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Association of NOD2 Mutations with Aggressive Periodontitis.  
*Journal of Dental Research* 2017 Sep; 96 (10): 1100-1105.  
Aggressive periodontitis (AgP) is characterized by rapid alveolar bone destruction and tooth loss early in life, and its etiology remains unclear. To explore the genetic risk factors of AgP, we performed genome-wide single-nucleotide polymorphism genotyping for identity-by-descent mapping and identified 32 distinct candidate loci, followed by whole exome sequencing with 2 pedigrees of AgP consisting of 3 cases and 1 control in 1 family and 2 sibling cases in the other. After variant filtering procedures and validation by targeted Sanger sequencing, we identified 2 missense mutations at 16q12 in NOD2 (p.Ala110Thr and p.Arg311Trp), which encodes nucleotide-binding oligomerization domain protein 2. We further examined 94 genetically unrelated AgP patients by targeted sequencing of NOD2 and found that 2 patients among them also carried the p.Arg311Trp variant. Furthermore, we found 3 additional missense mutations in this gene (p.His370Tyr, p.Arg459Cys, and p.Ala868Thr). These mutations either had not been previously observed or are extremely rare (frequency <0.001) in Asian populations. NOD2 plays a crucial role in innate immunity as an intracellular receptor initiating nuclear factor kappaB-dependent and mitogen-activated protein kinase-dependent gene transcription. These results demonstrated NOD2 as a novel gene involved in AgP.

Efficacy of combined orthodontic-periodontic treatment for patients with periodontitis and its effect on inflammatory cytokines: A comparative study.  
INTRODUCTION: In this study, we aimed to investigate the efficacy of combined orthodontic-periodontic treatment in the treatment of patients with periodontitis and its effects on the levels of inflammatory cytokines.  
METHODS: A total of 117 patients with periodontitis were randomly assigned to the basic group (receiving basic periodontic treatment, n = 58) and the combined group (receiving combined orthodontic-periodontic treatment, n = 59). In addition, 52 healthy people without periodontal disease were selected as the normal group. Probing depth, tooth mobility, plaque index, clinical attachment level, and sulcus bleeding index were recorded. ELISA was applied to detect gingival crevicular fluid (GCF) and serum levels of inflammatory cytokines. A 2-year clinical follow-up was conducted.  
RESULTS: Before treatment, the periodontal parameters (probing depth, tooth mobility, plaque index, clinical attachment level, and sulcus bleeding index) and GCF and serum levels of inflammatory cytokines (high-sensitivity C-reactive protein, interleukin-1beta, interleukin-5, interleukin-6, interleukin-8, tumor necrosis factor-alpha, and prostaglandin E2) in the combined and basic groups were higher than those in the normal group. After 6 and 18 months of treatment, the periodontal parameters and GCF and serum levels of inflammatory cytokines decreased in the combined and basic groups. The periodontal parameters and the GCF and serum levels of inflammatory cytokines in the combined group were significantly lower than those in the basic group after 18 months of treatment. The combined group had a lower recurrence rate compared with the basic group.  
CONCLUSIONS: Combined orthodontic-periodontic treatment had good clinical efficacy in the treatment of periodontitis and could effectively decrease the levels of inflammatory cytokines.

Do quaternary ammonium monomers induce drug resistance in cariogenic, endodontic and periodontal bacterial species?
OBJECTIVES: Antibacterial monomers were developed to combat oral biofilm acids and caries; however, little is known on whether quaternary ammonium monomers (QAMs) would induce drug resistance in oral bacteria. The objective of this study was to investigate the effects of new antimicrobial monomers dimethylaminohexadecyl methacrylate (DMAHDM) and dimethylaminododecyl methacrylate (DMADDM) on the induction of drug resistance in eight species of cariogenic, endodontic and periodontal bacteria for the first time.

METHODS: Streptococcus mutans (S. mutans), Streptococcus sanguis, Streptococcus gordonii, Enterococcus faecalis (E. faecalis), Aggregatibacter actinomycetemcomitans (A. actinomycetemcomitans), Fusobacterium nucleatum (F. nucleatum), Porphyromonas gingivalis (P. gingivalis), and Prevotella intermedia (P. intermedia) were tested. Minimum inhibitory concentration (MIC) was assessed using chlorhexidine (CHX) as control. Minimal bactericidal concentration (MBC), bacterial growth and membrane permeability properties were also investigated.

RESULTS: CHX induced drug resistance in four species. DMAHDM did not induce any resistance. DMADDM induced drug resistance in only one benign species S. gordonii. The DMADDM-resistant and CHX-resistant S. gordonii had the same MIC and MBC values as S. gordonii parental strain against DMAHDM (p>0.1), hence DMAHDM effectively inhibited the resistant strains. The resistant strains had slower growth metabolism than parental strain.

SIGNIFICANCE: DMAHDM induced no drug resistance, and DMADDM had much less drug resistance than the commonly-used CHX in the eight common oral species. With its potent antimicrobial functions shown previously, the new DMAHDM is promising for applications in restorative, preventive, periodontal and endodontic treatments to combat cariogenic and pathological bacteria with no drug resistance in all tested species.


OBJECTIVES: Traditionally, healing after surgical endodontic retreatment (SER); i.e. apicectomy with or without a retrograde filling, is assessed in periapical radiographs (PR). Recently, the use of cone beam CT (CBCT) has increased within endodontics. Generally, CBCT detects more periapical lesions than PR, but basic research on the true nature of these lesions is missing. The objective was to assess the diagnostic validity of PR and CBCT for determining inflammation in SER cases that were re-operated (SER-R) due to unsuccessful healing, using histology of the periapical lesion as reference for inflammation.

METHODS: Records from 149 patients, receiving SER 2004-10, were screened. In total 108 patients (119 teeth) were recalled for clinical follow-up examination, PR and CBCT, of which 74 patients (83 teeth) participated. Three observers assessed PR and CBCT as "successful healing" or "unsuccessful healing" using Rud and Molven's criteria. SER-R was offered to all non-healed teeth with expected favourable prognosis for subsequent functional retention. During SER-R, biopsy was performed and histopathology verified whether or not inflammation was present.

RESULTS: All re-operated cases were assessed non-healed in CBCT while 11 of these were assessed successfully healed in PR. Nineteen biopsies were examined. Histopathologic diagnosis revealed 42% (teeth = 8) without periapical inflammation, 16% (teeth = 3) with mild inflammation and 42% (teeth = 8) with moderate to intense inflammation. A correct diagnosis was obtained in 58% with CBCT (true positives) and 63% with PR (true positives+true negatives).

