

Basic Sciences

Macrophages and mast cells mediate MTA-induced neutrophil migration

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Mineral trioxide aggregate (MTA) induces inflammation but the mechanisms involved on neutrophil migration during this process are unknown. The purpose of this study was to investigate the inflammatory mediators involved on neutrophil migration (NE) induced by MTA, as well as, the role of the resident cells on the release of chemotactic factor. Mice were pre-treated with anti-inflammatory drugs 30 minutes before the stimulus injection. Resident cells role was investigated using the increase of macrophage population with thylglycolate and mast cell depletion with 48/80 compound. Identification of the NE chemotactic factors in the peritoneal exudate was evaluated by ELISA. MTA induced dose- and time-dependent NE migration to peritoneal cavity of mice. Migration was inhibited by Dexamethasone, BW A4C and U75302, but not by Indometacin. The increase of the macrophage population powered the MTA-induced NE migration, while mast cell depletion reduced it. IL1- α and MIP-2 were detected in the peritoneal exudate of the animals stimulated with MTA. These results suggest that MTA induces NE migration to mice peritoneal cavities mediate by LTB4 release because BW A4C, U75302 and Dexamethasone were able to inhibit NE migration. However, cyclooxygenase products are not involved on the process. In addition, NE migration was dependent on the presence of mast cells and resident macrophages. Supported by FAPESP and CNPq.

Densitometric study of the newly formed bone by monoolein/rhBMP-2 application

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Material carriers that promote gradual and slow bioavailability of bone morphogenetic protein type 2 (rhBMP-2) have been investigated in several recent studies in the medical and dental fields. The purpose of this study was to evaluate the efficiency of monoolein gel as a carrier for rhBMP-2 during the bone healing process either after mandibular decortication or not, in Wistar rats, using a densitometric method (DEXA) for analysis. Fourteen animals were selected and assigned to 2 groups with 7 animals each: 1- mandibular decortication (5x5mm) and insertion of 5 μ g rhBMP-2 combined with monoolein gel; 2- no mandibular decortication and application of 5 μ g rhBMP-2 combined with monoolein gel. After 2 weeks, the animals were perfused and the hemimandibles were removed for radiographic exposure in a Kodak mammography film (50Kv, 10mA, 0.5s) and subsequent densitometric evaluation (Sidexis, Germany). The results showed a large number of optical pixels (mean \pm SD) in the animals submitted to decortication (234.95 \pm 4.27), even though this group did not differ significantly from the group in which decortication was not performed (219.18 \pm 5.22) ($p < 0.05$). Based on the findings of this study using a rat experimental model, it may be concluded that the application of the bone morphogenetic protein rhBMP-2 using monoolein gel as carrier, speeded up the bone healing process, which was demonstrated by the larger number of optical pixels in this group. On the other hand, in the group without decortication, the bone repair occurred slowly, which was confirmed by the small number of optical pixels. Key-words: optical densitometry, rhBMP-2, monoolein, bone defects.

Histomorphometrical alterations on the sublingual gland of rats after long-term alloxan-induced diabetes

Rodrigues, P.A.L.; Cestari, T.M.; Garlet, G.P.; Ceolin, D.S.; Martins, A.C.O.; Meneghetti, I.C.; Assis, G.F.

Changes in salivary flow and composition in diabetic patients, as well as in experimental models of diabetes, have been reported in several studies. In this study, a morphometric evaluation of the sublingual glands of diabetic rats was performed at periods of 9 and 12 months of disease. Rats with alloxan-induced diabetes were killed and had their sublingual glands extracted and examined histomorphometrically. The results were analyzed statistically by analysis of variance. The results indicated that: a) the corporal mass of the 9- and 12-month diabetic animals were, respectively, 57% and 47% lower than that of the non-diabetic animals; b) the average food intake, water ingestion and diuresis were, respectively, 75%, 326% and 2700% greater in the diabetic group; c) no statistically significant difference was observed between the groups with respect to the mass of the sublingual gland; d) the sublingual glands of the diabetic group presented a larger number of mucous cells and less amount of stroma compared to the non-diabetic group; e) the density of volume of the mucous acinus of the 12-month diabetic group was 0.10 times greater than that of the non-diabetic group; f) the density of volume of stroma in the 12-month diabetic group was 0.30 times lower than that of the non-diabetic group, indicating an increase of the mucous acinus increase, occupying the space of stroma; and g) the volume of the mucous acinar cells in the 9-month diabetic group, was 41% greater than that of the non-diabetic group. In conclusion, the alterations

in the salivary flow and composition in diabetic rats stimulate a greater production of mucous by the sublingual glands causing the hypertrophy of its mucous cells.

A previous study of the analysis of muscle asymmetry in young adults with normal occlusion

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The purpose of this study was to evaluate the existence of functional asymmetry of the masticatory muscles in 7 healthy, young adults aged 19 to 23 years, with normal and asymptomatic occlusion. The clinical exam was composed of a questionnaire inquiring on the Severity of Signs and Symptoms of Temporomandibular Disorders (TMD) and the axis I of the Research Diagnostic Criteria for TMD disorders (RDC/TMD). Myofunctional evaluation and occlusion analysis were also performed. The action of the masseter (M) and anterior temporal (AT) muscles was evaluated by electromyography (EMG) examination (Freely, De Götzen, Milan, Italy) during the tests of maximum voluntary clench on cotton rolls positioned on the posterior teeth and maximum voluntary clench intercuspal position. The EMG signs were analyzed and compared by calculating the percentage overlapping coefficient (POC%), coefficient of torsion (TORS%) and the index of asymmetry (ASYM%). The results of this study revealed that EMG index means (POC - M= 86,78 and AT= 86,56; TORS= 8,43; ASYM= 5,28) were within the normal range. The severity questionnaire demonstrated a mean of 1 degree for several symptoms. There were alterations in the stomatognathic system, such as oronasal breathing and preferential unilateral mastication. In conclusion, the values of muscle functional asymmetry were in accordance to those reported in the literature for healthy young adults. The disturbed functions did not seem to relate with the presence of TMD.

