a well-defined radiolucent area in the mandibular ramus, with no signs of bone expansion on computed tomography. Considering the hypotheses of OOC and OKC and the need for greater sampling, a second biopsy with decompression was performed. Histopathological examination revealed a cystic lesion fragment partially lined by stratified squamous epithelium, sometimes orthokeratinized with a prominent granular layer, and sometimes non-keratinized. The final diagnosis was OOC, and complete removal followed by periodic clinical and radiographic monitoring was indicated. This case highlights the importance of correlating clinical, radiographic, and histopathological findings for the differential diagnosis of odontogenic lesions and the establishment of appropriate therapeutic management.

Keywords: Odontogenic Cysts; Differential Diagnosis; Biopsy; Mandible.



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CASE REPORT

Guided implant surgery: clinical case report

De Lira RA, Pereira TC, Pereira GM, Saavedra G, Bacigalupo JC, Diamantino PS

The aim of this study was to highlight the benefits of guided surgery in implant dentistry regarding the accuracy of three-dimensional implant positioning, preserving anatomical structures and supporting prosthetic rehabilitation. The patient presented with unsatisfactory cast metal post-and-core restorations in the maxillary central and lateral incisors, and provisional crowns over the canine roots. After clinical examination, extraction of the six roots was performed, followed by the fabrication of a temporary removable prosthesis. Ten months later, surgical planning was carried out using cone-beam computed tomography and intraoral scanning. The files (.DICOM and .STL) were imported into the Exoplan 3.1 Rijeka 8657 software (Exocad, Darmstadt, Germany) for implant planning. Rehabilitation with four Morse taper implants (3.5 x 13 mm) was selected, and a surgical guide was fabricated accordingly. Following implant placement, a provisional prosthesis was adapted using four temporary cylinders to provide esthetics during osseointegration. This clinical case suggests that guided surgical techniques enable safe and predictable execution of complex cases, benefiting both the clinician and the patient.

Keywords: Dental Implants; Mouth Rehabilitation; Digital Health.



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CASE REPORT

Is scanning under rubber dam isolation a feasible approach for the execution of indirect restorations?

de Paulo BC, Pereira TC, Gomes APA, Queiroz TS, Moreira C, Saavedra G

Objective: The aim of the study was to report the applicability of intraoral scanning while rubber dam isolation is in place. **Material and Methods:** Female patient, 50 years old, required restorative procedures on teeth 35 and 37. An intraoral scan was initially performed on both arches. Isolation was carried out from 33 to 37, tooth preparation and immediate dentin sealing were carried out. A new scan with the rubber dam in place was performed and a CAD/CAM lithium disilicate hybrid block was digitally designed, milled, crystallized and cemented under the tooth surface with the rubber dam still in position. After completing this stage, the rubber dam was removed, the occlusion was verified, presenting excellent aesthetic and functional results. **Results:** The absolute isolation process used in the present study works as an excellent device for gingival retraction. **Conclusion:** The absolute isolation can be recommended in clinical activities of intraoral scanning favoring the quality of the final result of treatments.

Keywords: Cad/Cam; Denture Precision Attachment; Digital Technology; Mouth Rehabilitation; Rubber Dams.



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CASE REPORT

Pediatric mucoepidermoid carcinoma: a rare case report with clinicopathological considerations

Malta IS, Menezes DO, Anbinder AL, Prado RF, Alves MGO, Tango EK

Malignant salivary gland neoplasms represent a diagnostic challenge, especially in young patients, due to their rarity in this age group and their clinical resemblance to benign lesions. Case reports are fundamental to highlight the importance of the dentist's attentive evaluation of persistent lesions in this population. A 13-year-old female xanthoderma patient sought dental care due to a palatal swelling with a two-year evolution. Clinical examination revealed a sessile, 2-cm, purplish nodule with a smooth surface. An incisional biopsy was performed under the diagnostic hypotheses of mucoepidermoid carcinoma and pleomorphic adenoma. Microscopic examination showed cystic spaces filled with amorphous eosinophilic material, lined by mucous, epidermoid, and intermediate cells. Clear cells were also observed, confirming the diagnosis of mucoepidermoid carcinoma. The patient was referred to a head and neck surgeon for surgical treatment and, after 18 months of follow-up, remains free of recurrence. This report underscores the essential role of the oral medicine specialist and the oral pathologist in early and accurate diagnosis, directly impacting the patient's prognosis and quality of life.

Keywords: Carcinoma, Mucoepidermoid; Neoplasms; Salivary Glands; Diagnosis.



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CASE REPORT

Clinical performance of the vono files system in cases of severe root curvatures

Maciel ACG, Silva EG, Barbosa RI, Laurentino AM, Martins FV, Gomes APM

Endodontic treatment aims to preserve the tooth in a functional state and free from infection through effective disinfection and obturation of the root canal system. However, severe root curvatures pose a significant challenge due to mechanical limitations of instruments. This study reports three clinical cases of posterior teeth with accentuated curvatures treated in a private practice by a specialist, in a single session. The protocol included endodontic access, manual and mechanical glide path, rotary instrumentation with Vono Files, irrigation with 2.5% sodium hypochlorite and 17% EDTA, irrigation activation with EasyClean® tips, and obturation using the single-cone technique with AH Plus sealer. The cases, involving mandibular molars and a premolar with multiple canals, showed immediate clinical resolution, absence of symptoms, and satisfactory radiographic outcomes after six months, with evidence of periapical healing and tooth preservation. The findings suggest that the proposed protocol is efficient and safe, even in complex anatomical situations, and highlight the potential of the Vono Files system as a viable option for predictable single-session endodontic treatment.

Keywords: Endodontic Treatment; Rotary Instrumentation; Clinical Case.



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CASE REPORT

Pleomorphic adenoma in the upper lip: case report

Souza MS, Costa PVB, Alves MGO, Prado RF, Ribeiro JL, Anbinder AL

Pleomorphic adenoma (PA) is the most common benign neoplasm of the salivary glands. Although it has a predilection for the parotid gland, it can also affect other major and minor salivary glands, accounting for 33 to 41% of minor salivary gland neoplasms, in sites such as the palate, upper lip, buccal mucosa, tongue, and retromolar trigone. It is an epithelial tumor composed of ductal cells, myoepithelial cells, and stromal changes, which explains its broad histopathological diversity. We report the case of a 54-year-old female patient presenting with a nodule of approximately 1.5 cm in the vestibular sulcus of the right upper lip. The lesion was firm, painless, well-defined, and without color alteration. With a clinical hypothesis of PA, an excisional biopsy was performed, and the specimen was submitted for histopathological examination. Sections revealed sheets, cords, and islands of cuboidal, ovoid, or plasmacytoid cells, as well as ductal structures formed by a double layer of cells, with luminal and peripheral myoepithelial components. The stroma displayed hyalinized, fibrous, or myxoid features, and the lesion was surrounded by a fibrous capsule. The final diagnosis was PA, and the patient remains under follow-up. The description of this case contributes to expanding knowledge on the presentation of PA in intraoral sites, supporting differential diagnosis and the improvement of clinical practice.

Keywords: Pleomorphic Adenoma; Salivary Glands; Case Reports; Benign Neoplasms.



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CASE REPORT

Non-keratinizing squamous cell carcinoma of the oropharynx: case report with p16 positivity

Silva LAN, Malta IS, Alves MGO, Prado RF, Linhares LD, Anbinder AL

HPV-associated oropharyngeal squamous cell carcinoma (OPSCC) has shown a rising incidence, with a predominance in males and a better prognosis compared to HPV-independent OPSCC. Its non-keratinizing form is characterized by epithelial nests with central necrosis and diffuse immunostaining for p16, a surrogate marker for high-risk HPV. We report the case of a 64-year-old male, former smoker, presenting with an ulcerated lesion with elevated and indurated borders in the right tonsillar pillar, first identified one week prior. Physical examination revealed ipsilateral cervical lymphadenopathy, firm and immobile, suggestive of metastasis. Incisional biopsy showed a malignant non-keratinizing epithelial neoplasm with basaloid cells, nuclear pleomorphism, peripheral palisading, frequent mitoses, and extensive necrosis, in a fibrous stroma with dense chronic inflammatory infiltrate. Immunohistochemistry demonstrated diffuse cytoplasmic and focal nuclear positivity for p16. The patient was referred for specialized oncological treatment. This case contributes to the clinicopathological recognition of non-keratinizing OPSCC, supporting differential diagnosis and therapeutic decision-making.

Keywords: Carcinoma; Squamous Cell; Oropharynx; Papillomaviridae; Cyclin-Dependent Kinase Inhibitor p16; Head and Neck Neoplasms; Immunohistochemistry.



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CASE REPORT

Histological comparison of two different techniques for guided bone regeneration used in alveolar ridge preservation: case series

Müller F, Cimonari AL

The purpose of this series clinical cases is compare the histological outcome of two different protocols for alveolar bone preservation in guided bone regeneration procedures (ROG). 12 patients were selected, requiring two or more dental extraction, for rehabilitation with dental implants. ROG was performed by a randomized way, xenogenic graft (Bio-Oss Collagen[®], Geistlich) associated with the reabsorbable membrane (Bio-Gide[®], Geistlich), as a positive control group; and blood clot covered by a polypropylene barrier (Bone-Heal[®], Bone-Heal) as a test group. After at least 4 months of preservation for ROG, surgery was performed to install dental implants. During milling, with trephine drill, samples of the neoformed tissues were collected from the areas submitted to ROG for histological comparison purposes. Samples were processed and stained by Hematoxylin and Eosin and Masson Trichrome staining. After descriptive histological analysis, it can be observed that although the healing pattern was similar in both techniques, the test group presented a morphological pattern with native bone characteristics, whereas in the control group, biomaterial remnant can be observed. Within the limits of this research, it can be concluded that further studies and different study models are needed to prove the efficacy of polypropylene barriers as an alternative for the maintenance of bone structure after tooth extraction.

Keywords: Membranes; Alveolar Process; Guided Bone Regeneration; Bone Transplantation; Polypropylene Barrier.



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CASE REPORT

Extensive ameloblastoma: case report

Cardoso LH, Silva CD, Prado RF, Alves MGO, Ribeiro JL, Anbinder AL

Ameloblastoma is the most common benign odontogenic tumor of epithelial origin. It is a locally aggressive neoplasm, clinically characterized by expansion of the jaw bones, with a predilection for the posterior mandible, and frequently associated with root resorption and local infiltration. We report the case of a 41-year-old male patient presenting with a two-year history of facial swelling. Clinical examination revealed facial asymmetry, with a painless swelling of approximately 10 cm in the right mandibular region, associated with bulging of the posterior vestibular sulcus and mobility of teeth 44 to 47. Imaging showed root resorption and a large unilocular hypodense lesion with a hyperdense halo. Aspiration biopsy yielded 40 ml of citrine fluid containing cholesterol crystals. Extractions of teeth 46 and 47 were performed, along with an incisional biopsy of the lesion under the clinical suspicion of odontogenic keratocyst or ameloblastoma, followed by placement of a decompression device. Histopathological examination revealed connective tissue fragments lined by ameloblastic epithelium, as well as islands of odontogenic epithelium with peripheral palisaded columnar cells, nuclei showing reverse polarity, and central cells resembling the stellate reticulum of the enamel organ within fibrous tissue, confirming the diagnosis of ameloblastoma. Decompression followed by enucleation represents a conservative therapeutic option for extensive cystic lesions, less mutilating for the patient, although strict follow-up is required due to the risk of recurrence.

Keywords: Ameloblastoma; Odontogenic Cysts; Histopathology; Differential Diagnosis.



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CASE REPORT

From aesthetics to science: precise volumetric quantification with 3D technology

Takemoto PM, Greca AR, Faria RCM, Araujo RM, Carvalho PCK

The presentation of a clinical case of facial volumization, analyzed by 3D scanning, highlights the applicability of the technology in clinical practice. The case involves a 47-year-old female patient with flaccidity in the mid-face region, who underwent treatment with a bio-stimulator based on hyaluronic acid and calcium hydroxyapatite (HarmonyCa, Allergan Aesthetics). The treatment was performed in the zygomatic, lateral, and jaw areas of the face, using the retrograde fanning technique (1 syringe on each side with a 22G cannula). For follow-up, a standardized photographic protocol and a facial scan with the Cone Beam Computed Tomography (CBCT) scanner (CS9600, Carestream Health) were performed before and 30 days after the application. DICOM images were converted to STL format and analyzed in GOM Inspect 2017 software, where the superposition of meshes allowed for volumetric measurement. The qualitative and quantitative analysis demonstrated an increase in volume in the treated region, confirming the effectiveness of the bio-stimulator and the improvement of facial contour. This case reinforces the potential of 3D facial scanning as an effective and non-invasive tool for monitoring the clinical effects of bio-stimulators. This technology enables objective and precise quantification of changes, eliminating the subjectivity of photographic evaluations. The integration of technology as a complementary standard elevates the scientific and clinical reliability of aesthetic results obtained in orofacial harmonization.

Keywords: Dermatologic Agents; Esthetics; Tomography Scanners.



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CASE REPORT

Direct restorative approach for closing large diastemas in anterior teeth: case reports

Barros MCAS, Moises TA, Silva LA, Santos RS, Prado TP, Huhtala MFRL

The closure of large diastemas is a clinical challenge, as it involves esthetic, functional, and biological aspects, such as maintaining dental proportion, interdental papilla, and occlusal harmony, while avoiding black spaces and gingival recessions resulting from overcontours or inadequate contact points. The aim of this study is to report, through clinical cases, the direct restorative technique for diastema closure, highlighting the importance of detailed planning and individualization according to the patient's clinical needs to achieve predictable outcomes. Both patients presented with diastemas in anterior teeth and esthetic concerns related to the presence of interdental spaces. The treatment plan included anamnesis, clinical examination, photographic records, and impressions for study models, enabling diagnostic waxing and the fabrication of a silicone palatal guide. The restorative protocol involved shade selection, rubber dam isolation, application of a universal adhesive system (Single Bond Universal, 3M), and the use of the palatal guide for constructing the palatal shell with enamel resin. Stratification was performed using dentin and enamel composite resin (Beautifil II, Shofu), followed by finishing and polishing. It is concluded that proper planning, combined with the use of a palatal guide and modern restorative materials, increases predictability, favors dental recontouring, and reinforces the potential of minimally invasive direct adhesive restorations for diastema closure.

Keywords: Diastema; Composite Resins; Dental Esthetics.



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CASE REPORT

Oral papillary squamous cell carcinoma in a patient under chronic immunosuppression: a case report

Carneiro AJS, Silva LAA, Costa VBB, Anbinder AL, Prado RF, Alves MGO

Papillary squamous cell carcinoma is an uncommon variant of oral squamous cell carcinoma that may be mistaken for benign papillary lesions. This distinction becomes even more critical for the prognosis of immunosuppressed patients. This study aimed to report the clinical case of a 51-year-old female patient with systemic lupus erythematosus under immunosuppressive therapy and a previous history of Heck's disease. The patient presented with two lesions on the right ventral surface of the tongue. She reported similar episodes previously; however, this time she observed greater persistence and progression of the lesions, characterized by a sessile verruciform nodule of approximately 1 cm, associated with a small whitish papule with a digitiform appearance. Both lesions underwent excisional biopsy, whose histopathological examination revealed hyperparakeratinized stratified squamous epithelium with marked hyperplasia, exophytic papillary projections, and bulbous endophytic extensions. Prominent cytological atypia, presence of microabscesses, comedonecrosis, and compromised margins were also observed. The established diagnosis was papillary squamous cell carcinoma. This case highlights the importance of recognizing this rare variant, especially in immunosuppressed patients, in whom progression tends to be faster and therapeutic intervention must be immediate.

Keywords: Oral Squamous Cell Carcinoma; Papillary Carcinoma; Systemic Lupus Erythematosus; Immunosuppressive Therapy; Case Report.



