

H001 Airway changes and stability after maxillo-mandibular surgery with TMJ Concepts® total joint prostheses

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Patients suffering of autoimmune diseases, rheumatoid arthritis, idiopathic condilar resorption and other pathologies may have respiratory disturbances due to upper airway obstruction and need orthognathic surgery and TMJ total joint prostheses for their complete rehabilitation. This study evaluated changes and stability of oropharyngeal airway, head and cervical posture of 46 female patients submitted to TMJ reconstruction and simultaneous maxillo-mandibular surgical advancement with counter-clockwise rotation. The average post-surgical follow-up was 41.5 months. Three lateral cephalometric radiographs of each patient were analyzed: immediately before surgery (T1); immediately after surgery (T2) and long-term follow-up (T3). Random and systematic errors were controlled with appropriate methods. Student-t test was used with 5% level of significance. The results showed an increase of the narrowest retroglottal airway space (5.0 ± 4.1 mm) due to surgery, remaining stable during the entire follow-up period. Head posture showed flexure immediately after surgery (5.6 ± 6.8 degrees) and extension long-term (1.8 ± 6.7 degrees), while cervical curvature had no significant change. The distance from the hyoid to the mandibular plane decreased during the post surgery period.

It was concluded that maxillo-mandibular advancement with counter-clockwise rotation and TMJ reconstruction produced immediate increase in oropharyngeal airway dimension, which was influenced by changes in head posture, but remained stable over the entire follow-up period.

H002 Linear measurement comparison between 3-dimensional multislice computed tomography and conventional cephalometry on human dry skulls

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Three-dimensional (3D) craniofacial imaging techniques are becoming increasingly popular and have opened new possibilities for orthodontic assessment, treatment, and follow-up. The purpose of this study was to compare linear cephalometric measures obtained by lateral and frontal conventional cephalograms, within measures based on spiral multi-slice (MS) computed tomography (CT), and verify the intraobserver and interobserver error for 08 cephalometric measurements. The sample was constituted by human dry skulls ($n = 10$). The conventional cephalograms were obtained using a Panoura® X-ray equipment (Yoshida Dental) and the 3D-CT images were obtained utilizing a 16 channel CT scanner (Aquilon® - Toshiba Medical). The acquisition parameter was 0,5 mm slice thickness by 0,3 mm slice rendering. The raw data was transferred to an independent workstation containing the software Vitrea®, where the measurements were made in 3D and aided by multiplanar reformations for posterior comparison with those measurements made on lateral and frontal cephalograms, using the software Dolphin®. The Intraclass correlation coefficient (ICC) and the Bland-Altman Plot constituted the statistic approach.

The averages obtained from 3D-CT measurements were consistently precise. They shown high ICC values and short intervals of confidence (95%), in addition, the intraobserver and interobserver error were low in absolute and percent terms. Regarding the conventional cephalometry the measurement $Zm(d)-Zm(e)$ was not reliable for intraobserver and interobserver error.

H003 The use of Group A "T" loop for differential moment mechanics: An implant study

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When anchorage control is critical and compliance is less than ideal, efficient treatment depends on differential tooth movements. The purpose of this paper was to evaluate the distal tipping of partially retracted canines and mesial movement of the molars. Eleven patients, with metallic bone markers serving as reference, had their maxillary and mandibular canines partially retracted using a TTLS preactivated for group A with a tip back bend. The canines were retracted until enough space was available for alignment of the incisors without proclination. Forty-five degrees radiographs were taken immediately before the initial activation and at the end of the partial retraction. The radiographs were scanned, superimposed on the bone markers and measured digitally. The results showed that the mandibular canines' crowns were retracted (4.1 ± 1.9 mm) and intruded (0.7 ± 0.3) by uncontrolled tipping. In contrast the maxillary canines' crowns were retracted (3.2 ± 1.4 mm) by controlled tipping. The maxillary and mandibular molars crowns were protracted similar amounts (1.0 ± 0.6 mm and 1.2 ± 1.2 mm, respectively) by controlled tipping, without significant extrusion. The molars were protracted approximately 0.3 mm for every 1 mm of canine retraction.

We conclude that the TTLS used in this investigation produced controlled tipping of the maxillary canines, but it did not produce controlled tipping of the mandibular canines or translation of the molar as expected. (Support: CAPES - 3936/05-3)

H004 The effects of alveolar corticotomies on bone structures and on orthodontic tooth movement

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Alveolar corticotomies have been used to accelerate orthodontic movement. However, few animal studies evaluated the biologic phenomena involved in this therapeutic combination. The purpose of this study was to investigate the effects of alveolar corticotomies (AC) on the adjacent bone structures and how AC affected tooth movement in a canine model. Initially, 16 adult male mongrel dogs were randomly divided into 4 groups. Corticotomies were performed buccal and lingual to the mandibular third premolar with the left side serving as intra-animal control. Animals were sacrificed pre-surgery (inter-group control) and at 7, 14 and 28 days post-AC. Optical radiographic density analysis suggested a localized decrease in bone density with maximum reduction at 7 days after AC and progressively increasing recovery at 14 and 28 days post-AC. Histomorphometry and scanning electron microscopy showed increased trabecular spacing and decreased bone volume per tissue volume (BV/TV) ratios at the cancellous bone adjacent to the AC injury. Subsequently, other 5 dogs were submitted to tooth movement initiated after corticotomies on the mandibular right sides and conventional orthodontic movement (without combining AC) was implemented on the left side, as the control. After a 10-week application of reciprocal and constant 200 gram forces on second and fourth pre-molars, greater tooth movement rates and smaller amounts of anchorage loss were registered at the experimental sites.

Alveolar corticotomies significantly affected the adjacent bone structures, reducing BV/TV ratios and also potentiated tooth movement.

H005 Force exerted by a mandibular propulsive appliance modulates protein and gene expression in the rat condylar cartilage

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Mandibular propulsor appliances modulate the growth of the condylar cartilage indirectly by promoting postural alterations in the orofacial musculature. The aim of this study was to examine some molecular mechanisms involved in this therapy, particularly the role of fibronectin-binding integrins in the transduction of the force signal generated by the appliance. Immunohistochemical analyses showed that, *in vivo*, the use of the appliance for different periods of time (from 3 to 35 days) modulated the expression of the $\alpha 5$ and αv integrin subunits as well as cellular proliferation. By immunohistochemistry and real time polymerase chain reaction (PCR) it was shown that fibronectin expression was also up regulated by the appliance's use. *In vitro*, cyclic distension of condylar cartilage-derived cells increased fibronectin messenger ribonucleic acid (mRNA), as well as Insulin-like Growth Factor-I and II (IGF-I and IGF-II) mRNA and PCNA mRNA (a cell proliferation marker). The blockage of RGD-binding integrins abolished the increase in fibronectin, IGF-I and PCNA mRNA, but did not interfere with IGF-II mRNA expression.

These results suggest that the appliance modulates the growth of rat condylar cartilage through RGD-binding integrins, and contributes to the understanding of the molecular mechanisms involved in functional orthopedic therapy. (Support: FAPESP - 02/11920-9)

H006 Human Dental Pulp-Like Tissue Engineering Using Stem Cells and Endothelial Cells

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Tissue engineering is the development of biological substitutes for an organ or tissue. Dental pulp tissue engineering would help in the regeneration and long-term outcome of immature teeth whose pulp was irreversible compromised by caries or trauma. The aim of this study was to engineer a vascularized functional dental pulp-like tissue using dental pulp stem cells and endothelial cells. Human dental pulp stem cells from deciduous teeth (SHED) and human dermal microvascular endothelial cells were seeded in poly-L(lactic) acid scaffolds prepared inside the pulp cavity of 1 mm-thick tooth slices. Tooth slice-scaffolds containing cells were implanted in the dorsum of severe combined immunodeficient mice. After 14-28 days, implants were retrieved, fixed, and prepared for histology and transmission electron microscopy. Tooth slices containing pulp tissue or empty tooth slice-scaffolds were used as controls. SHED stably transduced with LacZ (SHED-LacZ) were used to track their contribution to the newly formed tissue. The engineered tissue presented cellularity and morphology that resembled that of regular dental pulp. It was observed the presence of functional blood vessels staining positive for anti-human Factor VIII antibody within the tissue. Cells lining the predentin showed structural characteristics of odontoblasts and stained positive for DSP, a marker for odontoblastic differentiation. SHED-LacZ cells lined the predentin and also differentiated into vascular cells.

This study demonstrated the feasibility of human dental pulp tissue engineering using dental pulp stem cells and primary endothelial cells.

H007 GTPases RhoA and Rac1 are important for amelogenin and DSPP expression during ameloblasts and odontoblasts differentiation

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During tooth development cell proliferation predominates in morphogenesis and differentiation involves change in form and gene expression. The cytoskeleton is essential for both processes, being regulated by small Ras homology (Rho) GTPases proteins. In the present study, the role of the GTPases RhoA and Rac1 during tooth development was evaluated. By immunohistochemistry, both GTPases were strongly expressed during morphogenesis. During cytodifferentiation, RhoA was present in ameloblasts and odontoblasts, while Rac1 and its effector p21-activated kinase (Pak3) were observed only in ameloblasts with a punctual manner. The expression of RhoA mRNA and its effectors Rho kinase (Rock1 and II, Rac1 and Pak3, analyzed by real time polymerase chain reaction (PCR), increased after ameloblasts and odontoblasts differentiation, according to the expression of amelogenin and dentin sialophosphoprotein (DSPP). The inhibition of all Rho GTPases during tooth germ development, analyzed by anterior eye chamber culture, completely abolished amelogenin and DSPP expression, while the specific inhibition of Rocks had only a partial effect.