Protocol for obtention of chitosan-based biomaterials of different molecular weights

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Chitosan is a polymer obtained from chitin, which shows bone repairing properties when used as a gel. There is also chitosan chloride, a water-soluble chitosan derivate. The goal of this study was to set the protocol for obtention of chitosan and chitosan chloride gels with different molecular weights. For such purpose, 5 g of chitin were mixed with 220 mL of 40% NaOH solution in two volumetric bottles at 115°C under agitation for 6 hours, thus promoting its deacetylation. In one bottle, NaBH₄ was added to reduce chain depolymerization and produce greater molecular weight chitosan. These materials were washed in distilled water, filtered, dried and suspended in 1% acetic acid solution, under agitation for 24 hours. The resulting samples were filtered and neutralized by addition of NH₄OH, thus promoting chitosan precipitation, and then washed with distilled water, dried and suspended in 0.1 M acetic acid solution at 20 g/L, thus resulting in chitosan gels. For obtaining chitosan chloride gel, chitosan was suspended in 0.1 M acetic acid solution at 20 g/L and dialyzed against 0.2 M NaCl solution during 3 days. Samples were frozen and freeze dried before its dissolution in water and gel acquirement. Chitosan and chitosan chloride gels with molecular weight of 100,000 and 400,000 kDa, pH 6 and stable viscosity at 37°C were obtained. It may be concluded that, chitosan- and chitosan chloride-based biomaterials have a simple obtention protocol and that the variation of some aspects of chitosan lead to the attainment of a variety of biomaterials, which should be further investigated, allowing its application as bone repair assisting materials.

Standardization of modulated medium culture for mesenchymal stem cells originating from rabbit dental pulp

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The study of mesenchymal stem cell is a tool of great aid for cell engineering due to its high capacity of clonogenic proliferation and differentiation in tissue. The dental pulp presents undifferentiated cells with such a capacity that when cultivated *in vitro*, exhibit characteristics of stem cells. The rabbit, as an experimental model, is advantageous because of the large size of the pulp tissue of its incisors and its ease of removal. The goal of this study was to standardize a medium of culture for proliferation of mesenchymal stem cells originating from dental pulp. The incisors of rabbits were collected and their pulp tissue was extracted, divided into 4 parts and cultured individually 24-well plates, totaling 48 samples. Two culture media were evaluated: MediumA: D-MEM High Glucose (Gibco®) supplemented with 10% of fetal bovine serum and antibiotic for 24 samples; and MediumB: KnockOut D-MEM (Gibco®) supplemented with 10% of fetal bovine serum and antibiotic, for the other 24 samples. The media were changed every 48 hours and cell viability was evaluated at the 10th day of the experiment. Of the 24 samples, 6 (25%) cultured with MediumA did not present cell proliferation. Two (8.3%) presented contamination and were discarded. MediumB showed proliferation of mesenchymal stem cells after the 2nd day of culture while in MediumA proliferation occurred within 5 days. At 10 days,

the frame number in MediumA was of 8x104 and in MediumB 72x104, as observed for the viability test. From the 22nd day of culture on, the cells in MediumA initiated cell apoptosis. In conclusion, for the culture of mesenchymal stem cells originating from the rabbit dental pulp, the use of the culture medium KnockOut D-MEM presented better results with cell proliferation within a shorter time. More studies on cell apoptosis are suggested and optimization of the modulated medium by supplementation is important for development of cell culture.

Differential expression of chemokines in compression and tension sides during orthodontic movement

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Orthodontic tooth movement is achieved by the remodeling of alveolar bone, triggered by an inflammatory response after force application. In this work we investigated the pattern of expression of osteoblast- and osteoclast-related chemokines, and further correlated them with the profile of bone remodeling markers in tension (T) and compression (C) sides of human tooth submitted to orthodontic forces. RealTime-PCR were performed with mRNA from periodontal ligament samples harvested from T and C sides of human teeth (N=14) submitted to rapid maxillary expansion. Periodontal ligament of normal teeth (N=8) were used as controls. Our data demonstrated higher levels of MCP-1 and MIP-1a, associated with osteoclast precursors migration and differentiation, in C side. In accordance, C side presented higher levels of osteoclast markers RANKL and CathepsinK. On the contrary, T side presented higher expression osteoblast markers CBFA-1 and OCN, suggesting a predominance of an anabolic activity. However, the expression of SDF-1a and RANTES, versatile chemokines that can contribute to both osteoclastic and osteoblastic activity, were similar in C and T sides. Furthermore, chemokines role seems to be more related to osteoclast activity. In conclusion, these data demonstrate a differential expression of osteoblast- and osteoclast-related chemokines in compressed and stretched sides of periodontal ligament, suggesting that chemokines are involved in chemoattraction and activation of bone cells during orthodontic tooth movement.

