

Evaluation of Propolis from Kurdistan Region as a New Resinous Sealer in Root Canal Obscuration

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Degree: Ph.D.

Specialty: Conservative Dentistry

Date of the Debate: 11/10/2009

Supervisor: Dr Hussain Al-Huwaizi
Dr.Salim Al-Samaraai

Abstract

The present study was designed to evaluate Propolis collected from five different areas (Shaqlawa, Aski Kalak, Haji Omran, Duhok and Koisinjaque) in Kurdistan region/ Iraq as a new resinous sealer in root canal obturation. The chemical constituents, visual examination and its physical properties according to American national standard institute /American Dental Association specification No. 57 for endodontic sealing materials were investigated. Moreover, the new material was implanted in vivo to investigate its effect on soft tissue healing. Dye penetration was also performed to evaluate its effect on apical microleakage.

Outcome of chemical analyses on the ethanolic extract of the Propolis samples revealed the presence of flavonoids and benzophenone in all the samples.

Regarding the physical properties, the melting point was for the Propolis samples measured depending on American Standard for Testing Materials D-87 test of bee wax. Depending on the results of this test and visual examination, it was decided to use Propolis sample that was collected from Shaqlawa area.

The radiopacity test demonstrates that raw Propolis was radiolucent and acceptable radiopacity according to the specification No 57 (not less than 3mm aluminum). Accordingly, it was decided to mix with Propolis 20% barium sulfate, eventually adequate radiopacity was obtained. Concerning the solubility and film thickness of the tested material, the samples were within the desirable limits for acceptable endodontic material proposed by American Dental Association.

The biocompatibility of Propolis was also studied. Eighteen albino rats, of six week old were used to evaluate subcutaneous biocompatibility of the Propolis sample compared with zinc oxide eugenol sealer as a control. The animals were divided into three groups, six rats to be sacrificed at three intervals: three days, seven days and twenty one days after implantation. The histopathological study expressed that Propolis sample was biocompatible with the surrounding tissues.

For detection of the apical dye penetration of the Propolis, sample as endodontic sealer, one hundred and twelve freshly extracted human single-rooted teeth were collected and divided into eight groups of fourteen teeth each. In the first group the teeth were obturated with Thermafil obturators coated with Propolis only without sealer. While obturation of the second group was done with Soft Core obturators coated with Propolis only with out sealer. The third and fourth groups were obturated with Thermafil and Soft Core obturators respectively using Propolis as a sealer after dilution with ethanol. In group five and six, obturation was done with Thermafil and Soft Core obturator using Propolis as a sealer after dilution with eugenol. For the last groups, obturation was performed by using Thermafil and Soft Core obturators respectively with zinc oxide eugenol based sealer, these groups were considered as the control of this study. The obtained results from dye penetration test showed that using Propolis as sealer after dilution with ethanol produce better sealing ability than the other groups.

In conclusion, it is suggested according to the obtained results in this study that the tested Propolis sample had desirable properties as sealer that fit the requirements of American national standard institute /American Dental Association specification No. 57 for endodontic sealing materials

The Effect of Meloxicam Gingival Injection on Gingiva of Rabbits (Histological, Immunological and Biochemical Study)

Name: Hashim D. Musa

Degree: Ph.D.

Specialty: Philosophy in Periodontology

Date of the debate: 25/5/2013

Supervisor: Prof. Lekaamahmood

Assist. Prof. Mohammed T. Rassol

Abstract

Background: Gingivitis is the inflammation of the gingival in which the junctional epithelium normally attached to the tooth in it is original level.

Although bacteria are considered to be the primary etiologic agents of periodontal disease, the pathogenesis of periodontitis involves host-bacterial interaction followed by release of inflammatory mediators such as eicosanoids and cytokines. Arachidonic acid metabolites, mainly prostaglandins of the E series (PGE₂), seem to be critical mediators in the progression of periodontal disease.

Meloxicam inhibits prostaglandin synthetase (Cyclooxygenase 1 and 2) and leads to a decrease of the synthesis of prostaglandins, therefore, inflammation is reduced.

Aim of the study:

To evaluate the effect of sulcular injection of meloxicam on rabbits gingiva, throughout immunological, biochemical and histological studies in serum and tissue at different time intervals and compare to control group .

Animals and Methods

Ninety (90) rabbits have been used in experimental study. After sulcular injecting of meloxicam and normal saline in lower right central incisor tooth, blood had been collected from all experimental animals from the ear vein for later analyzing of the biochemical and immunological analysis.

The animals were sacrificed, and the tissue samples have been prepared for histological reading.

The samples were divided into 2 main groups group A&B.

Group A: which involved 45 rabbits with healthy gingiva and divided in to 3 subgroups.

Sub-groupA1: included 20 rabbits that injected with meloxicam with a dose equivalent to human therapeutic dose using insulin syringe, then the rabbits were sacrificed after (1, 3, 7, 10, 14) days of injection.

Sub-groupA2: included 15 rabbits were injected with normal saline as the same volume of drug & the animals were sacrificed as the same as (groupA1) as a control group.

Sub-groupA3: include 10 rabbits were left without interference to be used as a normal group.

The Effect of Addition of Radiopaque Materials on Some Mechanical and Physical Properties of Flexible Denture Base

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Degree: Ph.D.

Specialty: Prosthodontics

Date the Debate: 8/12/2009

Supervisor: Prof.Salem Abdul-Latifsalem

Abstract

The present study was undertaken in an attempt to produce radiopaque Valplast which is a Nylon denture base by addition of different radio-opaque materials to the radiolucent Valplast. The radiopacity of non-modified and modified Valplast was studied by Densitometer readings of x-rays of the specimens. The effect of this addition on some mechanical and physical properties was studied. Tensile strength, Yield strength, Young's modulus, Elongation percentage, Transverse deflection, Impact strength, Creep, Water sorption and Solubility, were studied for both non-modified and modified Valplast specimens. On the other hand, the stress distribution to the bone surrounding root of the abutment tooth and the supporting bone beneath the flexible distal-extension flexible removable partial denture made from non-modified and modified Valplast, a three-dimensional finite element analysis (FEA) used to study the distribution of the stress. For this evaluation, three-dimensional models were constructed, two flexible (non-modified and modified Valplast) and one conventional metallic removable partial denture. A finite element software (ANSYS 11) used to study the distribution of the stresses under different loading conditions. Selected nodes under RPDs and around the root of abutment tooth were evaluated under Canine guided occlusion (vertical, mesiodistal, buccolingual loading) and Group-function occlusion. The results showed that best radiopacity obtained by addition of 15% weight/ weight of Barium sulfate ($BaSO_4$) powder. Also the results showed that the addition of $BaSO_4$ 15% produced adverse effect on the tested properties, except the yield strength, elastic modulus, water sorption, and creep in an-elastic and viscous region regions. The results of FEA revealed that the differences among the three types of RPD, for all selected areas for evaluation; in all loading conditions were non-significant, except in case of buccolingual loading in crest of cortical and cortical-cancellous interface the differences among the models were significant. Finite element analysis showed that the forces transmitted to the bones by both types of flexible removable partial dentures were nearly the same. The highest stress was exerted by the clasp side of CoCr-RPDs. The stresses in the crest of cortical bone were higher than the cortical cancellous interface. It has been concluded that the addition of barium sulphate 15% produced a radio-opaque nylon denture base material. Although the addition caused some changes in properties but the radio-opaque Valplast remained as a flexible denture base material. The differences among the FRPDs and CoCr-RPDs were non significant except in case of buccolingual loading condition. The equivalent von Mises stresses in the cortical group were higher than the cortical-cancellous interface in the models I and II, and vice versa in the model III in both clasp and rest side. Also higher stresses showed in supporting bone, under canine-guided occlusion in the models I and II; this was vice versa for the model III (clasp and rest sides).