In conclusion, GTPases are important for tooth morphogenesis. Rho proteins are essential for differentiation of ameloblasts and odontoblasts, by regulating the expression of amelogenin and DSPP. RhoA and its effector Rock1 (highly expressed) contribute for this role. A specific function for Rac1 in ameloblasts, however, remains to be elucidated. Due to its punctual distribution, it is possible that Rac1 has a role in exocytosis/endocytosis. (Support: FAPESP - 01/09047-2)

H008 Effect of 980 nm diode laser radiation on root canal permeability after conventional endodontic treatment

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This study evaluated the effect of the 980 nm diode laser wavelength at different parameters on the permeability of root canal dentine when associated with different irrigating solutions. Seventy-five human mandibular canines were sectioned at 15 mm from the apex, prepared biomechanically with Hero 642 instruments up to a # 40 .02 file and irrigated with 2 ml of distilled water between files. After final preparation, the teeth were randomly divided into 3 groups and received a final irrigation with 10 ml of the following solutions: I - distilled water, II - 1% sodium hypochlorite, and III - 17% EDTAC. A final flush with 10 ml of distilled water was repeated to eliminate solution trace. Laser was then applied at 1.5 or 3.0 W as either a continuous wave (CW) or a pulsed wave (100 Hz). The teeth were then processed histochemically with 10% copper sulphate and 1% rubeanic alcohol-acid solutions, clarified in xylol, machine sectioned under water-spray at 70 μ m and the percentage values of copper ion penetration in the dentin counted. Data were analyzed statistically with the Tukey-Kramer test ($p < 0.001$), and the results depend on the solution used for final irrigation: when associated with water and increase in permeability was found (from 7.96 ± 0.700 to 10.28 ± 0.880), when associated with EDTAC permeability decreased (from 14.84 ± 1.272 to 7.04 ± 0.776) and with NaClO was not altered (from 8.74 ± 0.838 to 8.30 ± 1.175).

It can be concluded that the 980 nm diode laser presents different effects on dentine permeability depending on the irrigating solution used.

H009 Effect of 980 nm diode laser on bond strength of AH Plus and Epiphany sealers on dentin walls, using push-out test

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This study evaluate the bond strength of AH Plus and Epiphany sealers in radicular human dentine irradiated with laser 980 nm diode laser, using push-out test. Roots of 60 canines were sectioned transversally at 4 mm of the cervical region, obtaining dentin discs. The root canals of dentin discs were prepared with diamond conic drill (large diameter = 2.70 mm, small diameter = 2.30 mm, and height = 4 mm) and irrigated with NaOCl, EDTA and distilled water. The specimens were distributed in 3 groups according to the laser potency used: 1.5 W (n = 24); 3.0 W (n = 24) and without irradiation (n = 12). The irradiated groups were subdivided in 2 subgroups (n = 12) according to the frequency: CW and 100 Hz. After laser irradiation, half of the specimens had the root canals filled with AH Plus and the other with Epiphany. Push-out test was performed in the Instron Machine and the results (MPa) were submitted to the statistical analysis by ANOVA and Tukey tests ($p < 0.05$). Fracture types were analysed by SEM. The specimens irradiated with laser and filled with AH Plus presented superior values ($8.69 \pm 2.44a$) than groups filled with Epiphany ($3.28 \pm 1.58b$) and the non-irradiated samples (control = $3.85 \pm 0.60b$), however, the groups filled Epiphany did not present significant difference among themselves and to the control ($1.75 \pm 0.68b$). The predominant failure types were: adhesive (77%) for Epiphany-dentin interface and mixed (67%) for AH Plus-dentin interface.

It was concluded that the irradiation of 980 nm diode laser increased the bond strength AH Plus sealer and not altered the Epiphany adhesion.

H010 Autogenous Tooth Transplantation: Evaluation of a 91 case series performed and followed through 21 years

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One hundred and eight transplanted teeth from 91 patients were clinically and radiographically examined in order to study the pulpal and periodontal reparatory phenomena and propose a clinical protocol well fundamented. Clinical examination consisted in pulpal sensibility tests and periodontal condition assessment. Periapical radiographs were also applied throughout follow-up examinations. The results revealed that pulpal response decrease along the time in teeth with incomplete root formation; pulpal calcifications and radiopacity of the root canal increases when comparing the transplanted teeth with its nontransplanted homologs; radiographic signs of pulpal necrosis were more frequent in teeth with complete root formation; gingival retraction and gingival bleeding were eventual findings related to poor oral hygiene; external root resorption did not impaired the transplants; teeth transplanted during incomplete root formation stages presented better pulpal repair results rather than teeth with complete root formation.

These findings supports that autogenous tooth transplantation is capable of rehabilitate physiologic and aesthetic aspects of tooth loss caused by dental trauma; the success of this therapy depends on several factors leaded by a straight surgical control.

H011 Influence of Er:YAG laser on microhardness of enamel adjacent to restorations submitted to cariogenic challenge in situ

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Er:YAG (Erbium:Yttrium-Aluminum-Garnet) laser has been studied as an alternative tool for cavity preparation, with the aim of overcoming limitations of air turbine handpieces. The present study aimed to assess the effect of Er:YAG laser on enamel adjacent to composite restorations submitted to cariogenic challenge *in situ*, by microhardness analysis. Slabs of human enamel were randomly assigned to 7 groups (n = 12), according to the type of cavity preparation: I. Er:YAG laser - 250 mJ/2 Hz; II. 250 mJ/3 Hz; III. 250 mJ/4 Hz; IV. 350 mJ/2 Hz; V. 350 mJ/3 Hz; VI. 350 mJ/4 Hz; VII. High-speed handpiece - control. Specimens were restored (Single Bond/Z250) and fixed in intra-oral appliances, worn by 12 volunteers for 14 consecutive days. Cariogenic challenge was simulated by application of sucrose solution on each slab 6 times per day. Thereafter, samples were removed from the appliances, sectioned and observed for microhardness in different distances (100, 200 and 300 μ m) and depths (30, 60 and 90 μ m), from restoration and enamel surface, respectively. Statistical analysis was performed by Split-plot Analysis of Variance, each volunteer being a complete statistical block. Significant factors were identified by contrast technique. Differences were observed among volunteers ($p < 0.0001$) and among depths ($p < 0.0001$). However, there was not statistical difference among the types of cavity preparation or among the distances.

Er:YAG laser, employed for cavity preparation, did not influence microhardness of enamel adjacent to composite restorations submitted to cariogenic challenge *in situ*. (Support: CAPES - Demanda Social)

H012 Effect of a 15% xylitol-chewing gum on salivary MS levels, on S. mutans genotypes and on the detection of xylitol tolerant (X^S) isolates

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Very little is known about the effect of xylitol on the clonal variation of *S. mutans* despite of its effect on caries prevention. This study evaluated the effect of xylitol on reduction in salivary MS levels, on *S. mutans* genotypes and on the detection of xylitol tolerant (X^S) isolates. Ten subjects with MS salivary levels 10^3 CFU/ml saliva used 15% xylitol chewing gum, 5 X/day, 30 days. Saliva was collected at baseline, 30 days after gum usage, and 30 days after the interruption of the usage. The average salivary levels of MS decreased from $9.8 \pm 10^3 \pm 2.6 \pm 10^3$ to $2.1 \pm 10^3 \pm 1.9 \pm 10^3$ after experimental period and it was statistically significant, using variance analysis to repeated values (Tukey test, $\alpha = 1\%$), but after interruption of xylitol usage, values were similar to baseline ($3.5 \pm 10^3 \pm 2.71 \pm 10^3$), with no difference. Fifteen isolates of *S. mutans*/subject/phase were genotyped by RAPD-PCR using OPA-02 primer and 17 genotypes were detected. Xylitol resistance/tolerance was studied in 124 isolates, representative from these 17 genotypes and in 6 of them X^S isolates were found. Growth was monitored by optical density measurements of cultures in BHI and BHI +1% xylitol at time zero and every other hour for 16 h. X^S isolates were considered those that exhibited growth in BHI+xylitol media similar to the negative control, X^S strain TW17 (Tanzer, 1995). X^S and X^S isolates within the same genotype were detected in 4 of those 6 X^S genotypes considering all phases (including baseline).

Xylitol used this way helps reduce salivary MS levels temporarily but it is not determinant to select XR genotype *in vivo*.

H013 Restorative materials and caries-inducing methods: analysis through polarized light microscopy, SEM and X-ray diffraction spectroscopy

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Different caries-inducing methods may present different results. The purpose of this study was to evaluate caries-inducing methods (*Streptococcus mutans* cariogenic challenge - Group A - and pH cycling - Group B) in human enamel with Class V cavities restored with: Z250 resin composite (I), Freedom compomer (II), Fuji IX glass-ionomer cement (III) and Vitremer resin-modified glass ionomer (IV), through SEM and polarized light microscopy for the area of caries lesion and X-ray diffraction spectroscopy (EDS) for the concentration of calcium, phosphorous and fluoride. The control group was restored and kept at 37°C/100% relative humidity (n = 24). In Group A, samples were immersed in glucose broth with 0.1 ml of *S. mutans* suspension (10^6 cells) and remineralizing solution for 14 days. In Group B, samples were cycled in des and remineralizing solutions for 9 days. For SEM and EDS, samples were dehydrated, gold sputtered and a 15 kV electron beam measured the concentration of the chemical elements. Data was compared to the control group and submitted to Anova and Tukey (5%) statistical analysis. Significant differences were found between Group A (element/material): calcium/III, phosphate and fluoride/I, II, III and Group B: phosphate/I, II, III. Mean caries area in mm² (\pm SD) were: I 9.55 (\pm 1.75)a, II 10.27 (\pm 1.52)a, III 4.2 (\pm 3.2)b, IV 7.22 (\pm 2.42)b. Different letters indicate different statistical findings.