Densitometric values in head and third part of femurs of rats submitted to weightlessness and exercise on a treadmill

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Rat tail suspension has been used in human medicine to comprehend bone loss in laid patients. This study evaluated the bone density in rat femurs submitted to this experimental model. Seventy male Wistar rats weighing 260 g were allocated in different groups: C1(n=15) 21 control days; C2(n=15) 42 control days; S(n=12) 21 suspension days; ST(n=13) 21 suspension days and 21 treadmill physical exercise; SL(n=15) 21 suspension days and 21 released walking. After sacrifice, the femurs were removed and kept frozen at -20°C. For bone density determination, radiographic images were taken using a Dabi Atlante x-ray equipment. The femur and a 9-step aluminum stair were placed over the optical plaque. The readings were done in a scanner and manipulated on Digora for Windows 1.51 software. The head part values were C1(2.03±0.51mmAl), C2(5.98±0.56mmAl), S(1.71±0.15mmAl), ST(2.66±0.56mmAl), SL(2.3±0.60mmAl). In the third part these values were C1(1.45±0.51mmAl), C2(2.11±0.50mmAl), S(1.23±0.26mmAl), ST(1.66±0.22mmAl), SL(1.51±0.28mmAl). The statistical analysis (Tukey, p<0.05) identified significant difference on head part between groups C1-S, C2-S, S-ST, S-SL and ST-SE, and on the third part between groups C1-C2, C2-S, C2-ST, C2-SL and S-SE. In conclusion, tail suspension decreased the bone density values, and the released walking and treadmill physical exercise recovered these values. Support: Fapesp no 2004/13264-7.

Influence of GenDerm® thickness in MMP-2 and MMP-9 expression during its resorption in rat subcutaneous tissue

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Guided tissue regeneration (GTR) is a clinical procedure to facilitate periodontal regeneration using a barrier membrane to exclude non-desirable cells (epithelial and gingival connective tissue cells) and maintain a space for appropriate cells (PDL cells, bone cells and/or cementoblasts) to repopulate the wound area. Thus, a membrane must maintain its structural integrity during early wound healing. Little information is available in the literature regarding the degradation profile of the commercially available collagen membranes. This study evaluated morphometrically the influence of GenDerm® thickness in its resorption speed and analyzed immunohistochemically the expression of metalloproteinases -2 and -9. Bovine bone-derived resorbable membranes (GenDerm®) with thicknesses <0.1mm (Group 1), 0.1-0.2 mm (Group 2) and >0.2mm (Group 3) were implanted in the subcutaneous tissue of 30 rats. The study periods were 3, 5, 7, 10 and 14 days after implantation. The morphometric data were submitted to two-way ANOVA. At 3 days, the membranes of Groups 1, 2 and 3 were intact and showed mean thickness of 0.14 mm, 0.21 mm and 0.33 mm,

respectively. At 7 days, the membrane thickness of Groups 1 and 2 decreased, respectively, 43% and 24%, and their structure was fragmented. On the other hand, in Group 3, the membranes decreased only 9% and their structure was intact. At 10 days, the membranes were totally resorbed in Group 1, fragmented in Group 2 and partially intact with superficial resorption in Group 3. At 14 days, the membranes were absent in all Groups. The immunohistochemical analysis showed that in Group 1, the percentage of MMP-9 positive cells was on average 20 times higher than that in Groups 2 and 3 in all analyzed periods. MMP-2 expression was practically absent in all groups. The resorption time and structural integrity of GenDerm® in rat subcutaneous tissue are dependent on its thickness and involves the participation of MMP-9.

Cytokine expression in bone repair process in balb/c mice

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In addition to the control performed by growth factors and hormones, recent studies suggest that the immune and skeletal systems have in common a variety of regulatory molecules, such as the cytokines. Despite the progress in the field of osteoimmunology, most studies have been focused on the influence of different immune system cell and mediators on bone resorption process. Therefore, the possible influences of the immune and skeletal systems interactions on bone formation and repair remain unknown. The aim of this study was to evaluate the expression of cytokines in the bone repair process in different experimental defects in mice balb/c calvaria. Calvarial 1.5 and 3.5 mm diameter defects prepared in 28 mice were evaluated radiographically and histologically and analyzed by RealTimePCR during 0 h to 8 weeks after defect creation in order to assess the expression of cytokines TNF- α and IL-10. The radiographic morphometric results showed presence of bone formation in 1.5 mm defects. The histological analysis demonstrated that both sizes of defects were filled by fibrotic connective tissue in the earlier periods (0h, 1st and 2nd weeks) and, in the subsequent periods (from 3rd week), there were areas suggestive of bone formation showed in the edges of the defects. Regarding cytokine analysis, TNF- α expression was found to be transitory, being present in low levels at 4th, similarly to the inflammatory process. Messages to IL-10 were detected in both defects; however the expression this mediator was more intense in samples that presented bone formation. In conclusion, there seemed to be a participation of cytokine IL-10 during bone formation in 1.5 mm diameter defects, and TNF- α may act as an important mediator of inflammatory events in bone defects.

Different storage media for maintenance of periodontal ligament cells in avulsed teeth

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Avulsion is one of the most frequent traumatic dental injuries. It is a complex injury that can affect several periodontal tissues. Immediate replantation of a tooth into its socket is the correct conduct for maintenance of periodontal ligament cells, determining a successful prognosis. Nonetheless, in general, many difficulties are posed to immediate tooth replantation and in these cases the periodontal ligament cells are entirely dependent on the storage medium. The purpose of this study was to evaluate the viability of human periodontal ligament cells of teeth maintained in different storage media for avulsed teeth. Twelve recently extracted teeth were stored in distilled water, ultra-pasteurized milk, saliva and Hank's balanced salt solution (HBSS) at 20°C during 3 hours. After incubation, the periodontal ligament cells were removed enzymatically and samples were collected for microscopic analysis using the trypan blue dye exclusion method and for calculation of cell concentration. The results indicated that all storage media had a better performance than water (p<0.05), which presented the least cell concentration (1.27 x 10⁵ cells/mL; p<0.05). At 3 hours, saliva, HBSS and milk showed 80.28%, 77.77% and 66.77% of cell viability, respectively. Saliva presented the better cellular concentration (5.6x10⁵cells/mL). These preliminary results suggest that, for storage of avulsed teeth, in addition to milk, which is usually indicated, saliva can also be used as it is able to preserve cell viability and periodontal ligament concentration.