Detection of Hepatitis B Viral Markers in Saliva and Serum of Chronic Carriers in Erbil Governorate

Name: Sazan mwaffaq Abdulaziz

Degree: Ph.D.

Specialty: Oral Microbiology

Date the Debate: 5/2/2009

Supervisor: Prof. Mahmoud Y.M. Taha
Assist. Omer Surchi

Abstract

Serum and saliva samples were collected from 153 patients selected from blood donors and certain high risk groups including those with thalassaemia, lymphoma, leukemia, patients on hemodialysis and healthcare workers, with known and unknown previous history for hepatitis B virus (HBV) infection and with no signs of periodontal diseases, attended Nanakali Hospital for Blood Diseases, Hemodialysis Unit, Thalassaemia Center and Rizgary, Hawler and Maternity Teaching Hospitals in Erbil City. The study was carried out from June 2008 to March 2009. Chronic HBV carriers were identified on the basis of their seropositivity for hepatitis B surface antigen (HBsAg) for more than six months after an acute infection and antibody to hepatitis B core antigen (anti-HBc) of IgG class. It was found that 2 chronic HBV carriers were co-infected with HCV and were excluded. None of the tested samples were seropositive for anti-HDV test. As a result 65 patients were identified as pure chronic HBV carriers that represented the study group (age range: 5-70 years). Thirty serum samples were collected from blood donors who have been screened for the presence of HBsAg and were HBsAg seronegative and they represented the control group (age range: 20-52 years). The total percentage of chronic HBV carriers was the highest among blood donors (46%) and the lowest among thalassaemic patients (1%). Of the 65 chronic HBV carriers, 17(26%) were seropositive for hepatitis B e antigen (HBeAg+) and 48(74%) were seronegative for HBeAg and seropositive for antibody to HBeAg (HBeAg-/anti-HBe+). The highest percentage of chronic HBV carriers in the HBeAg+ group was recorded among patients with leukemia (41%) followed by patients on hemodialysis (29%). The results showed that the highest percentage of chronic HBV carriers (25%) was recorded for the age class 30-39 years and the lowest (2%) for the age class <10 years. Statistical analysis showed significant relation between age and chronic HBV infection ($P<0.05$). It was found that males are at a higher risk (71%) than females (29%) for chronic HBV infection. Statistical analysis showed a highly significant relation between gender and chronic HBV infection ($P<0.01$). All HBV markers which were tested in serum were retested in saliva samples and the detection rates of saliva were compared to that of serum. The detection rate of HBsAg, anti-HBc, HBeAg and anti-HBe were 55%, 65%, 53% and 100%, respectively. Generally, saliva samples obtained from HBeAg+ chronic HBV carriers had a higher rate of detection than those obtained from HBeAg-/anti-HBe+. Ten serum and saliva samples from each of HBeAg+ and HBeAg-/anti-HBe+ chronic HBV carrier groups were tested for the presence of the complete HBV particle through the detection of HBV DNA using polymerase chain reaction (PCR) technique. Serum and saliva samples obtained from HBeAg+ group had significantly higher rates of detection (100% and 70% respectively) than those obtained from HBeAg-/anti-HBe+ (80% and 50% respectively) group ($P<0.05$) with a total detection rates of 90% and 60% for serum and saliva, respectively. To measure the degree of liver injury, HBeAg+ and HBeAg-/anti-HBe+ chronic HBV carriers were tested for alanine aminotransferase (ALT), aspartate aminotransferase (AST), alkaline phosphatase (ALP), gamma-glutamyltransferase (GGT) and total serum bilirubin

levels (TSB) in their sera. It was found that serum levels of all, except TSB, were significantly higher in HBeAg+ group than HBeAg-/anti-HBe+ ($P < 0.05$). On conclusion, saliva can be used for detection of HBV markers with a total detection rate of 55-100% and saliva of all HBsAg chronic carriers should be regarded as a highly infectious material on the basis of detection of HBV DNA by PCR. The use of PCR to detect viral replication activity in HBeAg-/anti-HBe+ chronic HBV carriers with abnormal levels of ALT and a study of HBV genotypes among chronic HBV carriers in Erbil Governorate are recommended.

Cleft Lip And /Or Palate in ErbilCity: Epidemiological, Genetic and Orthodontic Aspects

Name: Zana qader Omer

Degree: Ph.D.

Specialty: Preventive Dentistry

Date the Debate: 15/3/2010

Supervisor: Prof..Alifakhri Al-Zubaidee

Prof.Tariq Salman Al-Hadithi

Abstract

Cleft lip and /or palate (CL/P) is the most common craniofacial malformation which results in morphological and functional problems such as feeding, breathing, speech and hearing disorders. This study was the first which done in ErbilCity that discusses non-syndromic CL/P with the epidemiological, genetics and orthodontics aspects. This study includes two main samples, one investigated the incidence, and the second was concerning to find the associations of CL/P with socio-demographic, genetic and orthodontic factors. The socio-demographic sample was 102 cases with CL/P and matched with 204 subjects without orofacial clefts as a control group, the results were as follow: The incidence of CL/P in Erbil City hospitals was 0.96 per 1000 live births out of 22941 live births during 2007, and CLP was found to be (62.7%); CL group (14.7%) and CP group (22.5%). Clefts were predominant in males (59.8%), male to female's ratio was 1.48:1, CLP was predominant in males, while CP was predominant in females. Socio-economic status was highly associated with CL /P types. Paternal and maternal ages were not associated with oral clefts. Parents' were relatives in 54.9%, and 60.7% with same tribe. Mother's occupation and nutrition during 1st trimester of pregnancy was significantly associated with CL/P types. Father's smoking and number of cigarette were significant associated with CL/P. Speech problems were found in 55.9%, otitis media in 12.7% and respiratory disease in 10.8%, these complications were highly associated with CL/P. Significant association was found between CL/P types and increasing birth order, increased siblings with oral cleft, maternal, paternal cleft family history and fetal mortality in the CL/P family. Plasma level of TGF- β 1 in CL/P was significantly different from controls with no significant association with CL/P types. In comparison with controls, CL/P cases showed significant reduced anterior facial height, more retruded maxilla and mandible, more backward mandibular rotation and significant association was found with facial length (S-Gn).Significant differences were found between CL, CLP and CP in some cranio-facial morphology measurements. In conclusion, CL/P incidence in ErbilCity was comparable to Caucasian population. CL/P was found to be associated with some environmental and genetic factors. Cephalometric analyses had shown that there were well-known differences in cranio-facial morphology measurements between cleft and non-cleft populations.

Malocclusion and Orthodontic Treatment Need and Demand among 13-18 Years Students in Erbil City

Name: Bayan Abdullah Hassan

Degree: Ph.D.

Specialty: Preventive Dentistry

Date the Debate: 1/7/2010

Supervisor: Prof. Alifakhri Al-Zubaidee

Prof. Tariq Salman Al-Hadithi

Abstract

Malocclusion is a common oral disorder which manifests itself during childhood seems to have become more prevalent in recent decades. This provided the stimulus of malocclusion, assessing self-perception of participants of secondary school and finding out orthodontic treatment the questionnaire and clinical examination using dental Aesthetic index (DAI) and Modified Index of Orthodontic Treatment Need (MIOTN) of 2446 students aged 13-18 year-old from 66 intermediate and high schools in Erbil City. A multi-stage cluster sampling technique was used in this investigation. Results of this study showed that: Awareness of malocclusion was found in %44.7 of the students. An orthodontic treatment demand was found in % 38.3 of the students. Prevalence of malocclusion according to ADI, was %32.2 ranged between definite, severe malocclusion according to DAI, %67.8 were found to have no or slight treatment need, %19.5 with treatment elective, (handicapping) with treatment mandatory. Prevalence of malocclusion according to Dental Health Component (DHC-MIOTN) was found to be %24 and according to Aesthetic Component (AC-MIOTN) was found to be %4.7. The most common orthodontic problem in the current study according to DHC was retained deciduous teeth (%8.1) and deep bite that cause gingival trauma (%7.2), Significant weak correlation ($r=0.203$) was found between HDC and AC of MIOTN. Highly significant correlation ($r=0.460$, $p<0.001$) indicating moderate correlation between the researcher and the students AC were found.