Caries-inducing methods present different results for the same restorative materials regarding concentration of chemical elements, but not lesion area. (Support: FAPESP - 05/58458-6)

H014 Induced growth of hydroxyapatite in dentin - approaches for functional remineralization

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It has been suggested that wet mechanical properties of dentin is related with the presence of intrafibrillar mineral (Kinney *et al.*, JDR 2003). Remineralization of dentin can occur either by precipitation of mineral between the collagen fibrils or functionally, bound to its structure. We sought to restore the properties of demineralized dentin matrix by inducing the nucleation of hydroxyapatite (HAP) from Ca/PO₄ metastable solutions. Experiments used 12 mm² samples, demineralized with a 0.05 M acetate buffer (pH 5.0; 8 hours). Samples were remineralized with approximated Ca/PO₄ constant composition solutions, saturated for HAP (37°C, pH 7.4) for 5 days, and removed at 24 hrs (n = 9). Before and after experiments wet elastic moduli (E) of the tissues were measured using nanoindentation. Atomic Force Microscopy (AFM) and Scanning Electron Microscopy (SEM) images were made and mineral growth was evaluated by FTIR analysis. E values were calculated as a function of crystal growth and split into: mineral grown within the collagen or mineral precipitated over the tissue. Mean values of E were subjected to ANOVA and Tukey HSD ($p < 0.05$). Both conditions showed significant improvement on E of the tissues, however when the over precipitated mineral increased the initial values, 0.2 (0.1) GPa, up to 3.6 (3.2) GPa, the collagen related growth recovered E up to 10.9 (4.3) GPa. SEM and FTIR analysis indicated the presence of HAP on the samples, AFM showed pronounced growth of mineral within the collagen.

Thus, we concluded that, under specific conditions, functional remineralization has occurred within collagen fibrils of dentin. (Support: NIH/NIDCR - T32-DE17249/R)

H015 Effect of Er,Cr:YSGG laser associated with topical application of fluoride on fluoride retention and enamel demineralization *in vitro*

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This study evaluated the influence of Er,Cr:YSGG laser and topical acidulated phosphate fluoride (APF - 1.23% F) application on incipient caries development and on fluoride retention *in vitro*. One hundred and sixty (160) human enamel slabs were randomly divided into 8 groups (n = 20): G1 - untreated; G2 - treated with APF for 4 min; G3, G4 and G5 - irradiated with Er,Cr:YSGG at 2.8 J/cm², 5.6 J/cm² and 8.5 J/cm², respectively; G6, G7 and G8 - pre-irradiated with Er,Cr:YSGG at 2.8 J/cm², 5.6 J/cm² and 8.5 J/cm², respectively, and subjected to APF application. Samples were submitted to a pH-cycling model and after ten days the mineral loss and the retention of loosely bound fluoride (Ca_f) and firmly bound fluoride (fluorapatite) were evaluated. Calcium, inorganic phosphorous and fluoride contents were also evaluated in the demineralizing and remineralizing pH-cycling solutions. The statistical analysis (ANOVA) evidenced that the fluence of 8.5 J/cm² reduced the mineral loss when compared to the untreated group; however, this mineral loss was similar than that showed by APF application. Laser irradiation promoted an increase in Ca_f retention after APF application, but did not increase the fluorapatite formation. The analysis of pH-cycling solutions showed higher formation and retention of fluoride on lased samples.

On conclusion, Er,Cr:YSGG laser at 8.5 J/cm² increased the retention of formed Ca_f after APF application; however, the association of both treatments (laser + APF) did not present higher effect on reducing enamel demineralization than the effects of these treatments alone. (Support: FAPs - FAPESP - 04/02229-6)

H016 Insights of RANK/RANKL/OPG on enamel development

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Besides functional differences between ameloblasts and osteoclasts several features support an analogy between their ruffled ends. Osteoprotegerin (OPG) inhibits ruffled ends formation in mature osteoclasts. This study aimed to investigate the involvement of receptor activator of nuclear factor kappaB (RANK)/RANK ligand (RANKL) and OPG on dental fluorosis (DF) development. Wistar rats were treated for 30 days with 0 (G1), 5 (GII), 50 (GIII) and 100 (GIV) ppm fluoride (F) in the drinking water (n = 9/group). Data from plasma, urine, feces and diet F, and even DF (Thylstrup-Fejerskov Index) supported a dose-effect on F metabolism. Jaws were analyzed for ultrastructural changes and for amelogenin, matrix metalloproteinase 20 (MMP-20), RANKL and OPG through real-time polymerase chain reaction and immunohistochemical assays. G3 and G4 showed DF. G1 was RANK(+), and RANKL(+), and G4 was RANKL(+). G4 showed changes in amelogenin(+) and MMP-20 patterns. Changes in MMP-20 occurred in G2. All groups were OPG(-). OPG and amelogenin transcripts were increased in G2.

These data suggest (1) the importance of RANK during enamel formation for the integrity of dental enamel, (2) that most RANK must be soluble (extracellular) during the maturation stage to trigger the end of abnormal ameloblast synthesis in DF and maybe that (3) a 5 ppm F dose in drinking water may trigger initial biochemical/ultrastructural changes in dental enamel in respect to DF with no clinical signs. (Support: FAPs - Fapesp - Proc. 03/13437-6 and 05/01847-0)

H017 Influence of the Association of Proanthocyanidins and Fluoride on *S. mutans* Biofilms and Dental Caries

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Cranberry proanthocyanidins (PACs) are naturally occurring agents that affect the development of biofilms. Fluoride (F) interferes physicochemically with caries development and also exhibits antibacterial activity. The present study investigated whether the association of cranberry PACs enhances the cariostatic properties of F by acting cooperatively on the ability of *Streptococcus mutans* to form biofilms *in vitro* and to develop dental caries *in vivo*. The PAC extract was comprised of monomers and A-type oligomers of epicatechin as determined by HPLC, LC-MS and MALDI-TOF. The biological effects of each of the agents were greatly enhanced when used in combination. In general, biofilms treated with PAC (0.5 or 1.5 mg/ml) in combination with F (125 ppmF) displayed less biomass and acidogenicity, and fewer extracellular insoluble polysaccharides than did those treated with the test agents alone or controls (250 ppm F; and 10% ethanol, v/v). The combination of the test agents with 125 ppm F was highly effective in preventing caries development in rats when compared to vehicle control ($p < 0.05$), and the results were comparable with those observed with 250 ppm F (positive control).

Results from these studies showed that proanthocyanidins in combination with low concentration of fluoride is an effective anti-biofilm and cariostatic chemotherapeutic approach. (Support: CAPES - BEX154/067)

H018 Malocclusion and quality of life: a population-based study among adolescents

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The normative assessment of malocclusion may overestimate the demand for orthodontic treatment, because dentofacial anomalies are seldom perceived as a functional or aesthetic limiting condition. The objective of this study was to assess the prevalence of malocclusion and its relationship with quality of life among adolescents (15-17 years old). A cross-sectional, home-based census was performed in the town of Água Doce, SC, comprising 247 participants examined by 2 calibrated dentists. Dental examinations followed criteria standardized by the WHO; the diagnosis of malocclusion considered the severe and handicapping categories of the DAI index (> 30). The assessment of quality of life used the Oral Health Impact Profile (OHIP) questionnaire. Poisson regression models assessed the association of variables, as controlled by the prevalence of dental caries, periodontal and socioeconomic conditions. The overall prevalence of malocclusion was 25.1% (19.9-31.1%, 95% confidence interval). The following dental impacts associated to malocclusion in the multivariate analysis: to feel uncomfortable to eat any foods (prevalence ratio = 2.91, $p = 0.001$ CI 1.51-5.64), tense (PR= 1.58, $p = 0.085$), embarrassed (PR= 2.26, $p = 0.000$) and irritable with other people (PR= 2.83, $p = 0.019$).

Adolescents with severe and handicapping malocclusion tended to perceive their impaired dental status; health services may use this information for the planning of orthodontic treatments.

H019 Ergonomics: checking and filming of the dental attendance

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The dental professional in his activities, is attacked by works unhappy resulted of a big physical consuming; consequence of work posture. This study had the aim to analyze the ergonomics principles realized by dental surgeon and auxiliary, through filmings with checking that allowed captured images during of attendance ($n = 30$). For filmings were installed four professional cameras "Coo Color Keep HDL" with fixed iris lens. For checking was installed a plate of capture for four geovision digital transmission channels - Pico 2000 - to capture the images and send them to computer. In results analysis during observation of filmings, the attendances were about 1 hour and 30 minutes. The professional didn't used the ergonomics principles like: twist column vertebral to get instrumentals on position of 7 hours when works on position of 9 hours and the act of auxiliary to work with crossed legs; no use of auxiliary table; wake up the operator shoulders, don't stay forearm line parallel with floor, can causing problems like "bursitis"; and the operator don't accommodate adequately on dental bench.