Effect of 4% titanium tetrafluoride varnish on demineralization and remineralization of bovine enamel in vitro

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This in vitro study assessed the effect of 4% titanium tetrafluoride (TiF₄) varnish on demineralization of sound enamel and remineralization of artificial enamel caries. For such purpose, bovine sound and carious enamel blocks (n=110) were randomly allocated to each type of varnish used: Duraphat® (D) (NaF, 2.26% F, Colgate-Brazil, n=30), Duofluorid® (F) (NaF, 2.71% F, FGM-Brazil, n=30), TiF₄ (T) (2.45% F, FGM-Brazil, n=30) and no-fluoride - (P) (FGM-Brazil, n=20). For the formation of artificial enamel caries, half of the enamel blocks were immersed in 32 mL buffer acetate solution during 16 h, whereas the other half was maintained sound. After that, the varnishes

were applied onto the enamel surfaces. The blocks were then subjected to pH cycles in an oven at 37°C during 7 days. Surface and cross-sectional microhardness were measured to calculate the percentage of surface microhardness change (%SMHC) and the mineral loss (ΔZ). Data were tested by Kruskal-Wallis test ($p < 0.05$). For sound enamel, %SMHC and ΔZ means (\pm SD) were: D (-27.41 \pm 4.35a/ 2815.8 \pm 1597.2A), F (-27.07 \pm 5.56a/ 2584.8 \pm 1253.8A), T (-38.35 \pm 7.75b/ 2415.0 \pm 2155.1A) and P (-86.82 \pm 11.86c/ 4739.9 \pm 1582.6B). For carious enamel, %SMHC and ΔZ (\pm SD) means were: D (+13.20 \pm 4.17a/ 1853.6 \pm 911.6A), F (+14.17 \pm 4.12a/ 2294.7 \pm 1435.2A), T (+27.35 \pm 4.13b/ 2412.4 \pm 1102A) and P (-9.57 \pm 4.24c/ 613.7 \pm 1006B). TiF4 varnish seemed to improve enamel remineralization in comparison to other fluoride varnishes. In contrast, it did not reduce enamel demineralization as other fluoride varnishes.

Aloxan-induced diabetes results in high cariogenic activity and progressive pulp alterations

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Diabetes mellitus is a systemic disease characterized by abnormal regulation of both glucose and lipids metabolism resulting in hyperglycemia and hyperlipidemia. Diverse aspects related to diabetes contribute to caries lesions development and progression. This study investigated the cariogenic profile and evolution of histological changes in the pulp tissue of diabetic rats. Diabetes was induced in Wistar rats ($n=25$) by the administration of 42 mg/kg of aloxan. The diabetic group and control group ($n=25$) were analyzed in the periods of 1, 3, 6, 9 and 12 months. The animals were sacrificed and hemijaws were removed. Histological slices stained by HE were evaluated descriptively and by scores. Histological analysis was based on severity of caries and characteristics of pulp tissue (collagen fibers, blood vessels, inflammatory cells, integrity of the odontoblastic layer and areas of necrosis). The diabetic group showed an accentuated presence of caries, associated with loss of integrity of the odontoblastic layer from the 3rd to the 12th month, being statistically different from the control group in this period ($p < 0.05$ Kruskal Wallis). The concentration of collagen fibers and blood vessels in the dental pulp of the diabetic rats was significantly reduced in comparison to the control rats at 3, 6, 9 and 12 months. There was a negative correlation with the presence of inflammatory cells and necrosis areas, which were increased in the diabetic animals in the periods of 6, 9 and 12 months. These results suggest that diabetes promotes characteristic alterations on the development of caries and necrosis in rat pulp tissue. Thus, diabetes can be considered a risk factor for the prevalence and severity of dental caries and the consequent pulpal alterations.

Oral manifestations in HIV-positive prisoners from the city of Bauru, SP, Brazil

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The dentist plays a key role in the early diagnosis, treatment and control of patients serum-positive for the human immunodeficiency virus (HIV), considering the large number of opportunistic infections that affect these individuals. HIV-infected patients may present early oral manifestations, some of which have a relevant diagnostic and prognostic value. This study compared the oral manifestations of male HIV-negative and HIV-positive prisoners from the Penitentiary "Dr. Alberto Brocchieri" of Bauru, SP, and correlated the oral manifestations of HIV-positive prisoners with the results of laboratory exams on T CD4 lymphocyte count, CD4/CD8 ratio and quantification of the serum viral load. The HIV-positive prisoners presented more oral manifestations than the HIV-negative prisoners, namely 79.17% and 16.67%, respectively ($p < 0.05$). The most frequent oral manifestation among HIV-positive patients was periodontitis ($p < 0.05$), followed by gingivitis, candidiasis and hairy leukoplakia. The reduction in T CD4 lymphocytes and the increase in the serum viral load are associated to the immunodepression and to the increased degree of severity of oral manifestations. The dentist should recognize the oral manifestations of the acquired immunodeficiency syndrome (AIDS) by clinical examination and request and analyze laboratory examinations in the routine care of patients whenever HIV positivity is suspected. The results revealed the importance of including the dentist in the multidisciplinary team for care of HIV-positive patients, in order to combine efforts to improve the quality of life of patients, aiding in the diagnosis and evaluation of progression of the disease because oral manifestations may represent early signs of the disease, because of its correlation with worsened serum parameters.

