AAP position paper. Periodontal considerations in the management of the cancer patient. J Periodontol 1997;68:791-801.

Purpose: To provide information regarding the effects of radiation, chemotherapy, and bone marrow transplantation on the oral tissues and to offer suggestions for the prevention and treatment periodontal side-effects of cancer therapy.

Materials and Methods: Literature review.

Findings: Radiation therapy: Relatively low dose of total body radiation is used in conjunction with chemotherapy to achieve complete myelosuppression and is associated with milder and transient complications. In contrast, head and neck radiation is usually administered locally, either by means of an intense external beam or by implantation of radioactive substances such as iridium, gold, cesium, or palladium. Patients are susceptible to dermatitis, mucositis, xerostomia, dysgeusia (altered taste), hypovascularity of soft and hard tissues, and muscle fibrosis and trismus, melanotic hyperpigmentation, and developmental abnormalities of the teeth and jaws may occur in irradiated children. The altered tissues make them susceptible to bacterial, viral, fungal infections, gingival recession, periodontal inflammation, trismus, dental caries and impairment of salivary glands. It is better to avoid mouth rinses with alcohol, phenolics, or astringents because they may further dehydrate the mucosa and increase discomfort. Wound healing is severely compromised in these patients due to obliterative endarteritis.
Chemotherapy: Chemotherapeutic drugs adversely affect cells that are mitotically active like GI cells, skin and hematopoietic cells. Many of the resultant side effects are similar to radiation although more transient. Chemotherapeutic management is usually episodic over a 3-5 day period with recovery intervals of 21-28 days. Routine hygiene measures should be curtailed when platelet counts <40,000-50,0000 per mm and when WBC count is <2,000 -1,500 cells/mm. Patients should be encouraged to maintain oral hygiene during this period since they are susceptible to bacterial, viral and fungal infections. Prophylactic antibiotics are recommended for these patients before any dental therapy. Bone marrow transplantation (BMT): The lack of complete histocompatibility may actually cause graft-versus-host disease (GVHD). Pancytopenic phase lasts for 3-4 weeks after engraftment and predisposes the patient to ulcerative mucositis, xerostomia, and hairy leukoplakia. GVHD affects up to 45% of the BMT patients with most acute lesions occurring within the first post-engraftment month. Target organs include liver, lungs, gastrointestinal tract, exocrine glands, skin and mucosa. Oral cavity is affected 80% of the time. Cyclosporin frequently used for the prevention of GVHD may cause gingival enlargement.

Conclusions: Manangement of cancer patients is complicated and the periodontist should co-ordinate with the oncologist in monitoring and treating these patients.

Cillo JE Jr, Finn R. Correlation and comparison of body mass index on hemodynamics in hypertensive and normotensive patients undergoing intravenous sedation. J Oral Maxillofac Surg. 2006 Apr;64(4):583-8.

Purpose: To compare body mass index (BMI) and hemodynamics in hypertensive and normotensive patients undergoing intravenous (IV) sedation for dentoalveolar surgery.

Patients and Methods: 263 consecutive charts of male patients undergoing IV sedation were retrospectively analyzed. Based on BMI, they were divided into 5 BMI groups: underweight, normal weight, overweight, obese, extremely obese. Data were recorded at baseline before IV access was obtained and intraoperative hemodynamic measurements at 5-minute intervals for systolic blood pressure (SBP), diastolic blood pressure (DBP), mean arterial pressure (MAP), pulse pressure (PP), and pulse (P) were obtained. Statistical analysis of mean values between groups was carried out using multivariate linear regression analysis, Pearson's correlation coefficient, and Student's *t* test.

Findings: Average hemodynamic values for normotensive patients were significantly lower than the hypertensive patients for all groups except for pulse in the normal group, pulse in the obese group, and DBP in the extremely obese group. For normotensive patients, there were statistically significant positive correlation for elevated BMI and increased baseline changes in SBP and PP. For the hypertensive group, there was a statistically significant positive correlation for elevated BMI and increased baseline changes in PP and statistically significant positive correlation for baseline changes in MAP. Baseline changes were significant for greater increases in SBP and decreases in DBP and MAP in the underweight hypertensive group. Significant increases from baseline in the normotensive group were for PP in the normal BMI group and for pulse in the obese group. All baseline changes, with the exception of normotensive underweight SBP (26.7%) and hypertensive PP (23.9%), were within 20% of baseline.