It concluded that professionals doesn't be paying attention at ergonomics principles and because of this, it's very important to film and analyze the attendances. The dental attendance plan on the strategically form is indispensable for professional or organization can get its aims, guaranteeing bis survival and bis social performance. (Support: CAPES)

H020 An one-year intra-individual evaluation of maximum bite force in children wearing a removable partial dental prosthesis

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The aim was to evaluate the effect of a removable partial dental prosthesis on the bite force in children from six to nine years old with early loss of primary molars. The dental prosthesis was fabricated with auto-polymerized acrylic resin and artificial teeth, retained by clasps of orthodontic wires. The bite force was determined with a pressurized tube transducer connected to a sensor element. The facial proportions were evaluated on photographs and body variables determined. All evaluations were performed before, six months and one year after the rehabilitation. No statistical significant difference between genders was found. There was a significant increase in bite force from the first to the second evaluation (302 ± 61 N and 345 ± 43 N), but not in the third evaluation (360 ± 47 N). Body weight and height increased during the follow-up period. Facial proportions did not correlate with bite force, whereas body height correlated with bite force at the six-month evaluation ($r = 0.521$, $p = 0.007$), with a low adjust determination coefficient (24.01%).

The findings suggested that the removable partial dental prosthesis increased the bite force in the first six months, suggesting that the prosthesis was adequate to replace the missing posterior primary teeth, with possibility to improve the masticatory system function. (Support: FAPESP - 03/11843-7)

H021 Dental erosion in Brazilian schoolchildren and its association with potential risk factors

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Dental erosion has been potentially associated with an acidic diet, some medical conditions and a good standard of oral hygiene. There are scant Brazilian data about dental erosion and its association with potential risk factors. Aiming to assess these aspects, a cross-sectional study of a representative sample of 458 schoolchildren, mean age 13.81 (SD 0.39) years, was developed in Três Corações, southeast Brazil. Ethical approval and written consents were obtained. Information about potential risk factors for erosion was obtained from pre-validated questionnaire surveys completed by children and their parents/guardians. Schoolchildren were examined at school using the index and criteria of a United Kingdom national epidemiological survey - the National Diet and Nutrition Survey 2000. The associations under study were tested using the Chi-square, Fisher's and Linear Association exact tests and a logistic regression model. The level of statistical significance was set as 5%. The prevalence of erosion was 34.1%. There was not statistically significant association between erosion and sociodemographics, general health or oral hygiene habits. The only variable independently associated with erosion was the consumption of sugared carbonated drinks, with schoolchildren with a daily consumption of such drinks having a greater likelihood of having erosion.

A significant proportion of these Brazilian schoolchildren had experience of dental erosion. The daily consumption of sugared carbonated drinks represented the most important risk factor for erosion in the present sample. (Support: CAPES - PBEX 1376/01-2)

H022 Antimicrobial properties of *Psidium cattleianum* leaf extract on *S. mutans* biofilm

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Plants naturally produce secondary metabolites that can be used as antimicrobials. The aim of this study was to assess the effect of *Psidium cattleianum*'s leaf extract on *S. mutans* UA159 biofilms and to better understand its mechanism of action. The extract was obtained by decoction in deionized water. For the viability assay, *S. mutans* biofilms were treated with water (negative control) or extract (up to 4 times diluted) during 5 or 60 min. To establish the sub-lethal concentration, biofilms were treated with water, extract (1.6 and 0.8%) or chlorhexidine (0.025 and 0.0125%) for 30, 60, 90 or 120 min. For proteome analysis, biofilms were exposed to water, 1.6% extract or 0.0125% chlorhexidine for 120 min and submitted to two-dimensional difference gel electrophoresis. Differentially expressed proteins were identified by mass spectrometry. Cell viability was similar after 5 min treatment with the undiluted extract or 60 min with 2 times diluted extract (around 0.03% survival). There were no differences in viability between biofilms exposed to 4 times and to 2 times diluted extract after 60 min treatment (around 0.02% survival) (Kruskal-Wallis, $p < 0.05$). The expression of 24 proteins decreased after exposure to the extract compared to water. We found no differentially expressed proteins in cells exposed to chlorhexidine (ANOVA, $p < 0.05$). Thirty-three percent of the identified proteins are involved in carbohydrate metabolism.

In conclusion, at high concentrations the extract of *P. cattleianum* kills *S. mutans* and at low concentrations it inhibits expression of essential proteins. (Support: ACTA, CAPES-PDEE (4446/05), FAPESP (06/00726-8))

H023 Randomized controlled trial of Vitremer, Freedom and TPH Spectrum in class I and class II restorations in primary molars: 24-month results

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Evaluate the clinical performance of Vitremer (V), Freedom (F) and TPH Spectrum (TPH), in class I and class II restorations (Rs), in primary molars over a 24-month follow-up period. One hundred forty-one Rs were done in beveled cavity margins of which 46 were with V (32 class I/14 class II), 51 were with F (38 class I/13 class II) and 44 were with TPH (30 class I/14 class II). Two calibrated examiners evaluated the Rs using the slight modified USPHS criteria and presence of visible dental biofilm at baseline, 12, 18 and 24 months. The data were analyzed by pertinent tests. A life table analysis assessed the survival rate of Rs. After two years, forty-two children (mean age, 7 years and 5 months) had reevaluated 124 Rs of which 38 were with V (26 class I/12 class II), 46 were with F (33 class I/13 class II) and 40 were with TPH (26 class I/14 class II). One hundred one Rs were considered as clinical success (22 class I and 08 class II; 30 class I and 07 class II; 23 class I/11 class II) were built with V, F and TPH, respectively. Only class II preparations influenced the performance of Rs ($r = -0.216$; $p < 0.01$; χ^2 McNemar, $p < 0.01$), in all three restorative materials (Multivariate analyses, $p > 0.025$) and Freedom was the worst material. The cumulative survival rate percentage of Rs was of 72% for V, 80% for F and of 84% for TPH, with no statistically significant difference (Wilcoxon/Gheran/Test, $p > 0.05$).

After 24 months, spite of Vitremer, Freedom and TPH Spectrum showed similar survival rate in occlusal and occluso-proximal restorations, Freedom should be the last choice for restoring primary molars.

H024 Evaluation of Flexural Strength, Microhardness and Superficial Roughness of Different Acrylic Resins for Denture Base

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The purpose of this study was to evaluate and compare flexural strength, superficial roughness and microhardness of 4 acrylic resins for denture base. It was made 40 specimens, divided into 4 groups: CL (Clássico) and VW-H (Vipi-wave) - heat-cured, AC (Acron MC) e VW-M (Vipi-wave) - micro-wave-cured. The flexural strength (MPa) was obtained utilizing the universal testing machine MEM 2000. The Vickers microhardness was performed by the hardness tester Shimadzu HMV-2. The roughness values were obtained by the digital roughness tester SJ-201P. The data were analyzed by ANOVA and Tukey tests ($p = 0.05$). There was no significant difference among the groups for flexural strength (VW-H = $108,74 \pm 17,13$; AC = $124,21 \pm 14,87$; VW-M = $121,10 \pm 15,90$; CL = $121,09 \pm 14,48$). For superficial roughness, there was significant difference between the groups VW-M and CL, and the others presented intermediate values (VW-H = $0,107 \pm 0,014$; AC = $0,099 \pm 0,017$; VW-M = $0,083 \pm 0,025$; CL = $0,117 \pm 0,035$). For microhardness, there was significant difference between groups AC and CL, and the others presented intermediate values (VW-H = $22,10 \pm 0,81$; AC = $19,44 \pm 1,87$; VW-M = $21,01 \pm 1,06$; CL = $22,15 \pm 1,83$).

The results suggest that the tested acrylic resins have different physical properties possibly due to the degree of polymerization. However, the differences probably have not clinical relevance due to the little extent.

H025 Bond strength and morphological characterization of crown and root dentine treated with adhesive systems

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This study aimed to characterize the morphology, density and dentine tubule cross-section area of deep crown (DCD) and cervical root dentine (CRD), intact and etched with 32% phosphoric acid (PA) or the acid primer (P). Bond strength and fracture patterns for DCD and CRD were also compared. Human intact premolars ($n = 5$) were cleaved in sections of DCD and CRD and were treated as follows: G1: DCD + PA; G2: DCD + P; G3: intact DCD; G4: CRD + PA; G5: CRD + P; G6: intact CRD. The sections were prepared for Scanning Electron Microscopy and analyzed by the software Leica IM50 to obtain the density and dentine tubule cross-section area (μm^2). For microtensile testing, sections of DCD and CRD of 12 teeth were used and divided in: G7: CRD + Single Bond II (SB); G8: CRD + Clearfil Protect Bond (CPB); G9: DCD + SB; G10: DCD + CPB. Beam specimens were obtained and evaluated using a universal testing machine (Instron) at 0,5 mm/min.