CONCLUSIONS: Of the re-operated teeth, 42% had no periapical inflammatory lesion, and hence no benefit from SER-R. Not all lesions observed in CBCT represented periapical inflammatory lesions.

5. Qu HL, Tian BM, Li K, Zhou LN, Li ZB, Chen FM.

**PURPOSE:** Evidence that asymptomatic third molars (M3s) negatively affect their adjacent second molars (A-M2s) is limited. The present study evaluated the association between visible M3s (V-M3s) of various clinical status with the periodontal pathologic features of their A-M2s.

**PATIENTS AND METHODS:** Subjects with at least 1 quadrant having intact first and second molars, either with V-M3s and symptom free or without adjacent V-M3s, were enrolled in the present cross-sectional investigation. Periodontal parameters, including plaque index (PLI), bleeding on probing (BOP), probing pocket depth (PPD), and at least 1 site with a PPD of 5 mm or more (PPD5+), obtained from M2s were analyzed according to the presence or absence of V-M3s or the status of the M3s. The chi<sup>2</sup> test or t test was used to compare the mean PLI, PPD, BOP percentage, and PPD5+ percentage. The association of PPD5+ with V-M3 status was assessed using a multivariable logistic regression model (quadrant-based analysis), and variances were adjusted for clustered observations within subjects.

**RESULTS:** In total, 572 subjects were enrolled in the study, and 423 had at least 1 V-M3. At the in-quadrant level, the presence of a V-M3 significantly increased M2 pathologic parameters, including PLI, PPD, BOP, and PPD5+. When analyzed using a multivariate logistic regression model, impacted M3s and normally erupted M3s significantly elevated the risk of PPD5+ on their A-M2s (odds ratio 3.20 and 1.67, respectively). Other factors associated with an increased odds of PPD5+ were mandibular region and older age. Finally, the patient-matched comparison showed that the percentage of BOP and PPD5+ on M2s increased when V-M3s were present.

**CONCLUSIONS:** Irrespective of their status, the presence of V-M3s is a risk factor for the development of periodontal pathologic features in their A-M2s. Although the prophylactic removal of asymptomatic V-M3s remains controversial, medical decisions should be made as early as possible, because, ideally, extraction should be performed before symptom onset.

Do Genetic Markers of Inflammation Modify the Relationship between Periodontitis and Nonalcoholic Fatty Liver Disease? Findings from the SHIP Study. 
*Journal of Dental Research* 2017 Nov;96(12):1392-1399.

An association between periodontitis and nonalcoholic fatty liver disease (NAFLD) has been reported by experimental animal and epidemiologic studies. This study investigated whether circulating levels of serum C-reactive protein (CRP) and a weighted genetic CRP score representing markers of inflammatory burden modify the association between periodontitis and NAFLD. Data came from 2,481 participants of the Study of Health in Pomerania who attended baseline examination that occurred between 1997 and 2001. Periodontitis was defined as the percentage of sites (0%, <30%, >=30%) with probing pocket depth (PD) >=4 mm, and NAFLD status was determined using liver ultrasound assessment. Serum CRP levels were assayed at a central laboratory, and single-nucleotide polymorphisms previously identified through genome-wide association studies as robustly associated with serum CRP were combined into a weighted genetic CRP score (wGS<sub>CRP</sub>). Logistic regression models estimated the association between periodontitis and NAFLD within strata of serum CRP and separately within strata of the wGS<sub>CRP</sub>. The prevalence of NAFLD was 26.4% (95% confidence interval [CI], 24.6, 28.1) while 17.8% (95% CI, 16.0-19.6) had >=30% of sites with PD >=4 mm. Whereas the wGS<sub>CRP</sub> was not a modifier (P<sub>interaction</sub> = 0.8) on the multiplicative scale, serum CRP modified the relationship between periodontitis and NAFLD (P<sub>interaction</sub> = 0.01). The covariate-adjusted prevalence odds ratio of NAFLD comparing participants with >=30% of sites with PD >=4 mm to those with no site affected was 2.39 (95% CI, 1.32-4.31) among participants with serum CRP <1 mg/L. The corresponding estimate was 0.97 (95% CI, 0.57-1.66) for participants with serum CRP levels of 1 to 3 mg/L and 1.12 (95% CI, 0.65-1.93) for participants with serum CRP >3 mg/L. Periodontitis was positively associated with higher prevalence odds of NAFLD, and
this relationship was modified by serum CRP levels.

7.
Wadia R, Ide M.
Periodontal Emergencies in General Practice.
*Primary Dental Journal* 2017 May 01;6(2):46-51.
Diagnosing and managing periodontal emergencies is a common part of general dental practice. This article summarises the presentation, aetiology and management of the key periodontal emergencies, including gingival abscess, periodontal abscess, peri-coronitis/peri-coronal abscess, perio-endo lesion/abscess, necrotising gingivitis and periodontitis, acute herpetic gingivostomatitis, acute physical/chemical/thermal injury and subgingival root fracture.

8.
MicroRNAs and Periodontal Homeostasis.
*Journal of Dental Research* 2017 May;96(5):491-500.
MicroRNAs (miRNAs) are a group of small RNAs that control gene expression in all aspects of eukaryotic life, primarily through RNA silencing mechanisms. The purpose of the present review is to introduce key miRNAs involved in periodontal homeostasis, summarize the mechanisms by which they affect downstream genes and tissues, and provide an introduction into the therapeutic potential of periodontal miRNAs. In general, miRNAs function synergistically to fine-tune the regulation of biological processes and to remove expression noise rather than by causing drastic changes in expression levels. In the periodontium, miRNAs play key roles in development and periodontal homeostasis and during the loss of periodontal tissue integrity as a result of periodontal disease. As part of the anabolic phase of periodontal homeostasis and periodontal development, miRNAs direct periodontal fibroblasts toward alveolar bone lineage differentiation and new bone formation through WNT, bone morphogenetic protein, and Notch signaling pathways. miRNAs contribute equally to the catabolic aspect of periodontal homeostasis as they affect osteoclastogenesis and osteoclast function, either by directly promoting osteoclast activity or by inhibiting osteoclast signaling intermediaries or through negative feedback loops. Their small size and ability to target multiple regulatory networks of related sets of genes have predisposed miRNAs to become ideal candidates for drug delivery and tissue regeneration. To address the immense therapeutic potential of miRNAs and their antagonirs, an ever growing number of delivery approaches toward clinical applications have been developed, including nanoparticle carriers and secondary structure interference inhibitor systems. However, only a fraction of the miRNAs involved in periodontal health and disease are known today. It is anticipated that continued research will lead to a more comprehensive understanding of the periodontal miRNA world, and a systematic effort toward harnessing the enormous therapeutic potential of these small molecules will greatly benefit the future of periodontal patient care.