Conclusion: Normotensive patients had lower average hemodynamic values than hypertensive patients in all BMI groups. Great variability was seen in baseline changes for all BMI groups, but remained within 20% of baseline. IV sedation for oral and maxillofacial surgery procedures maintains a stable hemodynamic state in hypertensive and normotensive patients regardless of BMI.

De Rossi et al. Dental considerations for the patient with renal disease receiving hemodialysis. J Am Dent Assoc.1996;127:211-219.

Purpose: Discuss the basis for the dental practitioner's management considerations and propose a new treatment protocol

Findings: End-stage renal disease is a chronic, progressive disease that is characterized by the destruction of nephrons. .It is important to ascertain if an underlying disease is present since such a disease, in itself, may influence dental management. Several changes occur in the oral cavity that are associated with chronic renal failure and uremia. The most common oral finding is pallor of the mucosa secondary **to** the anemia commonly seen in patient undergoing hemodialysis. Uremic stomatitis is often a clinical finding in cases of advanced disease. The exact etiology of uremic stomatitis remains unknown, but it is suspected to be a chemical like burn or a loss of the tissue's resistance to normal and/or traumatic influences. White patches often associated with the skin, called "uremic frost," can occasionally be seen intraorally. Since these patients often require high-carbohydrate and low-protein diets to minimize the nitrogen products produced by the metabolism of protein, severe caries would be expected. However, the caries index is often noticeably lower in these patients. This low caries rate is attributed to the inhibition of plaque and bacteria by higher levels of salivary urea. Other oral manifestations of renal disease are related to renal osteodystrophy. It is important to recognize that with the increased availability and use of dialysis, and, ultimately renal transplantation, many of the oral manifestations of renal failure and uremia are less commonly seen. Patients with uremia and renal failure who are undergoing hemodialysis require special consideration, most importantly with regard to risk of excessive bleeding, risk of infection and medications used. Hematologic conditions that most commonly affect the patient with uremia and renal failure are excessive bleeding and anemia. Often, these patients have reduced platelet counts, decreased platelet adhesiveness, increased prostacyclin activity, decreased availability of platelet factor **3** and increased capillary fragility, all of which can lead to increased loss of blood. Adjunctive hemostatic measures should be used. Infection is a frequent cause of morbidity and mortality in patients receiving hemodialysis therapy thus, antibiotic prophylaxis prior to dental care needs to focus on preventing infective endocarditis. The drug of choice is vancomycin infused during dialysis. Because of changes in fluid volume, salt retention and the presence of shunts and fistulas, patients commonly are affected by certain cardiovascular conditions. Specifically, congestive heart failure and pulmonary hypertension can be seen in patients with renal failure often, hypertension in patients with renal disease leads to atherosclerosis, with significant cerebral, coronary and peripheral vascular effects." Although patients are often treated with antihypertensive medications, dentists should take precautions to avoid excessive stress in the dental chair that could elevate systolic pressure. In, addition, patients should not be kept in cramped positions in the dental chair and should be allowed to stand or walk occasionally to minimize the risk of access obstruction. Prescribing medications for patients with renal failure who are undergoing hemodialysis poses a challenge to dentists. The therapeutic regimen must be maintained within a narrow range, avoiding toxicity at one end and sub-therapeutic dosing at the other.

Conclusions: The goal of dental treatment in patients with renal disease should be the early and frequent evaluation of the oral cavity for the source of infection.

Fisher S, Kells L, Picard JP, et al. Progression of periodontal disease in a maintenance population of smokers and non-smokers: a 3-year longitudinal study. J Periodontol 2008; 79(3): 461-468. (50 ref.)

Purpose: To examine the effect of tobacco use on disease progression over a 3-year period in a group of subjects with chronic periodontitis who were current smokers or current non-smokers, as assessed by expired air carbon monoxide concentration, and following a regular 3- to 4- month maintenance schedule in a hospital periodontal clinic.

Materials and Methods: 108 adult human patients (56 males and 52 females; mean age: 57 years) with chronic periodontitis and unknown systemic health initially participated in this longitudinal clinical study to assess the effects of a *strict maintenance program on a population of smokers/non-smokers with periodontal disease*. Of the original 108 subjects, only 81 participants adhered to the 3- to 4- month maintenance program for 3 consecutive years and attended at least 2 annual clinical evaluations. Smoking habits were initially determined by self-reporting, and subsequently confirmed by measurement of expired-air carbon monoxide (CO) concentrations. A subject was classified as a current smoker if the concentration exceeded 8 parts per million (ppm); current non-smokers were subjects who did not exceed that predetermined cut-off point. In addition, all subjects were clinically assessed for bleeding on probing (BOP), probing depths (PD), clinical attachment levels (CAL), number of teeth, and the presence or absence of plaque (PI). Interventional therapy was determined to be necessary if there were any indications of disease activity.