CRD presented a surface covered with calcospherites, differing it morphologically from DCD. The density ($42.627/\text{mm}^2$) and average transversal cross-section area of dentine tubules in CRD did not present significant difference from that of DCD ($p > 0,05$), according to ANOVA. Average bond strength of DCD (26,6 MPa) was statistically different from CRD (19,7 MPa). The fracture pattern in the hybrid layer and adhesive (mixed) was predominant for both regions. DCD and CRD presented morphological and bond strength differences, but similarities in relation to tubule density and fracture patterns, independent of the adhesive system used. (Support: Fapesp - 05/53290-0)

H026 Minimizing the degradation on dentin bonds

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Hydrophilic dentin adhesives are prone to water sorption that adversely affects the durability of resin-dentin bonds. This study examined the feasibility of bonding to dentin with hydrophobic resins via the adaptation of electron microscopy tissue processing techniques and the effect of water storage on the bond strengths and nanoleakage of this system compared to conventional adhesives. Hydrophobic primers were prepared by diluting neat Bis-GMA/TEGDMA resins with known ethanol concentrations (80%, 70%, 60%, 50%, 25%). They were applied to acid-etched, moist dentin using an ethanol wet bonding technique. Scotchbond MP and Single Bond II (SB) were used as positive controls using conventional water wet bonding technique. Microtensile bond strengths and TEM micrographs were analyzed immediately after specimens' preparation and 6 months later. Using the ethanol wet bonding technique, the experimental primer versions with 40%, 50% and 75% resin exhibited minimal nanoleakage and tensile strengths ($40.3 \pm 6.1/43.6 \pm 5.1/34.9 \pm 6.3$ MPa, respectively) that were not significantly different from MP (39.5 ± 4.8 MPa) and SB (40.2 ± 6.8 MPa) ($p > 0.05$). With the 50% version, bond strength did not change after 6 months (41.3 ± 5.3 MPa) compared to the conventional systems, which showed significant decrease in bond strengths (MP: 31.1 ± 7.6 ; SB: 32.2 ± 2.3 MPa) ($p < 0.05$).

In conclusion, it is possible to bond hydrophobic resins to dentin using a stepwise sequence of water replacement in acid-etched dentin with ethanol. This experimental technique provides a proof of concept for the preservation of resin-dentin bonds.

H027 Parameters related to reaction kinetics and polymerization stress in restorative composites

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This study evaluated the volumetric shrinkage (VS), degree of conversion (DC), maximum rate of reaction ($R_{p\text{max}}$) and polymerization stress (PS_{max}) of two experimental composites varying the photoinitiator concentration ([cat]). Bis-GMA/TEGDMA (B) or Bis-GMA/UDMA/TEGDMA (U) were mixed in equal parts (wt%). EDMAB and camphorquinone, respectively, were added in 3 concentrations (wt%): high (H) = 0,8/1,6; medium (M) = 0,4/0,8 and low (L) = 0,2/0,4. In all mixtures, 80wt% filler was added. Materials were photoactivated with 10 J/cm² (section 1) or with the dose adjusted according to [cat] so that all levels would achieve similar DC (section 2). VS (mercury dilatometer), DC (FTIR), RP_{max} (DSC 7) and VS (controlled compliance device) were evaluated. No interaction was observed between the factors. Section 1: "U" presented higher DC/ RP_{max} and lower VS than "B" ($p < 0.05$). "B" and "U" had equivalent PS_{max} ($p > 0.05$). "H" and "M" presented similar DC, statistically higher than "L". RP_{max} increased significantly between each [cat] ($p < 0.001$). "H" presented PS_{max} higher than "L". "M" presented values similar to both ($p < 0.001$). "L" had VS statistically higher than the other [cat] ($p < 0.05$). Section 2: DC/ PS_{max} were not influenced by [cat] ($p > 0.05$). "U" presented higher DC/ RP_{max} and lower VS/ PS_{max} than "B" ($p < 0.001$). RP_{max} increased with [cat] between all levels ($p < 0.001$). "L" had VS statistically higher than the other [cat] ($p < 0.05$).

It was not possible to determine the relative contribution of VS, DC and RP_{max} on stress development. However, PS_{max} seemed to be influenced more markedly by DC or VS than by RP_{max} . (Support: CAPES - BEX0682/05-5)

H028 Surface-conditioning Effect on Bond Strength of Composite-Composite Before and After Aging Conditions

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This study evaluated the effect of 2 different surface conditioning methods on the bond strength of nanofilled composites before and after aging conditions. Blocks ($N = 160$) were prepared from composites namely, Tetric EvoCeram (TE) (Ivoclar) or Filtek Supreme (FS) (3M ESPE) and randomly divided into 2 groups: a) control (no aging); b) thermocycling (TC) ($X 5000, 5-55^\circ\text{C}$). The specimens were further assigned to two surface-conditioning methods: (1) Silica-coating (CoJet, 3M ESPE)+silane (ESPE-Sil), (2) Adhesive resin (A). As repair composites either the same material was used as the substrate (FS or TE) or a microhybrid one (Quadrant Ameron Shine, Cavex-QA). The specimens were submitted to either microtensile or shear bond test (1 mm/min). Data (MPa \pm SD) were analyzed using Student *t*-test, two-way ANOVA and Tukey's test. Microtensile test showed significant effect of the composite type ($p < 0.001$) and the aging condition ($p < 0.001$). After TC aging, TE composite (37.6 ± 12) showed significantly lower ($p < 0.05$) microtensile bond strength results than FS (45.7 ± 12.8). TC decreased the bond strength results both for TE and FS when compared to the non-aged control group (49.4 ± 15.6 and 52.2 ± 17.1 , respectively). The choice of repair composite (TE, FS, QA) did not significantly affect the results ($p > 0.05$).

When shear test was employed on TC aged, repaired specimens, silica coating and silanization significantly increased the bond strength for FS (21.5) when compared to adhesive resin application (14.8) ($p < 0.001$) but for TE, adhesive resin (22.29) was more effective than silica coating (13.35) ($p > 0.05$).

H029 Analysis of the interaction between Streptococcus mutans and esthetic restorative materials in vitro after 30 days

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This study analyzed the *S. mutans* biofilm and the surface of restorative materials (RM) after 30-days interaction. Disks of ceramic - C, nanofill composite - NC, and resin-modified - RMGI and conventional glass ionomer - CGI were made and distributed in storage groups at 37°C: G1) 100% relative humidity ($n = 5$); G2) growth medium ($n = 5$); G3) biofilm and growth medium ($n = 15$). Hardness values from G1 were obtained previously storage. After 30 days, biofilm images were obtained by confocal microscopy in order to analyze thickness, bio-volume, roughness coefficient, surface to volume ratio, viable/non-viable cells distribution and architecture. G1, G2 and G3 were washed and analyzed to surface roughness, hardness and microstructure. There was high proportion of nonviable cells in the deeper regions of the biofilms, near the disk, and cellular aggregates and fluid-filled channels on all RM; C and NC accumulated thicker biofilms than RMGI and CGI. There was no difference among groups of C and NC concerning to surface roughness and hardness. However, G3 of NC showed surface biodegradation microscopically, as well RMGI and CGI. G1 of these materials presented higher hardness values after 30 days than immediate, while G3 showed the highest surface roughness values. G3 of RMGI also showed lower hardness values than G1 and G2, while no difference statistically significant among three storage groups of CGI was observed.

It was concluded that there was influence of restorative materials on biofilm development and influence of biofilm on the surface of materials tested. (Support: CAPES)

H030 Effect of Glass Chemical Composition on Flexural Strength of Commercial Glass Ionomer Cements (GICs)

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The current literature regarding glass ionomer cements indicates that calcium and aluminum ions are responsible for matrix curing, promoting links between the poly(acrylic acid) chains. In this study the chemical composition of six conventional [Amalgamer® CR (A), Fuji IX® (F), Ionofil® Plus (I), Ketac® Molar Easy Mix (K), Vidrion® R (VR) and VitroMolar® (VM)] glass powders was analyzed. An low vacuum SEM/EDS with backscattering system (BES) was used to detect atomic number contrast in the powder. The flexural strength of each cured cement was measured in five samples prepared in silicon molds of $3 \times 3 \times 35$ mm using 3,6:1 g powder:liquid ratio. After 1 hour of cure the samples were desiccated and stored in distilled water 37°C for 24 hours before the tests. SEM images and EDS analysis revealed that some powder include more than one composition and calcium is not always present. In (F) and (I) powder calcium was not observed while in (K), (A), (VR) and (VM) the powder always presents calcium and aluminum. These powders in general presents particles with more than one composition except for (F) and (K) that showed only one particle type. The flexural strength of calcium free CIVs present excellent mechanical performance with 27,7 MPa for (F) and 27,9 MPa for (I). The best mechanical performance for GICs with calcium was 23,94 MPa for (VR).