9.
Differential Expression and Roles of Secreted Frizzled-Related Protein 5 and the Wingless Homolog Wnt5a in Periodontitis.
*Journal of Dental Research* 2017 May;96(5):571-577.
The Wingless/integrase-1 (Wnt) family of protein ligands and their functional antagonists, secreted frizzled-related proteins (sFRPs), regulate various biological processes ranging from embryonic development to immunity and inflammation. Wnt5a and sFRP5 comprise a typical ligand/antagonist pair, and the former molecule was recently detected at the messenger RNA (mRNA) level in human periodontitis. The main objective of this study was to investigate the
interrelationship of expression of Wnt5a and sFRP5 in human periodontitis (as compared to health) and to determine their roles in inflammation and bone loss in an animal model. We detected both Wnt5a and sFRP5 mRNA in human gingiva, with Wnt5a dominating in diseased and sFRP5 in healthy tissue. Wnt5a and sFRP5 protein colocalized in the gingival epithelium, suggesting epithelial cell expression, which was confirmed in cultured human gingival epithelial cells (HGECs). The HGEC expression of Wnt5a and sFRP5 was differentially regulated by a proinflammatory stimulus (lipopolysaccharide [LPS] from Porphyromonas gingivalis) in a manner consistent with the clinical observations (i.e., LPS upregulated Wnt5a and downregulated sFRP5). In HGECs, exogenously added Wnt5a enhanced whereas sFRP5 inhibited LPS-induced inflammation, as monitored by interleukin 8 production. Consistent with this, local treatment with sFRP5 in mice subjected to ligature-induced periodontitis inhibited inflammation and bone loss, correlating with decreased numbers of osteoclasts in bone tissue sections. As in humans, mouse periodontitis was associated with high expression of Wnt5a and low expression of sFRP5, although this profile was reversed after treatment with sFRP5. In conclusion, we demonstrated a novel reciprocal relationship between sFRP5 and Wnt5a expression in periodontal health and disease, paving the way to clinical investigation of the possibility of using the Wnt5a/sFRP5 ratio as a periodontitis biomarker. Moreover, we showed that sFRP5 blocks experimental periodontal inflammation and bone loss, suggesting a promising platform for the development of a new host modulation therapy in periodontitis.


OBJECTIVE: To test the hypothesis that intravenous (IV) bisphosphonate (BP) therapy thicken or alters the micromorphology of cementum and periodontal ligament (PDL) in cancer patients.

STUDY DESIGN: Thirty-two teeth extracted from 24 cancer patients and separated into test (patients who have undergone IV BP therapy, n = 16) and control (patients naive to BP therapy, n = 16) groups were studied. Cementum thickness was measured in 3 different areas of the dental root with polarized light microscopy. PDL was assessed by optical light microscopy and the immunohistochemical expression of periostin.

RESULTS: No significant difference was detected in cementum thickness (apical, P = .06; medium, P = .16; cervical, P = .18) between groups. The numbers of fibroblasts in PDL (P = .56), incremental lines of cementum (P = .51) and the immunohistochemical patterns of periostin expression in PDL (P = .68) did not differ between groups.

CONCLUSION: IV BP therapy does not thicken cementum or change the micromorphology of PDL.


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 and risk factors, which may be regarded as a major health problem.

12. Najim U, Norderyd O.
Prevalence of intrabony defects in a Swedish adult population. A radiographic epidemiological study.
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.

13. VJ OR.
Azithromycin as an adjunct to non-surgical periodontal therapy: a systematic review.
The aim of this study was to investigate the current published work relating to the clinical benefits of the use of systemic azithromycin as an adjunct to non-surgical periodontal therapy. A published work search of PubMed, EMBASE and Cochrane Register of Controlled Trials up to 27 April 2016 was undertaken. The large degree of heterogeneity in the types of studies, treatment protocols, test subjects, sample size and exclusion criteria indicated that the use of narrative synthesis of all relevant studies was a valid method of review. Of the 194 eligible studies, 15 were found to be of relevance. The majority of studies demonstrated an additional clinical benefit when azithromycin is used as an adjunct to non-surgical periodontal therapy, particularly in deeper pockets (>=6 mm). In conclusion, the current body of research on the adjunctive use of systemic azithromycin in non-surgical periodontal therapy suggests there is a
clinical benefit and that this benefit is greatest in deeper initial pockets (>=6 mm). The findings also suggest that future studies need to be more careful in subject selection to identify susceptible patients or at risk sites, both the immunoregulatory effects and antibiotic resistance of azithromycin needs to be reported, and that study populations need to be more homogeneous.

OBJECTIVES: To investigate the relationship between dose and image quality for a dedicated dental CBCT scanner using different scanning protocols and to set up an optimal imaging protocol for assessment of periodontal structures.

METHODS: Radiation dose and image quality measurements were made using 3D Accuitomo 170 (J. Morita, Kyoto, Japan) dental CBCT scanner. The SedentexCT IQ phantom was used to investigate the relationship between contrast-to-noise ratio (CNR) and dose-area product. Subjective image quality assessment was achieved using a small adult skull phantom for the same range of exposure settings. Five independent observers assessed the images for three anatomical landmarks using a three-point visual grade analysis.

RESULTS: When correlating the CNR of each scanning protocol to the exposure parameters used to obtain it, CNR decreased as these parameters decreased, especially current-exposure time product. When correlating to subjective image quality, the CNR level remained acceptable when 5mA and 17.5s or greater was selected and 80kV could be used without compromising the CNR.

CONCLUSIONS: For a dedicated CBCT unit, changing the rotation angle from 360degree to 180degree degrades image quality. By altering tube potential and current for the 360degree rotation protocol, assessment of periodontal structures can be performed with a smaller dose without substantially affecting visualization.

OBJECTIVE: Both an elevated leukocyte count and periodontitis share well-recognized associations with cardiometabolic diseases. This cross-sectional study aimed to identify whether the leukocyte count is associated with periodontitis in a nationally representative Korean adult population.

MATERIALS AND METHODS: Data from 9391 participants (3659 males and 5732 females) enrolled in 2012-2014 Korean National Health and Nutrition Examination Survey were analyzed. Leukocyte quartiles were categorized as follows: 3000 <= Q1 <= 4870, 4880 <= Q2 <=5790, 5800 <= Q3 <= 6840, and 6850 <= Q4 <= 10000 cells/mul. Periodontitis was defined as scoring greater than or equal to 'code 3' in at least one site according to the WHO's Community Periodontal Index. The odds ratios (ORs) and 95% confidence intervals (95% CIs) for periodontitis in each leukocyte count quartile were calculated using multiple logistic regression analyses.

