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**OBJECTIVES:** The aim of this study is to determine the relationship between atherosclerosis and periodontopathogenic microorganisms in chronic periodontitis patients following periodontal treatment.

**MATERIALS AND METHODS:** A total of 40 patients were included in the study. 20 of these patients diagnosed with atherosclerosis and chronic periodontitis formed the test group. The remaining 20 patients were systemically healthy patients diagnosed with chronic periodontitis and formed the control group. All patients had nonsurgical periodontal treatment. The periodontopathogenic microorganism levels were determined at baseline and at 6 months in microbial dental plaque samples and WBC, LDL, HDL, PLT, fibrinogen, creatinine and hs-CRP levels were determined by blood samples.

**RESULTS:** Statistically significant reduction has been achieved in clinical periodontal parameters following non-surgical periodontal treatment in test and control groups. Following periodontal treatment, WBC, LDL, PLT, fibrinogen, creatinine and hs-CRP levels significantly decreased and HDL levels significantly increased in both test and control groups. Similarly, the periodontopathogenic microorganism levels significantly decreased following periodontal treatment in the test and control groups. A statistically significant positive correlation has been determined between the periodontopathogenic microorganism levels and WBC, LDL, PLT, fibrinogen, creatinine, and hs-CRP levels in the test group.

**CONCLUSIONS:** The association between hs-CRP, WBC, LDL, PLT, fibrinogen, creatinine, and the amount of periodontopathogenic microorganisms indicates the possibility that periodontal treatment could decrease the risk atherosclerosis. More studies must be conducted in order for these results to be supported.


**OBJECTIVE:** Historically, it has been shown that rheumatoid arthritis (RA) and periodontitis (PE) share pathophysiological similarities and possibly a genetic background. In order to elucidate the genetic background between both diseases, we evaluated the distributions of five SNPs genotypes and all the possible haplotypes composed in subjects with isolated RA, PE, combined diseases and healthy controls.

**MATERIALS AND METHODS:** The study population consisted of 280 Mexican subjects. Genomic DNA was isolated from buccal epithelial cells collected by cheek scrapings and analyzed for the determination of the following SNPs: IL-1alpha+4845 (rs17561), IL-1alpha -889 (rs1800587), IL-1beta+3954 (rs1143634), IL-1beta -511(rs16944) and TNF-alpha -308 (rs1800629).

**RESULTS:** After adjustment for age, sex and smoking status, multiple logistic regression analysis revealed a no significant association in the genotype frequencies of TNF-alpha -308 and IL-1alpha+4845 SNPs. Otherwise a significant association was observed in IL-1beta+3954 and IL-1beta -511 (p<0.05) while IL-1alpha -889 was of borderline statistical significance (p=0.054). Also, we found three negative associated haplotypes with PE: IL-1alpha+4845 G/IL-1beta -511 A, IL-1beta+3954 C/IL-1beta -511 A and interestingly IL-1alpha -889 C/IL-1beta -511 A also with a positive association with RA.

**CONCLUSIONS:** Some genotypes and haplotypes are associated with the diseases. But it seems that the genetic background of the association between RA and PE needs to be explored deeper.
In the peroperative period, obtaining proper antibiotic usage may be beneficial for reducing the incidence of infection. The results from this study indicate that the infection rate after surgeries was very low when systemic antibiotics were used in patients with chronic periodontitis. The NNT to prevent one infected case was 203, suggesting that the difference in infection rates between using and not using antibiotics might lack clinical significance. Considering the low incidence of infection and the disadvantages of systemic antibiotic use, it is suggested that systemic antibiotics in the peroperative period of periodontal flaps may not be needed to prevent infection.

4. Ferreira CF, Babu J, Hamlekhan A, Patel S, Shokuhfar T.
Efficiency of Nanotube Surface-Treated Dental Implants Loaded with Doxycycline on Growth Reduction of Porphyromonas gingivalis.
PURPOSE: The prevalence of peri-implant infection in patients with dental implants has been shown to range from 28% to 56%. A nanotube-modified implant surface can deliver antibiotics locally and suppress periodontal pathogenic bacterial growth. The aim of this study was to evaluate the deliverability of antibiotics via a nanotube-modified implant.
MATERIALS AND METHODS: Dental implants with a nanotube surface were fabricated and loaded with doxycycline. Afterward, each dental implant with a nanotube surface was placed into 2-mL tubes, removed from solution, and placed in a fresh solution daily for 28 days. Experimental samples from 1, 2, 4, 16, 24, and 28 days were used for this evaluation. The concentration of doxycycline was measured using spectrophotometric analysis at 273-nm absorbance. The antibacterial effect of doxycycline was evaluated by supplementing Porphyromonas gingivalis (P. gingivalis) growth media with the solution collected from the dental implants at the aforementioned time intervals for a period of 48 hours under anaerobic conditions. A bacterial viability assay was used to evaluate P. gingivalis growth at 550-nm absorbance.
RESULTS: Doxycycline concentration varied from 0.33 to 1.22 mug/mL from day 1 to day 28, respectively. A bacterial viability assay showed the highest P. gingivalis growth at day 1 (2 nm) and the lowest at day 4 (0.17 nm), with a gradual reduction from day 1 to day 4 of approximately 87.5%. The subsequent growth pattern was maintained and slightly increased from baseline in approximately 48.3% from day 1 to day 24. The final P. gingivalis growth measured at day 28 was 29.4% less than the baseline growth.
CONCLUSION: P gingivalis growth was suppressed in media supplemented with solution collected from dental implants with a nanotube surface loaded with doxycycline during a 28-day time interval.