Group B: 45 rabbits were used with induced inflammation and left for 10 days for the inflammation to be observed. Induction of inflammation was done by making a notch on the mid- labial aspect of lower right central incisor tooth with #8 round bur. The notch extended into enamel and was carried within the gingival margin. Group B was divided into 3 subgroups same as in group A.

Results:

A-healthy gingival group:

The meloxicam injected group had produced early higher level of TNF- α , IL-1 β & ALP than normal saline after 3rd day of injection then there was highly significance reduction at day 14 in meloxicam injected group in compare to other group. Initially there was high level of inflammatory biomarker (hs-CRP & PGE2) in both groups followed by significant reduction till the end of the 2nd week in both groups. In histological examination, the meloxicam injected group showed moderate inflammation after one day of injection while normal saline injected group showed mild inflammation but both of them ended with no inflammation and healthy periodontium.

B- Gingivitis group: For serum TNF- α in meloxicam injected group show marked decrease from day 1 to day 14, while for normal saline injected group there is increase in the level of this biomarker in day 3 followed by gradual decrease over the next 10 days.

There was highly significant reduction of IL1- β in meloxicam injected group while in normal saline group there was initial increase in the level of (IL-1 β) at day 3 followed by decline similar to meloxicam injected group.

For PGE₂, initially both groups got the same level then there was highly significant reduction in the meloxicam group, while in normal saline group there was non significant differences.

Initially there was similar decline in the ALP inflammatory marker after 3days of injecting for both groups. There was significant declined after 3days in case of meloxicam compared to normal saline group and then the declined dampened but still at the end the difference was significant.

No significant differences of hs-CRP in the initial and final periods in both groups, but with significant differences between the 1st and 3rd day on one hand and the 10th and 14th day on the other hand.

For histological examination , Initially both groups started with high number of inflammatory cells and sever inflammation but at day 14 , the meloxicom injected group ended with no inflammation and healthy periodontium with increased osteoblastic activity while normal saline injected group ended with mild inflammation at day 14.

Conclusion:

In this study, it was shown that sulcularinjection of meloxicam reduce gingival inflammation and modify the progression of experimentally induced gingivitis in rabbits by reducing proinflammatory mediators and inhibiting of prostaglandin.

Evaluation The Effects of Pomegranate Extracts on Rabbit's Periodontium and Bone Defects (Histological, Biochemical, Immunological and Immunohistochemical Studies)

Name: Amal Hanna Aziz

Degree: Ph.D.

Specialty: Periodontics

Date of the debate: 9/10/2013

Supervisor: Assist. Prof. Zewar A. Al-Qassab
Assist. Prof. Bakhitiar M. Ahmed

Abstract

Pomegranate is a medicinal plant that has been reported to promote healing of tissue due to its antioxidant and anti-inflammatory mechanism of action.

The present study was designed to assess the biochemical, immunological, and histological effect of single dose local injection of pomegranate extracts solution on rabbit's periodontium. 13 rabbits were used for pilot studies, while 144 male rabbits were included in this study, 45 rabbits were used for biochemical study. They were divided into three main groups; non injected group, pomegranate extracts solution injected group, and normal saline injected group. Both pomegranate extract and normal saline injected groups were subdivided into 4 subgroups. The pomegranate injected subgroups were injected locally with 50 μ l/kg dose of 0.25g/dl pomegranate extracts solution into mid-labial area at the base of gingival sulcus of lower right central incisor, while for normal saline injected subgroups, they were injected with 50 μ l/kg of saline solution (0.9%NaCl). Blood samples were taken from rabbit's heart at 1, 3, 7, and 14 days after injection. The biochemical studies included; estimation of serum total protein, Alkaline phosphatase, Acid phosphatase enzymes, and Malondialdehyde.

Immunological studies were performed on 35 rabbits, which were also divided into three main groups as in biochemical study to evaluate the effect of sulcular injection of pomegranate on serum interleukin-1beta (IL-1 β) and tumor necrosis factor-alpha (TNF- α). Blood samples were collected at 3, 7, and 14 days after injection.

Histopathological study was firstly done on 45 rabbits with clinically healthy periodontium, which were also divided into three main groups. The tissue samples were taken following 3, 7, 14, and 21 days after injection.

The pomegranate has an obvious effect on the healing process. Secondary a histopathological and immunohistochemical study was done on 24 rabbits throughout surgically created bone defect on rabbit's mandible between roots of two central incisors. This group was divided into two main groups; surgically created bone defect with 1ml (0.9%NaCl) normal saline irrigation group, which consider as a control group and a surgically created bone defect with 1ml of 0.25g/dl pomegranate extracts irrigation group, which consider as an experimental group. Both groups were subdivided into 4 subgroups. Two expression markers were used, included Vascular endothelial growth factor (VEGF) and Bone morphogenic protein4 (BMP4). Tissue samples were taken at 1, 3, 7, and 14 days post operation.

The biochemical results showed that; Serum (ACP) and (ALP) activities increased significantly in pomegranate solution local injected groups, 1 and 3 days after injection, then this value started to decline. The result revealed that serum (MDA) and (TP) concentration decreased significantly after pomegranate injection.

The immunological results indicated that, serum IL-1 β and TNF- α increased significantly in rabbits injected with pomegranate solution after 3days of injection, then the concentration of this cytokine started to decrease.

The histopathological results after injection on Periodontium showed that; healing of damaged periodontal tissue in shorter duration of time comparing with saline injected groups. The regeneration in the periodontal tissues represented by increasing number of proliferative fibroblast cells, well organized and well arranged collagen fibers with dilated, newly formed capillaries fill PDL.

The results of immunohistochemical study showed that pomegranate extracts solution accelerates the positive expression of VEGF and BMP4 markers with new capillaries formation and the presence of stem cells, when compared with saline group. The healing process in surgically created bone defect, was noticed faster since osteoid tissue formation, while the healing process of the defect irrigated with normal saline consisted of fibrous tissue formation.

From the results of this study, it can be concluded that pomegranate extracts can reduce inflammatory reaction, decrease tissue destruction and enhanced healing process. Therefore it can be used as an irrigation of any surgical procedure.

Effect of Local Injection of α -L-Fucose on Rabbit Tongue Muscle

Name: Rezan majeed Omer

Degree: Ph.D.

Specialty: Oral Biochemistry

Date the Discussion: 17/2/2011

Supervisor: Prof. Ali F. Al-Zubaidee

Prof. Hamid G. Hasan

Abstract

α -L-Fucose (6-deoxy-L-galactose) is a monosaccharide that is a component of many N- and O-linked glycans of glycoproteins and glycolipids (glycoconjugates) produced by mammalian cells. Important roles for fucosylated glycans have been demonstrated in a variety of biological settings, including cell adhesion, blood antigens, host-microbe interaction, immunity, and signaling events. In literature, no report was found about the investigation of fucose metabolism using local injection of fucose, or the suitability of using fucose local injection as an administration way for fucose, therefore the present study was designed to assess the biochemical and histological effect of single dose local injection of α -L-Fucose on rabbit tongue muscle, thus to investigate the metabolism of α -L-Fucose in tongue muscle tissue and to evaluate the possibility of using local injection of fucose into tongue muscle as a suitable administration manner in oral cavity. This study was performed using 123 male rabbits weighing (1-1.5kg), 95 rabbits were used for biochemical studies; which were divided into normal group, fucose solution local injected groups, and normal saline local injected groups (control). Both fucose and saline groups were subdivided into 9 subgroups (each group consisted of 5 rabbits), and they were injected intramuscularly at the tip of their tongue with a single dose of 50 μ l fucose solution (50mM) or 50 μ l of saline solution (0.9%NaCl), the samples were taken, 0.5, 1, 2, 3, 5, 7, 24, 72, and 168 hours after local injection, while 28 rabbits were used for histological studies, these rabbits were divided into 3 groups; normal (4 rabbits), fucose injected (12 rabbits), and control or saline injected (12 rabbits) groups. Both fucose and saline injected groups were subdivided into 3 subgroups; following 24, 72, and 168 hours after local injection at their tip of tongue with a single dose of 50 μ l fucose solution (50mM) or 50 μ l of saline solution (0.9%NaCl) (each groups consisted of 4 rabbits).