RESULTS: The prevalence of periodontitis was directly correlated with increasing leukocyte quartiles: 19%, 20.4%, 24.3%, and 30.3%. Compared with the lowest leukocyte quartile group, the OR (95% CI) for periodontitis of the highest leukocyte quartile was 1.558 (1.285-1.891) after controlling for confounding factors.

CONCLUSION: An elevated leukocyte count was positively associated with the presence of periodontitis.

Periodontitis is a common infectious disease. Recent studies have indicated that the progression of periodontitis may be regulated by interactions between host immunity and periodontopathic bacteria. Although periodontopathic bacteria can destroy periodontal tissue, a dysfunctional host immune response triggered by the bacteria can lead to more severe and persistent destruction. Toll-like receptors (TLRs), a type of pattern recognition receptor (PRR) that recognizes pathogens, have been implicated in host innate immune responses to periodontopathic bacteria and in the activation of adaptive immunity. TLR-targeted drugs may hold promise to treat periodontal disease. This review summarizes recent studies on the role of TLRs in periodontitis and discusses areas needing further research. We believe TLRs may be an effective biomarker for the prevention, diagnosis, and treatment of periodontitis in the near future.


The aim of this descriptive study was to provide an overview of the status of implementation of Commission on Dental Accreditation (CODA) Standard 4-10.2.d (Provisionalization of Dental Implants) by U.S. graduate periodontics programs since its introduction in 2013. Surveys were sent in May 2015 to 56 accredited postdoctoral periodontics program directors to ascertain program director characteristics; status of planning, implementation, and curriculum resulting from adoption of Standard 4-10.2.d; preferred clinical protocols for implant provisionalization; interdisciplinary educational collaborators; and competency assessment mechanisms. The survey response rate was 52% (N=29); the majority were male, aged 55 or older, and had held their position for less than ten years. Among the responding programs, 93% had formal educational curricula established in implant provisionalization. Graduate periodontics (96%) and prosthodontics (63%) faculty members were predominantly involved with curriculum planning. Of these programs, 96% used immediate implant provisionalization, with direct (chairside) provisionalization protocols (86%) being preferred over indirect protocols (14%) and polyethylpentone provisional abutments (75%) being preferred to titanium (25%) provisional abutments. Straight and concave transmucosal emergence profile designs (46% each) were preferred in teaching, with only 8% of programs favoring convex transmucosal profiles. A majority of responding programs (67%) lacked protocols for communicating to the restorative referral a mechanism to duplicate the mature peri-implant mucosal architecture. Regional location did not play a significant role in any educational component related to implant provisionalization for these graduate periodontal programs. Overall, this study found that a clear majority of graduate periodontics programs had established formal curricula related to implant provisionalization, with substantial clinical and philosophical consensus within the specialty.


The number of graduates of U.S. dental schools enrolled in U.S. postdoctoral programs in periodontics has been decreasing. The aims of this study were to
determine the perspectives of periodontics department chairs regarding 1) features of a school's predoctoral curriculum that promote student interest in advanced periodontal education and 2) characteristics of a periodontal residency program that make it more attractive to dental students over other specialty programs. In 2015, a 14-question survey was designed and sent to chairs of periodontics departments at all 65 U.S. dental schools at the time. Questions addressed number of instructional hours; specialty clinic rotations; elective courses; number of applicants to periodontal residency; existence of a residency program; length of the residency program; and externships, fellowships, and financial stipends offered. The survey response rate was 73.8%. The results showed that departments offering more than seven clinical credit hours in periodontics to predoctoral students had the greatest number of residency applicants. Most of the applicants were from institutions that offered specialty clinic rotations, elective courses, and residency programs in periodontics. The number of applicants did not change significantly if a stipend or fellowship was offered. However, the availability of an externship was significantly associated with a greater number of applicants (p=0.042). These results suggest that offering periodontal clinical rotations, elective courses, and especially externships in periodontics during predoctoral education may encourage more graduating students to pursue postdoctoral periodontal education.

Periodontal disease (PD) and coronary artery disease (CAD) are common diseases characterized by an overaggressive inflammatory response to diverse stimuli. Whereas PD leads to destruction of the tooth-supporting structures, CAD is a chronic inflammatory condition ultimately causing myocardial infarction via narrowing and occluding of blood vessels. Classical twin studies led to the conclusion that both complex diseases have a similar degree of heritability and that a significant fraction of the genetic factors accounting for this heritability is shared. Recent genome-wide association and large-scale candidate gene studies highlight that variations in >50 genes are associated with premature CAD, while variations in only 4 genes showing nominally significant associations with aggressive periodontitis and/or chronic periodontitis have so far been identified. Remarkably, 3 of the PD loci (75%) show shared associations with CAD (ANRIL/CDKN2B-AS1, PLG, CAMTA1/VAMP3), suggesting involvement of common pathogenic mechanisms. In this critical review, we highlight recent progress in identifying genetic markers and variants associated with PD, present their overlap with CAD, and discuss functional aspects. In addition, we answer why a significant fraction of the heritability of PD is still missing, and we suggest approaches that may be taken to close the gap.

Porphyromonas gingivalis is a keystone pathogen of chronic periodontitis, and its intraoral levels have been shown to predict disease progression (activity). An accurate and sensitive chair-side (point of care) test to determine disease activity is critical for early intervention and clinical management of disease. This study aimed to develop a rapid, chair-side, saliva-based detection of P. gingivalis. Monoclonal antibodies (mAbs) to the A1-adhesin domain of the P. gingivalis RgpA-Kgp proteinase-adhesin complex were screened by enzyme-linked immunosorbent assay and microbial flow cytometry, with 2 mAbs shown to recognize all laboratory and clinical strains tested, without significantly cross-reacting with other oral bacteria tested. With these mAbs, an immunochromatographic device was produced and shown in preclinical studies to detect, in inoculated saliva, all P. gingivalis laboratory strains and clinical isolates tested. The device was able to detect >=1 x 10^5 P. gingivalis cells/mL. In a patient age- and sex-matched control clinical cohort, P.
gingivalis levels in saliva—as measured by real-time polymerase chain reaction—positively correlated with P. gingivalis levels in subgingival plaque ($r = 0.819$, $P < 0.01$) and clinical parameters of disease ($r = 0.633$, $P < 0.01$). A positive device result strongly correlated with P. gingivalis levels > $1 \times 10^5 <sup>cells/mL</sup>$ in saliva ($r = 0.778$, $P < 0.001$) and subgingival plaque ($r = 0.715$, $P < 0.001$) with sensitivity, specificity, positive/negative predictive values, and accuracy levels of 95.0%, 93.3%, 90.5%, 96.6%, and 94.0%, respectively. The device result also positively correlated ($r = 0.695$, $P < 0.01$) with disease severity as measured by probing depth. Detection of P. gingivalis in saliva was found to be rapid, taking 3 min from sample collection.