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CASE REPORT

Upper labial frenectomy for prosthetic rehabilitation: case report

Ploposki APO, Moraes MB, Toledo GCS, Sato FRL, Moreira LGC, Filho VP

The upper labial frenum can be considered an anatomical structure, described as a tissue fold of the oral mucosa, composed of non-keratinized stratified squamous epithelium, with fibrous connective tissue and elastic fibers, and may contain fibers from the orbicularis oris muscle. Its displaced connection to the alveolar ridge or incisive papilla leads to displacement of the prosthesis due to the traction exerted by the frenum, necessitating its removal. Therefore, this clinical case reports the need for upper labial frenectomy for oral rehabilitation with a complete denture. The procedure was performed after a detailed history and clinical examination, in an outpatient setting, under local anesthesia. Seven days postoperatively, the patient was released for prosthetic rehabilitation. It is concluded that a detailed clinical evaluation is important in prosthetic planning and can favor its success, providing better prosthetic adaptation and restoring adequate function and aesthetics.

Keywords: Oral Frenectomy; Labial Frenum; Complete Denture; Oral Surgery; Oral Rehabilitation.



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CASE REPORT

Myoepithelioma: clinical case report

Paulo LS, Loureiro CCS, Anbinder AL, Prado RF

Myoepithelioma is a tumour affecting the salivary glands, composed of myoepithelial cells. Considered rare, it occurs between the third and ninth decades of life and shows no gender predilection. It is predominantly a benign lesion, although malignant behaviour may be observed in some cases. Among the major salivary glands, the parotid is most frequently affected, while among the minor glands, the palate region is the most common site. Its cells display variable morphology, with plasmacytoid, spindle-shaped, and clear cells being the most frequently observed. The therapeutic approach consists of surgical excision including the lesion margins to ensure safety, and the prognosis is generally excellent, with rare recurrences. The present report aims to describe the clinical case of a 39-year-old female patient presenting with a painless, sessile nodular lesion located on the palate, with a three-year history. Initially, an incisional biopsy was indicated under the suspicion of mucoepidermoid carcinoma; however, during surgery the lesion was completely excised, although fragmented. The diagnosis of myoepithelioma was established through histopathological and immunohistochemical analysis using SOX10, p63, S100, vimentin, CK7, SMA, and Ki-67 antibodies. Involvement of the margins was confirmed, indicating the need for re-intervention.

Keywords: Myoepithelioma; Salivary Gland Neoplasms; Immunohistochemistry.



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CASE REPORT

Computer assisted zygomatic implants in atrophic maxilla: a clinical report

Leite SMG, Miranda PRP, Campos JF, Nishioka RS

Different bone anchorage techniques allow the rehabilitation of atrophic maxillae without the need for bone reconstructions techniques, the zygomatic implant is one of the therapeutic options. The present case reports the use of computer assisted zygomatic implants to rehabilitate an atrophic maxilla. The surgery was planned using a planning software, with the use of .stl and .dicom archives obtained from the patient's mouth scanning and cone beam tomography. Four zygomatic implants were planned, along with a drill guide and a prototype, which were printed. Surgery was trained in the prototype, then was performed with local sedation of the patient. A protocol-type prosthesis was installed within 24 hours. The chosen technique proved to be effective in an 12-month follow-up, during which the implants showed no mobility, the prosthesis showed no prosthetic compensations and the patient had no complaints.

Keywords: Dental Implants; Zygomatic Implant; Atrophic Maxilla; Surgery Computer-Assisted.



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CASE REPORT

Oral basaloid squamous cell carcinoma – clinical and histopathological features

de Oliveira CMA, Silva LAA, Almeda JD, Alves MGO, Prado RF, Anbinder AL

Basaloid squamous cell carcinoma is a rare and aggressive subtype of squamous cell carcinoma, characterized by basaloid cells and areas of squamous differentiation. It predominantly affects the oral cavity, oropharynx, and larynx, with a high propensity for perineural invasion, regional metastasis, and local recurrence, requiring a multidisciplinary therapeutic approach and presenting a worse prognosis compared to conventional squamous cell carcinoma. We report the case of an 82-year-old male patient who presented with severe pain, dysphagia, and speech difficulties, associated with an ulcerated and infiltrative lesion on the lateral border of the tongue, extending to the floor of the mouth. Under the diagnostic hypothesis of squamous cell carcinoma, an incisional biopsy was performed. Histological sections revealed a malignant epithelial neoplasm with a basaloid pattern, marked pleomorphism, hyperchromatic nuclei, and frequent mitoses. The neoplastic islands invading the connective tissue showed peripheral palisading, squamous differentiation with keratin pearls, and central areas of comedonecrosis, within a stroma exhibiting intense inflammatory infiltrate. The final diagnosis was basaloid squamous cell carcinoma. The patient was referred to a head and neck surgeon for treatment and remains under follow-up. This case highlights the importance of early diagnosis and appropriate therapeutic management.

Keywords: Head and Neck Neoplasms; Mouth Neoplasms; Neoplasms; Squamous Cell.



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CASE REPORT

Use of digital tools in clinical decision-making: a case report

Júnior SRRC, Pereira GM, Diamantino PS, Saavedra G, Lira RA, França CG

The objective of this study is to report a clinical case that highlights the relevance of biomechanical, aesthetic, and functional analysis in the decision between partial restoration and full crown. An 58-year-old patient presented extensive coronal destruction in tooth 45. Initially, a partial crown was proposed, seeking a conservative approach. However, the occlusal evaluation revealed that the restoration would fall directly on the functional lingual cusp, predisposing to overload and risk of early failure. Furthermore, the existing diastema, which bothered the patient, would not be resolved with a partial crown. Therefore, a full zirconia crown was performed, without the need for prior endodontic treatment, with subgingival preparation to optimize marginal adaptation and allow the restoration to follow the natural morphology up to the gingival region, providing adequate closure of the interdental space. To complement the aesthetic and functional result, composite resin recontouring was performed on tooth 47. This case demonstrates that conservative management does not always represent the best clinical solution. The choice of a full crown allowed for better distribution of masticatory loads, superior aesthetics, and greater long-term predictability. The importance of careful clinical decision-making is emphasized, which should consider everything from biomechanical aspects to the patient's underlying aesthetic needs.

Keywords: Crowns; Biomechanical Phenomena; Mechanical Stress; Dental Restoration Failure.



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CASE REPORT

Adequacy of the oral environment in a patient with POEMS syndrome who is a candidate for autologous bone marrow transplantation

Pereira JAJ, Ploposki APOS, Santos ACS, Guerrero GG, Carvalho V, Dutra MT

Oral health plays an essential role in the interdisciplinary management of hematologic patients, as untreated infectious foci can compromise the safety and success of bone marrow transplantation. POEMS syndrome is a rare paraneoplastic disorder that requires careful multidisciplinary monitoring, including dental intervention. This study describes the oral health of a 44-year-old female patient referred for treatment at the ONCO Project – UNESP due to an indication for autologous bone marrow transplantation. The initial evaluation revealed the need for periodontal, endodontic, and restorative intervention to eliminate potential infectious risks. Periodontal scaling, prophylaxis, and specific oral hygiene guidelines were performed for the post-transplant period. Tooth 14 underwent endodontic retreatment, and tooth 36 received a direct restoration. The rehabilitation plan also includes prosthetic treatment, scheduled for post-transplantation, ensuring greater functional and aesthetic stability. The measures adopted allowed the control of local risk factors and the preparation of the oral cavity, ensuring better systemic conditions for the patient during the oncological-hematological process.

Keywords: Poems Syndrome; Bone Marrow Transplantation; Autologous Transplantation; Endodontics; Periodontics.



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CASE REPORT

Gingival recession treatment due to chemical trauma using tunnel technique and connective tissue graft

Suarez EAC, Torres CRG, Marco AC, Jardini MAN, Rovai ES

The aim of this study is to report a clinical case of periodontal plastic surgery for the treatment of gingival recession resulting from chemical trauma. A 22-year-old female patient, systemically healthy, presented with gingival recession in tooth 11, associated with a history of local chemical trauma. The tunnel technique with autogenous connective tissue graft harvested from the palate was performed, aiming at root coverage and gain of keratinized soft tissue. Clinical follow-up was carried out at 3 months and 1 year postoperatively, showing tissue stability, satisfactory root coverage, and significant esthetic improvement. This case demonstrates the predictability of the tunnel technique associated with connective tissue graft in the treatment of trauma-induced recessions, reinforcing its applicability in complex situations.

Keywords: Gingival Recession; Connective Tissue; Periodontics.



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CASE REPORT

Plexiform schwannoma of the lower lip: a case report

Ferreira LC, Meneses DO, Americo MG, Anbinder AL, Prado RF, Alves MGO

Plexiform schwannoma is a rare benign neoplasm of the nerve sheath, composed of Schwann cells and characterized by a multinodular architecture with classic Antoni A and B histological patterns and Verocay bodies. It represents an uncommon presentation among head and neck schwannomas and is rare in the labial mucosa. Case description: A 39-year-old female patient presented with a discrete, asymptomatic, and slowly enlarging swelling of the lower lip, with no history of trauma. Clinical examination revealed a sessile, smooth-surfaced, yellowish lesion measuring approximately 4 mm in diameter. The differential diagnosis included mucocoele, chronic sialadenitis, and minor salivary gland neoplasms. Management and results: An excisional biopsy was performed, and histopathological analysis revealed an encapsulated, multilobular lesion composed of spindle-shaped Schwann cells arranged in well-defined lobules, and areas forming palisading patterns surrounding a central acellular eosinophilic area (Verocay body). The findings were consistent with a diagnosis of plexiform schwannoma. The patient recovered uneventfully, with no complications or evidence of recurrence. Conclusion: This case highlights the importance of histopathological evaluation and the careful assessment of persistent swellings, emphasizing the role of dental surgeons in the early detection of rare benign neoplasms at unusual sites.

Keywords: Neurilemmoma; Biopsy; Diagnosis; Differential; Schwann Cells; Lip Neoplasms.



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CASE REPORT

Oral adenosquamous carcinoma: report of a challenging case

Castro DCA, Silva LAA, Loureiro CCS, Anbinder AL, Alves MGO, Prado RF

Adenosquamous carcinoma of the oral cavity represents a rare variant of squamous cell carcinoma, with a more aggressive behavior. Its heterogeneous clinical presentation, combined with the biphasic histopathological pattern, poses a diagnostic challenge, with the potential to delay detection and compromise patient prognosis. This report aims to present the case of a 68-year-old male patient with a leukerythroplakic lesion, infiltrative in appearance, painless, and with a three-month evolution, affecting the lateral border of the tongue and extending to the soft palate. Under the clinical hypothesis of squamous cell carcinoma, an incisional biopsy of the lesion was performed. Histopathological examination revealed a biphasic pattern, with an epithelial component characterized by sheets and nests of neoplastic squamous cells showing nuclear pleomorphism, prominent nucleoli, hyperchromatism, individual keratinization, and keratin pearl formation. The glandular component, in turn, showed islands of epithelial cells with oval morphology, clear cytoplasm, and hyaline eosinophilic matrix, arranged in a ductal or cribriform pattern. On immunohistochemical analysis, the squamous component showed positivity for p53, p63, and p40, while the glandular component exhibited staining for CK8/18. The integration of these findings established the diagnosis of adenosquamous carcinoma. This case reinforces the relevance of recognizing this rare entity and highlights the importance of early and accurate diagnosis for defining an appropriate treatment.

Keywords: Oral Squamous Cell Carcinoma; Adenosquamous Carcinoma; Immunohistochemistry; Case Report.



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CASE REPORT

Management of root perforation and rehabilitation with a new post and core technique: a case report

Silva LRD, Battistelli LS, Valera MC, Rodrigues CS, Silva JMF, Paes Junior TJA

This study reports a clinical case of iatrogenic root canal perforation, immediately sealed with MTA, followed by restorative treatment and a 9-month follow-up. During an attempt to remove an inadequate fiberglass post, a perforation occurred in tooth 21 at its middle third, in the distolingual direction. The perforation was immediately sealed with MTA under rubber dam isolation. Due to the complexity of the case—since customizing a conventional fiberglass post would pose a risk of dislodging the MTA seal, and considering that, according to the scientific literature, the main failure of fiberglass posts is adhesive failure—the rehabilitative stage employed a new system of perforated intraradicular posts combined with an optical fiber illumination device. This approach enabled more effective photopolymerization of the resin cement in the apical and middle thirds of the post and ensured the stability of the MTA seal. Finally, the tooth received full-coverage restoration with lithium disilicate, along with rehabilitation of the anterior maxillary segment, also in the same material, as required. Radiographic follow-up was performed throughout the entire treatment period of the affected tooth, and no external resorption or significant periodontal damage was observed. Immediate sealing of the perforation was crucial to the successful outcome, in combination with the new intraradicular post technique, which preserved the MTA stability and provided adequate adhesion of the restorative complex, optimizing the resin cement polymerization.

Keywords: Dental Prosthesis; Root Canal Preparation; Post and Core Technique; Adhesiveness; Mouth Rehabilitation.



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CASE REPORT

Coronally advanced flap with digital guide: a new strategy for the treatment of multiple gingival recessions

Bonafé ACF, Rossato A, Miguel M, Mathias-Santamaria IF, Queiroz LA, Santamaria MP

The treatment of multiple gingival recessions (GR) remains a clinical challenge, as the modified coronally advanced flap (MCAF) combined with connective tissue graft requires high technical skill and precision. The integration of technologies such as intraoral scanning, computed tomography (CT), and CAD-CAM allows greater standardization and predictability. This case report describes the application of guided MCAF in a 29-year-old patient presenting with aesthetic concerns and dentin hypersensitivity (IRB: 84051318000000077). Tooth #22 presented GR=1.93mm, #23=2.05mm, and #24=1mm, with gingival thickness (GT) <1mm and keratinized tissue width (KTW) = 2mm. Intraoral scanning and CT data were integrated into the DentalCAD software to design oblique incisions and the dimensions of the palatal graft, resulting in a 3D-printed surgical guide. After guide positioning, the g-MCAF was performed according to the predetermined incisions at the mesial and distal aspects of the defects. The graft was harvested from the palate following the guide design, de-epithelialized, and stabilized with simple sutures; the flap was then advanced 2mm coronal to the CEJ. At 6 months, complete root coverage was achieved, with increases in GT (1.29mm, 1.03mm, and 1.47mm), improved esthetics, and absence of hypersensitivity. The g-MCAF technique proved to be a promising approach for the management of multiple GR defects.

Keywords: Computer-Aided Design; Dental Esthetics; Gingival Recession; Surgical Flaps; Tooth Sensitivity.



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CASE REPORT

3D printing for the rehabilitation of a molar with coronal fracture: a case report

Osório SVS, Bonafé ACF, Souza LS, Caneppele TMF, Huhtala MFRL, Prado TP

The incorporation of digital technologies into dentistry, particularly 3D printing, enables indirect restorations with improved adaptation and anatomy, more conservative preparations, reduced costs, and fewer laboratory steps, thereby optimizing clinical time. Although not yet widely disseminated, this technology expands restorative alternatives for posterior teeth by combining esthetics and function. The aim of this case report is to describe the rehabilitation of a posterior tooth with a 3D-printed resin indirect restoration. A 65-year-old patient attended the Dental Clinic of UNESP-ICT with a complaint of a fractured tooth. Clinical examination revealed a subgingival fracture of the lingual wall of tooth #36 associated with an extensive amalgam restoration. Radiographically, a satisfactory endodontic treatment was observed, with favorable conditions for an adhesive indirect restoration. Treatment was performed in four sessions: 1st – prophylaxis, scaling, oral hygiene instructions, and sealing with glass ionomer cement (Vidrion R, SS White); 2nd – clinical crown lengthening to reestablish the biological width; 3rd – shade selection, removal of amalgam and glass ionomer, tooth preparation, intraoral scanning, and fabrication of a provisional restoration cemented with TempBond (Kerr); 4th – cementation of the definitive 3D-printed resin restoration with self-adhesive resin cement (RelyX U200, 3M), followed by occlusal adjustments and polishing. It is concluded that 3D printing enables precise, customized, and minimally invasive indirect restorations, representing an effective alternative for the rehabilitation of posterior teeth with significant structural loss.