The biochemical studies included the:

- 1- Estimation of total protein (TP), total fucose (TF), protein bound fucose (PBF), lipid association fucose (LAF), protein bound hexose (PBH), and Ca^{+2} ion concentrations in the rabbit tongue muscle homogenates of all the groups.
- 2- Performance of cellulose acetate and agarose-gel electrophoresis techniques for protein separation in tongue muscle homogenate.
- 3- Enzymatic studies including; alkaline phosphatase (ALP), acid phosphatase (ACP), creatine kinase (CK), and aspartate aminotransferase (AST), to investigate their activity, kinetic and thermodynamic parameters alteration by fucose local injection, and to evaluate their relation with fucose metabolism. Histological studies were performed to investigate the effect of fucose local injection on the histological feature of the tongue muscle, and to assess the tissue response to local fucose injection.

The results of the biochemical studies revealed that α -L-Fucose local injection:-

- 1- Highly increased the amount of tongue muscle content of fucose for a long duration (168 hours).
- 2- Elevated the tongue muscle content of PBF and LAF, which indicated that fucose may incorporate into newly synthesized glycoconjugates.

- 3- Increased PBH level in rabbit tongue muscle. This result may be due to that injected fucose can induce the incorporation of the hexoses into newly synthesized fucosylated glycoconjugates.
- 4- Increased the Ca^{+2} ion concentration in the rabbit tongue muscle, thus supporting the role of Ca^{+2} ion in newly synthesized glycoprotein secretion and function.
- 5- Altered the activity, kinetic and thermodynamic parameters of some enzymes in rabbit tongue muscle such as ALP, ACP, CK, and AST.
- 6- Changed the electrophoretic behaviours of rabbit tongue muscle proteins.

The results of histological studies showed that:-

- 1- Twenty four hours after injection of fucose into rabbit tongue, an inflammatory reaction was observed in both oral mucosa and muscle layer as in saline injected group, but the inflammatory reaction was more obvious in muscle layer.
 - 2- Seventy two hours following the injection, the fucose solution affected muscle layer greatly, while in normal saline injection, the inflammatory reaction which was confined to lamina propria, appeared clearly in the muscle layer.
 - 3- After 168 hours of the injection of normal saline, the inflammatory reaction still seen in the oral mucosa, and muscle layer showed many sites of destruction in muscle fibers, while, 168 hours after fucose injection, many signs of inflammatory reaction were reduced with the signs of regeneration in both oral mucosa and muscle layer.
- From the above results, one can conclude that local injected fucose in rabbit tongue muscle can enter to newly synthesized glycoconjugates, and the tongue tissues were able to adapt the situation of fucose administration.

Biochemical Studies of Sialic Acid and Its Related Parameters in Periodontitis

Name: Jwan Ibrahim Jawzaly

Degree: Ph.D.

Specialty: Oral Biochemistry

Date the debate: 2/8/2010

Supervisor: Prof. Hamid G. Hasan

Assist. Prof. Bakhtiar M. Ahmed

Abstract

Periodontitis is one of the most wide spread disease in the world. Saliva was used as a noninvasive diagnostic fluid to measure chemical parameters released during oral diseases (especially sialic acid in periodontitis), and the relations of these chemical parameters with socio-demographic and medical history, periodontal health status, and severity of periodontitis disease in the center of ErbilCity. This study included total sample of (286) individuals. They consisted of (149) males and (137) females which represented 52% and 47% of the total sample size respectively. They included two age groups (18-44) years and (45-75) years. The individuals were distributed into 161(56.29%) periodontitis patients , 59 patients of clinical controls which consist of; simple gingivitis 25 (8.7%), simple caries 13 (4.5%), partially edentulous periodontitis 13 (4.5%) and medicated mild inflammable group 8 (2.8%), also 66 (23.1%) healthy individuals as controls The levels of the following chemical parameters in both supernatant and sediment of saliva were measured: total sialic acid (TSA) and its fractions; free sialic acid (FSA), lipid bound sialic acid (LSA) and protein bound sialic acid (PSA), total calcium (Ca), total proteins, sialylated ?1-acid glycoprotein (SA-AAG), and interleukin-6 (IL-6) . The levels of salivary biochemical parameters in periodontitis (especially with systemic diseases) were higher than that of controls and clinical controls groups, except for some biochemical parameters in some groups of clinical controls. These groups were medicated mild inflammable group which showed non-significant difference with periodontitis in total proteins (raised from oral tissues destruction) and total calcium. Also in gingivitis group there was a similarity in total calcium with periodontitis. In caries group (PSA) especially in sediment of saliva (due to bacteria) also showed a nonsignificant difference with periodontitis. Total lipid bound sialic acid represent (42.7%) of total salivary sialic acid in periodontitis which showed more significant correlation (than other fractions in periodontitis) with salivary total measured sialic acid comparing to the controls and other cases of mild inflammation (clinical controls) The biochemical parameters (except IL-6) showed a non-significant difference between partial edentulous group and controls. This result was related to less inflammation in this elderly group with history of sever destructive periodontitis. This was indicated by negative relations of teeth missing and progress of ages with (TFSA) and positive relation of teeth missing with (PSA) in supernatant of saliva in periodontitis. While (IL-6) which is a predictor of severity of periodontitis as indicated by significant positive relation of it with progress of ages in dentate periodontitis and significant positive correlation of (IL-6) with FSA in sediment of saliva and high relations with hereditary of periodontitis in partial edentulous group. Salivary total measured sialic acid (mTSA) in periodontitis showed significant correlations with all the biochemical parameters in supernatant and sediment of saliva (except PSA in supernatant and sediment, and total salivary calcium). While mTSA in clinical controls correlated significantly with sialic acid fraction in supernatant (except FSA) and more correlate with

(PSA) (sialylated protective and acute phase proteins). In controls mTSA correlated significantly with all biochemical parameters (except LSA and PSA) in sediment of saliva and more with (FSA) as protective parameter. The highest percentage (47%) of patients was found in moderate group of severity of periodontitis, while the lowest (15%) was found in mild group with lowest (TSA). Females occupied (65.2%) of mild group with more localized form of periodontitis and more bleeding in their teeth on probing.

Smokers occupies (40%) of males, more in the age group of (45-75) years. They were former smokers with advanced severity, generalized form of periodontitis and high (TSA). While current smokers were more moderate in severity, generalized form of periodontitis and lower (TSA) due to less inflammation and calculus (inverse relation of Ca with TSA) . Smokers were characterized with more mobility and teeth missing , no bleeding on probing (high salivary calcium in current smokers), with highest pocket depth in former smokers and the lowest (pseudo pocketing) in current smokers. Hereditary of periodontitis represents (33%) of the patients, while (65%) of the hereditary periodontitis were in generalized form of periodontitis with highest pocket depth. These results reflect a genetic variation in cytokine production and acute phase reactants. This was demonstrated by high relation of PSA acid with(hereditary of periodontitis ,diabetes mellitus , and IL-6). It was also demonstrated by high relations of hypertension with (LSA andSA-AAG) in periodontitis.

Homogeneity was observed in relations of most biochemical parameters among the periodontal indices (PD2 and mobility of teeth), severity of periodontitis and mTSA.