Sometimes pain originating from a non-odontogenic pathologic condition is mistaken as endodontic illness, leading to misdiagnosis. The patient can misinterpret the pain as originating from a site different from the actual site, which is known as referred pain. However, the clinician managing pain in the orofacial region needs to be well-informed about the typical signs and symptoms of non-odontogenic diseases and to be able to make the correct referral when necessary for proper diagnosis and treatment. A 43-year-old man presented to the department of conservative dentistry complaining of dental pain. Despite nonsurgical root canal treatment and curettage, he complained that the pain had spread to an area inclusive of the right side of the head and face and the right eye. The patient's pain differed from the typical endodontic pain. Therefore, the patient received a diagnosis of non-odontogenic pain and was referred to the pain clinic. Brain magnetic resonance imaging and parotid contrast images showed a mass in the right maxillary sinus. In addition, destruction in the hard palate and alveolar recess adjacent to the sinus floor was found. Infiltration into the cavernous sinus through the pterygopalatine fossa was seen. A neurosurgeon partially removed the mass by performing an osteoplastic craniotomy on the right occipital bone with the patient under general anesthesia. On the basis of the biopsy results, an adenoid cystic carcinoma was diagnosed.


Periodontal disease has been associated with cardiovascular disease (CVD), but whether the response to the treatment of periodontal disease affects this association has not been investigated in any large prospective study. Periodontal data obtained at baseline and 1 y after treatment were available in 5,297 individuals with remaining teeth who were treated at a specialized clinic for periodontal disease. Poor response to treatment was defined as having >10% sites with probing pocket depth >4 mm deep and bleeding on probing at >=20% of the sites 1 y after active treatment. Fatal/nonfatal incidence rate of CVD (composite end point of myocardial infarction, stroke, and heart failure) was obtained from the Swedish cause-of-death and hospital discharge registers. Poisson regression analysis was performed to analyze future risk of CVD. During a median follow-up of 16.8 y (89,719 person-years at risk), those individuals who did not respond well to treatment (13.8% of the sample) had an increased incidence of CVD ($n = 870$) when compared with responders (23.6 vs. 15.3%, $P < 0.001$). When adjusting for calendar time, age, sex, educational level, smoking, and baseline values for bleeding on probing, probing pocket depth >4 mm, and number of teeth, the incidence rate ratio for CVD among poor responders was 1.28 (95% CI, 1.07 to 1.53; $P = 0.007$) as opposed to good responders. The incidence rate ratio among poor responders increased to 1.39 (95% CI, 1.13 to 1.73; $P = 0.002$) for those with the most remaining teeth. Individuals who did not respond well to periodontal treatment had an increased risk for future CVD, indicating that successful periodontal treatment might
influence progression of subclinical CVD.


Periodontitis is a common dysbiotic inflammatory disease with an estimated heritability of 50%. Due to the limited sample size of available periodontitis cohorts and the underlying trait heterogeneity, genome-wide association studies (GWAS) of chronic periodontitis (CP) have been unsuccessful in discovering susceptibility factors. A strategy that combines agnostic GWAS with a well-powered candidate-gene approach has the potential to discover novel loci. We combined RNA-seq data from gingival tissues with quantitative trait loci (QTLs) that were identified in a F<sub>2</sub> cross of mice resistant and susceptible to infection with oral bacterial pathogens. Four genes, which were located within the mapped QTLs, showed differential expression. The chromosomal regions across the human orthologous were interrogated for putative periodontitis-associated variants using existing GWAS data from a German case-control sample of aggressive periodontitis (AgP; 651 cases, 4,001 controls), the most severe and early onset form of periodontitis. Two haplotype blocks, one upstream to the coding region of UGT2A1 (rs146712414, P = 9.1 x 10<sup>-5</sup>; odds ratio [OR], 1.34; 95% confidence interval [CI], 1.16-1.56) and one downstream of the genes PF4/PPBP/CXCL5 (rs1595009, P = 1.3 x 10<sup>-4</sup>; OR, 1.32; 95% CI, 1.15-1.52), were associated with AgP. The association of rs1595009 was validated in an independent cohort of CP of European Americans (1,961 cases and 1,864 controls; P = 0.03; OR, 1.45; 95% CI, 1.01-1.92). This association was further replicated in another sample of 399 German CP cases (disease onset <60 y of age) and 1,633 controls (P = 0.03; OR, 1.75; 95% CI, 1.06-2.90). The combined estimates of association from all samples were P = 2.9 x 10<sup>-5</sup> (OR, 1.2; 95% CI, 1.1-1.3). This study shows the strength of combining QTL mapping and RNA-Seq data from a mouse model with association studies in human case-control samples to identify genetic risk variants of periodontitis.


**PURPOSE:** Most previous studies of the effect of third molars (M3s) on the health of adjacent second molars (A-M2s) have focused on impacted M3s (I-M3s). The purpose of this study was to investigate whether nonimpacted M3 (N-M3s) could affect the periodontal status of A-M2s. The periodontal parameters (ie, GI, PLI, PPD, CAL, BOP, and PPD5+<sup>+</sup>) were markedly greater in group A.
When other factors associated with periodontal disease were controlled, N-M3s were associated with the PPD$^+$ (odds ratio = 6.7) and BOP (odds ratio = 4.0) of the A-M2s. Other factors positively associated with A-M2 PPD$^+$ were location on the mandible, age older than 35 years, and smoking.

CONCLUSIONS: The presence of N-M3s is a potential risk factor for the development of periodontitis in A-M2s.


Palatoradicular grooves (PRGs), morphologic defects that are found most frequently in maxillary anterior teeth, are predisposing factors for periodontal disease. This case report describes the successful management of a 30-year-old man who presented with advanced periodontal destruction associated with a PRG in the maxillary right lateral incisor. The treatment involved the use of a calcium phosphosilicate synthetic bone graft substitute as a periodontal regenerative material.


The aim of this study was to test whether the combination of diode laser therapy and surgical treatment for a lateral periodontal cyst (LPC) would result in greater clinical improvement compared with surgery alone. A total of 18 patients with LPCs were assessed for eligibility for this study. At baseline, each patient was randomly allocated to one of two regimens: diode laser plus surgery (test group) or traditional surgical treatment alone (control group). Healing parameters were assessed at 7 to 21 days to monitor short-term complications, and periodontal parameters were assessed at 3, 6, and 12 months to evaluate long-term healing. The test group demonstrated highly significant differences in both the short-term and long-term parameters compared with the control group. This study showed that diode laser treatment results in a shorter wound-healing period and could be considered valuable for the surgical treatment of LPCs.