Findings: Over the 3-year period, no statistically significant differences were noted between current smokers and non-current smokers in terms of number of teeth lost, changes in PI and BOP, and changes in prevalence and proportion of disease progressing sites as measured by mean PD and mean CAL. Thus, the majority of subjects positively responded to the maintenance therapy. However, interventional therapy (i.e. open flap debridement, local chemotherapeutics, extractions, hemisections, etc.) was initiated in 31% of current smokers and 31% of current non-smokers.

Conclusions: Current smokers with chronic periodontitis who adhered to the strict maintenance protocol were able to prevent progressive periodontal breakdown and achieve a similar degree of periodontal stability as non-smokers over the 3-year study period. The investigators caution, however, that the study should not be interpreted as evidence for refuting any negative influence or risk of smoking on oral and systemic health.

Hall DL, Tatakis DN, Walters JD, et al. Oral clonidine pre-treatment and diazepam/meperidine sedation. J Dent Res 2006:85(9):854-858.

Purpose: To characterize and quantify the effects of oral clonidine pre-treatment on diazepam/meperidine IV sedation during periodontal surgical procedures of long duration.

Materials and Methods: Sixteen systemically healthy adult human subjects with severe chronic periodontitis and/or the need for dental implants participated in this randomized, placebo-control, crossover study to examine the effects of oral clonidine pre-treatment and IV sedation. Prior to IV sedation, subjects participated in two 1-hour pre-treatment sedation sessions, in randomized order, and acted as his or her own control. An hour before administration of IV sedation, subjects were shown a photograph for 5 seconds and instructed to remember. Then, either oral clonidine (test) or placebo (control) was administered to the patients. The primary outcome was change in BIS readings. Secondary endpoints were Observer's Assessment of Alertness/Sedation Scale (OAA/S) values, vital signs, diazepam and post-operative analgesic dosages, and survey responses. An hour following pre-treatment clonidine/placebo sedation, subjects were given another photograph and instructed to remember. Subsequently, IV midazolam, IV diazepam, and lidocaine with epinephrine were administered. All original baseline measurements were repeated at the end of the two-hour session. In addition, recall of the photo was assessed following final recovery via a post-session follow-up questionnaire.

Findings: Pretreatment with oral clonidine reduced the total 2-hour diazepam dosage by 44%, increased the time between each of the three increments by 24%, decreased the dosage of diazepam by 21%, and reduced the post-induction increments given during the two-hour study period by 32%. In addition, pretreatment with oral clonidine resulted in greater numbers of depressed BIS readings and final percentage of Memory Loss compared with both baseline and placebo values. Vital signs were stabilized in both the clonidine and placebo group.

Conclusions: Oral clonidine is a useful supplement in periodontal surgical procedures. Oral clonidine significantly increases the numbers of BIS-depressed readings, prolongs sedation and amnesia, and diminishes diazepam and post-operative usage.

Mercado F.B, Marshall R.I et al. Relationship Between Rheumatoid Arthritis and Periodontitis. J Periodontol 2001, 72 :779-87.

Purpose: To study a population of rheumatoid arthritis patients and determine the extent of their periodontal disease and correlate this with various indicators of rheumatoid arthritis.

Materials and Methods: 65 consecutive patients attending a rheumatology clinic were examined for their levels of periodontitis and rheumatoid arthritis. A control group consisted of age- and gender- matched individuals without rheumatoid arthritis. Specific measures for periodontitis included probing depths, attachment loss, bleeding scores, plaque scores, and radiographic bone loss scores. Measures of rheumatoid arthritis included tender joint analysis, swollen joint analysis, pain index, physician's global assessment on a visual analogue scale, health assessment questionnaire, levels of C-reactive protein, and erythrocyte sedimentation rate. The relationship between periodontal bone loss and rheumatological findings as well as the relationship between bone loss in the rheumatoid arthritis and control groups were analyzed.

Findings: No differences were noted for the plaque and bleeding indices between the control and rheumatoid arthritis groups. The rheumatoid arthritis group did, however, have more missing teeth than the control group and a higher percentage of these subjects had deeper pocketing. When the percentage of bone loss was compared with various indicators of rheumatoid arthritis disease activity, it was found that swollen joints, health assessment questionnaire scores, levels of C-reactive protein, and erythrocyte sedimentation rate were the principal parameters which could be associated with periodontal bone loss.