Effect of Nd:YAG irradiation and fluoride application on enamel resistance to erosion

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The effect of Nd:YAG irradiation and fluoride application on enamel resistance to erosion was evaluated in vitro. One hundred bovine enamel blocks (4X4 mm) were randomly divided into 10 groups, according to the treatments: G1- untreated (control); G2- APF (1.23% F) for 4 min; G3- fluoride varnish for 6 h (NaF- 2.26%); G4- 0.5 W

Nd:YAG laser (250 μ m pulsewidth, 10 Hz, 35J/cm²); G5- 0.75 W Nd:YAG laser (52.5J/cm²); G6- 1.0 W Nd:YAG laser (70J/cm²); G7- APF + 0.75 W Nd:YAG laser; G8- 0.75 W Nd:YAG laser + APF; G9- Varnish + 0.75 W Nd:YAG laser; G10- 0.75 W Nd:YAG laser + varnish. After the treatments, half of the surface of the enamel blocks was protected with nail polish. The blocks were then stored in artificial saliva (30 mL/block) and were immersed in Sprite light® (30 mL/block) for 1 min, 4X/day, during 10 days. The erosive wear was evaluated by profilometry at days 5 and 10. The mean wear (μ m) at days 5 and 10 was, respectively: GI-1.83/2.67; GII-1.04/2.60; GIII-1.03/2.48; GIV-1.13/2.47; GV-1.07/2.44; GVI-1.0/2.35; GVII-0.75/2.27; GVIII-0.80/2.12; GIX-0.76/2.47 and GX-1.09/2.46. ANOVA and Tukey's tests ($p < 0.05$) showed a significant difference among GI and the other groups, as well as between days 5 and 10. The results suggest that laser irradiation, fluoride application, as well as the association of both were able to increase the enamel resistance to erosion in the shorter interval.

Hetero-control of public water supply fluoridation, in Bauru, SP

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Considering all the aspects involving fluoridation procedures, the control of the whole process is as important as keeping or adding fluoride to the water. Based on the results of previous studies carried out in Bauru and the singularity of the city's public supply system itself, the need of hetero-control of the public water supply in the municipal area, is justified. This study aimed at monitoring the fluoridation of public water supply. The study was conducted from August 2005 to July 2006, in Bauru, SP. Monthly, in lottery-established dates, 58 water samples, in the 19 supply sectors, totaling 691 samples, were collected. Fluoride concentration present in the water samples was determined in duplicate, utilizing the sensitive ion electrode (Orion 9609), coupled to the potentiometer. Following the descriptive analysis, the samples were rated as acceptable or unacceptable, according to fluoride concentration. The mean fluoride concentration ranged between 0.57 and 1.78 mg/L. About 64% of the samples were classified as acceptable and of these, 23.88% as optimal. 29.95% of the samples presented inadequate fluoride content (above 0.84 mg/L). The results indicate that the fluoridation presents a trend towards optimal concentration and super-fluoridation. Monitoring of water supply fluoridation by surveillance systems must be encouraged, for the control of caries and dental fluorosis. Compared to the data of previous studies carried out in the city, there was an improvement in the fluoridation conditions of the supply water, in relation to regularity.

Stereological analysis of the parotid gland of rats with aloxan-induced advanced diabetes

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Diabetes Mellitus is associated with diverse buccal diseases originated mainly from reduction of salivary flow. The objective of this study was to evaluate morphometrically the parotid gland of rats with aloxan-induced diabetes in the delayed periods of the disease. For such purpose, 10 diabetic rats and 8 controls were used in the experimental periods of 9 and 12 months. The results showed that: a) corporal mass of the 9- and 12-month diabetic animals, were, respectively, 57% and 47% lower than that of the control rats; b) food intake, water ingestion and diuresis were, on average, respectively, 75%, 326% and 2700% greater in the diabetic group; c) mean fasting glycemia in the non-diabetic group was 80.5 and 111.7 mg/dL for the periods of 9 and 12 months; in the diabetic group, these values were 451.4 and 373.1 mg/dL, respectively; d) the mass of the parotid gland in the 9-month diabetic group was 75% lower than that of the diabetic group for the same period, whereas in the period of 12 months no statistically significant difference was observed between the groups; e) the volume of density of the acinus in the 9-month diabetic group was 0.13 times greater in relation to the control group for the same period; f) the absolute volume of stroma in the non-diabetic group of 9 months was 1.18% greater, in relation to the diabetic group of the same period; g) the density of volume and absolute volume of duct to intercalate in the 9-month non-diabetic group were, respectively 0.76 times and 2.65% greater, in relation to the diabetic group for the same period; h) the density of volume and the absolute volume of the striated ducts and excretory ducts did not show statistically significant difference between the non-diabetic and diabetic groups, in the periods of 9 and 12 months; i) the volume of the acinar cells in the animals of the 9-month and 12-month non-diabetic groups were, respectively 0.55% and 0.44% greater compared to the diabetic group for the same periods. In conclusion, the parotid gland of rats with long-term aloxan-induced diabetes undergoes morphologic alterations and the intensity of these alterations is proportional to the greater or lower destruction of the pancreatic B cells during the induction.