PURPOSE: To describe the survival rate and peri-implant bone loss in very old patients dependent for their activities of daily living (ADL), treated with mandibular two-implant overdentures (IODs) in the context of a previously reported randomized controlled trial.

MATERIALS AND METHODS: A total of 19 patients received two interforaminal Straumann implants (Regular Neck, 4.1 mm diameter, 8 mm length) that were subsequently loaded with Locator attachments, transforming their preexisting inferior conventional denture into an IOD. The primary outcome measures were implant survival rate and radiographically assessed peri-implant bone loss. Secondary outcome measures included peri-implant probing depth and Plaque Index scores, as well as implant mobility. Nutritional state (body mass index and blood markers) and cognitive state (Mini-Mental State Examination) were also analyzed.

RESULTS: The patient cohort comprised eight men and 11 women with a mean age of 85.7 +/- 6.6 years. The implant survival rate up to 5 years was 94.7%, with one early and one late implant failure. The mean loss of peri-implant bone height was 0.17 mm per year (95% confidence interval: 0.09 to 0.24; P < .001). Peri-implant probing depth and Plaque Index scores were low and stable during the first 2 years, and thereafter increased continuously. Correlation analysis suggests that a reduced cognitive function and nutritional state are not a particular risk factor for accelerated peri-implant bone loss.

CONCLUSION: The high implant survival and acceptable peri-implant health suggest that neither age nor dependency for the ADLs is a contraindication for the placement of implants. Nevertheless, close monitoring of the patients concerning a potential further functional decline precluding denture management and performing oral hygiene measures is advised.


OBJECTIVE: To investigate if differences according to discontinuation of treatment could be identified between patients with aggressive periodontitis and chronic periodontitis at two specialist clinics of periodontology irrespective of the effects of background factors.

MATERIALS AND METHODS: This is a retrospective case-control study. The variables were registered from dental records. The population consisted of patients referred to two specialist clinics of periodontology during three years. A study group was included consisting of 234 patients with a diagnosis of aggressive periodontitis. A control group with a diagnosis of chronic periodontitis was randomly selected.

RESULTS: In total, 234 patients (4% of the referrals) with a diagnosis of aggressive periodontitis were referred to the two periodontal clinics during a period of three years. Forty-two per cent of the non-compliant patients were smokers compared to 31% for the compliers and this difference was statistically significant. Patients with aggressive periodontitis interrupted their periodontal treatment significantly more frequently (46%) compared to those patients with chronic periodontitis (34%). The non-compliant patients had significantly deeper periodontal pockets at baseline as well as significantly more sites with bleeding at probing. In a stepwise logistic regression analysis, aggressive periodontitis, smoking and the relative frequency of sites with periodontal pockets >4mm at baseline were the remaining variables with a significant influence on the incidence of interrupting ongoing periodontal treatment.

CONCLUSIONS: The patient group with aggressive periodontitis interrupted the periodontal treatment significantly more often irrespective of background factors.
factors and risk factors, which may be regarded as a major health problem.


AIM: The purpose of this radiographic study was to evaluate the prevalence of intrabony defects and to study the correlation between these defects and clinical variables in a Swedish adult population. Another aim was to study the combined relationship of intrabony defects and furcation involvement with clinical variables.

MATERIALS AND METHODS: The present study was performed using bitewing and apical radiographs from 329 subjects. The clinical and radiographic data were collected from the study that was carried out in Jonkoping 2003. Intrabony defects were measured from the bottom of the pocket to the highest point of alveolar bone crest. Furcations were considered healthy if the furcation was filled with bone up to the fornix. SPSS was used to analyze the results.

RESULTS: 2014 molars and 5898 non-molars were included in the study. The prevalence of intrabony defects was 2.2% in the whole population. Multivariate analysis showed that periodontal pockets (p<0.0001), plaque (p<0.001), age (p<0.02) and gender (p<0.03) had a significant relationship with the occurrence of intrabony defects. On the other hand, gingivitis, smoking habits and education level were not associated with intrabony defects. Multivariate analysis showed that the only variable associated with presence of intrabony defects and furcation involvement was presence of periodontal pockets (p<0.0001). Whilst, gingivitis, education level, plaque, gender, age and smoking habits were not associated with the outcome.