The absence of alkali ions in known to have favorable influence upon setting characteristics and water solubility. These observations demonstrated that the calcium free powders are also resulting in excellent flexural strength cements. (Support: CAPES)

H031 Alternative photoinitiators reduce the shrinkage stress while maintaining the degree of conversion and crosslink density of composites

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Shrinkage stress continues to be a major factor that limits predictability and longevity of restorative composites (RC). Different formulations were tested, but not in the photoinitiator system. This study evaluated the effect of the photoinitiator type on the maximum rate of polymerization ($R_{p\text{max}}$), rate of shrinkage stress development ($R_{s\text{max}}$), degree of conversion (DC) and crosslink density (CLD). Hypothesis: alternative photoinitiators could reduce the $R_{p\text{max}}$ and the $R_{s\text{max}}$ while producing similar DC and CLD as camphorquinone (CQ). Experimental RCs (BisGMA/TEGDMA, 80 wt% filler) with CQ (control), phenylpropanedione (PPD) or CQ/PPD were cured by halogen light for 40s at 500 mW/cm². $R_{p\text{max}}$ was evaluated via differential scanning calorimetry (DSC). Stress development was monitored with a single cantilever device (BioMan, U Manchester) for five minutes. The samples (disk shape - 10 mm \varnothing ; 0,8 mm thickness) were subsequently tested by FTIR to evaluate the DC on two sides (top and bottom). After soaking in ethanol (one month), the swelling coefficient (α) was measured to estimate the CLD. Data was analyzed with ANOVA and Tukey's test ($p = 0.05$). CQ showed the highest $R_{p\text{max}}$ (3.3 ± 0.1 %/sec) and $R_{s\text{max}}$ (5.75 ± 1.18 MPa). DC (%) values were similar at top side, but PPD produced lower DC at bottom side (CQ $52.60 \pm 3.37 =$ CQ/PPD $52.59 \pm 4.05 >$ PPD 46.16 ± 1.87). PPD produced the lowest α (0.008 ± 0.002 g/ml).

CQ/PPD reduced the $R_{p\text{max}}$ and $R_{s\text{max}}$ without reduction in DC and CLD. Alternative photoinitiators are a promising way to reduce the shrinkage stress development. (Support: CAPES - BEX3667/05-7)

H032 Gelatinase expression in saliva of patients with noncarious cervical lesions

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Not only have noncarious cervical lesions (NCCL) multiple causal agents but also an obscure relation cause X effect. Since matrix metalloproteinases (MMPs) are involved in the regulation of cervical dentin remineralization, they might also be involved in the NCCL formation. This study aimed at evaluating the presence and quantity of gelatinases MMP-2 and MMP-9 in total and parotid saliva and in gingival crevicular fluid (GCF) of subjects with and without NCCL. The null hypothesis was that there was no difference in gelatinases among subjects with and without NCCL. Samples from 32 dentistry students with and without NCCL were collected. Total stimulated saliva, parotid saliva, and GCF were assessed for gelatin zymography and western immunoblot analysis. Densitometric quantification was performed to calculate total gelatinolytic activity and the amounts of MMP-2 and -9. Densitometric analysis revealed increased total gelatinolytic activity for subjects with NCCL ($p < 0,05$), Mann-Whitney test. No statistically significant difference was observed for MMP-2 and MMP-9 levels, separately. In parotid saliva, gelatinolytic activity was very low. Western immunoblots revealed that, while little immunoreactivity was detected for MMP-2, there was positive immunoreaction for MMP-9, in both total saliva and GCF.

By these results, the null hypothesis should be rejected. Gelatinases do not seem to originate from parotid gland. The main gelatinase present in the oral cavity is MMP-9. In total saliva, total gelatinolytic activity was higher in patients with NCCL. It is possible that salivary gelatinases are involved in NCCL etiology. (Support: CNPq - 473158/03-5)

H033 Effect of the Er:YAG laser preparation on the hybrid layer thickness

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The objective of this study was to compare the thickness of the hybrid layer formed by Scotchbond Multipurpose Plus, Single Bond 2, Prime & Bond 2.1 and Xeno III on dentine surface, prepared with a diamond bur in a high speed handpiece (control), or prepared with an Er:YAG laser, used with two parameters of pulse energy (200 and 400 mJ) and two parameters of frequency (4 and 6 Hz). Flat dentine surfaces obtained from twenty third molars human teeth were treated with the two methods, and then were prepared with the dentine adhesive systems. After a layer of composite was applied, specimens were sectioned, flattened, polished and prepared for SEM observation. Five different measurements of hybrid layer thickness were obtained along the bonded surface in each specimen. Results were statistically analyzed using analysis of variance and Student-Newman-Keuls tests ($p \leq 0.05$). When comparing the cavity preparation method, four groups were formed, Group I (diamond bur - $2.90 \pm 1.71 \mu\text{m}$) > Group II (Laser 200 mJ/4 Hz - $2.02 \pm 2.25 \mu\text{m}$) > Group III (Laser 200 mJ/6 Hz - $2.06 \pm 2.49 \mu\text{m}$) > Group IV (Laser 400 mJ/4 Hz - $1.11 \pm 1.76 \mu\text{m}$) > Group V (Laser 400 mJ/6 Hz - $0.41 \pm 1.00 \mu\text{m}$). When comparing the dentine adhesive systems, it was not found any statistically significant difference inside each group. When analyzing the hybrid layer thickness, and comparing the cavity preparation method x the dentine adhesive systems, it was found seven different groups.

The authors concluded that Er:YAG laser with the parameters used in this experiment, is a negative influence to the hybrid layer formation. (Support: FAPERJ; FUNADESP)

H034 Temporomandibular disorders and migraine. A epidemiological study

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International literature presents prevalence studies of Temporomandibular Disorder (TMD) and headaches showing that both are very prevalent conditions in the population. Headache is a symptom frequently presents associated to the TMD. The aims of this study were to report the prevalence of TMD and headache in a Brazilian population, and discuss the interaction observed between TMD and migraine. A randomized population-based sample was selected. It was composed for 1230 individuals (51.4% of female) with ages between 15 and 65 years. Sociodemographic factors and the symptoms related to TMD and headaches had been collected using two distinct questionnaires, answered by telephone calls. Tests of descriptive statistics and chi-square (χ^2) had been used and $p < 0.05$ was considered to indicate statistical significance. We found 482 individuals (39.2% of the sample) with compatible histories with TMD and 44.9% presenting some type of headache. Between the 139 migraineurs, the prevalence of TMD was 58.2% ($p < 0.01$). The results, showing greater prevalence of migraine on the TMD group than in the total sample can be explained by the important involvement of the Trigeminal Subnucleus Caudalis in the pathophysiology of both.

Based on our epidemiologic data, we hypothesized that TMD could be an aggravating factor of migraine and vice versa. Being the first hypothesis the most probable, control the signs and symptoms of TMD could collaborate in the treatment of this type of headache.

H035 Fracture Resistance of In-Ceram® Zirconia CAD/CAM Substructures Under Cyclic Fatigue

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The aim of this study was to test In-Ceram Zirconia® CAD/CAM (computer assisted design/computer assisted machining) posterior three unit fixed partial denture substructures under cyclic fatigue in water environment. A dental model was used to make full crown chamfer preparations on a lower second bicuspid and a lower second molar adjacent to a missing first molar. Epoxy resin dies (Scotch-Weld Epoxy Adhesive DP100, 3M) replicating the preparations were made after impression with addition silicone (Express®, 3M ESPE). The preparations were scanned and thirty-six anatomically identical substructures were machined on a CEREC (ceramic reconstruction) machine. The substructures were cemented with a resin cement (Rely X Unicem, 3M ESPE) to epoxy resin dies and submerged in water for testing under cyclic fatigue with a constant load of 400 N. The residual strength of the non-fractured specimens was tested after different numbers of cycles (initial - 3 samples, 5,000 - 4 samples, 15,000 - 5 samples, 25,000 - 5 samples, 50,000 - 4 samples, and 85,000 - 3 samples) through a three point bending test. Twelve substructures fractured under fatigue. The mean residual strength of the groups was .878 kN, .914, .772, .751, .724, and .624. The non parametric test of Kruskal-Wallis was used to verify significance in residual strength between the groups considering $p < 0,05$.

Within the limitations of this study, it was concluded that there is a decrease in strength as the number of mastication cycles increase, and that it is more pronounced after 50,000 cycles.

H036 Effect of artificial saliva storage and thermocycling on Knoop hardness of resin artificial teeth

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The objective of this study was to evaluate the effect of different storage periods and thermocycling on Knoop hardness of 8 commercial brands of resin artificial teeth (Artplus, Biolux, Biotone IPN, Myerson, SR Orthosit, Trilux, Trubyte Biotone and Vipi Dent Plus). For this purpose, 192 specimens of artificial teeth were made and divided into 8 groups ($n = 12$) corresponding to the 8 brands used. The specimens were submitted to three treatments: (control) immersion in distilled water and storage in thermic kiln with controlled temperature at $37 \pm 2^\circ\text{C}$ during 48 \pm 2 hours; storage in artificial saliva into thermic kiln with controlled temperature at $37 \pm 2^\circ\text{C}$ during 15, 30 and 60 days; and thermocycling procedures at temperatures from $5 \pm 5^\circ\text{C}$ to $55 \pm 5^\circ\text{C}$, with immersions of 30 seconds in each temperature, totaling 5000 cycles. For the accomplishment of the Knoop hardness test, it was used a load of 50 gf during 15 seconds. After the readings of Knoop hardness, the averages of all groups were submitted to the Kruskal-Wallis non-parametric statistical test. Considering the factors material and condition, the data were submitted to Variance Analysis, followed by Tukey Test ($p < 0,05$).

It was verified that, independently of the commercial brand, storage in artificial saliva and thermocycling had significantly reduced Knoop hardness ($19.77 \pm 4.13 \text{ KHN}$) in comparison with the control group. Besides that, independently of the studied treatment, SR Orthosit artificial teeth obtained the highest values of Knoop hardness ($28.42 \pm 2.80 \text{ KHN}$), in comparison with the other commercial brands.