Keywords: Digital Dentistry; Dental Restorative Materials; Three-Dimensional Printing; Dental Fractures; Permanent Dental Restoration.



Section 6

CLINICAL TRIALS/ EPIDEMIOLOGIC STUDIES – UNDERGRADUATE



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CLINICAL TRIALS/EPIDEMIOLOGIC STUDIES - UNDERGRADUATE

Concepts of sexual and gender diversity among dental surgeons who treat elderly patients

Dias LCF, Bezerra MA, Kallás MS, Mendes MSS, Jardim MAN

The aging population in Brazil is growing significantly, but the sexuality of older adults, especially LGBTI+ individuals, remains invisible, marked by heteronormativity and fear of discrimination in health services, including dentistry. Although there are studies on older adults and on the oral health of LGBTI+ individuals separately, there is a gap in relation to the LGBTI+ older adult population. This study sought to investigate the conceptions of dentists who treat older adults in Brazil regarding sexual and gender diversity, aiming to identify gaps in professional training and practice. This was a prospective descriptive study, with an online questionnaire adapted from Bezerra (2022), applied to dentists with active CRO registration, more than one year of experience, and experience treating older adults. Of the 172 questionnaires received by August 2025, 153 were validated. The sample was predominantly white (86%), residing in São Paulo (67%), between 41 and 50 years old (30%), with more than 20 years of experience (45%), and completed specialization (48%). Although 93% claimed to understand sexual and gender diversity, only 67% and 68% answered correctly about gender identity and sexual orientation. More than half have already cared for LGBTI+ elderly people, but 84% assume that they are mostly heterosexual. In addition, 90% do not adopt a specific approach, 69% do not record gender identity, and 89% do not record sexual orientation in medical records. These results highlight a lack of conceptual knowledge, an absence of protocols, and an urgent need for training and inclusion of the topic in dentistry curricula.

Keywords: Oral Health; Sexual and Gender Minorities; Dental Education.



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CLINICAL TRIALS/EPIDEMIOLOGIC STUDIES - UNDERGRADUATE

Maternal oral health: analysis of the sociodemographic profile and caries experience in pregnant women

Salgado AJM, Barbieri AA, Silva AS, Esteves SRMS, Teixeira SC, Feitosa FA

The objective of this study was to evaluate the caries experience (DMFT index) in pregnant women and its association with sociodemographic and behavioral variables. A cross-sectional study with a non-probabilistic convenience sample was conducted, composed of 32 pregnant women enrolled in a Primary Health Care Unit located in an area of high socioeconomic vulnerability. A structured questionnaire was applied to collect sociodemographic and oral health data, and a clinical examination was performed to calculate the DMFT index. Data were analyzed using descriptive statistics and the chi-square test ($p < 0.05$). The sample showed a predominance of good self-perceived oral health and regular hygiene habits. The mean DMFT index was 5.0 ± 2.6 , classified as moderate-high. No statistically significant associations were found between DMFT and sociodemographic variables, including education level ($p = 0.887$), marital status ($p = 0.651$), skin color ($p = 0.828$), family income ($p = 0.977$), and year of birth ($p = 1.000$). There was also no association between DMFT and clinical or behavioral factors, such as the presence of oral changes during pregnancy ($p = 0.789$), prenatal consultations ($p = 0.335$), participation in dental prenatal care ($p = 0.635$), or professional guidance received ($p = 0.865$). The pregnant women presented a moderate-high mean DMFT, indicating significant caries experience. No associations were found between DMFT and sociodemographic or behavioral factors. These findings reinforce the need for preventive actions and dental follow-up during prenatal care, aiming to reduce the impacts of caries during pregnancy.

Keywords: Pregnant Women; Dmft Index; Dental Caries; Oral Health; Epidemiology.



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CLINICAL TRIALS/EPIDEMIOLOGIC STUDIES - UNDERGRADUATE

Association between mouth breathing, malocclusion, dental caries, and dental biofilm

Barbosa ACA, Ferreira KD, Carvalho LS, Feitosa FA, Esteves SRMS

To investigate the association between mouth breathing, malocclusion, caries experience (DMFT/dmft), and dental biofilm in children. A cross-sectional study was conducted at Santo Antônio College (Caçapava, Brazil) with 20 children aged 5–13 years. Clinical examinations assessed breathing pattern, presence of malocclusion, caries indices, and dental biofilm. Statistical analyses used Chi-square, Fisher's exact, and Mann-Whitney tests ($p < 0.05$). The mean DMFT was 0.6, and the mean dmft was 3.35, indicating moderate to high caries prevalence in primary dentition. A significant association was found between mouth breathing and malocclusion ($p = 0.017$), with 83.3% of mouth-breathing children presenting occlusal alterations. Mouth breathing was also associated with dental biofilm (66.7%; $p = 0.035$) and gingival inflammation (66.7%; $p = 0.014$). However, no significant differences were observed between mouth breathing and caries indices. Mouth breathing is strongly associated with malocclusion, dental biofilm, and gingival inflammation, representing an important risk factor for children's oral health. Although caries prevalence was low in permanent dentition, primary dentition showed high disease levels. Early diagnosis and preventive interventions are essential to reduce the negative effects of mouth breathing on children's oral health.

Keywords: Mouth Breathing; Malocclusion; Dental Biofilm; Dental Caries; Child Health.



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CLINICAL TRIALS/EPIDEMIOLOGIC STUDIES - UNDERGRADUATE

Postoperative evaluation of the extraction of impacted and impacted lower third molars using piezoelectric technology

Ferreira MJB, Nishioka RS

Objectives: The aim of this study was to evaluate the effects of piezosurgery on postoperative outcomes following the extraction of impacted lower third molars. **Materials and methods:** Surgical time was measured from the initial incision to the completion of suturing (CAAE 83716224.7.0000.0077). After the procedure, data were collected using a structured electronic questionnaire. **Results:** The mean surgical time observed was 68.4 ± 22 minutes. Postoperative findings included pain (45.5% up to 4 days), edema (36.4% up to 6 days), trismus (36.4%), speech changes (63.6%, severe in 9.1%), and transient paresthesia (45.5%). These findings corroborate the results described in the literature, which point to time as the main disadvantage associated with the use of the piezoelectric device in third molar extractions. **Conclusion:** Piezosurgery applied to the extraction of lower third molars, even without the use of anti-inflammatory drugs, demonstrated satisfactory clinical results. No patient needed to resort to stronger analgesic drugs, and the postoperative period proceeded normally. The results reinforce piezosurgery as a viable and effective surgical alternative, and the absence of anti-inflammatory drugs contributed to validating the favorable results obtained in this study.

Keywords: Included Third Molar; Piezosurgery; Osteotomy; Surgical Flaps.



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CLINICAL TRIALS/EPIDEMIOLOGIC STUDIES - UNDERGRADUATE

Polymorphous adenocarcinomas: clinical-pathological correlations

Bizarro LC, Corrêa AGS, Prado RF

Polymorphous adenocarcinoma, a malignant neoplasm of the salivary glands, is characterized by morphological variability and the coexistence of solid, trabecular, tubular, papillary, and cribriform patterns. The objective of this study was to evaluate the quantity and polarization of tumor-associated macrophages in relation to angiogenesis and lymphangiogenesis in biopsies of polymorphous adenocarcinomas. All cases with blocks containing sufficient material for further sections were selected, totaling eight cases, from the Oral and Maxillofacial Pathology Laboratory of ICT-UNESP. Survival and immunohistochemical analyses were performed for the markers CD68, CD163, CD105, VEGF, and D2-40. Images of the different tumor areas were obtained with an Axiophot 4 photomicroscope equipped with an attached camera. CD68 and CD163 staining were used for macrophage counting by a calibrated examiner using ImageJ software, while CD105, VEGF, and D2-40 staining were analyzed for the marked area by automatic quantification using Leica software. The results were subjected to descriptive and inferential statistical analysis. The observed medians were: CD68 = 24; CD163 = 96.5; D2-40 = 1.738 μm^2 ; VEGF = 2.93375 μm^2 ; and CD105 = 2.1755 μm^2 . The tested correlations were not statistically significant. It is concluded that the convenience sampling was not sufficient to demonstrate a correlation between macrophage M2 polarization and vascular and lymphatic microdensities.

Keywords: Tumor-Associated Macrophages; Polymorphic Adenocarcinoma; Angiogenesis; Lymphangiogenesis.



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CLINICAL TRIALS/EPIDEMIOLOGIC STUDIES - UNDERGRADUATE

Analysis of salivary parameters and exposure to secondhand smoke in children with Molar-Incisor Hypomineralization associated with dental caries

Fernandes E, Pasquareli GFN, Ribeiro BS, Barbosa TS

The study evaluated salivary parameters and exposure to secondhand smoke in children with Molar-Incisor Hypomineralization (MIH) associated or not with caries. The sample consisted of 50 6-10-yr-old children, divided into groups: control (without MIH and caries, $n=22$), MIH ($n=20$), MIH+ caries ($n=8$). The diagnosis of MIH was made by a calibrated examiner (Kappa inter/intra = 0.81/0.85). Unstimulated (US) and stimulated (SS) saliva samples were collected for 5 and 10 min, respectively, in refrigerated tubes, in the morning, after a 2-hour fast and 1 hour after toothbrushing. Parents answered questions about sociodemographic information and smoking habits. Data were analyzed using Shapiro-Wilk, Chi-square, Fisher's exact, Kruskal-Wallis, Wilcoxon, and ANOVA tests. MIH group reported more than one health problem (64.3%, $p=0.034$). Most mothers in the MIH group (60%) and fathers of controls (68.2%) had a high school education ($p<0.05$). In all groups, one-third of participants had at least one smoker in the home, with the father being the main smoker and conventional cigarettes being the most commonly used. The frequency of consumption was <10 cigarettes/day, used indoors. There was no difference in the flow and pH values of the US among the groups ($p>0.05$). A similar result was obtained for the SS values in relation to flow, pH, and buffer capacity ($p>0.05$). In intragroup comparison, flow and pH values of the SS were higher than those of the US ($p<0.05$). Salivary characteristics and exposure to secondhand smoke did not differ in the presence of MIH and dental caries in the evaluated sample.

Keywords: Dental Caries; Child; Passive Smoke; Molar Incisor Hypomineralization; Saliva.



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CLINICAL TRIALS/EPIDEMIOLOGIC STUDIES - UNDERGRADUATE

Effect of photobiomodulation on dentin hypersensitivity in children with Molar-Incisor Hypomineralization

Pasquareli GFN, Fernandes E, Ribeiro BS, Barbosa TS

This clinical study evaluated the effect of photobiomodulation (PBM) on painful symptoms in children with Molar-Incisor Hypomineralization (MIH) associated with dentin hypersensitivity (DH). The sample consisted of 18 6-10-yr-old children, with at least one tooth affected by MIH associated with DH. The diagnosis of MIH was made by a calibrated researcher (Kappa inter and intra: 0.81 and 0.85, respectively). Participants were allocated into three groups: PBM (n=8), fluoride varnish – FV (n=5), and placebo PBM+FV (n=5). DH was assessed using air blast and tactile stimuli, using the Visual Analogue Scale (VAS) and Shiff Cold Air Sensitivity Scale (SCASS). Data were analyzed by Shapiro-Wilk, Chi-square, Fisher's Exact, Kruskal-Wallis, Wilcoxon, and ANOVA tests. A total of 34 teeth with DH completed the treatments: PBM (n=16), VF (n=6), and placebo PBM+VF (n=12). The majority of teeth of PBM (87.5%) and placebo PBM+VF (83.3%) groups had mild severity, unlike 100% of the VF group, which had moderate/severe severity (p=0.029). For PBM group, there was a reduction in the VAS score for air jet for incisors (2.2 vs. 0.2, p=0.011) and in the SCASS total score after treatment (0.8 vs. 0.3, p=0.027). For placebo PBM+VF group, after treatment, there was a reduction in the SCASS score (1.3 vs. 0.6, p=0.027) and in the VAS (1.9 vs. 1.0, p=0.027) in mild HMI; and in the VAS total score (2.1 vs. 1.0; p=0.011) and molar air jet (2.1 vs. 1.1, p=0.027). PBM and VF proved effective in reducing pain symptoms in children with MIH associated with DH.

Keywords: Molar Incisor Hypomineralization; Low-Level Light Therapy; Fluoride Treatment; Pain Measurement; Dentin Sensitivity.



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CLINICAL TRIALS/EPIDEMIOLOGIC STUDIES - UNDERGRADUATE

Dental management in individuals with autism spectrum disorder

de Camargo AKP, Scherma AP

Autism Spectrum Disorder (ASD) is an irreversible neurodevelopmental condition of unknown etiology, predominantly affecting males and characterized by impairments in communication, learning, and social interaction. Its increasing prevalence demands attention; according to the Brazilian Institute of Geography and Statistics (IBGE), nearly two million Brazilians have been diagnosed with ASD. In dentistry, professional preparedness is essential to provide individualized and humanized care. This cross-sectional study evaluated oral health factors in individuals with ASD, considering age, sex, brushing habits, caries prevalence, frequency of dental visits, and previous dental experiences. Data were collected through an electronic questionnaire sent to caregivers of children from the group "Espaço Família Autista Taubaté," with ethical approval (CEP/UNITAU No. 6.883.089). The sample included 50 individuals (64% male, 36% female): 46% aged 1–4 years, 28% aged 5–10, and 26% over 10 years. Sixty percent showed resistance to tooth brushing, 26% had never visited a dentist, and only half attended annual check-ups, which correlated with caries occurrence. Additionally, 56.8% reported unresolved dental issues and 32.4% refused treatment. Routine changes caused distress in 86% of participants, highlighting the importance of predictability. Early exposure to the dental environment, combined with consistent routines, proved crucial for better outcomes and anxiety reduction in individuals with ASD.

Keywords: Dentistry; Autism Spectrum Disorder; Approach; Dental Care; Brushing.



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CLINICAL TRIALS/EPIDEMIOLOGIC STUDIES - UNDERGRADUATE

Oral and maxillofacial pathology laboratory of the Institute of Science and Technology of São José dos Campos

Santos MMA, Prado RF, Alves MGO

Oral and Maxillofacial Pathology is a specialty of utmost importance for diagnostic formulation, employing routine hematoxylin and eosin (H&E) staining, histochemistry, immunohistochemistry, and even molecular techniques. The Oral and Maxillofacial Pathology Laboratory of ICT/UNESP, founded in the 1960s, is part of the Graduate Program in Applied Oral Health Sciences and the undergraduate course in Dentistry. The aim of this study was to characterize the service and demonstrate its potential for expansion through a retrospective observational study. Reports issued by the ICT Pathology Laboratory were analyzed for specific periods, based on sample size calculations. The timeframes considered were: 2010–July 2017 (prior to the implementation of the online examination request system); August 2017–2020 (pre-pandemic); and 2021–2024 (post-pandemic). Data collected included type of biopsy, patient sex, skin color, age, date of receipt, date of report release, and diagnosis. A total of 155 reports were randomly selected and analyzed for the pre-digitalization period, 146 for the pre-pandemic period, and 259 for the post-pandemic period. Excisional biopsies were the most frequently performed procedure across all periods. Patients with lighter skin tones, with no gender predominance, underwent biopsies more frequently in all periods. The analysis of the results indicates that the digitalization of the Oral and Maxillofacial Pathology Laboratory provided greater efficiency in the preparation of reports, reducing turnaround times and thus supporting the expansion of the service.

Keywords: Laboratory; Pathology; Report; Diagnostic.