CONCLUSIONS: Mandibular second molars were most likely to display intrabony defects, whilst mandibular incisors were the least likely to do so.


Care for a child's teeth and gums can start even before the baby is born. Pregnancy causes many hormonal changes, among these the rise of estrogen and progesterone increases the risk of developing oral health problems, like gingivitis and periodontitis. The presence of maternal periodontal diseases and active infections has been associated with adverse pregnancy outcomes, such as preterm birth, preeclampsia, gestational diabetes and foetal loss. Therefore, it is important to educate pregnant women about their oral hygiene and the importance of taking care of their newborn's oral health. J. Courtd and A. Horowitz devised six steps to help us in promoting oral health (ADA Convention- 2016 Denver): 1. Asking right questions such as "Has there been any change in your health history since your last visit?" and "When did you brush your teeth last?" is recommended in order to find out whether your patient is pregnant and to get to know her dental care better. 2. Know your audience: Mothers are increasingly informed about childbearing, however not every piece of information is correct! Let them know what they are doing well and do not sound like you are preaching to them. 3. Use informal language. 4. Emphasize the need to get dental treatments and to prevent decay: Parents can pass bacteria to their newborns, therefore we want mothers to have a healthy mouth before they give birth! 5. Mom and dad as first dentists: Teach parents about nutrition and when and how to clean their children's mouth. 6. Listen to patients and confirm what they heard: Ask the patient to tell you what she is going to do at home and confirm. As pregnant women are more receptive to oral health information than in any other moment in their life, our aim is to take this opportunity by providing good prevention information and instilling healthy habits as early as possible.

Sphingomyelin phosphodiesterase 3 (Smpd3), which encodes neutral sphingomyelinase 2 (nSMase2), is a key molecule for skeletal development as well as for the cytodifferentiation of odontoblasts and alveolar bone. However, the effects of nSMase2 on the cytodifferentiation of periodontal ligament (PDL) cells are still unclear. In this study, the authors analyzed the effects of Smpd3 on the cytodifferentiation of human PDL (HPDL) cells. The authors found that Smpd3 increases the mRNA expression of calcification-related genes, such as alkaline phosphatase (ALPase), type I collagen, osteopontin, Osterix (Osx), and runt-related transcription factor (Runx)-2 in HPDL cells. In contrast, GW4869, an inhibitor of nSMase2, clearly decreased the mRNA expression of ALPase, type I collagen, and osteocalcin in HPDL cells, suggesting that Smpd3 enhances HPDL cytodifferentiation. Next, the authors used exome sequencing to evaluate the genetic variants of Smpd3 in a Japanese population with aggressive periodontitis (AgP). Among 44 unrelated subjects, the authors identified a single nucleotide polymorphism (SNP), rs145616324, in Smpd3 as a putative genetic variant for AgP among Japanese people. Moreover, Smpd3 harboring this SNP did not increase the sphingomyelinase activity or mRNA expression of ALPase, type I collagen, osteopontin, Osx, or Runx2, suggesting that this SNP inhibits Smpd3 such that it has no effect on the cytodifferentiation of HPDL cells. These data suggest that Smpd3 plays a crucial role in maintaining the homeostasis of PDL tissue.


Osteoporosis is a systemic skeletal disease characterized by low bone mineral density (BMD) and has been considered a risk factor for periodontal disease. The aim of this systematic review and meta-analysis was to verify the scientific evidence for the association of periodontal attachment loss with low BMD in postmenopausal women. A systematic search of the literature was performed in databases until August 2016, in accordance with Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) guidelines. Eligibility criteria included studies that compared clinical attachment loss (CAL) between postmenopausal women with low and normal BMD. Studies using similar methodology, with lower and higher risk of bias, were pooled into 3 different meta-analyses to compare CAL among women with normal BMD, osteoporosis, and osteopenia. In the first meta-analysis, mean CAL was compared among groups. In the other 2 meta-analyses, the mean percentages of sites with CAL >=4 mm and >=6 mm were respectively compared among groups. From 792 unique citations, 26 articles were selected for the qualitative synthesis. Eleven of the studies were appraised as presenting low risk of bias, and the association between low BMD and CAL was observed in 10 of these studies. Thirteen cross-sectional articles were included in the meta-analysis for osteoporosis and 9 in the osteopenia analysis. Women with low BMD presented greater mean CAL than those with normal BMD (osteoporosis = 0.34 mm [95% confidence interval (CI), 0.20-0.49], P < 0.001; osteopenia = 0.07 mm [95% CI, 0.01-0.13], P = 0.02). Only studies with lower risk of bias were available for the analysis of CAL severity. Women with low BMD presented more severe attachment loss, represented as mean percentage of sites with CAL >=4 mm (osteoporosis = 3.04 [95% CI, 1.23-4.85], P = 0.001; osteopenia = 1.74 [95% CI, 0.36-3.12], P = 0.01) and CAL >=6 mm (osteoporosis = 5.07 [95% CI, 2.74-7.40], P < 0.001). This systematic review and meta-analysis indicates that postmenopausal women with osteoporosis or osteopenia may exhibit greater CAL compared with women with normal BMD.
Keeve PL, Khoury F.
Long-Term Results of Peri-implant Conditions in Periodontally Compromised Patients Following Lateral Bone Augmentation.