This result reflect importance of indices and TSA

as biochemical marker of disease severity. There was a significant difference among medication status in the levels of (TSA), and this was related to the action of each drug on periodontitis Immune modulation effect of (AAG) depends on the extent of its sialylation as indicated by positive correlation of (SA-AAG) with (LSA) in sediment of saliva and (mTSA) in periodontitis. While (IL-6) showed negative correlation with (LSA) in sediment of saliva of periodontitis as a result of antibacterial effect of (SA-AAG) which is induced by (IL-6) and both showed higher levels and relations with severity and indices of disease.

Preparation and Characterization of Nano Calcium Carbonate-Thermoplastic Polyurethane as a New Root Canal Obturation Material

Name: Bahar Jaafar Haji Omer Selivany

Degree: Ph.D.

Specialty: Conservative Dentistry

Date of the debate: 28/5/2013

Supervisor: Prof .Salem A. Salem Al-Sammarai

Abstract

The use of gutta-percha as a standard obturation material has made little changes in the obturation technique. Resilon has been developed as an alternative to guttapercha (GP), but its advantages over guttapercha remain controversial. The aim of this study was to prepare a new root canal filling material from thermoplastic polyurethane (TPU) based on polycarbonate (PCA), with inorganic filler particles (50% wt), calcium carbonate (CaCO_3), zinc oxide, calcium hydroxide and barium sulfate. The prepared material (CaCO_3 /TPU) characterized by Differential Scanning Calorimeter (DSC) and Infra Red Spectroscopy (FTIR) and were subjected to some mechanical (Hardness and Tensile strength) and physical tests (Radiopacity and Water sorption and solubility). For biocompatibility test the prepared material was implanted in rabbit subcutaneously. The root canal sealer was prepared from TPU with (10% wt) fillers and subjected to film thickness and flowability test according to ANSI/ADA No.57. Push out test and dye penetration test were also performed to evaluate bonding strength and apical microleakage.

The result of DSC, FTIR showed that the prepared material is definitely PCA/TPU with homogenous incorporation of the fillers. The hardness and tensile strength were consistent with ADA specification no.12. and ISO 527-2:1993. The solubility was 0.0035 g/mm^3 , while the water sorption was 0.0047 g/mm^3 and this conform with the ISO standard (4049:1988). Regarding the radiopacity test, it showed that the prepared material exhibits radiopacity equivalent to 6 mm of aluminum step wedge, which complying with the ANSI/ADA No.78. The Biocompatibility test demonstrated a significantly lower mean number of inflammatory cells in the CaCO_3 /TPU composite in comparison to GP particularly after 21 days. Comparing the flowability and film thickness of the prepared sealer with ZOE sealer as a control, it was noticed that the prepared sealer is within the desirable limits proposed by ANSI/ADA No.57. The Push out test revealed higher bond strength of CaCO_3 / TPU (18.15 Mpa) when compared with both GP - AH plus and TPU - TPU sealers. Finally, the microleakage of CaCO_3 /TPU without sealer showed significantly less microleakage when compared with GP-AH plus sealer and TPU-TPU sealer.

In conclusion the prepared material exhibits better mechanical, physical and bonding properties. It appears to have better compatibility than GP, particularly at 21 days and has potential to be used safely as a durable root canal filling material.

The Effect of Intracrevicular Gingival Injection of A-L-Fucose. Biochemical, Immunological and Histopathological Study on Rabbits.

Name: Chenar Anwar Mohammad

Degree: Ph.D.

Specialty: Periodontics

Date of the debate: 24/4/2013

Supervisor: Pro. Khulood A. Al-Safi

Assist. Prof. Bakhitiar M. Ahmed

Abstract

Fucose is one of the eight essential sugars that the body requires for optimal function of cell-to-cell communication and is an important component of glycoprotein and glycolipid.

The present study was designed to assess the biochemical, immunological, and histopathological effect of sulcular injection of a single dose of α -L-fucose on rabbit's gingiva.

One hundred and sixty two male rabbits were included in the study , 22 rabbits were used for pilot study and 55 one were used for biochemical study; which were divided into three main groups ; non injected group, fucose injected group, and normal saline injected group. Both fucose and normal saline injected group were subdivided into 5 subgroups. The fucose injected subgroups were injected intracrevicularly with a single dose of 50 μ l/kg of 150 mMfucose solution into the bottom of gingival sulcus at the mid-labial area at of lower right central incisor while for normal saline injected subgroups, they were injected with 50 μ l/kg of saline solution (0.9% NaCl). Blood samples were taken from the heart at 1, 3, 24, 72, and 168 hours after injection.....

The biochemical studies included: Estimation of total protein, total fucose, and protein bound fucose in serum of all groups and evaluating the antioxidant effect of fucose by measuring serum Vitamin C and Malondialdehyde (MDA)

Immunological studies were performed on 20 rabbits, to evaluate the effect of sulcular injection of fucose on serum interleukine-1beta (IL-1 β) and tumor necrosis factor alpha (TNF- α). Blood samples were collected from all rabbits before fucose injection and after 3 days of fucose injection. Histopathological study was performed on 65 rabbits with clinically healthy gingiva, which were divided into three main groups; non injected, fucose injected, and normal saline injected groups. Both fucose and normal saline injected groups were subdivided into 6 subgroups. The tissue samples were taken following 1, 3, 7, 14, 21, and 30 days of fucose injection. The biochemical results showed that serum content of ; total fucose, protein bound fucose, and vitamin C increased for long duration reaching 72 hrs after injection except for total protein increased 3hours after injection, while malondialdehyde level remained normal.

The immunological results showed that serum content of Il-1beta and TNF-alpha decreased, 3 days after injection.

The histopathological results on healthy gingiva showed that; fucose resulted in gradual reduction of the inflammatory reaction , and healing of damaged gingival connective tissue in short duration of time than saline injected groups. The regeneration in the connective tissue represented by more fibroblast cells and well formed and arranged collagen fibers with new capillaries formation.

From the results of this study, it can be concluded that sulcular injection of fucose can incorporate into newly synthesized glycoconjugate, have indirect antioxidant effect, can be used as a suitable method for fucose administration in treatment of gingival disease induced by injury processes (non plaque induced gingival disease), and this is a step in the study to explain the beneficial effect of fucose injection on gingival tissue.

Periodontal Health Status and Its Association with Body Weight and Salivary Flow Rate among a Group of Adults in Erbil City

Name: Vian Muhammad Hussein

Degree: Ph.D.

Specialty: Preventive Dentistry

Date of the debate: 28/4/2011

Supervisor: Prof. Ali Fakhree Al-Zubaidee

Assist. Prof. Namirghanm Al-Tawil

Abstract

Very little information is available on the prevalence of periodontal diseases and their risk factors among adults in Erbil city. The present cross-sectional study of 1600 subjects (20-69) years, who accompanied Primary health care center's patients, was designed to estimate the prevalence and severity of periodontal problems and to assess the association of several factors with periodontal diseases. The oral hygiene and periodontal health status were assessed using Plaque index, Simplified oral hygiene index, Gingival index, Periodontal pocket depth, Clinical attachment loss and Gingival recession. Unstimulated salivary flow rate was measured in ml per minute. Certain anthropometric measurements like Body mass index, Waist circumference and Waist-hip ratio were estimated to assess body weight. The results showed that the prevalence of gingivitis was 85%, prevalence of periodontitis was 8.9% and the prevalence of gingival recession was 28.6%. According to body mass index, 2.8% of the total sample was underweight, 35.5% was normal weight, 37.5% was overweight and 24.2% was obese. Regarding unstimulated salivary flow rate, only 28% of the total sample reported low unstimulated salivary flow rate while the remaining 72% had normal USFR. Bivariate analysis using Pearson correlation showed that there were significant positive correlations between age-Plaque index, age-Gingival index, age-Calculus index, Plaque index-Gingival index, Calculus index-Gingival index, age-Body mass index and Gingival index-Body mass index. Negative significant correlations were reported between age-Unstimulated salivary flow rate, Gingival index-Unstimulated salivary flow rate, Unstimulated salivary flow rate-Body mass index. Multivariate analysis using binary logistic regression showed that there were highly significant associations between age and Oral hygiene index-Simplified with periodontal diseases. Gender was significantly associated with gingivitis and periodontitis but its association with Gingival recession was non significant. Significant association found between unstimulated salivary flow rate and gingivitis but no significant associations found with periodontitis and gingival recession. No significant associations were found between body mass index, waist circumference and waist-hip ratio with gingivitis and gingival recession. The association between body mass index and periodontitis was significant while the association between waist circumference and waist-hip ratio with periodontitis was not significant. No significant associations were reported between smoking and socio-economic status with periodontal diseases. We conclude that gingivitis was prevalent in adult subjects in Erbil. Most of adults were overweight and had normal unstimulated salivary flow rate. Age and oral hygiene were the major contributors to periodontal diseases, increasing population's awareness of periodontal diseases, risk factors and body weight will be a major task for public health workers.