In vitro evaluation of enamel remineralization from acidified dentifrices with low fluoride content

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The excessive ingestion of fluoride (F) from different sources has led to an increase in dental fluorosis. Thus, the development of a dentifrice with low fluoride content could offer a higher security regarding F ingestion, but its effectiveness must be proven. The aim of this in vitro study was to assess the ability of acidified dentifrices with low F content to remineralize incipient caries lesions. Enamel bovine blocks were selected through surface microhardness. Next, artificial carious lesions were induced and surface microhardness was measured again. During 6 days, the blocks were submitted to pH cycling and treated twice/day with dentifrices (n=10): placebo, 275, 412, 550 and 1100 µg F/g. Thereafter, final surface microhardness was assessed to calculate the percentage recovery of surface microhardness (%RSMH). The values of %RSMH revealed an inverse relationship with regard to F concentration in the dentifrices. There were no statistically significant differences between groups 412, 550 and Crest and between 550, Crest and 1100 (ANOVA; p<0.05). A dose-response relationship for the dentifrices evaluated was observed. The acidified dentifrice with 550 µgF/g showed an enamel remineralization similar to those of the dentifrices with conventional fluoride concentration (1100 µgF/g). Financial support: CNPq/PIBIC.

Lipid peroxidation and oxidative stress induced by fluoride intoxication in rat salivary glands

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Fluoride is widely regarded as the cornerstone of modern preventive dentistry. It has been demonstrated to be a cheap, reliable and efficient method, which may be administered in many different manners and from multiple possible sources. Excessive fluoride intake is a serious health problem and, for that reason, there is a continuing concern about its toxic and deleterious effects. Earlier reports have demonstrated that free radicals and lipid peroxidation play an important role in cellular degeneration. The present study evaluated the toxicity alterations of acutely administered sodium fluoride on the antioxidant defense system in rat submandibular glands. Male Wistar rats were assigned to two groups: the experimental group was treated with aqueous sodium fluoride (NaF) intraperitoneally in a dose of 15 mg F/kg body weight and, the control group received the same volume of isotonic salt solution (NaCl 3.05%). The animals were euthanized 0, 1, 3, 6, 12 and 24 hours after injection and the submandibular glands were removed and assessed for catalase activity and lipid peroxidation level by the method of Aebi (1984) and Esterbauer & Cheeseman (1990), respectively. Protein content was determined by the method of Lowry et al. (1951). Statistical analysis was performed by analysis of variance and Tukey test at 5% significance level. Catalase activity in the experimental group was significantly higher (30.3%) than in the controls (p<0.01). Conversely, their exposure to NaF showed a 83.6% increase in lipid peroxidation level (p<0.01) in a time-dependent manner. These results suggest that fluoride induced toxicity on rat submandibular glands not only increases lipid peroxidation activity associated with free radical levels but also disturbs the antioxidant defense system and, consecutively, enhances the oxidative stress status.

In vitro evaluation of the effectiveness and abrasiveness of acidic fluoride dentifrices

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Low-fluoride dentifrices may reduce the risk of dental fluorosis. However, their anticariogenic action is lower than that of conventional dentifrices. Considering that CaF₂ formation is inversely related to pH, the aim of this in vitro study was to evaluate the effectiveness and abrasiveness of acidic fluoride dentifrices. Enamel bovine blocks (n=240) were selected according to their surface microhardness and allocated in 12 groups, according to the treatment performed. Dentifrices containing 0, 275, 412, 550 and 1,100 µg F/g (pH 4.5 or 7.0), in addition to two commercial dentifrices containing 1,100 (Crest, positive control) and 500 µg F/g (Colgate Baby) were used. Half of the blocks were submitted to pH cycling and treatment (2 times/day) with dentifrice slurries. Variations in surface microhardness, mineral content and amount of fluoride in enamel and slurries after pH cycling were calculated. The other half of blocks was used to test dentifrice abrasiveness, which was evaluated by profilometry, after brushing with an automated toothbrushing machine (16,000 strokes). Enamel blocks treated with acidic dentifrices exhibited less mineral loss compared to those exposed to neutral dentifrices (ANOVA, p<0.05). Acidic dentifrices with 412 and 550 µg F/g presented similar results (ANOVA, p>0.05) as the neutral dentifrice with 1,100 µg F/g and Crest. Positive correlation (Pearson, p<0.05) was found between fluoride concentration in dentifrices and in enamel and slurry. The abrasiveness of the acidic dentifrices was similar (p>0.05) to that of the neutral

products, whereas the commercial dentifrices yielded lower abrasion (p<0.05). It was concluded that acidic dentifrices with 412 and 550 µg F/g had the same anticariogenic action as that of the positive control. The pH had no influence on dentifrice abrasiveness.

Histological evaluation of Symphytum officinalis 6CH action over hepatic and subcutaneous tissues in mice

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Symphytum officinalis, known as Comfrey, is used as a healing agent since antiquity, showing tissue repairing properties on connective and bone tissues, although its internal use in the allopathic formulation is forbidden, due to hepatotoxicity. This study evaluated histologically the systemic action of Symphytum officinalis (SO) homeopathic (6CH), solved in hydroalcoholic solution (HAS) on the hepatic and subcutaneous tissues of mice. Eighteen male mice were assigned to six groups with three animals each: SO 6CH, oral administration (30 and 60 days); HAS oral administration (30 and 60 days); SO 6CH topical application (60 days) and HAS topical application (60 days). Liver tissue of the animals treated with oral administration and from the subcutaneous tissue of the animals treated with topical application. The histological evaluation showed that there were no morphological alterations on the subcutaneous tissues of animals treated with SO 6CH and HAS topical application, but the hepatic tissue of animals treated with SO 6CH and HAS by oral administration showed moderate degenerative alterations, in both evaluation periods. In conclusion, medicines with homeopathic concentration should be further studied before dental application because adverse effects caused by allopathic concentrations can also be seen during homeopathy use, although the hydroalcoholic basis used as a solvent should be considered.