**PURPOSE:** The aim of this retrospective study was to compare long-term (≥ 5 years) outcomes of implants placed in patients treated for chronic periodontitis versus those placed in periodontally healthy patients. In both groups, the implants were placed in alveolar ridges that were laterally augmented with autogenous bone block grafts using a split bone block technique.

**MATERIALS AND METHODS:** Two hundred ninety-two patients were screened in the course of supportive periodontal treatment examinations. Nonsmoking patients without any severe systemic diseases who had adhered to regular supportive periodontal treatment for a minimum of 5 years after undergoing autogenous lateral grafting (using the split bone block technique), implant placement, and prosthetic reconstructions were classified into two groups based on their presurgical status: periodontally healthy patients (PHP) and periodontally compromised patients (PCP).

**RESULTS:** Clinical outcomes for 77 patients, 38 PHP and 39 PCP, were examined. All had been successfully treated for severe lateral atrophy and received a total of 241 endosseous implants between 2002 and 2008. At the final examination, mean bleeding on probing was 7.08% +/- 7.27% in PHP and 14.49% +/- 18.14% in PCP, a statistically significant difference. Significantly higher Plaque Index and more recession were associated with a narrow (< 2 mm) width of keratinized mucosa.

**CONCLUSION:** Implants in alveolar ridges laterally augmented using a split bone block technique revealed similar clinical peri-implant conditions in both PHP and PCP. Using autogenous bone block grafts without biomaterials resulted in long-term peri-implant tissue stability.

Resistin as potential biomarker for chronic periodontitis: A systematic review and meta-analysis.

**OBJECTIVES:** To determine the serum and gingival crevicular fluid (GCF) levels of resistin between individuals with chronic periodontitis (CP) and those without CP, and to evaluate the role of resistin in CP.

**MATERIALS AND METHODS:** The addressed focused question was "Is there a difference in the resistin levels between individuals with CP and those without CP?" four electronic databases: Medline, PubMed (National Institutes of Health, Bethesda), EMBASE, and Science direct databases from 1977 up to March 2016 for appropriate articles addressing the focused question. EMBASE and Medline were accessed using OVID interface which facilitated simultaneous search of text words, MeSH or Emtree. Unpublished studies (gray literature) were identified by searching the Open-GRAY database and references of the included studies (cross referencing) were performed to obtain new studies. In-vitro studies, animal studies, studies that reported levels of other cytokines but not resistin, letters to the editor and review papers were excluded.

**RESULTS:** Ten studies were included. Nine studies compared resistin levels between CP and periodontally healthy (H) individuals and reported higher mean serum and GCF levels of resistin in CP patients than the H controls. Two studies showed comparable resistin levels from GCF and serum between diabetes mellitus with CP (DMCP) and CP groups. Three studies included obese subjects and showed comparable serum and GCF resistin levels between obese subjects with CP (OBCP) and CP subjects.

**CONCLUSIONS:** CP patients were presented with elevated levels of GCF or serum resistin as compared with H individuals. Resistin modulates inflammation in chronic periodontal disease and may be used as surrogate measure to identify subjects at risk for periodontitis. Resistin levels in patients with CP and
systemic inflammatory disorders such as diabetes, obesity, or rheumatoid arthritis was not significantly higher than the levels in patients with only CP.


OBJECTIVES: Oral mucosal macrophages (Ms) determine immune responses; maintaining tolerance whilst retaining the capacity to activate defences against pathogens. M responses are determined by two distinct subsets; pro-inflammatory M1- and anti-inflammatory/regulatory M2-Ms. Tolerance induction is driven by M2 Ms, whereas M1-like Ms predominate in inflammation, such as that exhibited in chronic Porphyromonas gingivalis (PG) periodontal infection. M responses can be suppressed to benefit either the host or the pathogen. Chronic stimulation by pathogen associated molecular patterns (PAMPs), such as LPS, is well established to induce tolerance. The aim of this study was to investigate the P. gingivalis-driven induction of and responsiveness to the suppressive, anti-inflammatory cytokine, IL-10, by M subsets.

METHODS: M1- and M2-like Ms were generated in vitro from the THP-1 monocyte cell line by differentiation with PMA and Vitamin D<sub>3</sub>, respectively. M subsets were stimulated by PG-LPS in the presence or absence of IL-10.