H037 Effect of the surface treatment of an indirect composite resin to a resin cement by microtensile bond strenght

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To evaluate the microtensile bond strength of an indirect composite resin (ICR) to a resin cement, after surface treatment with 10% hydrofluoric acid (HF) and thermocycling. An acrylic block (6 x 6 x 6 mm) was molded with polyvinilsiloxane obtaining a mold to build 30 blocks of ICR (Vita VMLC) according to manufacturer's instructions. The blocks were divided in 6 groups ($n = 5$): G1 (negative control): without HF; G2: HF 60 s; Group 3: HF 90 s; G4: HF 120 s; G5: HF 180 s; G6 (positive control): sand blasting (Cojet Sand) (10 s, 10 mm of distance, 2,8 bars of pressure); washed with distilled water and dried with air. Thirty blocks of direct composed resin (DCR) (W3D) were built obtaining a block of RCD for each block of RCI. On RCI block surface was applied silane (Monobond-S), adhesive (Excites DSC) and it was cemented to RCD blocks by resin cement (Variolink II) under load of 750 g. They were stored in water distilled ($37^\circ\text{C}/24 \text{ hs}$). The blocks were cut in machine obtaining 9 samples ($n = 9$) with cross section area of $0,6 \text{ mm}^2$, submitted to thermocycling (6000 cycles, 5°C to 55°C , 30 s). Each sample was set in a caliper adapted to an universal machine with speed of 1 mm/min. ANOVA ($\alpha = 0,05$) showed that the bond strength was not affected by the surface treatment ($p > 0,001$). It was verified that G5 ($41,86 \pm 7,01\text{b}$) was statistical different from G1 ($35,64 \pm 4,95\text{a}$); and G2 ($40,20 \pm 5,63\text{a}$), G3 ($40,96 \pm 5,18\text{a}$), G4 ($40,61 \pm 3,17\text{a}$) was statistical different from G6 ($47,38 \pm 6,12\text{b}$) (Dunnett test).

The surface treatment with HF 180 s of the indirect composite produced the highest values of microtensile bond strenght, after thermocycling, to a resin cement. (Support: CAPES)

H038 Evaluation of a two-times pouring technique for implant-supported prosthesis impression

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The long-term success of implant-supported prosthesis is related to the master cast accuracy. The aim of this study was to evaluate the efficacy of an experimental technique characterized by two-times pouring plaster into implant-supported prostheses impressions. A metallic matrix with two implants at 90 and 65 degrees related to the alveolar ridge was submitted to the direct transfer impression technique. In CP group ($n = 10$), the impressions were poured using the conventional technique. In EP group ($n = 10$), the analogs were embraced with latex tubes before the first pouring. After sixty minutes, these tubes were removed and the space was filled with dental stone. The metallic matrix (control group) and the replicas were evaluated according to vertical misfit between a framework and the implants/analog and implants/analog inclination. Data were submitted to analysis of variance and Tukey test ($\alpha = 0,05$). The results demonstrated significant difference ($p < 0,05$) between the control group and the experimental groups when the vertical misfit was observed in the perpendicular implant/analog with the retention screw in the leaning implant/analog and between the control group and the EP group in the opposite situation. Both experimental groups presented differences ($p < 0,05$) between the control group in relation to the leaning analogs inclination.

Both pouring techniques have affected the master cast accuracy regarding vertical misfit and perpendicular implants have produced more accurate casts than the leaning one. (Support: FAPESP - 05/54518-4)

H039 Vertical dimension of the face analyzed in digital photographs

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Esthetics is a primary consideration for patients seeking prosthodontic treatment. The alteration of the facial vertical dimension compromises orofacial esthetics and efficiency. When it is essential to assess the dentofacial attractiveness, it is a consensus at data that the soft tissue evaluation in digital photographs is much more consistent than the traditional cephalometric analyses. The aim of this study was to compare the lower third of the face with the facial segment: distance between the outer cantus of the eye and the labial commissure, in order to verify whether there are statistical correlation and significant differences between them. Standardized digital images of 84 dentate Brazilian subjects were used to measure all facial segments through an image processing program (HL IMAGE ++97, Western Vision Software, L.C, East Layton, Utah, USA). The Student's t test showed no significant difference between the left facial segment and the lower third of the face. Pearson's product-moment coefficient showed significant correlations between both facial segments and the lower third of the face. After the regression analysis, two mathematical equations were concluded to correlate the facial segment to the lower third of the face.

The distance between the outer cantus of the eye and the labial commissure can be a reliable guide to estimate the vertical dimension of rest position and when it is measured on the left side of the face there is a bigger chance to correctly estimate the appropriate measurement.

H040 Influence of bone resorption and the connection system of support tooth in mandibular class I removable partial denture associated with

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The purpose of this study was to assess stress distribution of a conventional bilateral distal extension removable partial denture supporting and associated with osseointegrated implant of $10,0 \times 3,75 \text{ mm}$ (Branemark system) with ERA-Sterngold system, with different levels of bone insertion and connectors between the prosthesis and support tooth by 2-D finite element methods. Eight mandibular Kennedy I 2-D finite element models were created with tooth 33, being: model A - conventional prosthesis (CP), distal rest (DR), without bone resorption (WBR); B - CP, distal plate (DP), WBR; C - prosthesis associated with dental implant (PADI), DR, WBR; D - PADI, DP, WBR; E - CP, DR, bone resorption (BR); F - CP, DP, BR; G - PADI, DR, BR; H - PADI, DP, BR. Stress analysis was performed using the FEA software ANSYS 9.0, with vertical load of 50 N applied on each cuspid. The results in values of von Mises were: A = $70,221 \text{ MPa}$, B = $97,024 \text{ MPa}$, C = $196,683 \text{ MPa}$, D = $198,726 \text{ MPa}$, E = $75,503 \text{ MPa}$, F = $91,591 \text{ MPa}$, G = $201,023 \text{ MPa}$ e H = $187,672 \text{ MPa}$. The support structures of the prosthesis were individualized; maximum stress areas were located around the implant and in the connection system.

Concluded that: 1 - With the use of implant; stress distribution decreased in the denture supporting in all models; 2 - distal plate decreased the stress on the tooth support, cortical bone and cancellous bone; 3 - bone resorption increased the stress in the apical tooth of tooth support in the models with distal rest.

H041 TGF- β 1 and EGF modulate the homeobox genes expression in oral squamous cell carcinoma

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Homeobox genes are vital to many aspects related with embryogenesis and had been described deregulated in several cancer. Their role in carcinogenesis, especially oral squamous cell carcinomas (OSCC), remains unclear and poorly characterized. The purpose of this study was to investigate the expression profile of five homeobox genes in two OSCC cell lines (primary tumor - HN6, and metastatic - HN31) and one non-cancerous cell line (HaCat) submitted to TGF- β 1 and EGF treatments. As control these cells were cultured with no treatment. Transcripts of the five analyzed homeobox genes (*ASH2L*, *HHEX*, *PITX1*, *PKNOX* and *TGIF*) were analyzed by RT-PCR and β -actin gene was used as loading control. The ANOVA ($p < 0.05$) showed that both TGF- β 1 and EGF treatments were able to modify gene expression in the three cell lines. The TGF- β 1 did not alter the expression of *PITX* and *PKNOX* when compared to the control group. *ASH2L* and *PKNOX* were overexpressed in HN6. After TGF- β 1 treatment *HHEX* expression was similar to the control in the HN31 cell line, while it was reduced in HaCat. The EGF has kept the expression of *ASH2L* and *PKNOX* in the HN31 cell line, when comparing to the control group, while its expression was reduced in HaCat.

The data collected suggest that *ASH2L* and *PKNOX* genes are related to primary OSCC when modulated by TGF- β 1. On the other hand, these two genes may be related to metastatic tumors when modulated by EGF. (Support: CAPES)

H042 LED therapy for treatment of chemotherapy-induced mucositis

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Mucositis is the most common oral complication of cancer chemotherapy that causes pain and impairs patient's ability to eat, swallow and may determine interruption of the treatment. The aim of this study was to evaluate the effect of LED (Light Emitting Diode) therapy on chemotherapy-induced mucositis in hamsters. The animals of both experimental (G1) and positive control group (G2) received intraperitoneal injections of 5-fluorouracil on days 0 and 2. All animals had their right and left oral mucosa irradiated by superficial scratching on days 3 and 4. In G1 the LED irradiation (630 nm \pm 10 nm, 160 mW, 12 J/cm²) was applied during 37.5 seconds at days 3, 4, 6, 8, 10, 12 and 14. The oral mucosa was photographed from day 4 to 14 at 2-day intervals. Photographs were randomly scored according to the severity of induced mucositis (0 to 5). The G2 received no treatment. In negative control group (G3) no mucositis was induced. Biopsies of the cheek pouches of 8 animals (G1 and G2) were surgically obtained on days 5, 9, 13 and 15 and processed for histopathological examination. The statistical analysis showed significant differences between treated and non-treated groups ($p < 0.05$). However, muscular degeneration was observed in 18% of the samples of G1.