The Effect of Gingival Sulcular Injection of Green Tea Extract. Biochemical, Immunological and Histopathological Study on Rabbit

Name: Dilyar Ahmed Baban

Degree: Ph.D.

Specialty: Periodontics

Date of the debate: 23/4/2013

Supervisor: Prof. Lekaa M. Ibrahim

Assist Prof. Nabeel E. Waheda

Abstract

Green tea has many beneficial effects on the body, and green tea is one of the best tonic for healthy well beings. The association between green tea consumption and human health has long been appreciated. Up to our knowledge, there have not been any previous experimental studies on this subject in Iraq and entire world used the method of aqueous green tea extract gingival sulcular injection, therefore the present study was designed to assess the biochemical, immunological and histological effect of single dose sulcular injection of green tea on rabbit gingival tissue. This study was performed using 139 male rabbits weighting (1-1.5 kg), 9 rabbits were used for pilot studies and 55 were used for biochemical studies; which were divided into three main groups; control group, green tea extracted injected group and distilled water injected group . Both green tea and distilled water groups were subdivided into 5 subgroups (each group consist of 5 rabbits), they were injected into the bottom of gingival groove at the mid- labial aspect of lower right central incisor with a single dose of 50 μ L of 5% green tea extract or 50 μ L of distilled water, the blood samples were taken, 1, 3, 24, 72, 168 hours after injection. The biochemical studies included the estimation of serum Malondialdehyde (MDA) level and effect of sulcular injection of green tea through estimation the level of serum vitamin C as an antioxidant. For immunological study; 20 rabbits were used to estimate the effect of sulcular injection of green tea extract. Blood samples were taken from the heart for all the rabbits before green tea injection and 3 days after the injection. The immunological studies included estimation of certain parameters like IL-1B , INF- γ , TNF- α before and after sulcular injection of green tea . Histological studies were performed to investigate the effect of green tea sulcular injection on the histological feature of the gingival tissue, and to assess the tissue response to local green tea injection. For histological studies; 55 rabbits with healthy gingiva were used, which divided into three main groups; control group, green tea extracted injected group and distilled water injected group . Both green tea and distilled water groups were subdivided into 5 subgroups (each group consist of 5 rabbits), samples were taken, 1, 3, 7, 14 and 21 days after injection. The results of the biochemical, immunological and histological showed:

- 1- Serum vitamin C increased 3 hours after injection while, serum concentration of Malondialdehyde decreased 3 hours after injection., which indicate that green tea had direct and indirect effect on oxidative stress pathway.
- 2- Decrease level of IL-1 β , TNF- α and INF- γ , thus sulcular injection may regulate oral immune response.
- 3- The sulcular injection of 5% aqueous green tea extract causes mild microscopical changes peaked 7 days after the injection, while, distilled water causes moderate microscopical changes peaked 14 days after the injection and reduced with time
- 4- All the changes observed following green tea sulcular injection were less serious and significantly differ from those observed following distilled water injection.

From the above results, we can conclude that green tea sulcular injection revealed a high biocompatible tissue reaction, thus, one can suggest, green tea can be used to

study its effects as local injection in periodontal disease. This is required further investigations.

Modification of Microhybrid Composite resin by Addition of Zinc Oxide and Calcium Carbonate Nanofillers

Name: Sazan Sherdil Saleem

Degree: Ph.D

Specialty: Conservative Dentistry

Date of the debate: 18/7/2013

Supervisor: Prof. Salem A.L. Al-Samarai
Lecturer Dr. Dara H. Saeed

Abstract

Incorporation of nanofillers into composite resins is highly recommended. Therefore, this study was designed to prepare a modified composite resin by adding two types of silane coated nanofillers (zinc Oxide and calcium carbonate) in the following concentration: (3% ZnO, 5% ZnO, 3% CaCO₃, 5% CaCO₃ and 3% ZnO + 3% CaCO₃) into the microhybrid composite and comparing them to un-modified microhybrid composite (control) and nanofilled composite resin and divided into seven groups which undergone physical tests, mechanical tests and antibacterial activity evaluation. In addition the biocompatibility test was evaluated for the experimental groups. Data were collected and statistical analysis was performed using the following tests: descriptive statistic, ANOVA and Duncan test. Regarding the physical properties, the result showed that the addition of ZnO to microhybrid composite increased the water sorption and water solubility values and decreased the depth of cure values compared to the control group, while the addition of CaCO₃ to microhybrid composite had no significant effect on the water solubility and depth of cure values but they significantly increased the water sorption compared to the control. The radiopacity was significantly increased when 3% of ZnO and CaCO₃ nanofillers were added alone or in combined with 3% CaCO₃ to microhybrid composite the, while the addition of 5% of both nanofillers to microhybrid composite showed non-significant increase in the radiopacity of the composite. The addition of nanofillers significantly increased the polymerization shrinkage of microhybrid except the addition of 3%

CaCO₃ had no significant effect. Very slight color change was observed of the experimental groups.

Regarding the mechanical properties, the addition of ZnO and CaCO₃ to microhybrid composite significantly increased the flexural strength (FS) and hardness values and decreased the surface roughness values compared to the control group, except the addition of 5% of ZnO which had no significant effect on FS value.

The biocompatibility was also studied by implanting the prepared modified composite in subcutaneous tissue of rats and comparing them to calcium hydroxide as a control group. The reaction examined at three intervals: (1 week, 4 and 9 weeks). The histopathological study showed that the experimental material presented compatibility since the inflammatory response at all evaluation periods was similar to the control group.

When the antibacterial activity was evaluated, the addition of ZnO nanofillers to microhybrid composite showed antibacterial properties against streptococcus mutans bacteria, while the addition of CaCO₃ to microhybrid composite appeared to be inactive.

In conclusion; the prepared modified composite resin had physical and mechanical properties that were within the limits accepted by ANSI/ADA specification No. 27 for resin based composite. The composites containing CaCO₃ showed better physical and mechanical properties than composite containing ZnO. Finally the addition of nanofillers ZnO to the microhybrid composites showed antibacterial activity while the

addition of CaCO₃ nanofillers had no antibacterial activity with respect to the studied bacteria.

Evaluation of Different Desensitizing Agents on Dentin Hypersensitivity in Vitro Study

Name: Saeed A. Mohammed

Degree: Ph.D.

Specialty: Periodontics

Date of the debate: 17/6/2013

Supervisor: Prof. Khulood A. Alsafi

Abstract

Background: Sensitive teeth are a rather common clinical problem for which several treatment options have been tested. Laser has been investigated as one of the possible therapies to minimize pain by either obliterating dentinal tubules or promoting dental analgesia, .in this study we use combination of Nd; YAG laser and Nano Fluor- Hydroxyapatite paste (N-FHA) as new modality used for the treatment of dentin hypersensitivity.