RESULTS: PG-LPS differentially induced IL-10 secretion and endogenous IL-10 activity in M1- and M2-like subsets. In addition, these subsets exhibited differential sensitivity to IL-10-mediated suppression of TNFalpha, where M2 Ms where sensitive to IL-10 and M1 Ms were refractory to suppression. In addition, this differential responsiveness to IL-10 was independent of IL-10-binding and expression of the IL-10 receptor signal transducing subunit, IL-10Rbeta, but was in fact dependent on activation of STAT-3.

CONCLUSION: P. gingivalis selectively tolerises regulatory M2 Ms with little effect on pro-inflammatory M1 Ms; differential suppression facilitating immunopathology at the expense of immunity.


OBJECTIVE: The aim of this study was to analyze whether periodontopathogens induced inflammatory cell death and the release of diverse endogenous danger molecules in THP-1-derived macrophages.

METHODS: The macrophages were treated with Treponema denticola, Porphyromonas gingivalis, and Tannerella forsythia. Activation of caspase-1 and caspase-4 was detected by Western blotting. Cell death of bacteria-stimulated macrophages was examined using a lactate dehydrogenase (LDH) assay and propidium iodide (PI)/annexin V (AV) staining. Levels of endogenous danger signals, including adenosine triphospate (ATP), uric acid, heat shock protein 60 (HSP60), high-mobility group box protein 1 (HMGB1), and fibronectin in the culture supernatants were determined using an ATP bioluminescence assay kit, a uric acid assay kit, and Western blotting, respectively.

RESULTS: T. denticola, P. gingivalis, and T. forsythia induced activation of caspase-1 and caspase-4. The LDH assay and PI/AV staining showed that all three pathogens induced pyroptotic cell death. All three bacteria induced release of ATP, which is an important ligand for inflammasome activation; the
increase in ATP ultimately leads to caspase-1 activation. T. denticola induced release of HSP60 and fibronectin, while T. forsythia induced release of HMGB1 in addition to HSP60 and fibronectin. None of the endogenous molecules except for fibronectin were detected in P. gingivalis-infected cells, possibly due to degradation of these factors by the proteolytic activity of the bacteria. Interestingly, P. gingivalis induced uric acid release.

CONCLUSION: Inflammatory cell death and endogenous danger molecules released from cells infected with periodontopathogens may play critical roles in the pathogenesis and progression of periodontitis by augmenting immune and inflammatory responses.

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OBJECTIVE: The objective of this study was to investigate effects of insulin-like growth factor 1 (IGF1) on proliferation, wound healing and differentiation processes of human periodontal ligament (PDL) cells under inflammatory conditions and whether the protective, anabolic effects of IGF1 can attenuate unfavorable effects of interleukin-1beta (IL-1beta).

DESIGN: Inflammation was mimicked through cell stimulation with IL-1beta. PDL cells were characterized in respect to the presence of components of the IGF system and the responsive potential on IL-1beta incubation. Gene expression levels were analyzed by quantitative real-time PCR. Cellular localization of target proteins was visualized using fluorescent-based immunohistochemistry. Effects on cell division were investigated by proliferation assays. Wound healing was analyzed using light microscopic techniques. Differentiation was quantified by measuring biomineralization and osteoblast-specific alkaline phosphatase enzyme activity.

RESULTS: PDL cell proliferation and wound healing were positively affected by IGF1 and the combination of IGF1 with IL-1beta, while only IL-1beta showed negative effects. Biomineralization was enhanced by IGF1, IL-1beta, and the combination of both stimulants. Osteoblast differentiation was increased by IL-1beta and the combination of IL-1beta with IGF1, whereas only IGF1 negatively affected ALP activity. Phosphorylation of p38 was regulated by IL-1beta and IGF1.

CONCLUSIONS: The data presented in this work showed a potential of IGF1 to improve wound healing and proliferation processes and to sustain cell differentiation under inflammatory stimuli in PDL cells.

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BACKGROUND AND OBJECTIVE: As caspase-5 plays a role in apoptosis, the present study aimed to identify the expression and activation of caspase-5 in human periodontal ligament cells in response to cyclic stretch and the role of caspase-5 in stretch-induced apoptosis.

METHODS: Human PDL cells were exposed to 10% or 20% stretch strain for 6 or 24h, and the mRNA and protein expressions of caspase-5 were analyzed with real-time PCR and Western blot, respectively. The caspase-5 activation was detected by colorimetric assay. Then the influence of the inhibition of
caspase-5 on the stretch-induced apoptosis and caspase-3 activation were analyzed with flow cytometry and colorimetric assay, respectively.

RESULTS: Both 6 and 24h stretches increased mRNA, protein expression and activation of caspase-5 in human PDL cells. Inhibition of caspase-5 inhibited the stretch-induced apoptosis and caspase-3 activation in human PDL cells.

CONCLUSION: This study for the first time identified the expression and activation of caspase-5 in cyclic stretched human PDL cells and found that the stretch-induced apoptosis and caspase-3 activation were caspase-5 dependent.