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CLINICAL TRIALS/EPIDEMIOLOGIC STUDIES - UNDERGRADUATE

Correlation between inflammation, bone markers, stress levels, and periapical lesion volume in endodontic infection

Bueno TL, Barbosa CGC, Ward RAC, Santos LR, Fiamini BK, Valera MC

This study evaluated the expression of the cytokine TNF- α and the bone markers sclerostin, osteocalcin, OPG, RANKL, and FGF-23 in the periapical fluid of patients with periapical lesions, relating them to the patients' stress levels and the volume of the lesions obtained by computed tomography. Twenty-two teeth from adult patients with primary endodontic infection were included. Coronal access was performed with spherical diamond burs, followed by canal preparation with a single reciprocating file and irrigation with 2.5% sodium hypochlorite. After foraminal enlargement with a #30 K-file, periapical fluid samples were collected using apyrogenic paper points and stored in amber microtubes. For statistical analysis, Spearman's correlation test was used, and to compare lesion volume and stress, a generalized linear model test was performed, both with a 95% confidence interval. There was no direct correlation between lesion volume, cytokine, and bone markers; however, correlations were observed between TNF- α and osteocalcin; TNF- α and RANKL; osteocalcin and FGF-23; OPG and FGF-23. Regarding the correlation between lesion volume and stress levels, no specific level of stress (mild, moderate, or severe) showed a significant association with volume compared to the no-stress group, although the overall model ($p < 0.001$) indicates that volume has some global effect.

Keywords: Cytokines; Bone Density; Endodontics; Apical Periodontitis; Root Canal Preparation.



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CLINICAL TRIALS/EPIDEMIOLOGIC STUDIES - UNDERGRADUATE

Analysis of maxillary sinus volume and infraorbital canal position in different facial patterns using CBCT

Moreira KS, Fernandes EE, Lopes SLPC, De Oliveira W, Rode SM

The objective of this study was to evaluate the volume of the maxillary sinus (MS) and its relationship with the position of the infraorbital canal (IOC) in different facial patterns (brachyfacial, mesofacial, and dolichofacial), using cone-beam computed tomography (CBCT). A total of 246 CBCT scans were analyzed. The facial pattern and IOC position were determined using OnDemand 3D Dental. The IOC was classified as: type 1 (intraosseous in the maxillary roof), type 2 (partially projected into the MS), and type 3 (fully projected into the MS, with both corticals). The MS volume was measured in ITK-SNAP. For statistical analysis, the Shapiro-Wilk normality test was applied, followed by descriptive statistics and inferential tests (t-test, ANOVA with Tukey, Mann-Whitney, and Kruskal-Wallis with Dunn), considering $p=0.05$. The MS volume showed a significant difference between mesofacial and dolichofacial individuals in type 3 IOC ($p=0.012$). In the brachyfacial pattern, males exhibited significantly larger volumes ($p=0.035$). Among females, there was a difference between mesofacial and dolichofacial patterns ($p=0.013$), which was not observed in males. Overall, MS volume was greater in males, corroborating the influence of sexual dimorphism on craniometric values. MS volume was greater in dolichofacial individuals with type 3 IOC and in brachyfacial males. These findings reinforce the need for systematic analysis of the MS and IOC in CBCT, contributing to safe surgical planning in oral and maxillofacial procedures.

Keywords: Anatomy; Cone-Beam Computed Tomography; Maxillary Sinus; Maxillofacial Injuries.



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CLINICAL TRIALS/EPIDEMIOLOGIC STUDIES - UNDERGRADUATE

Salivary shedding of human herpesvirus type 1 (HSV-1) and Epstein-Barr virus (EBV) in crack cocaine users

Galení TM, da Silva TXP, Zerbinati RM, Sarmiento DJS, da Silva PHB, Almeida JD

Crack cocaine use has been associated with immunosuppression and increased susceptibility to viral infections. Among these, Human Herpesvirus type 1 (HSV-1) and Epstein-Barr virus (EBV) stand out, both of which are highly prevalent worldwide and potentially responsible for lesions and other pathological changes in the oral cavity. These viruses can be detected in saliva, a biological fluid of growing relevance as a diagnostic tool in clinical practice. Objective: To investigate the salivary shedding of HSV-1 and EBV in crack cocaine users, former users, and controls individuals, assessing prevalence and viral titers. Materials and Methods: A total of 89 saliva samples were analyzed, distributed among crack cocaine users ($n=30$), former users ($n=30$), and controls ($n=29$). Viral DNA/RNA was extracted using the Extracta kit (Loccus), and the purified material was subjected to real-time PCR (GoTaq™ Probe qPCR MasterMix, Promega) on the QuantStudio™ 6 Flex system. Statistical analysis was performed using the chi-square and Kruskal-Wallis tests ($p<0.05$). Results: HSV-1 prevalence was higher among former users (60.0%) compared with users (26.7%) and controls (13.8%) ($p<0.001$). No significant differences were observed between groups for EBV ($p=0.649$). Viral loads did not show statistically significant variations. Conclusions: Former crack cocaine users exhibited a higher prevalence of salivary HSV-1 excretion compared with users and controls, without differences in viral loads. EBV prevalence was similar across groups. Saliva proved to be a noninvasive and promising diagnostic tool for epidemiological studies in vulnerable populations.

Keywords: Herpesvirus 1; Human; Epstein-Barr Virus; Cocaine; Crack; Saliva; Diagnosis.



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CLINICAL TRIALS/EPIDEMIOLOGIC STUDIES - UNDERGRADUATE

Evaluation of different intracanal medications on volumetry and repair of periapical lesions

Laurentino AM, Barbosa RI, Santos CHSD, Maciel ACG, Silva EG, Gomes APM

The objective of this study was to evaluate the effect of different intracanal medications on the volume and bone repair of teeth with periapical lesions treated endodontically. To this end, 42 single-rooted teeth from patients with primary endodontic infection and apical periodontitis were selected and divided into three groups (n=14) according to the intracanal medication (ICM): Calcium Hydroxide + 2% Chlorhexidine gel; Ultracal XS®; and NAC (N-Acetylcysteine) + Physiological Saline Solution. To select the teeth, periapical radiographs (PR) and cone-beam computed tomography (CBCT) scans were obtained before starting the endodontic treatment (T0). The teeth were prepared using a rotary system, irrigated with 2.5% sodium hypochlorite, received the ICM, and obturation was performed after a 14-day period. After obturation, the teeth were restored with composite resin and re-evaluated with a new tomography scan after six months (T6). The tomography files were exported in DICOM format (Digital Imaging and Communications in Medicine) to evaluate the lesion volume before and after endodontic treatment through a semi-automated segmentation process at the pre-established time points (T0 and T6). The data obtained were analyzed using descriptive and inferential statistical tests with a significant level of 5% ($p < 0.05$). It was concluded that the intracanal medications used showed good clinical performance, promoting the periapical bone repair process, with no statistically significant differences among them. NAC may be a promising alternative as an intracanal medication, but further clinical studies are still needed.

Keywords: Endodontics; Root Canal; Root Canal Medicament; Cone-Beam Computed Tomography; Calcium Hydroxide; Acetylcysteine.



Section 7

CLINICAL TRIALS/ EPIDEMIOLOGIC STUDIES – GRADUATE



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CLINICAL TRIALS/EPIDEMIOLOGIC STUDIES - GRADUATE

Modulation of the inflammatory response by MMP-9: interactions with cytokines and endotoxins in apical periodontitis

dos Santos LF, Santos AC, Barbosa CGC, Ward RAC, Khoury RD, Valera MC

This clinical trial investigated the relationship between IL-6, IL-1 β , TNF- α , lipopolysaccharide (LPS) levels, periapical lesion (PA) volume by cone beam computed tomography (CBCT), and matrix metalloproteinase-9 (MMP-9) in teeth with primary endodontic infection (PEI) and PA. Twenty-six single-rooted teeth were selected, and coronal opening and biomechanical preparation were performed using a reciprocating file, associated with irrigation with 2.5% sodium hypochlorite. At the end of the preparation, foraminal enlargement was performed with a Kerr #30 file. Samples were collected from inside the canals immediately after the crown opening and periapical interstitial fluid was collected after biomechanical preparation and foraminal enlargement with a K #30 file. Afterwards, the canals underwent a final cleaning protocol and were filled. LPS samples were subjected to endotoxin analysis using the Limulus amoebocyte lysate (LAL) chromogenic kinetic assay, and periapical fluid samples were subjected to multiplex assay for quantification of cytokines and MMP-9. The volume of periapical lesions was measured using ITK-SNAP software and obtained in mm³. The data were statistically analyzed using a significance level of 5% ($p < 0.05$). A positive association was found between MMP-9 and the markers evaluated. It was concluded that there is a correlation between MMP-9, LPS, IL-6, IL-1 β , TNF- α , and the volume of the periapical lesion, suggesting the active participation of MMP-9 in the inflammatory response and progression of apical periodontitis.

Keywords: Cytokines; Endodontics; Endotoxins; Periapical Periodontitis; Cone-Beam Computed Tomography.



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CLINICAL TRIALS/EPIDEMIOLOGIC STUDIES - GRADUATE

Labor market insertion and professional trajectories of dentistry graduates from ICT-UNESP

Gomes NM, Brandão MVV, Louzada R, Pucci CR, Yui KCK

Monitoring the professional trajectories of higher education graduates is essential to assess the effectiveness of academic education and its contribution to labor market insertion. At UNESP, which offers 137 undergraduate programs, understanding how the education impacted the professional lives of university graduates is crucial to inform pedagogical and institutional improvements. This descriptive, qualitative, exploratory study analyzed the professional trajectories of graduates, identifying forms of market insertion, positions held and the influence of undergraduate education on their careers. Of the 199 entrants between 2003-2005 at ICT-Unesp, Dentistry Course, 149 were contacted, resulting in 52 online interviews via Google Meet, using a questionnaire with 38 items. The average time since graduation was 15 years. The sample consisted of 71% women. Entry into the labor market occurred mainly through private clinics (51%); currently, 34% own a private practice, 12% work in the public sector, and 6% are outside the profession. Most participants engaged in extracurricular activities (90%) and received research or scientific initiation fellowships (54%). After graduation, 74% pursued specialization, 36% a master's degree, and 15% a PhD. Regarding professional activity, 88% remain in the health sector, concentrated in the state of São Paulo (86%). The group's average monthly income was R\$ 31,561.47. In conclusion, most graduates sought academic advancement and achieved stable labor market insertion, highlighting the positive impact of training and the relevance of institutional studies of this nature.

Keywords: Dentistry; Higher Education; Labor Market; Professional Practice; University Graduates.



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CLINICAL TRIALS/EPIDEMIOLOGIC STUDIES - GRADUATE

Rennova Diamond Intense® resorption in facial biostimulation: a volumetric and temporal analysis via CBCT

Marques TO, Greca AR, Faria RCM, de Araújo RM

The search for facial rejuvenation has spurred the use of calcium hydroxyapatite (CaHA)-based collagen biostimulators to improve dermal quality and provide volumization. However, the scientific literature lacks data on the resorption of CaHA in the face—a crucial knowledge for determining the ideal interval between sessions and guiding aesthetic professionals. This study aimed to quantify the resorption rate of the Rennova Diamond Intense® bio-stimulator (Innovapharma Brazil), between 7 days and 3 months after application. Three patients, selected according to inclusion criteria, received the product via subdermal retroinjection with a cannula. Resorption analysis was carried out using Cone Beam Computed Tomography (CBCT) with an Orthophos SL (Dentsply Sirona) unit. The images were exported in DICOM format and processed in the OnDemand3D and Blue Sky Plan software for three-dimensional segmentation of CaHA. Volumetric comparison was done using Geomagic Wrap software. The data were submitted to statistical analysis using a paired t-test in Microsoft Excel. This study provides valuable insights into CaHA resorption, contributing to the optimization of aesthetic treatment protocols and standardization of results.

Keywords: Hydroxyapatite; Collagen; Volumetric CT.



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CLINICAL TRIALS/EPIDEMIOLOGIC STUDIES - GRADUATE

Impact of total denture rehabilitation on the quality of life of elderly patients

Rodrigues GQF, Paradella TC, Tango RN, Paes Junior TJA, Carvalho PCK

This study assessed the impact of complete denture rehabilitation on the quality of life of edentulous elderly individuals using the WHOQOL-bref questionnaire at two time points: before and after the prosthetic treatment. A total of 291 volunteers treated at a university service participated. Data were statistically analyzed and results showed a significant improvement in the psychological domain after the new dentures were installed. Although other domains did not present statistically significant changes, a positive trend in perceived quality of life was observed. These findings highlight the importance of a comprehensive approach to oral rehabilitation, considering functional, aesthetic, and psychosocial factors in elderly care.

Keywords: Aged; Quality of Life; Dentures; Oral Health; Prosthodontics.



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CLINICAL TRIALS/EPIDEMIOLOGIC STUDIES - GRADUATE

Case series of the effectiveness of endodontic treatment in patients undergoing head and neck radiotherapy

Guerrero GG, Gagliardi CF, dos Santos LF, Paes LEA, Santos AC, Valera MC

The side effects of head and neck radiotherapy (RT) promote changes in bone metabolism and influence periapical lesion repair. Five cases of endodontic treatment (ET) in teeth with a single canal, pulp necrosis, and apical periodontitis were selected. Three microbiological samples were collected during treatment: S1 (after coronal opening), S2 (after biomechanical preparation - PBM), and S3 (after 15 days of intracanal medicament - MIC), later evaluated by Checkerboard DNA-DNA hybridization. CT scans were performed at baseline (before ET), 6 and 12 months after ET. Microbiological analysis showed a decrease of certain species after PBM and MIC, although pathogenic species persisted in some cases. Volumetric evaluation revealed an increase in lesion volume in only one case (70.34%) due to anatomical limitations that prevented apical patency, while the others had reduced bone volume (from 83.72% to 99.87%). Based on the assessment of signs and symptoms, combined with clinical and tomographic examinations, a reduction in apical periodontitis was observed in cases 1 to 4, while in case 5, despite a reduction in microbial load, an increase in lesion volume was observed, probably due to the lack of apical patency. The need for long-term follow-up is highlighted, considering the persistence of potentially pathogenic bacteria after ET in patients undergoing RT.

Keywords: Apical Periodontitis; Radiotherapy; Oral Microbiota.



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CLINICAL TRIALS/EPIDEMIOLOGIC STUDIES - GRADUATE

Intracanal microbiome analysis by next-generation sequencing in patients undergoing or not head and neck radiotherapy

Santos AC, Gagliardi CF, Guerrero GG, Bento MT, Barbosa CGC, Valera MC

The aim of this study was to analyze, through next-generation sequencing (NGS), the intracanal microbiome of teeth with primary endodontic infection (PEI) and apical periodontitis (AP) in patients who had or had not undergone head and neck radiotherapy (RT). Samples from 20 canals were evaluated (10 patients without RT and 10 with RT). DNA was extracted using the ZymoBIOMICS kit, the V3/V4 region of the 16S rRNA gene was amplified by PCR, and sequencing was performed on the Illumina platform (paired-end, 300 bp), yielding an average of 100,000 reads per sample. Data processing was carried out in Qiime2 (v.2023.5) with DADA2, and taxonomic classification was performed using the SILVA database (v.138) with a Naive Bayes classifier. Statistical analyses were conducted in R (v.4.3.1) using phyloseq and tidyverse. *Phocaeicola abscessus* was the most prevalent species in both groups, although in lower abundance after RT. Other species, such as *Tannerella forsythia*, *Porphyromonas endodontalis*, *Streptococcus mutans*, and *Filifactor alocis*, were found in reduced proportions. The RT group showed lower diversity of known species, decreased overall diversity, and an increase in the "other taxa" category, suggesting a less characterized microbiota. It is concluded that RT promotes alterations in the intracanal microbiota, resulting in reduced diversity of recognized species.

Keywords: Periapical Periodontitis; Radiotherapy; Cancer; Endodontics.