Objective: To verify the efficacy of Nd; YAG laser and Nano Fluor- hydroxyapatite paste in sealing the dentinal tubules for the blocking of dentinal tubules, a very frequent complaint in the dental office. In spite of the existence of many articles over this subject, no fast, efficient and long lasting treatments for this problem were found yet. The obliteration of the opening of the dentinal tubules stops its inner fluid displacement and the consequent painful response (Braennstroem's Hydrodynamics Theory)

Method: One hundred thirty six fireshly and healthy extracted human teeth, sixty extracted teeth from rabbit (experimental) , were used as samples for this study, kept in saline solution at room temperature. The coronal portion of each human tooth was removed to the level of the cervical line by using a diamond disc with straight hand piece; the pulpal tissue of each canal was removed. Class V cavity preparation was made in the crown of each rabbit tooth. Different desensitizing agents in this study have been applied to the dentin surface according to sample grouping mentioned later in this study.

Result : The dentinal tubules were opened fully in the control group; methylene blue solution permeation results showed that combination group (group one) have the lowest value of permeation, scanning electron microscope results that sealing of the dentinal tubules in the nanofluor - hydroxyapatite paste and Nd : YAG laser group was better than in the other four groups. The FLM showed that the combination group have the lowest value of fluorescent dye penetration.

Conclusion: This study showed that the methylene blue solution permeation, the highest mean value was founded in control group(31.65) um, while the lowest mean value was founded in Nano FHA and Nd:YAG laser group(2.57) um. The SEM indicated that the highest occluding effect for dentinal tubules was for Nano fluor hydroxyapatite and Nd:YAG laser (99.8%). The FLM showed that highest mean value was founded in control group (134.08) uin, while the lowest mean value was founded in Nano FHA and Nd:YAG laser group(10.47)um.

Therefore the blocking effect and sealing depth of the nanofluor-hydrxyapatite paste and Nd:YAG laser groups are higher than other modalities in this study, and within the limitation of the study, it could be used as a permanent method in the treatment of dentinal hypersensitivity.

Assessment of Novel Self - Adjusting File System (In Vitro Study)

Name: Diyar Khalid Bakr

Degree: Ph.D.

Specialty: Conservative Dentistry

Date of the debate: 30-2-2013

Supervisor: Dr. Hussain F. Al-Hwaiz
Dr. Raid F. Salman

Abstract

A total of sixty single rooted, single canalled premolars were selected for micro-computed tomography evaluation study. Twenty samples were used for each of three study lines; hard tissue debris accumulation, quantitative measurement of the amount of dentin removal, and canal morphological changes includes (Surface area, Volume, Structure model index, Curve length, Concavity and touched - untouched surface). All the specimens pre-operatively and post-operatively scanned by Micro Computed Tomography in Scanco Medical Company, ten specimens from each line were prepared with ProTaper system and the second ten specimens from each line were prepared with self adjusting file. Three dimensional image reconstructed pre and post operatively by a special software and the data evaluated.

Standardized thirty endodontic-training blocks of clear resin were used for simulated root canal evaluation study and were divided into two groups of fifteen blocks for each; they were prepared using; group A: ProTaper rotary file system and group B: Self adjusting file system. Then (Perforation, Blockage, Centering, Transportation, Ledge, Elbow and Zipping) were recorded.

A three dimensional finite element model was developed then to analyze the stress distribution in mandibular premolar using oval canal shape with twenty different models. Ten were prepared with self adjusting file System and second ten models were prepared with ProTaper System.

For both canal morphology changes studies, comparable differences were present between both instruments, where as for finite element analysis, during the self adjusting File preparation, the instrument was less stress concentration forming on canal walls.

As conclusion, the self adjusting file instrument was behaved well in different aspects of testing (amount of dentine removal, Surface area, touched and untouched surface, curve length ratio and Finite element analysis) and the results were comparable to those of ProTaper.

The Effect of Sialoprotein Local Injection on Orthodontic Mini-Implant and Dental Anchorages for Tooth Retraction in Dogs

Name: Omar Fawzi Abduljabbar Chawshli

Degree: Ph.D.

Specialty: Orthodontics

Date of the debate: 12-1-2014

Supervisor: Assist. Prof. Rafah Al-Marouf
Assist. Prof. Dr. Fadhil Y. Jasim

Abstract

Background and objectives: Bone sialoprotein (BSP) is a mineralized tissue-specific protein expressed in differentiated osteoblasts that appear to function in the initial mineralization of bone. Dental units, extra oral devices and mini-implants are the main types of anchorage that are used in orthodontic treatment. The aim of this study was to investigate the effect of local BSP injection on dental and mini-implant anchorage during orthodontic tooth movement and to compare between mini-implants and dental unites as anchorage.

Method: This study used 14 dogs with an orthodontic appliance banded on both right and left sides of the maxilla for 40 days. On right side, canine was used as dental anchorage to retract the 3rd incisor toward the canine by nickel-titanium closed coil spring along a straight arch wire (17*25 mil). On the left side, mini-implant between the roots of canine and 1st premolar was used as skeletal anchorage. The dogs were divided equally into two groups (7 dogs for each group); experimental group that injected with 0.01 $\mu\text{g}/\mu\text{L}$ sialoprotein around the anchoring unit in three different time intervals, while the other control group received normal saline injection in the same amount and location. Different clinical measurements were done on the stone casts of each dog before and after tooth retraction. Tissue samples including, the moved tooth, anchorage tooth, and area of mini-implant were collected and subjected to histological, histomorphometrical, immunohistochemical, and ultra structural study using transmission electron microscope studies were

Evaluation the Effect of Addition Chitosan Material on Calcium Enriched Mixture (In Vivo & In Vitro Study)

Name: Bassam Karem Amin

Degree: Ph.D.

Specialty: Conservative Dentistry

Date of the debate: 4-5-2014

Supervisor: Prof. Hussain Al-Huwaizi

Assist. Prof. Raid Fahim Salman

Abstract

Objective: This research was conducted to prepare pulp capping material based on novel material: Calcium Enriched Mixture with injectable consistency by adding chitosan polymer and evaluate the material in vitro and in vivo studies for pulp revascularization .

Method : Preparation of the final experimental material from different reagents was firstly executed by Performing flowability test , setting time test and solubility test ,it was apparent that the formula passed the American Dental Association specification no. 57/2008 was the formula of (1:0.6 powder: liquid ratio with liquid/chitosan ratio 1:2). The experimental material was then tested via biocompatibility study, in the back of five young female rabbits for 7 days , 14 days & 21 days .The material was prepared and placed into autoclaved silicone tubes and they were implanted into the subcutaneous connective tissue of each rabbit .Also the experimental material was used as direct pulp capping agent for traumatic exposure of rabbit teeth in comparison to MTA & 2 control groups (one group capped with glass ionomer filling material and the last group were left without capping agent for 3 days , 7 days & 28 days duration.

Results : It was clear that; with increasing the chitosan concentration, the setting time was increased and with increasing the chitosan liquid: cement liquid ratio, the setting time was increased too. However, the formula of (1:0.6 powder: liquid ratio with liquid/chitosan ratio 1:2) was gained acceptance since it had a near & comparable values between the setting time & hard mass formation. For all time period; the experimental material solubility was very low that was not exceeding 3% which is the minimal limit accepted by American Dental Association specification. In deed there was water sorption gained which was optimum at Day-7 & then decreased till reached 0.04% at Day-21.

Histo-pathological results of both biocompatibility & direct pulp capping studies showed improvement of the histological picture with the time.Group (28) days produced better result than other time intervals for all materials used. Complete replacement of the pulp tissue by necrotic tissue was detected for the empty cavity group at 7th day & moderate inflammatory reaction for the glass ionomer capping group. Although, the same picture was seen for MTA capping group, there was irregular shape reparative dentin formed on the peripheries of the pulp with gradual restoration of the typical organization of the odontoblast along the periphery of the pulp . For the experimental material, there were marked results; firstly an area of mineralized tissue formation was recognized with irregular outlines but the irregularity was more than MTA group where it represented rough surface and demonstrated less continuation with regular dentinal tubules of the secondary dentin and more interruption of cellular components, secondly some area of hyalinization also present.