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The aim of this study was to analyze dental students’ descriptions of and reflections on the periodontal care they provided for their patients in dental school clinics. All students enrolled in the final year of the DDS program in 2011-14 at the University of Colorado School of Dental Medicine were required to complete a self-assessment of the periodontal care they provided for patients. Assessments from 263 students were compiled and qualitatively analyzed. The key reasons given for not providing good care were identified and then stratified as student/school-dependent or patient-dependent factors. Among these students, 63.1% reported that the periodontal care they provided for their patients was inadequate. Some of the student/school-dependent factors were multiple providers involved in patient care (22.8%), student oversight (21.3%), licensure and academic requirements (20.9%), limited clinic operator sessions (19.4%), clinical rotations to other sites (18.3%), and students’ interest in emphasis on other areas of dentistry (17.9%). Some of the patient-dependent factors were patient scheduling compliance (61.6%), patient finances (46.4%), medical status (20.5%), urgent dental needs (18.3%), emphasis only on restorative care (17.5%), periodontal care awareness (16.4%), and patients’ oral hygiene compliance (11.5%). This analysis of students’ attitudes, challenges they faced, and patient-related factors that influenced the delivery of periodontal care helped to facilitate changes in the curriculum and school policies to optimize clinical instruction and patient care in periodontics.

Periodontitis is characterized by inflammation of the gingival tissue. The main risk factors are socioeconomic factors, sex, age, smoking, and diabetes, but periodontal disease has also a genetic background. Previous genome-wide association studies failed to reveal genome-wide significant associations of single common single-nucleotide polymorphisms with chronic periodontitis. Using the Illumina ExomeChip data of 6,576 participants of the German population-based cohort studies Study of Health in Pomerania (SHIP) and SHIP-Trend, the authors performed single variant and also gene-based association studies of rare and common exonic variations on different periodontal case definitions. Although our study comprised the largest sample size to date to assess genetic predisposition for chronic periodontitis, the authors found no significant association. This study emphasizes that for chronic periodontitis, large sample sizes will be necessary to find genetic associations, even when examining rare genetic variants.

19.
Association of Periodontal Destruction and Diabetes with Mortality.
Current evidence indicates the effects of periodontitis on diabetes as well as mortality, for which diabetes itself represents a risk factor. However, the possible interaction of these 2 chronic conditions regarding mortality has not yet been investigated. Therefore, the purpose of this study was to evaluate whether periodontal destruction interacts with diabetes on all-cause and cardiovascular disease (CVD) mortality or if diabetes serves as a mediator in this association. The study sample comprised 3,327 participants aged 20 to 81 y from the Study of Health in Pomerania. Periodontal destruction was assessed via clinical attachment level (CAL) and the number of missing teeth. Information on mortality (date and ICD-10 code) was ascertained from death certificates. Directed acyclic graphs were used to identify potential confounders, and Cox proportional hazard models were applied. In 36,701 person-years of follow-up, 263 study participants deceased, 89 due to CVD. Fully adjusted main effect models resulted in hazard ratios of 1.01 (95% confidence interval [95% CI]: 1.002 to 1.01) for extent of CAL >=3 mm, 1.10 (95% CI: 1.03 to 1.18) for mean CAL, and 1.03 (95% CI: 1.01 to 1.04) for the number of missing teeth regarding all-cause mortality. Analogous results were obtained for CVD mortality, with hazard ratios of 1.01 (95% CI: 0.99 to 1.02), 1.10 (95% CI: 0.98 to 1.23), and 1.02 (95% CI: 0.99 to 1.05) for extent of CAL, mean CAL, and the number of missing teeth, respectively. Findings did not indicate additive interaction of periodontal destruction and diabetes regarding all-cause and CVD mortality. Similarly, no substantial evidence was found to demonstrate the presence of multiplicative interaction or mediation. Besides adjustment for baseline covariates, time-varying covariates were also considered and led to comparable results. In summary, despite their reciprocal relationship, periodontal destruction and diabetes may be independent risk factors for all-cause and CVD mortality.

20.
Salvi GE, Cosgarea R, Sculean A.
Prevalence and Mechanisms of Peri-implant Diseases.
The aim of the present critical review is to summarize recent evidence on the prevalence of peri-implant diseases and their similarities and differences with periodontal diseases with a focus on their pathogenetic mechanisms. Reports on the extent and severity of peri-implant diseases are influenced by different case definitions. The prevalence of peri-implant diseases is reported at the subject or implant level and affected by the type of population samples analyzed (e.g., randomly selected population samples or convenience samples). The outcomes of studies on animals and humans indicate that experimental biofilm accumulation leads to a higher frequency of bleeding sites around implants as compared with teeth. Despite the proof of principle that experimentally induced mucositis may be reversible, early diagnosis and management of naturally occurring peri-implant mucositis are clinically relevant. Tissue destruction at experimental peri-implantitis sites is faster and more extensive when compared with that at experimental periodontitis sites. Although human periodontitis and peri-implantitis lesions share similarities with respect to etiology and clinical features, they represent distinct entities from a histopathologic point of view. To avoid implant loss, patients diagnosed with peri-implantitis should be treated without delay.