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CLINICAL TRIALS/EPIDEMIOLOGIC STUDIES - GRADUATE

Oral health-related quality of life in type 2 diabetic patients with periodontitis: a prospective clinical study with 6 months of follow-up

Silva TM, Salas-González CA, Silveira MI, Alves LR, Rovai ES

The aim of this study was to evaluate the impact of periodontal treatment on oral health-related quality of life in patients with type 2 diabetes mellitus and periodontitis over a 6-month follow-up. Ten participants with stage III-IV periodontitis and type 2 diabetes mellitus were included. Patients underwent clinical periodontal examination at baseline and 6 months post-treatment. Oral health-related quality of life was assessed using the OHIP-14 questionnaire at the same follow-up times. Statistical analysis was conducted using GraphPad Prism software, and a significance level of 5% was adopted. Periodontal treatment resulted in a significant improvement in the clinical parameters evaluated. However, no changes were observed in the total OHIP-14 scores or in the seven dimensions evaluated in the questionnaire ($p > 0.05$). Plaque index ($r = 0.657$) and number of teeth present in the mouth ($r = -0.608$) were correlated with a worse total OHIP-14 score ($p < 0.05$). Periodontal treatment did not alter oral health-related quality of life as assessed by OHIP-14.

Keywords: Quality of Life; Type 2 Diabetes Mellitus; Periodontitis.



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CLINICAL TRIALS/EPIDEMIOLOGIC STUDIES - GRADUATE

Caries risk classification in schoolchildren from lorena city: a prospective study

Pereira SA, Aquino DR, Silva RA

Lorena, a city in the interior of São Paulo, provides dental care through Family Health Strategy (FHS) units. In partnership with the Department of Education, health promotion and prevention activities are carried out in public schools through the School Health Program (PSE), although these actions lack standardization. Seeking an evidence-based approach, a caries risk classification grounded in scientific literature was adopted. Since 2019, children from Municipal School Prof.^a Ighes Cardoso Ferreira have been monitored. Initially, 124 students were evaluated. In 2020, data collection was suspended due to the COVID-19 pandemic. In 2021, epidemiological data, socioeconomic questionnaires, and clinical examinations were collected to assess the DMFT index (Decayed, Missing, Filled Teeth), plaque index, and gingival bleeding index. A total of 87 children aged 5 to 12 participated. Most mothers had less than eight years of education (51.7%) and a household income below two minimum wages (71.2%). The majority lived far from the FHS unit (66.6%) and had not visited a dentist (78.1%). A statistically significant increase ($p < 0.05$) in the DMFT index was observed among children aged 5 to 9 years, while the index remained stable in other age groups. Excessive sugar consumption, high plaque levels, unsupervised oral hygiene, history of caries, and low demand for dental care were identified as contributing factors. These findings indicate a population at high risk for dental caries and reinforce the need for structured oral health promotion strategies within school environments.

Keywords: Dental Caries; Preschool Children; Risk Assessment; Prospective Study; Oral Health Promotion.



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CLINICAL TRIALS/EPIDEMIOLOGIC STUDIES - GRADUATE

Relationship between sleep habits and possible sleep bruxism in children

Ribeiro BS; Carvalho MEF; Luiz JBD; Barbosa TS

This cross-sectional study evaluated sleep habits in children with and without possible sleep bruxism (PSB). The sample consisted of 75 pairs of parent/children, aged 6 to 9 years ($n = 72\%$). PSB was assessed by 3 questions asked to parents about the presence and frequency of teeth grinding at night and the presence of jaw locking/pain upon waking. A positive response to any question determined the presence of PSB. The sleep diary was self-completed by parents for 7 consecutive days, about the sleep quantity and quality, waking up and teeth grinding during sleep, eating before bedtime, mood upon waking, and clenching teeth while awake (awake bruxism, AB). The data were analyzed using Shapiro-Wilk, Chi-square, Fisher's Exact and unpaired t-tests ($\alpha = 5\%$). PSB was reported in 46.7% of children, with 71.4% reporting "sometimes" (1-2 times/week) and 28.6% reporting "frequently" (3+ times/week). In the analysis of the sleep diary, the groups with and without PSB differed significantly in the reporting of teeth grinding at night (38.8% vs. 2.9%; $p = 0.002$) and in AB (42.9% vs. 13.2%; $p = 0.045$). Sleep quality was compromised in 24.9% of PSB group (without PSB = 5%; $p = 0.063$), with reports of body agitation, snoring, teeth grinding, shortness of breath, nightmares, and crying (PSB = 52.5%; $p < 0.0001$). More than two-thirds of the groups consumed foods/drinks containing sucrose before bedtime, and medication use was significantly higher in children with PSB (20.6% vs. 9%; $p = 0.010$). Medication use, disturbed sleep, and AB may be related to PSB in children.

Keywords: Sleep Bruxism; Child; Sleep Duration; Sleep Quality; Surveys and Questionnaires.



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CLINICAL TRIALS/EPIDEMIOLOGIC STUDIES - GRADUATE

Longitudinal analysis of the expression of S100A8, S100A9, and S100A12 proteins in the saliva of patients with type 2 diabetes and periodontitis

Gonzalez CAS, da Silveira MI, Maximo PM, Cortelli SC, Cortelli JR, Rovai ES

The aim of this study was to compare the levels of the S100A8, S100A9, and S100A12 proteins in saliva before and after 3 months of periodontal treatment, and to evaluate the potential of these biomarkers for the diagnosis of periodontitis. Eighty participants were divided into four groups: with type 2 diabetes mellitus (DM) and periodontitis; with DM without periodontitis; without DM with periodontitis; and without DM and without periodontitis. Periodontal clinical examination and saliva collection were performed at baseline and three months after periodontal treatment. The salivary levels of S100A8, A9, and A12 proteins were analyzed using ELISA kits. Statistical analysis was performed with a significance level of $p < 0.05$. At baseline, the S100A8 and A9 proteins showed higher expression in the periodontitis groups compared to the group without DM and periodontitis. The S100A12 protein was elevated in the DM with periodontitis group compared to the DM without periodontitis group. Periodontal treatment resulted in improved periodontal clinical parameters in the periodontitis groups ($p < 0.05$). Three months post-treatment, the levels of S100A8, A9, and A12 significantly decreased in the saliva of the periodontitis group without DM, while in patients with DM and periodontitis, the levels of S100A9 and A12 decreased. All three proteins demonstrated diagnostic accuracy (DA) for the diagnosis of periodontitis between 0.85 and 0.93, and DA for the diagnosis of periodontitis in diabetics between 0.78 and 0.88. The S100A8, A9, and A12 proteins exhibit good potential as biomarkers for the diagnosis of periodontitis.

Keywords: Type 2 Diabetes Mellitus; Periodontitis; S100 Proteins; Saliva.



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CLINICAL TRIALS/EPIDEMIOLOGIC STUDIES - GRADUATE

Evaluation of bone biomarkers in teeth with primary endodontic infection and apical periodontitis post-radiotherapy

Ward RAC, Santos AC, Barbosa CGC, dos Santos LF, Khoury RD, Valera MC

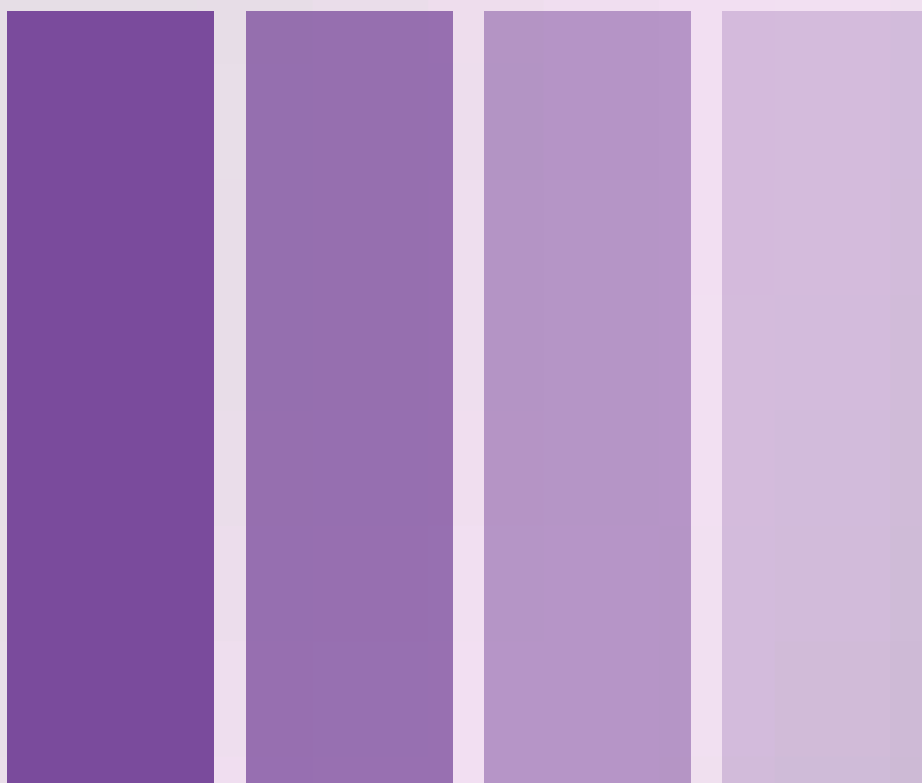
Radiotherapy for head and neck cancer (RT) may interfere with dental tissue and tissue response before and after endodontic treatment. Bone remodeling can be altered by the development of apical periodontitis (AP), which is influenced by biomarkers such as RANKL, osteoprotegerin (OPG), DKK-1, FGF-23, osteocalcin (OCN), and sclerostin. The aim of this study was to analyze the expression of periapical bone markers in teeth with primary endodontic infection (PEI) and AP from patients submitted or not to RT, establishing correlations. Twenty-two single-rooted teeth with PEI and AP from patients who had undergone RT ($n=11$) or not ($n=11$) were selected. Root canals were accessed and prepared using a single reciprocating instrument with 2.5% NaOCl irrigation. Calibrated paper points were introduced beyond the working length to collect periapical fluid samples for quantification of bone biomarkers. The material was subjected to Multiplex assay and statistical analyses. Higher levels of OPG and OCN were observed in non-irradiated patients, while RANKL and sclerostin showed higher expression in samples from RT patients. However, no statistically significant differences were detected between the groups for any analyte. It can be concluded that bone biomarkers should be monitored throughout endodontic treatment, particularly in patients undergoing RT procedures who present altered bone protectors.

Keywords: Endodontics; Apical Periodontitis; Root Canal Preparation; Radiotherapy; Bone Resorption.



Section 8

CASB AWARD





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CASB AWARD

Surface roughness of bulk-fill resin composites: impact of two-step polishing systems

Chagas GS, Dehnavi V, Junior GCS, Pucci CR, Santos MJMC

The purpose of this study was to evaluate the effect of two-step polishing procedures on the surface roughness of bulk fill restorative materials. Disc-shaped specimens ($N = 128$) were fabricated using the following high-viscosity resin composites: bulk fill nanohybrid Filtek One Bulk Fill (Solventum), bulk fill nanohybrid Tetric PowerFill (Ivoclar Vivadent), bulk fill microfilled X-tra fil LC (Voco), and a conventional nanofilled composite, Filtek Supreme (Solventum), used as the control. Polishing procedures were performed with D-fine™ (Clinician's Choice), Sof-Lex™ Diamond (Solventum), and A.S.A.P. Polishers (Clinician's Choice). Each polisher was applied for 30 seconds in a slow-speed handpiece (10,000 rpm) under water spray. Surface roughness (R_a) was measured using a profilometer before and after polishing at three locations per specimen (the mean value was calculated). Surface morphology was assessed using scanning electron microscopy (SEM). Data were analyzed using two-way ANOVA followed by Tukey's B test ($p < 0.05$). Statistically significant differences were found in the interaction between resin composites and polishing systems. SEM revealed that composites with larger filler particles (microfilled) corresponded with greater roughness. The effectiveness of polishing systems was material-dependent. While some composites exhibited similar surface roughness regardless of the system, others showed significant variation, highlighting the influence of composite formulation on polishing outcomes.

Keywords: Dental Polishing; Surface Properties; Composite Resin.



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CASB AWARD

Use of coconut wax in embedding: a new possibility in histopathological processing?

Souza ENPF, Lima VF, Silva LAA, Vasconcellos LMR, Spalding M

This study aimed to evaluate coconut wax as a sustainable alternative to paraffin in histopathological processing. Twenty-five soft tissue samples from Wistar rats were fixed in 10% formaldehyde and randomly distributed into five groups: GC (100% Paraplast®), GE1 (75% Paraplast®/25% coconut wax), GE2 (50%/50%), GE3 (25%/75%), and GE4 (100% coconut wax). After standard histotechnical processing, 7 μ m sections were stained with H&E and analyzed for section quality, staining, and cellular clarity, with scores ranging from 0 to 2. Groups GE3 and GE4 were unfeasible due to block fragility, which prevented slide preparation. In the statistical analysis (Kruskal-Wallis and Dwass-Steel-Critchlow-Fligner), GC showed better section quality compared to GE1 and GE2 ($p=0.047$). For staining, GC differed from GE2 ($p=0.011$) but not from GE1 ($p=0.296$). Regarding clarity, there was a difference between GC and GE2 ($p=0.037$), but not between GC and GE1 ($p=0.079$). It is concluded that the addition of coconut wax impaired section quality. Although substitutions of up to 25% did not significantly compromise staining or cellular clarity, the use of coconut wax proved inadequate for histological embedding.

Keywords: Laboratories; Histology; Paraffin Embedding; Waxes; Microscopy.



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CASB AWARD

Influence of mask aperture diameter on color difference detection by spectrophotometry

Silva AS, Berger F, Figueiredo JC, Feitosa FA, Borges AB, Torres CRG

The aim of this study was to evaluate the influence of mask aperture diameter on color difference values detected by spectrophotometry. Composite resin specimens (GrandioSO Flow, Voco) with 2 mm thickness were prepared in shades A1, A2, A3, A3.5, and A4 (n=5). Circular masks with aperture diameters ranging from 1 mm to 6 mm (M1, M2, M3, M4, M5, and M6) were fabricated to fit the CM-2600d spectrophotometer (Konica Minolta). Specimens were positioned on the masks over a white background, and L*, a*, and b* values were obtained (SAV, D65, 10°, SCI). Color differences (E00) were calculated between A1 and all other shades for each mask. Data were analyzed using two-way analysis of variance (ANOVA; factors: Diameter and Shade) followed by Tukey's test. ANOVA revealed significant differences for all factors ($p < 0.001$) and for their interaction ($p = 0.001$). Tukey's test results were as follows: Diameter – M1: 0.29 (0.20) a; M2: 2.85 (1.98)b; M3: 5.16 (3.83)c; M4: 5.63 (4.20)cd; M5: 5.88 (4.35)d; M6: 6.14 (4.43) d. Shade – A1: 0.02 (0.01)a; A2: 2.81 (1.69)b; A3: 3.49 (1.80)c; A3.5: 6.83 (3.58)d; A4: 8.48 (4.38)e. Groups sharing the same letter did not show statistically significant differences. It can be concluded that mask aperture diameter significantly affects the detected color difference values.

Keywords: Spectrophotometry; Composite Resins; Dental Materials; Colorimetry.