Subgingival margins are often required for biologic, mechanical, or esthetic reasons. Several investigations have demonstrated that their use is associated with adverse periodontal reactions, such as inflammation or recession. The purpose of this prospective randomized clinical study was to determine if two different subgingival margin designs influence the periodontal parameters and patient perception. Deep chamfer and feather-edge preparations were compared on 58 patients with 6 months follow-up. Statistically significant differences were present for bleeding on probing, gingival recession, and patient satisfaction. Feather-edge preparation was associated with increased bleeding on probing and deep chamfer with increased recession; improved patient comfort was registered with chamfer margin design. Subgingival margins are technique sensitive, especially when feather-edge design is selected. This margin design may facilitate soft tissue stability but can expose the patient to an increased risk of gingival inflammation.

29.
Previous studies have shown that patients with rheumatoid arthritis (RA) have a higher susceptibility to periodontitis, but the results of individual studies remain controversial. The aim of the present meta-analysis was to comprehensively evaluate the association between RA and periodontitis. A systematic literature search was conducted in PubMed and EMBASE. Data were extracted using standardized forms, and odds ratios (OR) with 95% confidence intervals (CI) were calculated for each study. Pooled data were estimated by fixed- and random-effects models if appropriate. Eight case-control studies were included in the present study. Study size ranged from 104 to 151,569 participants. The prevalence of periodontitis in RA patients ranged from 15.5% to 100%, compared with 10.0% to 82.1% in controls. In group 1 (control) and group 2, the heterogeneity was 38% and 11%, respectively. Using fixed-effects analysis, the overall pooled estimates of the ORs for periodontitis were 4.68 (95% CI: 3.11-7.05) and 1.28 (95% CI: 1.24-1.33) in groups 1 and 2, respectively. This meta-analysis indicates that RA was significantly associated with increased overall risk of periodontitis.

30.
Reformation of the lost interdental papilla remains one of the most challenging goals for clinicians. When a single tooth is replaced with an implant, the papilla between the tooth and the implant can often be maintained or predictably reformed as long as the adjacent tooth's periodontal attachment and bone are preserved. However, if the periodontal support is compromised on the neighboring natural tooth, the papilla will often be deficient or missing. The cases presented herein demonstrate long-term follow-up of successful reformation of periodontal/peri-implant tissue contours, including reconstruction of lost interproximal bone and papilla at periodontally compromised sites using a combined hard and soft tissue surgical approach.

31.
The lateral periodontal cyst is a rare benign lesion that is generally asymptomatic and commonly discovered by routine intraoral radiography. Reports on
proper management of this lesion are readily available. However, the literature is sparse regarding the long-term outcomes following surgery. A traditional radiographic technique does not provide an adequate image of the healing, and a patient may resist the prospect of a reentry procedure. The current report is the first to utilize a cone-beam computed tomography scan to evaluate the healing potential of a freeze-dried bone allograft approximately 18 months postoperatively.


AIM: To describe and analyse risk factors associated with prediction of periapical status, assessed using the full-scale Periapical Index (PAI) supplemented with extraction as outcome variable.

METHODOLOGY: In 1997-1998, 616 randomly selected individuals from Aarhus County, Denmark, underwent a full-mouth radiographic survey. All 616 were re-invited in 2003-2004 and in 2008-2009, when 473 and 363 persons, respectively, consented and attended a new radiographic examination. The study population of the present investigation included 330 persons who had participated in all three examinations, and 143 persons who had participated in the first and second examination only. Using the full-mouth radiographic survey and interview information, the following variables were assessed: on person level - age, gender, smoking habits and number of teeth; on tooth level - presence of tooth, PAI, root filling, caries, marginal bone level, restoration, jaw and tooth group. The outcome variable was the 5 score PAI supplemented with extraction. The observation period was 5 years. Ordered logistic regression analyses were carried out for root filled and non-root filled teeth separately. The Regional Committee of Ethics approved the study.

RESULTS: For both root filled teeth and non-root filled teeth, the baseline PAI score was the most important predictive factor of periapical status and extraction (P < 0.0001). Non-root filled teeth had in general a better outcome than root filled teeth. However, in non-root filled teeth, several other factors had a significant influence on the outcome, and the risk estimates were larger and showed a more pronounced variation between the different categories of predictive factors. For root filled teeth few variables, other than baseline PAI score, influenced the outcome significantly.

CONCLUSION: The full-scale PAI was the strongest predictive factor of periapical status or extraction even when adjusted for additional factors, such as marginal bone level. A high baseline PAI score increased the risk for an impaired outcome. The large difference in risk estimates for non-root filled compared to root filled teeth documents the importance of separate analyses/studies for identification and quantification of predictive factors associated with periapical status and extraction of a tooth.


OBJECTIVE: The purpose of this study was to identify the endodontic microbiome in primary teeth with dental caries using high-throughput pyrosequencing and to establish data on the oral microbiome of primary teeth with endodontic infection.

METHODS: Ten primary teeth with dental caries and endodontic infection were included. Samples were collected from root canals using sterilized paper points and analyzed by pyrosequencing, based on the V1-V3 hypervariable region of the 16S rRNA gene. The data were analyzed using the CLcommunity software.
RESULTS: Analysis of the 10 samples yielded a total of 64,291 16S rRNA gene sequences. In total, 1586 OTUs (range, 91-235), six bacterial phyla, including unclassified, and 187 genera were assigned. At the genus level, Neisseria (group A), Acinetobacter (group B), and Fusobacterium (group C) were prominent. These predominant microorganisms were associated with the clinical condition and reflected the progression of endodontic infection in primary teeth.

CONCLUSIONS: This study revealed a relationship between the oral microbiome and endodontic infection in primary teeth. Additionally, anaerobic bacteria such as Fusobacterium species were dominant in the teeth with apical abscesses.


BACKGROUND: Extracellular matrix (ECM) secretion and osteogenic differentiation in periodontal ligament fibroblasts (PDLF) facilitate the neogenesis of alveolar bone, which is the cellular basis for alveolar bone repair. Calcitonin (CT) has been reported to play an important role in promoting ECM expression and inducing osteogenic differentiation in osteoblast, but its effects on PDLFs remain obscure.

METHODS: The expression of CT, transforming growth factor-beta 1 (TGF-beta1) and bone morphogenetic protein (BMP) in gingival crevicular fluid (GCF) was measured by ELISA. The effects of CT on collagen synthesis and osteogenic differentiation in hPDLFs were investigated by using the primarily cultured hPDLFs infected with adenovirus carrying the CT gene. Gene expression was measured by quantitative PCR and western blot.