21.
Chronic Periodontitis Genome-wide Association Study in the Hispanic Community Health Study / Study of Latinos.
Chronic periodontitis (CP) has a genetic component, particularly its severe forms. Evidence from genome-wide association studies (GWASs) has highlighted
several potential novel loci. Here, the authors report the first GWAS of CP among a large community-based sample of Hispanics/Latinos. The authors interrogated a quantitative trait of CP (mean interproximal clinical attachment level determined by full-mouth periodontal examinations) among 10,935 adult participants (mean age: 45 y, range: 18 to 76 y) from the Hispanic Community Health Study / Study of Latinos. Genotyping was done with a custom Illumina Omni2.5M array, and imputation to approximately 20 million single-nucleotide polymorphisms was based on the 1000 Genomes Project phase 1 reference panel. Analyses were based on linear mixed models adjusting for sex, age, study design features, ancestry, and kinship and employed a conventional P < 5 x 10^{-8} statistical significance threshold. The authors identified a genome-wide significant association signal in the 1q42.2 locus (TSNAX-DISC1 noncoding RNA, lead single-nucleotide polymorphism: rs149133391, minor allele [C] frequency = 0.01, P = 7.9 x 10^{-9}) and 4 more loci with suggestive evidence of association (P < 5 x 10^{-6}): 1q22 (rs13373934), 5p15.33 (rs186066047), 6p22.3 (rs10456847), and 11p15.1 (rs75715012). We tested these loci for replication in independent samples of European-American (n = 4,402) and African-American (n = 908) participants of the Atherosclerosis Risk in Communities study. There was no replication among the European Americans; however, the TSNAX-DISC1 locus replicated in the African-American sample (rs149133391, minor allele frequency = 0.02, P = 9.1 x 10^{-3}), while the 1q22 locus was directionally concordant and nominally significant (rs13373934, P = 4.0 x 10^{-2}). This discovery GWAS of interproximal clinical attachment level—a measure of lifetime periodontal tissue destruction—was conducted in a large, community-based sample of Hispanic/Latinos. It identified a genome-wide significant locus that was independently replicated in an African-American population. Identifying this genetic marker offers direction for interrogation in subsequent genomic and experimental studies of CP.

22.

PURPOSE: Coronectomy of mandibular third molars is a procedure that still raises a number of questions. The aim of the present study was to answer one unsolved question: the periodontal healing distal to the mandibular second molar after third molar coronectomy.

MATERIALS AND METHODS: A prospective cohort study was performed of 30 patients treated at the Unit of Oral and Maxillofacial Surgery of the Department of Biomedical and Neuromotor Science of the University of Bologna. The predictor variables were the probing pocket depth (PPD), the distance between the marginal crest (MC) and the bottom of the osseous defect (BOD), and the distance between the cementum enamel junction (CEJ) and the BOD. These clinical indexes were recorded on 3 points of the distal surface of second molar: the distobuccal (DB), distomedial (DM), and distolingual (DL) sites. The other variables evaluated included root migration and postoperative complications. The Wilcoxon test for paired data and Kendall's tau-b correlation coefficient was used to evaluate all variables. The significance level was set at P = .05.

RESULTS: The cohort was composed of 30 patients with 34 high-risk mandibular third molars (9 men and 21 women), with a mean age of 28 +/- 7 years. At 9 months, a statistically significant reduction in the PPD of 2 +/- 3, 1 +/- 2, and 2 +/- 2 mm and a statistically significant reduction in the MC-BOD distance of 4 +/- 4, 4 +/- 4, and 4 +/- 5 mm for the DB, DM, and DL sites, respectively, was observed (P = .001). Also, the intraoperative CEJ-BOD distance showed a statistically significant reduction for the DB, DM, and DL sites.

CONCLUSIONS: After coronectomy, restoration of a clinical healthy periodontium distal to the second molar was observed. However, further studies are necessary to confirm these preliminary clinical results and to compare periodontal healing between coronectomy and complete extraction.

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A healthy periodontium provides stable gingival margins and stable tooth position prior to tooth preparations for indirect restorations. Good periodontal health allows easier tissue handling during tooth preparation, impression taking and restoration fitting. Periodontal health is integral to successful restorative care. This report documents common clinical scenarios in which periodontal problems cause aesthetic concern.

Singh A, Mittal P, Goel P, Purohit BM, Thukral R.

OBJECTIVE: The study explores the association between severity of illness (positive, negative, depressive and cognitive symptoms) and extra pyramidal symptoms (EPS) with dental caries, periodontal disease and prosthetic needs among patients with schizophrenia.