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CASB AWARD

Comparison of surface loss in artificial caries lesions after different acid conditioning protocols

Pereira TP, Torres CRG, Borges AB

Inducing artificial caries lesions (ACL) produces shallower lesions with a thinner hypermineralized surface layer (HS), which may affect resin infiltration (RI). This study evaluated the surface loss of ACL after conditioning with different acids and application times. Lesions were induced in bovine enamel using a lactic acid-based demineralizing gel/solution (pH 4.7; 45d). Half of each lesion was protected with varnish, while the other half was conditioned: PA5 (35% phosphoric acid, 5s), PA15 (15s), HA5 (15% hydrochloric acid, 5s) and HA120 (120s), applied to a 2 mm area of the same specimen (n=6/group). Transverse wear was analyzed by scanning electron microscopy (SEM). A new area was exposed for acid reapplication. In additional specimens, RI was performed after conditioning. Six human enamel specimens with natural white spot lesions (WSLs) were also included; half of the surface was protected, and the other half conditioned with HA120. Surface loss (μm) was quantified using SEM/PhenonImage Viewer and analyzed by RM-ANOVA/Tukey ($\alpha=0.05$). AC120 caused the greatest loss ($45.8 \mu\text{m}$; complete CH removal; 30% of total lesion [TL]) ($p<0.05$). AF5 showed the lowest loss ($2.3 \mu\text{m}$; 10% CH; 1.5% TL), not differing from AF15 ($5.9 \mu\text{m}$; 26% CH; 4% TL). AC5 caused $14.3 \mu\text{m}$ loss (62% CH; 9% TL), differing from AF5 and AC120. RI was satisfactory in all groups. In WSL, AC120 produced $47.5 \mu\text{m}$ loss (62% CH; 14% TL). In conclusion, AC120 is not recommended for ACL, as milder protocols (AF5, AF15, AC5) enable adequate infiltration while preserving lesion body.

Keywords: Dental Caries; Dental Enamel; Tooth Demineralization; Hydrochloric Acid; Scanning Electron Microscopy.



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CASB AWARD

Effect of electronic cigarettes on optical properties of long-lasting composites for CAD/CAM systems

Miranda PRP, Leite SMG, Rodrigues CS, Gonçalves NMF, Bottino MA, Marinho RMM

This study evaluated the influence of electronic cigarettes on the color stability and translucency of ceramic-filled resin composites fabricated by additive or subtractive manufacturing, indicated for long-term dental rehabilitation. VarseoSmile Crown Plus (BEGO) and Grandio® Blocs (VOCO) were tested. Circular specimens (10 mm × 1.5 mm) were polished up to #2000 grit. Samples were exposed to 1500 puffs, divided into baseline, 500, 1000, and 1500. Color was analyzed with a CM2600 spectrophotometer (Konica Minolta, Tokyo, Japan) using the CIELab system. Translucency differed significantly at baseline (milled ≈ 12.7 , printed ≈ 4.67). TP00 values showed no significant change for printed specimens ($p = 0.402$), while milled ones did ($p < 0.001$). All milled $\Delta TP00$ values were above the perceptibility threshold ($TP00 > 0.62$) but below acceptability threshold ($TP00 > 2.62$). Both groups had $E00 > 0.81$ (perceptibility threshold), with the milled group significantly higher than printed ($p < 0.001$) and above clinical acceptability ($E00 \leq 1.77$). In conclusion, milling resin showed clinically visible translucency changes and unacceptable color differences, whereas printed resin remained within clinical acceptability.

Keywords: Electronic Nicotine Delivery Systems; Computer-Aided Manufacturing; Dental Materials; Color; Translucency.



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CASB AWARD

Impact in the anterior maxillary region with the use of temporary prostheses and reinforced mouthguards – an in vitro study

Simões LCS, Borro LH, Queiroz TS, Paes Junior TJA

This study aimed to evaluate in vitro the dentoalveolar responses of central incisors associated with a provisional fixed partial denture (FPD) when subjected to trauma in the anterior maxillary region, using conventional and polyamide mesh-reinforced mouthguards (MGs). Study groups ($n=5$) consisted of a conventional MG with 4 mm thickness and an MG reinforced with polyamide mesh, both made of EVA. A skull model was 3D printed using Spin Red Resin – Quanton 3D, covering the maxillary region; teeth were made of Resilab Clear resin – Wilcos, the prosthetic component of Resilab Temp – Wilcos, and the periodontal ligament was simulated with addition silicone. Strain gauges were placed on the maxillary alveolar process and the crown center of the abutment tooth (21, FDI), parallel to its long axis, to measure micro-deformations. Impact was applied with a machine delivering an energy of $E_p = 0.5496$ J, within the elastic limit of the skull material, horizontally and parallel to the ground, using a 35 mm sphere. Data were analyzed with the Shapiro-Wilk normality test, one-way ANOVA, and Tukey Post-Hoc. Results showed a significant difference between non-reinforced and reinforced groups ($p = 0.018$), with greater micro-deformations in the conventional MG group. The association of a mouthguard with a reinforcement system positively influenced impact absorption in upper central incisors when combined with a provisional FPD.

Keywords: Reinforcement Mesh; Fixed Partial Denture; Mouthguard; Dental Trauma.



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CASB AWARD

Influence of staining and repolishing on the stability of optical properties of resin composites with simplified shade systems

Fernandes JB, Rocha ACMF, Mailart MC, Torres CRG, Borges AB

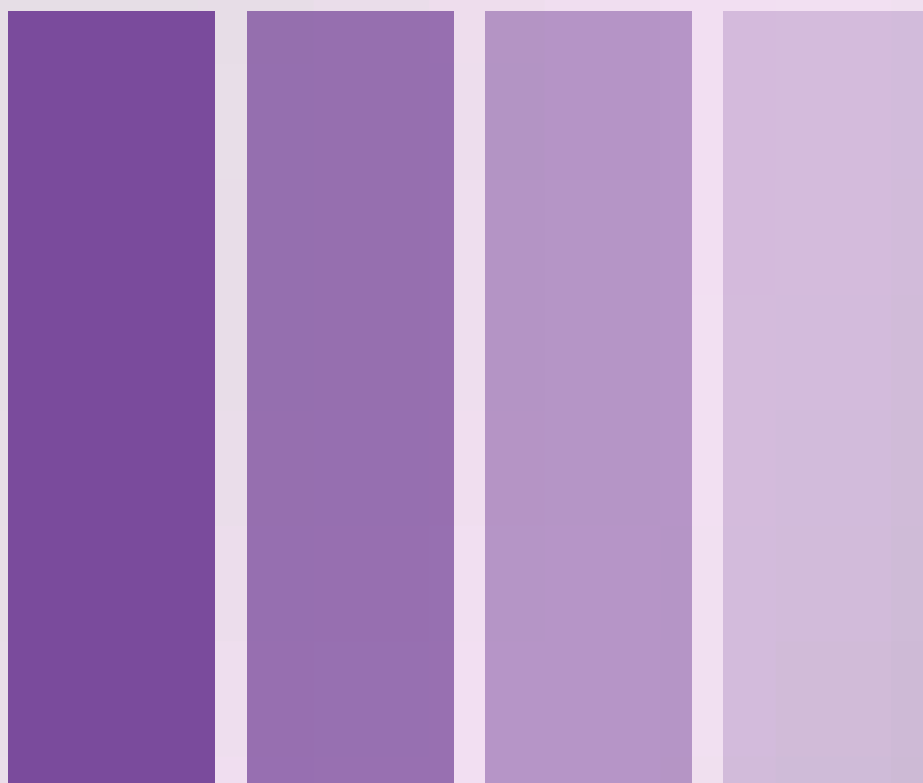
The study aimed to characterize the optical properties of resin composites with simplified shade systems and to assess their stability after staining and repolishing. Specimens (6×1 mm, $n=15$) were prepared from ten materials: six simplified systems – Admira 5 (Ad5), Filtek Universal (Fil), Tetric Prime (Tet), Spectra ST HV (Spt), G-aenial A'Chord (G-ae), Transcend Universal (Tra); three single-shade – Vittra Unique (Vit), Omnicroma (Omn), Charisma One (Cha); and one conventional (control) – Grandioso (Gnd). Color (CIELAB), gloss, translucency, and fluorescence were evaluated at T0 (baseline), T1 (14 days of staining), and T2 (after repolishing). Color change was calculated relative to T0 (E00T1, E00T2), and other properties as %T1/T0 and %T2/T0. Data were analyzed with ANOVA/Tukey (5%). All properties differed significantly among materials ($p<0.001$). Gloss %T1/T0 values were: Omn(97.8 ± 3)a; Fil(94.2 ± 7)a; Vit(92.6 ± 5)ab; G-ae(92.3 ± 7)ab; Tet(91.5 ± 9)abc; Spt(86.7 ± 7)abc; Gnd(81.5 ± 5)bcd; Ad5(80.5 ± 6)cd; Tra(72.1 ± 12)ed; Cha(68.6 ± 15)e; and %T2/T0 values were: Vit(122.6 ± 14)a; Adm5(113.0 ± 7)ab; Omn(101.6 ± 15)bc; Tra(98.9 ± 16)bcd; G-ae(90.5 ± 9)cde; Tet(89.3 ± 14)cdef; Spt(88.6 ± 8)cdef; Gnd(83.8 ± 16)def; Cha(83.3 ± 12)ef; Fil($74.9 \pm$)f. Optical properties varied between materials at T0. Gloss, translucency, and fluorescence decreased after staining, with partial recovery after repolishing ($p<0.05$). The stability of optical properties was material-dependent, showing variable performance with no direct correlation to the shade system.

Keywords: Dental Restoration; Permanent; Composite Resins; Dental Materials; Color; Fluorescence.



Section 9

LITERATURE REVIEW





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LITERATURE REVIEW

The use of platelet- and leukocyte-rich fibrin for bone and tissue regeneration in extractions

Panini P, Leite SMG, Miranda PRP, Nishioka RS

The objective of this study was to review the scientific literature on the use of Leukocyte- and Platelet-Rich Fibrin (L-PRF) in bone and tissue healing after tooth extractions. The methodology adopted was a descriptive and qualitative literature review based on national and international studies published between 2005 and 2022. The sources included scientific articles, books, case reports, and clinical trials, with searches conducted in the PubMed, Scielo, and Google Scholar databases. Bone resorption following tooth loss hinders oral rehabilitation, and L-PRF has emerged as an autologous alternative developed to accelerate healing, reduce inflammation, and promote regeneration. The results showed that L-PRF contributes to faster and more effective healing, with less pain, swelling, and greater bone formation. It can be used alone or in combination with grafts. Its application also enhances hemostasis, local stability, and the regeneration of both soft and hard tissues. It is concluded that L-PRF is a promising biomaterial in dentistry, with relevant clinical benefits in post-extraction healing, although further studies are required to standardize and validate protocols.

Keywords: L-PRF; Tooth Extraction; Tissue Healing; Bone Regeneration; Dental Biomaterials.



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LITERATURE REVIEW

Whitening mouthwashes: a narrative review on efficacy, mechanisms of action, and safety

Fogaça VAO, de Carvalho LS, Ávila DMS, Torres CRG, Borges AB, Mailart MC

Whitening mouthrinses are a treatment option considered easy to use, widely available, and low-cost, often employed without professional supervision, which raises concerns among professionals. This narrative review aimed to contextualize and evaluate studies on the whitening efficacy of mouthrinses containing different active agents. A search was conducted in PubMed and Scopus databases using the descriptors "Tooth Bleaching," "Teeth Whitening," "Whitening Mouthrinse," "Hydrogen Peroxide," "Activated Charcoal," and "Tetrapotassium Pyrophosphate," combined with the operators AND/OR. Of the 99 articles retrieved, 22 were selected, including clinical trials, laboratory studies, and a systematic review. Articles not related to the purpose were excluded. Formulations containing hydrogen peroxide or pyrophosphates and hydroxyapatite compounds may provide not only clinically acceptable whitening, with progressive effects dependent on long-term use, but also color maintenance obtained with bleaching gels treatment. Moreover, they demonstrate safety, with a low incidence of sensitivity or soft tissue irritation, attributed to their short application time. However, activated charcoal and hydrogen peroxide may increase the roughness of enamel and restorative materials. It is concluded that whitening mouthrinses represent a safe and effective alternative, acting through different mechanisms considering tooth substrate whitening, color maintenance of bleaching treatment, or reduction of extrinsic staining potential.

Keywords: Mouthwash; Tooth Whitening; Hydrogen Peroxide; Activated Charcoal; Phosphates.



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LITERATURE REVIEW

Platelet concentrates use in periodontal clinical practice: an integrative review

de Oliveira AGL, Jardini MAN

Platelet concentrates are blood-derived products rich in bioactive elements capable of stimulating periodontal tissue regeneration and modulating biological responses, playing a crucial role in the healing process of surgical sites. This technology has gained prominence in periodontics due to its ability to enhance treatment outcomes and patient recovery. This literature review aimed to analyze the use and effectiveness of platelet concentrates in periodontal treatment based on clinical studies involving these biomaterials. This review investigated the use of platelet concentrates in periodontal procedures by conducting searches in PubMed, Embase, Lilacs, and Scopus. Articles published from 2018 onward in Portuguese, English, or Spanish, including case reports and clinical trials, were included and organized using the Covidence platform for analysis. Out of 460 studies identified, only 26 were included for final analysis and discussion development. Platelet concentrates demonstrated effectiveness as biomaterials for use in basic and surgical periodontal treatment. Their association with other products can further enhance expected treatment outcomes.

Keywords: Platelet Concentrates; Periodontics; Tissue Regeneration.



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LITERATURE REVIEW

Digital platforms for the treatment of temporomandibular joint disorders: a literature review

Carvalho TMI, Rocha JC

Temporomandibular Disorder (TMD) comprises a group of musculoskeletal conditions that affect the temporomandibular joint (TMJ), the masticatory muscles, and adjacent structures. Early identification, education, and proper management of TMD in this population are crucial. Some studies have already demonstrated the importance of counseling and information for treatment success, as it involves patient participation in the treatment, making them more motivated and thus improving the final outcome. However, currently, few studies have employed technologies aimed at improving patients' understanding and comprehension. Therefore, this study aims to review the literature for evidence on the development and use of mobile applications in the treatment of temporomandibular disorders. The relevance lies in the fact that this is a chronic condition that requires patient participation in treatment, and through digital platforms, greater patient engagement could be achieved. An integrative review was conducted in the PubMed, Scopus, and SciELO databases, using descriptors related to TMD, mobile applications, education, and counseling, covering the last 10 years (2015-2025). The use of mobile applications appears promising in the management of TMDs, favoring education, treatment adherence, and patient engagement, as well as supporting evidence-based clinical practice.

Keywords: Temporomandibular Joint Disorders; Educational Technology; Mobile Applications; Self-Management.



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LITERATURE REVIEW

The influence of immediate pre-endodontic dentin sealing on resin-dentin adhesion resistance

Macedo NFEB, Moura FB

During root canal disinfection, irrigating solutions such as NaOCl and EDTA can alter the dentin structure, reducing microhardness and impairing adhesion to the dentin. This study aimed to analyze the influence of Immediate Dentin Sealing (IDS) and Immediate Pre-Endodontic Dentin Sealing (IPDS) techniques on resin-dentin bond strength in teeth undergoing endodontic treatment. The IDS technique was developed for indirect restorations, hybridizing dentin after cavity preparation and before molding, aiming to reduce dentin contamination, lower sensitivity, and increase adhesive strength. This led to the development of IPDS, which performs hybridization before endodontic treatment, protecting dentin against chemical agents and promoting sealing, resistance, and integrity. The methodology consisted of a literature review of 27 studies, including *in vitro*, *in vivo*, experimental, and clinical research, obtained from databases such as PubMed/MEDLINE and Google Scholar, encompassing publications from 1965 to 2025. The literature shows that NaOCl and EDTA compromise adhesion and bond durability. IDS helps reduce microleakage and sensitivity, while also increasing adhesive strength. IPDS reinforces protection by sealing the cavity before endodontic irrigation. It can be concluded that endodontic success depends on disinfection and effective coronal sealing. Evidence suggests that IDS and IPDS are proactive strategies that strengthen the adhesive interface, preserve dentin, and promote greater long-term restoration stability.

Keywords: Dentin; Dentin-Bonding Agents; Root Canal Irrigants; Sodium Hypochlorite.