RESULTS: The expression of CT in gingival crevicular fluid (GCF) of patients with periodontitis was significantly higher than that of healthy subjects. In addition, CT expression correlated with the clinical indexes including probing pocket depth (PPD), clinical attachment level (CAL), and gingival index (GI). The in vitro study demonstrated that overexpression of CT by adenovirus infection increased the expression of TGF-beta1, collagen type I and III, and osteoblastic markers including BMP-2/-4, alkaline phosphatase and osteocalcin in human PDLFs. Moreover, CT-enhanced collagen synthesis was abrogated in hPDLFs transfected with TGF-beta1 siRNA, and CT-induced osteoblastic differentiation was blocked in hPDLFs by BMPs inhibitor noggin.

CONCLUSIONS: These results suggest that CT promotes collagen synthesis and osteogenic differentiation in hPDLFs via the TGF-beta1 and BMPs signaling pathways, respectively.


INTRODUCTION: Although powered toothbrushes have been reported to reduce gingivitis more than manual toothbrushes in the general population, the evidence regarding orthodontic patients has been inconclusive. Thus, we aimed to compare their effectiveness in relation to any available parameter regarding oral health in orthodontic patients with fixed appliances.

METHODS: Searches without restrictions for published and unpublished literature and hand searching took place up to August 2017. Oral-health relevant data from randomized controlled trials of at least 4-weeks duration comparing powered and manual tooth brushing without supervision were reviewed. Data were classified as short term (assessments at 1-3 months) and long term (assessments at >3 months), and the random-effects method was used to combine treatment effects. Individual study risk of bias was assessed using the Cochrane Risk of Bias Tool, and the quality of evidence was evaluated according to the
Grades of Recommendation, Assessment, Development and Evaluation approach.

RESULTS: The initially identified articles were finally reduced to 9 randomized controlled trials investigating the periodontal health in 434 patients. Eight studies followed patients up to 3 months, and 1 up to 12 months during treatment. One study was at low and the rest at unclear risk of bias. Overall, in the short term, there was low-quality evidence that powered toothbrushes provide a statistically significant benefit compared with manual brushing with regard to the gingival index (weighted mean difference, -0.079; 95% confidence interval, -0.146 to -0.012; P = 0.021) and indexes assessing gingival bleeding (standardized mean difference, -0.637; 95% confidence interval, -1.092 to -0.183; P = 0.006). In the long term, only 1 available study showed a statistically significant benefit of powered over manual toothbrushes with regard to gingival index and bleeding. No differences were observed in probing pocket depth and relative attachment loss. For the rotation-oscillation brushes that involved the greatest body of evidence, statistically significant reductions in gingival index and bleeding were demonstrated only in the long-term study. No included study provided quantified measurements regarding caries activity.

CONCLUSIONS: Overall, powered toothbrushes may promote gingival health better than manual toothbrushes in orthodontic patients. However, no type demonstrated clear superiority. Better study standardization and reporting in longer follow-up studies are necessary to elucidate the clinical relevance of these results.

36. Cifter M, Gumru Celikel AD, Cekici A.
Effects of vacuum-formed retainers on periodontal status and their retention efficiency. 

INTRODUCTION: The stability of treatment results is a major concern in orthodontics. Numerous retention regimens to maintain stability have been introduced. The objectives of this study were to evaluate the effects of vacuum-formed retainers (VFRs) on periodontal tissues and the retention efficiency of VFRs.

METHODS: Forty patients were included in this study. Clinical effectiveness of VFRs for nighttime use only over a 12-month period was assessed by using the American Board of Orthodontics’ Objective Grading System. Periodontal measurements and indexes were recorded and evaluated immediately after removal of the braces and after 1, 6, and 12 months of VFR use.

RESULTS: There was no significant change in the total Objective Grading System score between the end of the active treatment period and the end of the 12-month retention period. However, regarding periodontal measurements, the plaque and gingival indexes decreased, whereas the bleeding on probing, probing depth, calculus index, and clinical attachment loss increased between the evaluated periods.

CONCLUSIONS: In terms of periodontal health, the use of VFRs resulted in a slight periodontal attachment loss that seemed to be clinically insignificant, without gingival inflammation or recession. In terms of stability, VFRs were found to be effective in orthodontic retention.

Comparison of clinical values between cone beam computed tomography and conventional intraoral radiography in periodontal and infrabony defect assessment. 

OBJECTIVES: The use of CBCT for periodontal diagnosis and treatment plan is limited. The aim of this study is to compare the assessment of periodontal conditions and infrabony defects between conventional intraoral radiography (IOR) and CBCT.
METHODS: The study included 25 subjects who had periodontitis and at least two infrabony defects. All subjects received clinical periodontal examination, IOR and CBCT. Three periodontists assigned periodontal diagnosis and prognosis of each tooth. For teeth with infrabony defects, the number of defect walls and treatment was determined. IOR and CBCT assessment was compared.

RESULTS: There were 666 teeth and 123 infrabony defects. The overall concordance between IOR and CBCT for periodontal diagnosis, prognosis, infrabony defect type and infrabony defect treatment were 79.3%, 69.5%, 44.7% and 64.2%, respectively. IOR underestimated diagnosis, prognosis and the number of infrabony defect walls at 16.4%, 24% and 37.4%, respectively. IOR and CBCT had poor concordance for periodontal regeneration (43.3%). Tooth extraction was more prevalent when assessed by CBCT (35.0% vs 22.7%). CBCT had excellent interexaminer agreement (Fleiss' kappa 0.87-0.94) and higher percentage of complete agreement among examiners than IOR for all assessments.

CONCLUSIONS: IOR underestimated the severity and prognosis of periodontal disease. CBCT was superior to IOR for evaluation of infrabony defect morphology and treatment. CBCT provides excellent agreement among examiners on periodontal and infrabony defect assessment.

   This article reviews trends in dental caries, periodontal disease, and tooth loss for the United States along with population dynamics and risk factors that might influence these trends going forward. Dental caries experience remains high in the primary dentition. Caries severity in permanent teeth of children has declined to historically low levels, and long-standing inequalities in untreated caries appear to be narrowing. Declines in caries severity of children's permanent teeth have stabilized at a low level, but likely will contribute to future reductions in dental caries severity in adults. The prevalence of periodontal disease is high in adults, and only a small percentage have severe forms of the disease. Countervailing trends in determinants would suggest little change in the prevalence of periodontal disease in the future, but the lack of an obvious trend over the last two decades makes projections uncertain. Tooth loss as a consequence of dental disease has declined markedly over the last half century and has been all but eliminated in high-income groups. However, notable exceptions to these favorable trends are evident. Progress in prevention policies and programs that affect disease experience appears slower than progress in meeting population-level caries treatment needs. Clearly, long-standing inequities related to political and social determinants remain for all dental diseases, and income disparities in dental disease are widening for some indicators. Growing inequalities raise ethical and public health concerns that should be prominent in discussions of dental workforce needs and strategies for the next 25 years. This article was written as part of the project "Advancing Dental Education in the 21st Century."