MATERIAL AND METHODS: A total of 71 schizophrenic patients diagnosed based on ICD-10 criteria participated in the study. Clinical Global Impression - Schizophrenia (CGI-SCH) scale was used to evaluate positive, negative, depressive, cognitive symptoms and overall severity of schizophrenia. Simpson-Angus Scale (SAS) was used for assessment of EPS. Dental examinations were conducted as per WHO (1997) criterion.

RESULTS: Mean DMFT and CPI scores with periodontal pockets were 5.57±2.12 and 2.37±0.74; significant differences being noted among those with and without EPS (p<0.001). Positive and EPS associated with dental caries with odds ratio of 5.26 (1.05, 26.2) and 8.52 (2.31, 31.4) (p<0.001). Depressive and EPS were associated with periodontal disease with odds ratio of 4.19 (1.53, 32.5) and 5.27 (1.29, 21.5), respectively (p<0.001). Cognitive and EPS were associated with dental prosthetic needs with odds ratio of 4.33 (1.47, 31.2) (p<0.001) and 7.78 (1.43, 42.2), respectively (p<0.001).

CONCLUSIONS: Patients with schizophrenia had high dental caries, periodontal disease and unmet dental prosthetic needs. Severity of the schizophrenic and EPS was associated with poor oral health. Efforts need to be focused on strengthening the evidence of its association with oral health indicators through further studies including cohort investigations.

Biosse Duplan M, Coyac BR, Bardet C, et al.

X-linked hypophosphatemia (XLH) is a rare genetic skeletal disease where increased phosphate wasting in the kidney leads to hypophosphatemia and prevents normal mineralization of bone and dentin. Here, we examined the periodontal status of 34 adults with XLH and separated them according to the treatment they received for hypophosphatemia. We observed that periodontitis frequency and severity were increased in adults with XLH and that the severity varied according to the hypophosphatemia treatment. Patients who benefited from an early and continuous vitamin D and phosphate supplementation during their childhood presented less periodontal attachment loss than patients with late or incomplete supplementation. Continued hypophosphatemia treatment during adulthood further improved the periodontal health. Extracted teeth from patients with late or incomplete supplementation showed a strong acellular cementum hypoplasia when compared with age-matched healthy controls. These results show that XLH disturbs not only bone and dentin formation but also
cementum and that the constitutional defect of the attachment apparatus is associated with attachment loss.


MicroRNAs (miRNAs) have been shown to be major regulators of eukaryotic gene expression. However, bacterial RNAs comparable in size to eukaryotic miRNAs (18-22 nucleotides) have received little attention. Recently, a novel class of small RNAs similar in size to miRNAs (miRNA-size, small RNAs or msRNAs) have also been found in several bacteria. Like miRNAs, msRNAs are approximately 15 to 25 nucleotides in length, and their precursors are predicted to form a hairpin loop secondary structure. Here, we identified msRNAs in the periodontal pathogens Aggregatibacter actinomycetemcomitans, Porphyromonas gingivalis, and Treponema denticola. We examined these msRNAs using a deep sequencing method and characterized dozens of msRNAs through bioinformatic analysis. Highly expressed msRNAs were selected for further validation. The findings suggest that this class of small RNAs is well conserved across the domains of life. Indeed, msRNAs secreted via bacterial outer membrane vesicles (OMVs) were detected. The ability of bacterial OMVs to deliver RNAs into eukaryotic cells was also observed. These msRNAs in OMVs allowed us to identify their potential human immune-related target genes. Furthermore, we found that exogenous msRNAs could suppress expression of certain cytokines in Jurkat T cells. We propose msRNAs may function as novel bacterial signaling molecules that mediate bacteria-to-human interactions. Furthermore, this study may provide fresh insight into bacterial pathogenic mechanisms of periodontal diseases.


OBJECTIVE: The aim of this pilot study was to determine whether salivary alkaline phosphatase levels can be a non invasive marker for early inflammatory periodontal disease in children with uncontrolled type 1 diabetes mellitus.

STUDY DESIGN: 10 healthy children (group 1), 10 children with recently diagnosed type 1 diabetes mellitus (group 2) and 10 children with type 1 diabetes mellitus for more than 4 years (group 3) were recruited for the study. All three groups were matched for age, gender and socioeconomic status. Periodontal health was assessed by plaque index, gingival index and probing pocket depth. Metabolic status was assessed by glycosylated hemoglobin levels, salivary alkaline phosphatase levels were determined by spectrophotometer. Data was analyzed by Kruskal Wallis ANOVA, Mann-Whitney U test and Spearman's rank correlation method.

RESULTS: Salivary alkaline phosphatase levels correlated significantly with the periodontal parameters in the diabetic group. An increase in salivary alkaline phosphatase levels increased with increased values of gingival index and probing pocket depth. Group 3 showed greater correlation than group 2 and group 1. At p value p<0.05.

CONCLUSION: The glycemic status of the children affects the periodontal disease parameters. Salivary alkaline phosphatase levels could be a useful tool in analyzing periodontal status of children with uncontrolled type I diabetes mellitus.