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LITERATURE REVIEW

Quantitative assessment of erosive tooth wear using intraoral scanners: Current overview and future perspectives

Barros LS, Torres CRG, Borges AB

Monitoring the progression of erosive tooth wear (ETW) remains a clinical challenge, as visual methods are inherently limited by the capacity of human vision. In this context, intraoral scanners may serve as a valuable tool since they allow the quantification of tissue loss within a feasible timeframe, even at levels imperceptible to the human eye. Therefore, the aim of this study was to review the current literature regarding the use of intraoral scanners in the monitoring of ETW. A literature search was conducted in the PubMed database to collect relevant information. Findings revealed that the quantification of ETW relies on the measurement of tissue differences obtained through the superimposition of digital models from two distinct evaluation time points. However, this step represents the most challenging aspect of the process, as several factors related to scanning procedures, equipment, and dental substrate can lead to distortions in the generated digital models. Nevertheless, despite these challenges, the use of intraoral scanners in clinical studies has provided significant evidence, particularly contributing to the elucidation of progression rates and morphological changes of ETW lesions, as well as to a better understanding of risk factors associated with its progression. It can be concluded that, although further studies are required for full validation of the method, intraoral scanners represent a feasible and promising approach for the clinical monitoring of ETW.

Keywords: Tooth Erosio;. Tooth Wear; Intraoral Scanners; Dental Scanners; Monitoring.



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LITERATURE REVIEW

Periodontal condition in patients undergoing chemoradiotherapy: a literature review

Sales GSA, Torquato LC, Alves TTS

Chemoradiotherapy, widely used in the treatment of various types of cancer, is known for its adverse effects on the oral cavity, including mucositis, periodontal disease, osteoradionecrosis, and opportunistic infections. However, the specific influence of these treatments on patients' periodontal condition is not yet fully understood. Therefore, this review aimed to investigate the effects of such therapies on the periodontal health of oncology patients while also identifying strategies for prevention and management. A total of 15 studies addressing the aforementioned conditions were analyzed. The literature revealed that periodontal alterations range from gingival inflammation to more destructive forms, such as aggressive periodontitis, which in some cases may lead to premature tooth exfoliation. Thus, it is essential to incorporate dental care aimed at preventing and controlling periodontal infection into the therapeutic planning of these patients. The implementation of non-surgical periodontal therapy, as well as low-level laser therapy, has shown positive outcomes in managing these complications. Such approaches may reduce tooth loss and infections, thereby contributing to the maintenance of systemic health.

Keywords: Antineoplastic; Periodontal Diseases; Osteoradionecrosis; Mucositis.



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LITERATURE REVIEW

Monitoring erosive tooth wear: a review of different clinical strategies

Ribeiro JA, Barros LS, Torres CRG, Borges AB

Given the significant and growing prevalence of erosive tooth wear (ETW) in the global population, particularly among young individuals, effective strategies to monitor its progression are essential. This study aimed to review the different methods for monitoring ETW and their respective timeframes required to detect significant tissue loss. A literature search was conducted (PubMed), gathering information from the selected articles. Monitoring methods classified as qualitative or semi-quantitative, such as indices, the use of study models, or photographs, are more common in clinical practice due to their ease of use. However, they present limitations, including evaluator subjectivity and a reliance on visual assessment, which inherently restricts the detection of minimal tissue changes due to the limitations of the human eye. Consequently, these methods typically require a diagnostic timeframe of 18 months to 5 years to detect ETW progression. In contrast, quantitative monitoring methods, such as intraoral scanning, offer a promising solution by enabling precise quantification of tissue loss over a significantly shorter period, from 6 months to 1 year. The findings of this review conclude that monitoring methods for ETW are essential to control lesion progression and prevent severe ETW. Among these methods, the use of intraoral scanners presents a promising strategy for detecting significant tissue loss within a short period.

Keywords: Dental Erosion; Erosive Tooth Wear; Monitoring.



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LITERATURE REVIEW

The influence of oral hygiene in the prevention of ventilator-associated pneumonia : literature review

Oliveira MG, Ribeiro KPM, Moura LGC

Ventilator-Associated Pneumonia (VAP) is a common nosocomial infection, often related to the microaspiration of oropharyngeal pathogens facilitated by the presence of an endotracheal tube. This study aims to review different oral care protocols adopted in Intensive Care Units (ICUs) to prevent VAP. Various interventions are described in the literature, including the use of chlorhexidine, povidone-iodine, oxidizing agents, herbal extracts, saline solution, and mechanical biofilm removal methods, either alone or in combination. The literature review was conducted through searches in the PubMed, SciELO, and Federal Council of Dentistry databases, using descriptors in Portuguese, English, and Spanish. Articles published between 2012 and 2024 that addressed the effects of oral care on reducing the incidence of VAP were included. Of the studies identified, 16 met the inclusion criteria, showing that oral hygiene protocols can significantly reduce infection rates, intubation time, and mortality in mechanically ventilated patients. It is concluded that oral care plays a fundamental role in preventing VAP; however, further studies with greater methodological rigor are needed to consolidate these practices in hospital routines.

Keywords: Ventilator-Associated Pneumonia; Oral Hygiene; Dental Staff Hospital; Disease Prevention; Intensive Care Units.



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LITERATURE REVIEW

The influence of electronic cigarettes on periodontal health

Ragazzi IM, Ragazzi NM

The study seeks to understand the effects of electronic cigarettes (vapes) on periodontal health through an integrative review of the literature from the last 10 years. Fifteen articles in Portuguese and English were analyzed, including clinical, laboratory, and in vitro studies, as well as reviews, available in databases such as SciELO, LILACS, and PubMed. Electronic cigarettes, created as an alternative for smoking cessation, have also become popular among young people, with worrying usage rates. Their aerosol, although tar-free, contains nicotine, heavy metals, formaldehyde, acetaldehyde, and acrolein, as well as flavorings with cytotoxic potential. These components are associated with xerostomia, halitosis, oral lesions, leukoplakia, risk of squamous cell carcinoma and, above all, significant changes in periodontal health. Evidence points to increased plaque, probing depth, bone loss, release of pro-inflammatory cytokines, oxidative stress, apoptosis, necrosis, and a reduction in type I collagen. Furthermore, contact with vapors alters the oral microbiota, favoring dysbiosis and worsening periodontitis, with species such as *Actinomyces* and *Rothia* spp. linked to biofilm formation, and *Enterococcus* spp. linked to inflammatory processes. Although some studies indicate that the effects are less than those of conventional cigarettes, others suggest genetic damage, changes in stem cells, and a possible increased risk of peri-implantitis. Ultimately, vapes do not represent a safe alternative, requiring greater attention from dentists and robust research to fully clarify their impacts on periodontal and oral health.

Keywords: Oral Health; Vape; Electronic Cigarettes; Periodontitis.



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LITERATURE REVIEW

Alternative techniques to bone grafting for atrophic maxilla rehabilitation

Dias VBS, Miranda PRP, Leite SMG, Campos JF, Diamantino PS

Tooth loss is a prevalent condition among the elderly, affecting 73% of Brazilians aged 65–74 years. Although complete dentures are widely used, they present functional and aesthetic limitations. Implant dentistry has introduced significant advances, enabling fixed rehabilitation with greater comfort and predictability. However, implant placement depends on sufficient bone quantity and quality, with maxillary resorption being one of the main challenges. Objective: To analyze, through a literature review, the efficacy, predictability, indications, and limitations of the main rehabilitation techniques for atrophic maxillae: All-on-four, short implants, and zygomatic implants. Methods: A bibliographic search was performed in PubMed, SciELO, and Cochrane databases, covering publications from 2013 to 2024. Clinical and review articles reporting success rates, indications, and complications of the selected techniques were included. Results: Studies report high success rates for all techniques, ranging from 93% to 98%. Clinical benefits include shorter treatment time, the possibility of immediate loading, and lower morbidity compared with bone grafting. Conclusion: All three techniques are viable and safe options for the rehabilitation of atrophic maxillae. The dentist must select the most appropriate approach according to each patient's clinical and systemic conditions.

Keywords: Atrophic Maxilla; Implant-Supported Prosthesis; All-On-Four; Short Implants; Zygomatic Implant.



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LITERATURE REVIEW

Functional orthopedic appliances and their effects on upper airway dimensions in growing class II patients: an umbrella review

Pereira IF, Machado Junior AJ

Obstructive sleep apnea (OSA) is a respiratory disorder that affects children during growth, particularly those with Class II malocclusion. Early diagnosis is challenging but essential, and dentists play a key role in identifying craniofacial changes associated with airway reduction. Functional orthopedic appliances (FOAs) have been proposed as an effective non-surgical treatment for mandibular advancement, with potential benefits for upper airway patency. This study aims to identify, assess, and synthesize evidence from systematic reviews and meta-analyses on the effects of FOAs on upper airway dimensions in growing Class II patients. The research was conducted in PubMed, Scopus, CAPES Journals Portal, Web of Science, Cochrane Library, Scielo, BVS, and BBO/Bireme databases. Studies published in the last ten years using imaging methods were included, with search terms in English: functional appliance, Class II malocclusion, upper airway, systematic reviews, and meta-analysis. Evidence suggests that FOAs can increase upper airway dimensions, particularly in the oropharyngeal region, and improve respiratory parameters associated with OSA, such as the apnea-hypopnea index and nocturnal oxygen saturation. However, heterogeneity among studies—including different appliance types, assessment criteria, and follow-up periods—represents a limitation and highlights the need for further research. Future studies should include larger samples, longer follow-up, and the use of cone-beam computed tomography and polysomnography to provide more accurate and reliable assessments of the benefits of FOAs in growing patients.

Keywords: Functional Appliances; Class II Malocclusion; Sleep Apnea; Systematic Review; Meta-Analysis.



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LITERATURE REVIEW

Public oral health care: access and care coordination for early diagnosis of oral cancer

Shimada BS, Cavalcante DFB

The epidemiological overview of oral and oropharyngeal cancer shows progress about reduction of victims, as well in the incidence of cases, however, the disease remains a symptomatic challenge to Unified Health System (SUS), considering the expenses, lack of assistance and pathological unpredictability globally. Thus, the study aimed to discuss the importance of dental management to prevent and detect early oral cancer and analysed the expertise of the professionals from Primary Health Care to health according to illness. It's about a review of the literature with a theoretical foundation of scientific articles collected from databases and periodics (Pubmed, Scielo e LILACS) published from 2016 to 2025. Altogether there were 31 articles (24 national and 7 international) that corresponded with the main idea of the study and later in a chronological table. Based on researches, revealed that dentists had knowledge enough about the theme and the oral exam (visual and tactile) can detect between 59% and 99% of cancers. However, multiprofessional participation is necessary and regular capacity and qualification of the Dental Care Team. In summary, it's imperative a collaborative care from these professionals from Primary Health Care and the spread of coverage of oral health, especially, by the awareness of part of the population.

Keywords: Primary Care; Mouth Neoplasms; Early Diagnosis.



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LITERATURE REVIEW

Mouth breathing and obstructive sleep apnea in children: an umbrella review

Biscuola MPC, Machado Junior AJ

Mouth breathing and obstructive sleep apnea (OSA) in children are interrelated conditions that can negatively impact neurocognitive development and overall quality of life. This study aimed to critically analyze the available evidence regarding the relationship between these conditions, highlighting their prevalence, clinical consequences, and therapeutic approaches. To this end, an umbrella review was conducted, including systematic reviews and meta-analyses retrieved from scientific databases, following rigorous inclusion criteria. A total of six systematic reviews met the inclusion and exclusion criteria and were included in the final analysis. These studies explored various aspects of the topic and underwent a thorough assessment of methodological quality. The findings indicated that mouth breathing may act as both a predisposing and aggravating factor for OSA, while OSA itself may contribute to the persistence of this breathing pattern. However, the methodological heterogeneity among the included studies posed a challenge to synthesizing the findings, underscoring the need for more standardized research. It is concluded that early interventions and multidisciplinary approaches are essential for the effective management of these conditions. Furthermore, this review provides a foundation for future research in this area.

Acknowledgements: FAPESP – 24/08994-0.

Keywords: Obstructive Sleep Apnea; Mouth Breathing; Umbrella Review; Pediatrics; Sleep Disorders.



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TECHNOLOGY AND INNOVATION

Interaction of the acquired pellicle with polymer and fluoride-based solutions in the modification of eroded dental surfaces

Prado TP, Azevedo JP, Torres CRG, Scaramucci T, Aoki IV, Borges AB

The influence of the acquired pellicle on the interaction between anti-erosive solutions and the dental surface was investigated through contact angle analysis. Bovine crowns were embedded in acrylic resin and ground until a flat area of enamel ($n=60$) or dentin ($n=60$) was exposed. After polishing, 30 specimens were subjected to an erosive challenge (citric acid 0.3%, pH 2.6, 30 s), subsequently immersed in human saliva (5 min) for pellicle formation and subsequent application of one of the treatment solutions (1 min); the remaining 30 specimens received only the erosive challenge and the treatment. The treatment solutions used were ($n=5$ /group): CN (ultrapure water), CP (Elmex Erosion, 500 ppm F⁻ + 800 ppm Sn²⁺), F (NaF 225 ppm F⁻), AMC (2% aminomethacrylate), and F+AMC. The contact angle was measured using a goniometer by dispensing 0.5 μ L of ultrapure water and recording images at 20 fps for 30 s. Data were analyzed using two-way ANOVA and Tukey's test ($p<0.05$). In enamel, differences were observed only for the treatment factor. Means ($\pm$ SD): CN ($17,3\pm3,5$)A, CP ($32,3\pm4,8$)B, F ($20,9\pm4,8$)A, AMC ($70,6\pm4,2$)C, AMC+F ($70,3\pm4,5$)C. In dentin, differences were observed for all factors. With pellicle: CN ($37,7\pm1,7$)CD, CP ($47,1\pm5,0$)E, F ($44,6\pm2,9$)DE, AMC ($67,0\pm5,7$)F, AMC+F ($69,5\pm2,5$)F; without pellicle: CN ($19,2\pm2,6$)A, CP ($30,6\pm4,5$)BC, F ($26,0\pm3,4$)AB, AMC ($67,8\pm4,2$)F, AMC+F ($67,6\pm2,2$)F. It was concluded that the pellicle influenced the interaction of the treatments only for dentin, and AMC increased the contact angle, rendering the dental surface more hydrophobic and showing promise for use in anti-erosive mouthrinses.

Keywords: Dental Erosion; Dental Enamel; Polymers; Sodium Fluoride.



Section 10

TECHNOLOGY AND INNOVATION



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TECHNOLOGY AND INNOVATION

DENTAL SAFETY – clinical protocols and prescriptions for patients with special care needs

Miguel N, de Carvalho PCK, Ramos CJ

The pedagogical content addressing patients with special care needs (SCN) in both undergraduate and postgraduate dental programs remains limited when compared to other specialties, despite the high clinical demand for dental care in this population. There is a need for tools that ensure safer treatment and prescription practices for SCN, enabling healthcare professionals to feel more confident in patient management and reducing the risk of hospitalizations or even death. This ongoing study aims to develop a mobile application, in Portuguese, designed to provide clinical dental care protocols and guidelines for the prescription of anesthetics, analgesics, anti-inflammatory drugs, and antimicrobials, including information on potential drug interactions. The target groups include pregnant women, hypertensive patients, and individuals with diabetes. A literature review was carried out in the Scopus and PubMed databases, selecting articles published between 2010 and 2025, using the keywords: Mobile Applications; Dentistry; Drug Interactions; Patient Safety. The prototype, titled Dental Safety, is being developed in JAVA, with specific modules and icons for each condition. Upon completion, the application is expected to consolidate updated dental care protocols and medication safety information for patients with systemic medical conditions, reinforcing the role of technology as a key support for clinical decision-making.

Keywords: Mobile Applications; Dentistry; Drug Interactions; Patient Safety.