Development of a novel fluoride varnish

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The use of fluoride varnishes has shown a great efficacy on caries prevention. The kinetics of fluoride in this product could interfere with enamel reactivity and efficacy. Thus, the aim of this in vitro study was to evaluate a novel fluoride varnish to improve its anticariogenic action. The varnishes had the amount of resin present in their composition modified. Enamel bovine blocks were obtained, selected by surface microhardness and randomized to five groups (n=12): placebo (Pla), Duraphat® (Dura), Duofluorid XII® (Duo), Duofluorid XII® with higher amount of resin (Higher) and Duofluorid XII® with lower amount of resin (Lower). The enamel blocks were treated with the varnishes during 6 h and submitted to pH-cycling during 7 days. Next, surface microhardness was again measured to calculate the percent surface microhardness change (%SMHC). Calcium fluoride present on enamel after the pH-cycling (CaF₂ retained) was also measured. The data were heterogenic and the statistical analysis was performed using Kruskal-Wallis test. The group with higher amount of resin presented the lowest %SMHC (p<0.05). There were no differences between the groups Dura, Duo and Lower. Regarding CaF₂ retained, the varnish with higher amount of resin showed better results (p<0.05), but there were no differences between groups Duo and Lower. It was possible to increase the amount of CaF₂ and decrease the mineral loss of the dental surface by increasing the amount of resin in fluoride varnishes, improving their anticariogenic action.

Pregnant woman X dental treatment

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Pregnancy is a period of great physiological and psychological alterations that should be regarded by professionals dealing with health care. As a health professional, the dentist has the responsibility to be attentive to any alterations and aware of the pathologies that can affect the patient during the gestational state. Special care related to feeding, drug therapies, positioning of the patient in the dental chair, radiographic examinations and use of local anesthetics must be exercised minutely by the dentist, and the restrictions that each dental area poses should be taken into account. A detailed and individualized clinical examination is of great importance to resolve as fast as possible and with maximum safety the oral problems of pregnant women. The present study has as objective to guide the dentists and clarify doubts on this subject.

Evaluation of the In vivo biocompatibility of Papacárie®

Mastrantonio, S.S.; Ramalho, L.T.O.

Papacárie® is a new material developed for chemomechanical removal of caries. The aim of this study was to evaluate the in vivo biocompatibility of Papacárie®. Polyethylene tubes filled with Papacárie® (group I) and its gel base (group II) were

implanted in mouse subcutaneous connective tissue. The animals were sacrificed 3, 7, 20 and 30 days after the implantation procedure and the specimens were prepared for histological evaluation. The results showed that Papacárie® caused a moderate inflammatory response up to the 20th day, which decreased at 30 days. The gel base showed a discrete inflammation, which increased at 30 days. Papacárie® and its gel base were proved biocompatible with the connective tissue, although the alterations caused for these materials were statistically different (Mann Whitney; $p < 0,05$).

Oral Surgery

Postsurgical stability of counter-clockwise maxillomandibular advancement surgery: influence of articular disc repositioning

Cassano, D.S.; Wolford, L.M.; Pinto, A.S.; Gonçalves, J.R.

A skeptical attitude has developed towards temporomandibular joint (TMJ) surgery because of the unpredictable and sometimes devastating outcomes resulting from TMJ surgical techniques performed in the 1980's and 1990's. However, significant advancements in TMJ diagnostics and the development of procedures to predictably treat and surgically rehabilitate the dysfunctional and pathological TMJ have provided good outcomes. The purpose of this study was to evaluate the stability following surgical counter-clockwise rotation and advancement of the maxillomandibular complex and the influence of disc displacement and articular disc repositioning. Seventy-two patients (59 females, 13 males) were allocated in 3 groups: G1 (n=21) – patients with healthy TMJs underwent double-jaw surgery only; G2 (n=35) – patients with articular disc displacement underwent articular disc repositioning concomitantly with orthognathic surgery; and G3 (n=16) patients with articular disc displacement underwent orthognathic surgery only. Each patient's lateral cephalograms were traced, digitized twice and averaged to estimate surgical changes (T2-T1) and postsurgical changes (T3-T2). During surgery, the occlusal plane angle decreased significantly in all groups. The maxillomandibular complex advanced and rotated counter-clockwise similarly in all groups, with advancement at the mentum. Postoperatively, the occlusal plane angle increased in G3 (2.6 ± 3.8) while G1 and G2 remained stable. Mandibular postsurgical changes in the horizontal direction had a larger relapse in G3 at the mentum (-3.8 ± 4.1 mm), B point (-3.0 ± 3.4 mm), and lower incisor edge (-2.3 ± 2.1 mm) while G1 and G2 remained stable. Maxillomandibular advancement with counter-clockwise rotation of the occlusal plane is a stable procedure for patients with healthy TMJs or for patients with simultaneous TMJ disc repositioning. Patients with preoperative TMJ articular disc displacement who underwent double-jaw surgery and no TMJ intervention experienced significant relapse.