The Local Effect of Infliximab Injection on Orthodontic Tooth Movement in Experimentally Induced Diabetic Rabbits (Macroscopically and Microscopically Studies)

Name: Anees M. Mudhir

Degree: Ph.D.

Specialty: Orthodontics

Date of the debate: 9-20-2014

Supervisor: Assist. Prof. Rafah Al-Marooof Assist.
Prof. Fadhil Y. Jasim

Abstract

Background: Orthodontic tooth movement is dependent on bone cells activities such as osteoblasts and osteoclasts, and it supposed to be mediated by several host mediators such as tumor necrosis factor- α which plays an important role, directly or via chemokine release, in osteoclast recruitment and activation. Type-1 diabetes is a systemic disease characterized by change in the bone remodelling and effects on orthodontic tooth movement.

Objective: The present study aimed to investigate the effects of infliximab (tumor necrosis factor- α antagonist) local injection on orthodontic tooth movement in diabetic rabbits.

Methods: A total of 70 male adult local bred rabbits, weighting (1.5-2 kg) were used in this study. Four rabbits were regarded as normal base line group, while the other remaining 66 rabbits were divided equally into 3 groups (22 rabbits for each group), two groups are experimental groups in which diabetes mellitus were induced using alloxan intravenous injection. One of these groups received insulin treatment, while the other group left untreated. The other third group was regarded as normal group without diabetes mellitus. All rabbits (normoglycemic and diabetic) were subjected to orthodontic tooth movement of upper central incisors for 18 days, half of each group received infliximab local injection, while the remaining number received saline subperiosteal injection. After sacrifice of the rabbits, tissue samples were subjected to Hematoxyline and Eosin stain, Periodic acid-schiff stain and histomorphometrics procedure.

Results: Clinically there was a significant smaller rate of tooth movement in all groups injected with infliximab than groups injected with saline represented by smaller spaces created, where in orthodontic treated normoglycemic group which received saline injection (NG) the space was 3.7 ± 0.52 mm, while with infliximab injection it was (3.5 ± 0.43) mm, in the uncontrolled diabetic (UCD) it was 3.4 ± 0.32 mm with saline injection, while it was less with infliximab group (UCDF) (2.9 ± 0.44) mm. Even in controlled diabetic group with saline injection (CD group), the space was (3.4 ± 0.40) mm, while with infliximab injection group (CDF) it was (2.8 ± 0.50) mm. According to histological methods, there was less bone resorption in pressure side and more bone formation in tension side in rabbits groups injected with infliximab than those injected with saline. Histomorphometric methods showed that the injection of infliximab minimized and reduced the compression in the width of PDL in the pressure side and caused obvious reduction in the osteoclast number in all studied group. where the highly noticeable decrease in the width of PDL was observed in the uncontrolled diabetic group (UCD), where the width of PDL was (17.6 ± 6.08) μ m, while the least changes was observed in the orthodontic treated normoglycemic group which received infliximab injection (NGF), where the width of PDL was (39.5 ± 10.64) μ m and controlled diabetic group that received infliximab

injection(CDF) ($39.6\pm 5.98\mu\text{m}$), where in orthodontic treated normoglycemic group which received saline injection(NG), the width was $114.14\pm 26.89\mu\text{m}$, while with infliximab injection it was $84.3\pm 14.45\mu\text{m}$. In the uncontrolled diabetic(UCD) it was $231.1\pm 42.57\mu\text{m}$ with saline injection, while it was less with infliximab injection (UCDF), where the width was ($176.1\pm 34.49\mu\text{m}$). Even in controlled diabetic group with saline injection(CD), the width was ($200.2\pm 30.06\mu\text{m}$), while with infliximab injection(CDF), it was ($137.7\pm 65.80\mu\text{m}$). Periodic acid–Schiff stain showed that infliximab did not alter carbohydrate content of the PDL

Masseter and Temporalis Muscle Contraction during Mandibular Closing in Different Facial Types

Name: Brwa Mahdi Aziz

Degree: Ph.D.

Specialty: Orthodontics

Date of the debate: 20-4-2014

Supervisor: Assist .Prof. Fadhil Y. JASIM

Dr. Sherwan Rahman Sulaiman

Abstract

It is quite clear that bone is a plastic tissue, it responds to pressure, whenever it is subjected to force, it bends to a limit and adapts its shape in response to the force and function. This study's hypothesis is the positive relation between the activity of jaw closing muscles (Masseter and anterior belly of temporalis) and skeletal facial types and heights, meaning that the hyperactive masseter and temporalis muscle predispose to shortening of the face, and reduction in facial height.

In this study 52 healthy Kurdish volunteers in Erbil city, were selected with different facial types, studied for the parameters of; masticatory muscle activity (amplitude) facial types in vertical and transverse dimensions, biochemical blood tests for Na⁺, K⁺, Ca²⁺ electrolytes, and Creatine kinase enzyme. In order to measure the muscle activity, a specific device have been designed as an occlusal force meter (COFM), this is together with the electromyography used to record the amplitudes of masseter and anterior belly of temporalis muscles, in four different stages of loading for each muscle separately, and each side independently. For the purpose of measurements of facial dimensions, both lateral, and posteroanteriorcephalometrics were taken for tracing. The lateral cephalometric radiographs were analyzed for Ricketts analysis, and traced with DET which is an American system for cephalometric analysis. While the posteroanteriorcephalometrics, were traced and analyzed by a specifically designed analysis by the researcher for comparing right and left sides' widths and heights at different levels of anatomic values.

In the sample it has been found that the distribution of mesofacial group (normal face), was the most common group, followed by brachyfacial group (Short face), and the least common group was the dolichocephalic (long face).

A highly significant difference has been discovered between the activity of jaw closing muscles of the three groups of facial types; (mesofacial, brachyfacial, and dolichfacial), supporting the hypothesis of positive relation between jawclosing muscles activity and facial heights

Development and Assessment of New Root Canal Filling Based On Novel Material: Poly-Phosphate Glass Ionomer Modified With Biopolymer (Chitosan)

Name: Abdulkareem Ramadhan Ibrahim Al-Mezouri

Degree: Ph.D.

Specialty: Conservative Dentistry

Date of the Debate: 7-1-2014

Supervisor: Dr. Hussain F. Al-Hwaizi

Dr. Dara H. Saeed

Abstract

The aim of this study was to develop a new root canal filling material based on poly-phosphonate glass ionomer material with addition of a biopolymer, chitosan. A pilot study was done to choose the best combination of the chitosan/poly-phosphonate glass ionomer liquid and the most appropriate powder/liquid ratio for the experimental material which can pass the ADA specifications with the desired properties to be used as root canal filling material.

The result of pilot study showed that the formula 2CH-25% v/v (1 part of 2 g L⁻¹ chitosan solution to 4 parts of poly-phosphonate glass ionomer liquid) with powder/liquid ratio of 0.2 gm/0.06 ml passed the ADA specification for the setting time and flowability and provided the best compressive strength (59.39 MPa) with 91.98% injectability.

The chosen experimental material formula was used throughout the study and subjected to push out strength, solubility, fluoride release, biocompatibility, microleakage tests and scanning electron microscopic analysis.

The results were showed that push out bond strength of experimental material was lower than that of AH26 sealer. The solubility test revealed that the experimental material had lower percentage of weight loss when compared with MTA and conventional GI restorative material and was showed higher fluoride ion release. The biocompatibility results were showed mild to moderate inflammatory reaction at 3 and 7 days periods with complete healing was observed at 21days period. Dye leakage results were not different from that of the traditional obturating systems apically and coronally. The SEM analysis revealed good adaptation to the root canal walls.

In conclusion, the experimental material showed comparable results of different assessments as root canal filling material compared to the most commonly used obturating system and can be used as an alternative material