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TECHNOLOGY AND INNOVATION

Extensometry applied to the measurement of deformations in the diagnosis of sleep bruxism

Silva CA, Kalczuk L, Amaral MSJ, Machado R, Tanaka H

Sleep bruxism is characterized by grinding or clenching of the teeth, resulting from nonfunctional tooth contact during the night and contractions resulting from rhythmic masticatory muscle activity (RMMA) in the masseter muscle region, causing imbalance in the stomatognathic system as a whole. Several tools are used to diagnose sleep bruxism, including the measurement of force or amplitude, such as polysomnography and electromyographic devices. In the search for versatile and accessible technologies, piezoelectric and pressure-resistant sensors have been considered due to their high sensitivity and affordable cost. Therefore, we present a prototype strain measurement system based on the strain gauge sensor and Arduino Nano microcontroller to evaluate the sensor's detection effectiveness during contractions and movement through simulations in a laboratory environment. We used a strain gage sensor and an Arduino microcontroller to record and process electrical signals. In a laboratory setting, different parameters were tested to establish reading limits. Data recording and saving were successful, and the data were then filtered and classified to determine the severity of bruxism. The prototype developed showed great potential for clinical use, and we hope to establish a highly accurate diagnostic method for sleep bruxism.

Keywords: Bruxism; Sensors; Microcontroller; Extensometer.



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TECHNOLOGY AND INNOVATION

Stop-safety device for temporomandibular joint arthroscopy

De Paula MFA, Santos YC, Sato FRL, Nogueira GT, Moraes MB, Raldi FV

Temporomandibular joint (TMJ) arthroscopy is a minimally invasive and effective procedure widely used by maxillofacial surgeons to treat intra-articular disorders. Although it is a closed surgical technique, there is a significant rate of accidents and complications, often related to the blind insertion of the arthroscope and working portal without direct visualization of the joint's interior. This practice can lead to medial wall rupture, resulting in fluid leakage into the oropharyngeal region, airway obstruction, vascular injury, intracranial hemorrhage, damage to the 5th cranial nerve, and consequent paresthesia. To reduce these risks, a stop-safety device was developed to limit the depth of instrument insertion to a safe distance of 25 mm. This is a low-cost, auto-clavable blocking device made from highly resistant plastic, designed to be compatible with various types of arthroscopes and working portals. It is laterally attached and adjusted using an internal screw, and the insertion depth is measured with a sterile ruler. Once the correct intra-articular position is confirmed, the device can be easily removed. The routine use of this stop-safety device in TMJ arthroscopy is expected to significantly reduce the likelihood of complications, enhancing the overall safety of the procedure.

Keywords: Temporomandibular Joint; Arthroscopy; Patient Security; Complications.



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TECHNOLOGY AND INNOVATION

Case study as a teaching strategy for early integration of basic and clinical sciences in dentistry

Felizari ACS, Grisante LAD, Lopes NFS, Vasconcellos LMR, Spalding M

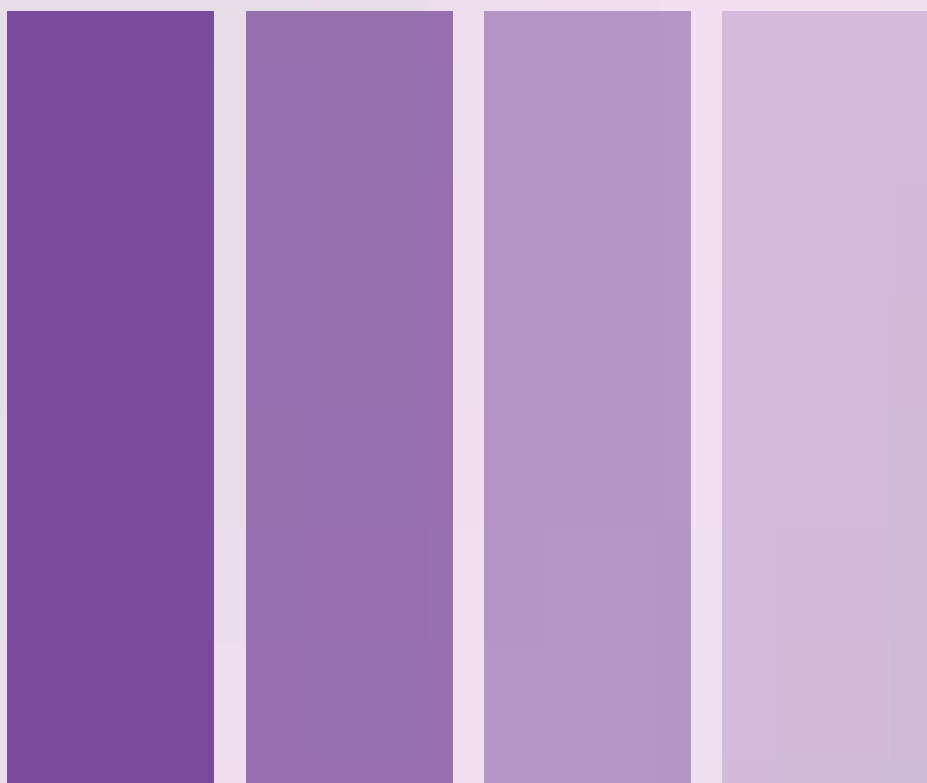
Admission to dental school is often accompanied by significant challenges, such as the mismatch between student expectations and the predominantly theoretical curriculum of the first years. In this context, the use of pedagogical approaches such as the active learning strategy "Case Study" aims to bring first-year students closer to clinical practice. Within the Histology and Embryology course of the School of Dentistry at the Institute of Science and Technology, São Paulo State University (Unesp), São José dos Campos, this strategy was implemented to integrate basic science content with clinical applications, promoting early integration and greater student engagement. Four clinical cases were developed and presented: exodontia, implantology, vesiculobullous disease, and temporomandibular disorder (TMD), designed to foster discussion of histological aspects related to the involved tissues. Working in groups, students analyzed each case and formulated hypotheses regarding the biological processes underlying the conditions. Subsequently, a playful methodology known as "hot potato" was applied, in which a symbolic object circulated among students while music played; when the music stopped, the student holding the object discussed the case with the support of the instructors, who encouraged critical reflection and the articulation between theory and practice. The Case Study strategy proved to be a valuable tool to enhance understanding of the clinical relevance of Histology, presenting it not merely as theoretical content but as an essential component of dental practice. Content previously perceived as distant could thus be meaningfully related to real situations in students' future professional activities.

Keywords: Case Reports. Histology; Teaching; Students; Dentistry.



Section 11

EXTENSION





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EXTENSION

The's dentados extension project: playful and educational strategies for promoting oral health in children

Maciel ANP, Chagas GS, Rocha MB, Gomes NM, Yui KCK, Pucci CR

The's Dentados project: fun and educational assistance in the waiting room of ICT in São José dos Campos and regional schools involves undergraduate and graduate students in humanized actions aimed at promoting oral health and reshaping the dental experience for children and adolescents treated at ICT-Unesp. Based on the RIR method (Relax, Inform, and Respect), the project seeks to reduce patients' anxiety while waiting for care in pediatric dentistry clinics through games, parodies, and playful activities, while also spreading information about oral hygiene to children and their caregivers. The actions sometimes extend to schools in the region, broadening the reach of the educational proposals. Every two weeks volunteer students meet to develop physical and digital informational materials, which are posted on a social media profile dedicated to the weekly dissemination of content related to oral health. The extension project activities integrate teaching, research, and community outreach, fostering the training of more humanized professionals prepared for pediatric dental care, as well as contributing to community awareness about the importance of hygiene care for oral health. Thus, it is concluded that the project has been achieving its goal of reshaping dental care for the target audience, promoting tranquility for patients while they wait for appointments.

Keywords: Health; Oral Health; Education; Oral Hygiene; Health Education.



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EXTENSION

Extension Project ICT UNESP MEO Project “More than Seeing and Hearing”: Inclusive Actions for the Visually and Hearing Impaired Regarding Oral Health

Nudi RS, Gonçalves NMF, Ribeiro BS, Bonafé ACF, Queiroz TS, Paes Junior TJA

The aim of this project is to promote the inclusion and accessibility of people with visual and hearing impairments, ensuring that information on oral hygiene care is accessible to all, while raising awareness about its importance. At the university, the project organizes lectures for students, highlighting the relevance of the topic and the need for inclusion and accessibility for people with hearing and visual impairments, in order to encourage respect and prepare future professionals for qualified care. Among the actions developed are the production of support materials such as macromodels, posters, and digital content aimed at awareness and sensitization, as well as visits to community centers for blind and deaf individuals, where educational activities on oral hygiene, oral health promotion, and practical guidance are carried out. The project also values active listening to this population, addressing their difficulties and transforming them into reflections that contribute to building more effective solutions. Thus, this project contributes not only to the humanized and inclusive training of students but also to improving the quality of life of people with visual and hearing impairments. By combining teaching, outreach, and social responsibility, we seek to reduce communication barriers, expand access to oral health information, and promote a fairer, more equal, and more inclusive society.

Keywords: Persons with Disabilities; Oral Health; Social Inclusion; Persons with Hearing Disabilities; Persons with Visual Disabilities.



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EXTENSION

Academic inclusion experience for public high school students

De Souza LCC, De Mello FZDA, De Oliveira VGB, Lage LMA, Vegian MRC, Spalding M

The extension project "Winter at the University", conducted by the Institute of Science and Technology at Unesp, São José dos Campos, under the PROPG/PROEC/PROPE 21/2025 call, aimed to bring public high school students closer to scientific practice and foster interest in higher education. Outreach efforts included visits to six state schools, reaching approximately 500 students, as well as dissemination through social media. A total of 98 applications were received, with 26 participants selected based on an electronic form and motivational letter. During August, students attended 12 hours of activities, including lectures, interactive sessions, guided tours, and hands-on laboratory practices in microbiology, pathology, histology, cellular and molecular biology, and anatomy, providing direct exposure to scientific methodologies and the academic environment. Evaluation of the project by 21 participants indicated high levels of satisfaction, highlighting organization, learning outcomes, and a sense of inclusion. Feedback demonstrated a positive impact on motivation toward higher education and reinforced interest in science. The project proved to be an effective strategy for academic inclusion, fostering connections between public school students and a university often perceived as elitist. In addition to stimulating scientific curiosity, engagement, and critical thinking, the initiative contributed to the development of pedagogical and professional skills among graduate student team members, reinforcing the importance of extension programs in student formation and in strengthening ties between schools and universities.

Keywords: High School; Science; University; Motivation; Education.



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EXTENSION

Microworlds in the palm: an integration activity between high school and university

Santos MEDS, Silva FAS, Ribeiro JL, Fernandes EE, Garcia MT, Spalding M

The objective of this experience report is to present an activity carried out within the scope of the call for proposals "Support for University Extension Actions in Graduate Studies", during the Winter School project at UNESP. Twenty-six high school students participated in the Microbiology Laboratory as "scientists for a day," investigating microorganisms present on their own hands and reflecting on the importance of hygiene in microbial reduction. The activity, entitled "Microworlds in the palm", began with a brief theoretical introduction conducted by a professor and a graduate student of the discipline, followed by laboratory practice. The students collected samples from the surface of their hands using sterile swabs, microscope slides, and performed Gram staining with crystal violet and fuchsin. They then observed the microorganisms under an optical microscope and discussed the findings in relation to hygiene and health practices. The activity was enthusiastically received, providing participants with a concrete experience of the scientific method. At the end, 21 students answered a questionnaire to evaluate the activity. The feedback was positive: 100% of the participants evaluated the activity as excellent, confirming the effectiveness of the integration. The students expressed surprise upon visualizing the microorganisms and reported a greater understanding of the importance of hand hygiene. The integration and engagement of students with the university and science through practical activities in the microbiology laboratory proved to be effective in demystifying education, often perceived as distant from reality. Moreover, it fostered increased interest in pursuing higher education.

Keywords: Science; Community–Institution Relations; Microbiology; High School; University.



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EXTENSION

Evaluation of the impact of a smoking cessation training workshop for dental students

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Objectives: To evaluate the impact of a smoking cessation training workshop for dental students. **Materials and Methods:** The program comprised four sessions addressing nicotine dependence, treatment strategies, benefits of abstinence, relapse prevention, and simulated clinical cases. Assessment was conducted using pre- and post-workshop questionnaires covering confidence, knowledge, attitudes, perceived barriers, and clinical applicability. **Results:** Following the course, participants reported a substantial increase in confidence when approaching patients who smoke. There was greater willingness to recommend treatment and improved ability to manage patient resistance. Perceived knowledge significantly increased across all domains, particularly in relapse prevention. Regarding barriers, there was a marked reduction in concerns such as lack of training and fear of compromising the dentist–patient relationship, with lack of time emerging as the main persistent barrier. **Conclusion:** The workshop demonstrated a positive impact by strengthening participant's confidence and competencies while reducing barriers to smoking cessation counseling.

Keywords: Smoking; Education; Professional; Smoking Cessation; Dentistry; Students.



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EXTENSION

Awareness of oral manifestations resulting from alcohol and tobacco

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Use tobacco and alcohol are predisposing factors for several oral pathologies, such as periodontitis, neoplasms, and, above all, oral cancer. Therefore, when combined, they further potentiate the damage to health, being responsible for a large number of lesions in the oral cavity. Thus, this work aims to promote awareness of the impacts of consuming these substances on oral health. To this end, different extension activities were developed: a lecture at the Casa de Recuperação Renascer rehabilitation center, a podcast presentation, a radio program broadcast, and social media publications, in order to reach diverse audiences. The lecture included illustrative images of lesions, a discussion circle for clarifying doubts, and guidance on oral hygiene. The other communication channels expanded the reach of information, allowing the participation of different age groups. As a result, significant engagement was observed, with knowledge acquisition by the public and the creation of a space for dialogue. It was therefore concluded that educational actions such as this are fundamental both for the training of professionals who are more sensitive to social demands and for disseminating knowledge to the lay public, reinforcing the role of the dentist as a health promoter and as an agent in the prevention of diseases associated with alcohol and tobacco.

Keywords: Neoplasm; Smoking; Alcoholic beverages; Oral manifestations; Awareness.



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EXTENSION

Tutorial Education Program – PET Dentistry UNESP São José dos Campos

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Objectives: To enrich students' education by promoting critical thinking, social responsibility, and active engagement in civic life. **Methods:** The Tutorial Education Program (PET) promotes diverse academic and community-based experiences, including the organization of events, outreach activities, cultural initiatives, and research projects. Actions are implemented through collective planning, weekly meetings, and the integration of teaching, research, and extension, under the guidance of an academic supervisor. **Results:** Key outcomes include strengthened teamwork and interdisciplinarity, increased student engagement, scientific production disseminated at academic conferences, and active participation in initiatives with academic and social impact. **Conclusions:** PET contributes to the education of ethical, critical, and socially engaged professionals, enriching students' academic trajectory and broadening their understanding of their transformative role in society.

Keywords: Universities; Education; Mentoring; Interdisciplinary Placement; Professional Training.



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EXTENSION

Transforming Smiles: transinclusive dentistry in education, extension, and health promotion

Bernardes FMG, Mendes JWS, Oliveira VGB, Silva AS, Alves MGO, Feitosa FA

To present the extension project Transformando Sorrisos (TS), highlighting its role within the teaching-research-extension triad, its impact on academic training, and the promotion of health equity for transgender (TG) individuals. TS provides weekly free care, offering integrated and interdisciplinary dental procedures carried out by undergraduate and graduate students under Professor supervision. Beyond clinical practice, it also develops lectures, educational campaigns, and research in partnership with LGBTQIAPN+ collectives. Between 2024 and July 2025, more than 120 clinical procedures were performed, ranging from rehabilitative and restorative to surgical interventions. Clinical evaluations and patient feedback revealed improvements in oral health, self-esteem, and adherence to ongoing care. Educational activities reinforced prevention, while institutional recognition underscored the project's social relevance. Today, TS stands as a consolidated extension initiative that integrates clinical care, teaching, and research. By providing humanized, continuous care, it contributes to critical professional training, reduces inequalities, and strengthens support networks for the transgender population.

Keywords: Dentistry; Health Promotion; Social Inclusion; Oral Health; Transgender People.