Reconstruction of atrophic edentulous ridge: initial history of the results obtained with five different surgical techniques

Flores, S.M.; Sant'Ana, A.C.P

The deficiency of bone height or thickness may be limiting factor to implant placement. Several surgical techniques for reconstruction of atrophic ridges have been proposed, with lower success rates for non-grafted areas. The objective of this study was to evaluate the viability and effectiveness of different grafting techniques for reconstruction of atrophic ridges and placement of osseointegrated implants. Thirty-nine patients aged 13-68 years assisted at FOB-USP were enrolled and consecutively treated with the following techniques: onlay with immediate or delayed implants, inlay with or without Le Fort I and combined inlay-onlay with immediate or delayed implants, using blocks of cool bone removed from the iliac crest, tibia, mento and external oblique line of the mandible. The patients were evaluated with respect to the painful symptomatology on the donor and recipient sites, accidents and complications in the immediate postoperative period and implant survival in the short-stated period after insertion, in accordance with the clinical criteria of immobility, absence of radiolucency on the peri-implant region and painful symptomatology. A total of 217 implants were installed, of which 28 (13%) were lost within 1 year after prosthetic installation. The results showed that the onlay technique with delayed implants presented the highest implant survival rate (100%), followed by the inlay technique without Le Fort (92%), inlay with Le Fort (86.7%) and onlay with immediate implants (60%). Regarding the origin of the graft material, the best results were obtained with grafts removed from the mentum (100% of survival). These data suggest that autogenous grafts constitute a viable and adjusted treatment for the rehabilitation of patients with alveolar ridge deficiency, as in these cases the implants are installed in a session subsequent to graft removal.

Handling of bone and gingival tissue previous to implant installation: Case Report

Freitas, R.M.; Neto, R.S.; Bedran, T.B.L.; Junior, E.M.

Implantology has developed remarkably in the last decades, although the presence of hard and soft tissue surrounding the implant area is still a limiting factor to esthetic prediction in oral rehabilitation. To overcome tissue deficiency, a wide array of techniques is currently available, among which the use of autogenous bone graft for bone correction, and use of acellular dermal matrix (Alloderm) for soft tissue corrections. This work reports the case of a young patient with lower central incisor agenesis, insufficient alveolar bone and gingival recession, who was referred to our clinic. The outline treatment plan comprised correction with autogenous bone graft from the retromolar region and use of acellular dermal matrix, in order to provide bone thickness and soft tissue increase on the region intended to receive the implant. After 6 months, the area was reopened followed by titanium implant installation. Four months later, the area was reopened for installation of the healing cap, and after 2 months, the prosthesis was constructed. The results showed bone thickness and soft tissue increase in the treated region, with functional and esthetic success in patient rehabilitation. In conclusion, the association between autogenous bone graft and acellular dermal matrix in an excellent treatment option for that the practitioners have for patient rehabilitation with implants.

TMD symptomatology manifestation in groups of different ages

Ferreira, C.L.P.; Silva, M.A.M.R.; Felício, C.M.

Although temporomandibular disorders (TMD) have a prevalence peak, there are controversies about its relation with the different ages. The purpose of this study was to analyze the prevalence of TMD signs and symptoms in four different age groups. A total of 1000 protocols of randomly selected TMD patients were analyzed, among which 948 had all required information. Of these, 110 subjects belonged to the group of adolescents (12 to 18 years), 585 were young adults (19 to 40 years), 232 adults (41 to 64 years) and 21 elderly (65 years or more). Analysis of the association between age group and signs/symptoms was carried out by qui-square test and odds ratio (OR) values. Significance level was set at 5%. Young adults predominated in the sample. The group of adolescents differed significantly from the groups of young adults and adults, but was statistically similar to the elderly group. Adolescents presented lower risk for manifestation of the following signs/symptoms: in relation to young adults: TMJ pain (OR=0.60), cervical pain (OR=0.49), chronic headache (OR=0.56), fatigue (OR=0.52), earache (OR=0.57); in relation to adults: muscle pain (OR=0.51), cervical pain (OR=0.29), chronic headache (OR=0.49), fatigue (OR=0.54), tooth sensitivity (OR=0.51), earache (OR=0.37) and vertigo (OR=0.44). There was statistically significant difference between young adults and adults, the former presenting greater risk for TMJ noises (OR=1.46), difficulty to close the mouth (OR=3.19), limited mouth opening (OR=1.59) and lower risk for cervical pain (OR=0.60), tinnitus (OR=0.64), earache (OR=0.66) and vertigo (OR=0.59). Young adults and elderly did not differ significantly to each other. There was statistically significant difference between the adult group and the elderly group only regarding bruxism (OR=2.59), the adult patients presenting greater occurrence. In conclusion, in the studied population, young adults and adults presented more TMD signs/symptoms than adolescents and elderly patients.

Immediate implants: a new perspective

Soriani, N.C.; Coppede, A.R.; Bersani, E.

Initially, a surgical protocol with a healing period of 3 to 6 months was proposed to grant success in implant therapy, which patients considered a too long period. Recently, the interest in the immediate loading concept has increased because, clinically, the results are similar to those of the conventional protocol. It is important to consider the possibility of extracting hopeless teeth with immediate implant installation and activation, providing comfort, function, esthetics and reducing treatment time. To make this concept possible, some techniques have been developed, such as simultaneous bone grafting, and use of membranes. These techniques require flap reflections, and the implant is not always activated immediately. This case report shows the installation and activation of an implant immediately after extraction of a condemned molar. Patient MLA, 36 years, healthy, presented with fractured tooth 36. Atraumatic extraction was performed, preserving the adjacent structures. Implant installation was done with a surgical guide. The abutment and an anatomically adjusted provisional restoration were installed immediately. No suture was done, and the original topography of the soft and hard tissues was preserved. It is possible to conclude that extraction followed by implant installation immediately activated is a feasible alternative that can be indicated in cases of tooth loss rehabilitated with osseointegrated implants.