   Immune-related disease tolerance is an important defense strategy that facilitates the maintenance of health in organs and tissues that are commonly colonized by bacteria. Immune tolerance to dysbiotic, tooth-borne biofilms is a poorly understood yet clinically relevant concept in the immunopathological mechanisms that are involved in the pathogenesis of periodontitis, particularly those related to neutrophil and macrophage responses. In periodontal health, neutrophils and macrophages respond to the formation of pathogenic bacterial biofilms by the production of bactericidal reactive oxygen species (ROS).
However, when released in excess, ROS cause tissue damage and exacerbate inflammation. To counter these destructive responses, many cell types, including neutrophils and macrophages, launch a dedicated antioxidant system that limits the cell and tissue-damaging effects of ROS. The expression of antioxidants is primarily regulated by genetic response elements in their promoters. Here we consider the roles of nuclear factor erythroid 2-related factor (NrF2), a transcription factor, and other key regulators of antioxidants. The concept of disease tolerance, neutrophil and macrophage-generated oxidative stress, and their relationship to the pathogenesis of periodontitis is reviewed. We focus on the regulation of NrF2 and recent evidence suggesting that NrF2 plays a central role in host protection against tissue destruction in periodontitis.

The metabolic syndrome (MetS) is a spectrum of conditions that increase the risk of cardiovascular disease and diabetes mellitus. The components of MetS include dysglycemia, visceral obesity, atherogenic dyslipidemia (elevated triglycerides and low levels of high-density lipoprotein) and hypertension. An association of periodontal disease and MetS has been suggested. This association is believed to be the result of systemic oxidative stress and an exuberant inflammatory response. When examined individually, the components of the MetS that are most closely related to the risk of periodontitis are dysglycemia and obesity, with lesser contributions by atherogenic dyslipidemia and hypertension. Data suggest that the odds of periodontitis increase with the number of MetS components present in an individual. The direction of the relationship between MetS and periodontal disease cannot currently be determined because the majority of studies are cross-sectional. The association between MetS and periodontitis, however, suggests that improved understanding of this association could promote interprofessional practice. Evidence suggests that periodontal therapy can reduce the levels of inflammatory mediators in serum. If this finding is confirmed, periodontal treatment could become part of therapy for MetS. Oral health providers who identify patients at risk for MetS could refer them to a medical provider, and physicians could refer patients to dentists to ensure that patients with MetS receive a dental evaluation and any necessary treatment. These clinical activities would improve both oral and general health outcomes.

OBJECTIVE: To compare counts of Aggregatibacter actinomycetemcomitans, Prevotella intermedia, Porphyromonas gingivalis and Fusobacterium nucleatum between crack users and non-users.
MATERIALS AND METHODS: A cross-sectional study was conducted involving seventy-four crack cocaine users and eighty-one non-users matched for age, gender and tobacco use. Demographic and clinical variables were analysed. Subgingival bacterial samples were collected from four sites with the greatest probing depths and were analysed using real-time polymerase chain reaction.
RESULTS: No significant difference was found in the prevalence of total counts for each bacterial species analysed between groups. However, crack users had a 1.85 (95% CI: 1.03-3.31), 2.19 (95% CI 1.24-3.88), 2.53 (95% CI 1.27-5.04) and 2.40 (95% CI 1.22-4.75) greater probability of having the higher counts (>=75th percentile) for Aggregatibacter actinomycetemcomitans, Porphyromonas gingivalis, Prevotella intermedia and Fusobacterium nucleatum, respectively.
CONCLUSION: Although some crack users had higher (>75th percentile) bacterial counts for Aggregatibacter actinomycetemcomitans, Porphyromonas gingivalis, Prevotella intermedia and Fusobacterium nucleatum, total counts did not differ between crack users and non-users, leading to the hypothesis that the higher occurrence of periodontitis on crack users may be related to other non-bacterial factors.

42. Morand DN, Davideau JL, Clauss F, Jessel N, Tenenbaum H, Huck O.
Regeneration of periodontal tissues is one of the main goals of periodontal therapy. However, current treatment, including surgical approach, use of membrane to allow maturation of all periodontal tissues, or use of enamel matrix derivatives, presents limitations in their indications and outcomes leading to the development of new tissue engineering strategies. Several cytokines are considered as key molecules during periodontal destruction process. However, their role during each phase of periodontal wound healing remains unclear. Control and modulation of the inflammatory response and especially, release of cytokines or activation/inhibition in a time- and spatial-controlled manner may be a potential perspective for periodontal tissue engineering. The aim of this review was to summarize the specific role of several cytokines during periodontal wound healing and the potential therapeutic interest of inflammatory modulation for periodontal regeneration especially related to the expression sequence of cytokines.

43. Turer CC, Balli U, Guven B.
OBJECTIVES: This study is evaluating fetuin-A, serum amyloid A (SAA) and tumor necrosis factor alpha (TNF-alpha) levels in gingival crevicular fluid (GCF) and serum samples in periodontal health and disease.
MATERIAL AND METHODS: Sixty patients were divided into three groups: Group 1 periodontal health (n = 20), Group 2 gingivitis (n = 20) and Group 3 chronic periodontitis (CP) (n = 20). GCF and serum samples were evaluated using enzyme-linked immunosorbent assay kit.
RESULTS: SAA and TNF-alpha levels in GCF and serum were significantly higher in patients with gingivitis and CP compared with controls (P < 0.016). Contrarily, fetuin-A levels in GCF and serum were significantly higher in controls than in patients with gingivitis and CP (P < 0.016). In CP group, a significant correlation was observed between GCF-SAA amount and the number of sites with 4 <= PPD <= 5 mm (P < 0.05). There was a significant correlation between GCF-fetuin-A levels and the number of sites with PPD >= 6 mm (P < 0.05). GCF-TNF-alpha was found to have a significant relationship with the number of sites with 4 <= PPD <= 5 mm and PPD >= 6 mm (P < 0.05).
CONCLUSIONS: In conclusion, serum and total levels of SAA significantly increased, whereas fetuin-A levels significantly decreased, with increasing severity of PD.

44. Rooney E.