It was concluded that the LED therapy protocol established for this *in vivo* study was effective to reduce the severity of oral mucositis, although the oral lesions arising was not completely prevented. (Support: CAPES)

H043 Effect of vascular endothelial growth factor receptors inhibition on tumor angiogenesis in head and neck squamous cell carcinoma

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The Vascular Endothelial Growth Factor (VEGF) has been considered the most important mediator in inducing tumor angiogenesis and binds to Vascular Endothelial Growth Factor Receptor (VEGFR). PTK787/ZK 222584 (PTK/ZK) is a potent antiangiogenic tyrosine kinase VEGFR inhibitor. To understand the antiangiogenic VEGF/VEGFR pathway of PTK/ZK in squamous cell carcinoma (SCC) of the head and neck region, it was developed *in vitro* and *in vivo* studies evaluating Bcl-2, CXCL-8 and CXCL-1 expression. Immunodeficient mice received implants of tumor and/or endothelial cells and were treated with PTK/ZK. Tumor progression was evaluated by bioluminescence imaging. Three μ m sections were obtained from paraffin embedded implants for microvessel density analysis and 7 μ m sections for laser microdissection and tumor and endothelial cell RNA retrieving analyzed by RT-PCR and Real time PCR. *In vitro* studies with co-culture of tumor and endothelial cells were analyzed by RT-PCR, Western Blot and ELISA to evaluate Bcl-2, CXCL-8 and CXCL-1 expression. The *in vitro* and *in vivo* results showed important downregulation of Bcl-2 as well as CXCL-8 expression in endothelial cells when treated with PTK/ZK. It was also observed a significant reduction of microvessel density in animals treated with the drug. These results suggest that the antiangiogenic mechanism of PTK/ZK on endothelial cells seems to be by downregulation of Bcl-2 leading to downregulation of CXCL-8, resulting in less tumor growth.

In conclusion, PTK/ZK seems to be a promising antiangiogenic drug for SCC adjuvant therapy. (Support: CAPES - 1895/05-2)

H044 Comparative study of the fracture resistance of implant/abutment connections in implants with internal hex and morse taper connections

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The implants with internal hex or morse taper connections were developed to improve biomechanical characteristics of the external hex implants. Even though both systems are internal, their designs are different. The objective of this study was to verify if these differences influence the fracture resistance of these systems. Twenty tapered implants with dimensions of 4.3 mm x 1.3 mm were utilized: 10 with an internal hex (IH) connection and 10 with a morse taper (MT) connection. Twenty abutments were utilized, 10 for the IH implants (with a trespassing fixation screw), and 10 for the MT implants (solid). The tests were carried out in a universal testing machine, with a 500 kgf load cell, a 1 mm/min dislocation, and a 45° angulation. The maximum deformation force (MDF) and the fracture force (FF) were analyzed. The collected data were analyzed with a parametric test (Student's t , $p < 0.05$). The average MDF for the MT implants (90,58 \pm 6,72 kgf) was statistically higher than the average MDF for the IH implants (83,73 \pm 4,94 kgf) ($p = 0,0182$). The average FF for the IH implants was 79,86 \pm 4,77 kgf. None of the MT implants fractured. By means of optical micrograph, it was verified that the fractures in the IH implants occurred always in the fixation screw. Although the MT implants did not fracture, they showed permanent deformations in the abutment and in the implant platform.

It is possible to conclude that the solid design of the MT abutments provides greater resistance to deformation and fracture when compared to the IH abutments.

H045 *In vitro* cytotoxicity and subcutaneous biocompatibility evaluation of hydroxyapatite, collagen and chitosan composites

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Bone grafts were widely employed on bone regeneration. The aim of present study was evaluate the biological behavior of hydroxyapatite (HA), collagen (Col) and chitosan (Chi) composites. Three biomaterials were developed: B1=HA(0,2 mm-1,18 mm)/Col/Chi, B2=HA(0,2 mm-1,18 mm)/Col and B3=HA(< 0,2 mm)/Col. The *in vitro* cytotoxicity test employed two cell lines and the toxicity were assessed in a spectrophotometer (570 nm). B1, B2, B3, latex (positive control) and culture medium (negative control) were evaluated ($n = 3$). In the biocompatibility test the biomaterials were implanted subcutaneously in Wistar rats. Immunohistochemistry and histomorphometric evaluation of capsule, implant-tissue interface and cellular growth within implant were performed 3, 7 and 28 days post-operatively ($n = 5$). Analysis of Variance and Tukey-Kramer multiple comparisons tests were used to analyze the results ($p < 0,05$). The cell lines showed similar results in cytotoxicity test. B1, B2 and B3 didn't show toxic effects. The capsule thickness and capsule quality didn't show significant differences between the biomaterials and time of implantation. A low foreign body reaction was observed in all biomaterials characterized by infiltration of few macrophages. A significant cellular growth was observed within the implants. Histological analysis suggested that the biomaterials were well tolerated with low inflammatory response.

The three bone grafts evaluated showed no evidence of cytotoxicity and good biocompatibility which makes them suitable candidates to design of bone grafts. (Support: CNPq - 133226/2004-2)

H046 Clinical and laboratory changes after non-surgical periodontal treatment in patients with inadequately controlled type 2 diabetes

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This study aimed to investigate the effectiveness of non-surgical periodontal treatment on the clinical condition and on markers of inflammation in gingival crevicular fluid (GCF) in patients with inadequately controlled type 2 diabetes mellitus (T2DM). Secondly, to assess whether the response to periodontal therapy was associated in improving glycemic control. Twenty-three patients with T2DM and 26 systemically healthy subjects were selected. Non-surgical periodontal treatment was performed and the subjects followed a plaque control program twice a month for 3 months. GCF samples were collected at baseline and 3 months after treatment, and assessed for the levels of elastase activity, interleukin (IL)-1 β , IL-18, matrix metalloproteinase (MMP)-8 and MMP-9. The glycated hemoglobin (HbA1c) levels were also measured. After treatment both groups showed significant clinical improvement. The levels of elastase activity, IL-1 β , MMP-8 and MMP-9 were significantly reduced ($p < 0.05$; Wilcoxon Test) regardless the group. The total amount of IL-18 at three months was close to the baseline levels regardless the group. Treatment reduced HbA1c concentrations in T2DM albeit not significantly so.

In conclusion, non-surgical periodontal therapy reduces clinical inflammation and reduces IL-1 β , MMP-8, MMP-9 levels, and elastase activity in GCF in T2DM patients with inadequate glycemic control. Notably, IL-18 remained almost unchanged after therapy. However, the glycemic control did not improve significantly in T2DM patients. (Support: FAPESP - 04/08142-0)

H047 Analysis of the salivary proteins MG1, MG2 and lactoferrin in individuals with aggressive and chronic periodontitis

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The aim of this study was to analyze the pattern of secretion and the expression of MG1, MG2 and lactoferrin in individuals with and without periodontitis. Five individuals with aggressive periodontitis (GAP), 5 with chronic periodontitis (GCP) and 5 without periodontitis (GC) were selected. Periodontal exams were conducted and samples of resting and stimulated submandibular-sublingual saliva collected. Obtained volumes were measured, samples submitted to electrophoresis and analyzed on Western blots probed with specific antibodies. Stimulation significantly raised the volumes in all groups (GAP $p = 0.01$; GCP $p = 0.03$; GC $p = 0.01$). In regard to the pattern of secretion, blots revealed that stimulation led to: an increase in MG1 expression in all groups; an increase in MG2 expression in GCP and a decrease in GAP and GC; and to an increase in lactoferrin expression in GAP and GCP, and a decrease in GC. In regard to comparison of expression among groups, blots revealed that under resting conditions, GC exhibited the highest expression of these glycoproteins, whereas GAP showed the lowest levels of MG2 and GCP of MG1 and lactoferrin. Under stimulated conditions, GC exhibited the highest expression of MG1 and MG2, whereas GAP the highest of lactoferrin.

In conclusion, the pattern of secretion of these glycoproteins in the three distinct groups is complex and the reduced expression observed in GAP and GCP under resting condition, the predominant circumstance of salivary secretion during a day, indicates that these salivary constituents may play a role in the etiopathogenesis of these diseases. (Support: FIP-PUCMinas - 2006/1352)

H048 Metronidazole and amoxicillin as an adjunct to periodontal debridement in the treatment of severe chronic periodontitis

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The aim of the present study was to evaluate the effect of periodontal debridement, with or without systemic administration of metronidazole and amoxicillin, in the treatment of severe chronic periodontitis. Fifty patients presenting at least 8 teeth with probing depth (PD) \geq 5 mm and bleeding on probing (BOP) were selected and divided into 4 groups: scaling and root planning + placebo (SRP); SRP + metronidazole and amoxicillin (SRP/AB); periodontal debridement + placebo (DB) and DB + metronidazole and amoxicillin (DB/AB). The following clinical outcomes were evaluated: plaque index, BOP, relative attachment level (RAL) and PD. The microbiological analysis was done by real-time PCR. The enzyme-linked immunosorbent assay technique (ELISA) permitted the quantification of IL-1 β , PGE₂, IL-10 and INF- γ . All parameters were evaluated at baseline and 3 and 6 months after periodontal treatment. All groups had similar means RAL gain ($p > 0.05$). Six months after treatment, the DB group showed less PPD reduction than SRP/AB and DB/AB groups. The results of real-time PCR failed to demonstrate significant differences between groups in the prevalence and quantity of *A. actinomycetemcomitans*, *P. gingivalis* and *T. forsythia*. All treatments promoted reduction in IL-1 β and PGE₂ levels ($p > 0.05$).

No difference was observed between groups in the levels of IL-10 e INF- γ . The periodontal debridement can be considered a justified approach for the treatment of severe chronic periodontitis and the adjunct use of metronidazole and amoxicillin does not provide additional benefits. (Support: FAPESP - 04/13256-4)