Conclusions: The results of this study provide further evidence of a significant association between periodontitis and rheumatoid arthritis. This association may be a reflection of a common underlying dis-regulation of the inflammatory response in these individuals.

Mustapha IZ, Debrey S, Oladubu M, Ugarte R. Markers of systemic bacterial exposure in periodontal disease and cardiovascular disease risk: A systematic review and meta-analysis. J Periodontol 2007; 78: 2289-302

Purpose: To examine recent studies and to perform a meta-analysis on the subject of linked biologic markers of periodontal disease exposure with cardiovascular outcomes.

Materials and Methods: A literature search and meta-analysis was completed. Four reviewers ran independent literature searches using PubMed, the Cochrane Controlled Trials Register, EMBASE, and SCOPUS in March 2006. The databases were searched only for studies done on humans.

Findings: The authors hypothesize that people with periodontal disease associated with high bacterial exposure are at higher risk for cardiovascular disease compared to people without periodontal disease. Patients with periodontal disease with elevated markers of systemic bacterial exposure (example C-reactive protein) have a stronger association with coronary heart disease than patients without periodontal disease. They also have a stronger association with a significant increase in mean carotid intimamedia thickening. There was not a stronger association with cardiovascular disease events or stroke is patients with periodontal disease associated with high bacterial exposure.

Conclusions: Periodontal disease with elevated markers of systemic bacterial exposure increases the risk for atherosclerosis and coronary heart disease. Periodontal disease with elevated markers of bacterial systemic exposure is associated with coronary heart disease with a stronger association than clinical periodontal disease. This meta-analysis shows that there may be a greater affect than previous similar studies have suggested. There should be further studies of cardiovascular disease which include serum markers specific to periodontal pathogens to assess for systemic exposure to periodontitis.

Patton LL, Shugars DA, Bonito AJ. A systematic review of complication risks for HIV-positive patients undergoing invasive dental procedures. J Am Dent Assoc. 2002;133:195-203.

Purpose: To compare the complication rates associated with dental treatment in HIV-positive patients with the complication rates for similar dental treatment in patients who are HIV-negative.

Materials and Methods: Literature review utilizing both MEDLINE and EMBASE searches of the English literature from 1981 to Aril of 2000. 767 articles were identified via the search. Of these, 201 articles were identified that as including the following: 1) Controlled clinical trials (1 article); 2) Randomized clinical trials RCTs (2 articles); 3) Multicenter study (3 articles); 4) Epidemiologic research design (187 articles); 5) comparative study (33 articles); 6) Evaluation study (6 articles); and outcome and process assessment, outcome assessment or treatment outcome (6 articles). After imposition of inclusion and exclusion criteria, 5 articles were found which meet the following requirements: original research; concurrent treatment of HIV-positive and HIV-negative patients; presence of complications (i.e. systemic or local infection, alveolitis, and post-op hemorrhage) resulting from oral surgical procedures (extractions and orthognathic surgery), implant placement, endodontic therapy and both non-surgical (Scaling and root planning/prophylaxis) and surgical periodontal therapy. From these 5 articles, information regarding both research design and results were entered into evidence tables for comparison purposes. A summary quality score was also assigned to each article in order to assess the attributes of the study.

Findings: Only 2 of the 7 dental procedures of interest were presented in the 5 articles evaluated. One article examined endodontic treatment and 4 articles evaluated complications involved with extractions. None of the studies evaluated the ramifications of periodontal surgery, orthognathic surgery, dental implants, scaling and root planning or prophylaxis. The study evaluating endodontic therapy was a retrospective cohort design. In this study only 1 or 2% of the 48 patients evaluated presented with post-operative endodontic complications (an HIV-positive patient presented with pain/swelling after initial endodontic therapy. Four studies met the inclusion criteria for examining post-operative complications associated with tooth extraction. Of these studies, 2 were retrospective cohort designs and 2 were prospective cohort designs. These 4 studies followed more than 500 patients, 238 of whom were HIV-positive. Within the studies, patient s in the HIV-negative groups had low rates of prophylactic antibiotic coverage (7.7 to 13.3%), while the preoperative antibiotic coverage in the HIV-positive groups ranged from 23.7 to 63%. Complication rates in the HIV-negative group ranged from 2.9 to 13.9%. Among the HIV-positive group, complication rates ranged from 3.0 to 22.2%. Three of the 4 studies demonstrated no significant difference between postoperative complications in the HIV-positive and HIV-negative groups, although the HIV-positive groups tended to have more complications. The forth study (Dodson (1997)) found that HIV-positive patients had a statistically higher complication rate; however, after adjusting for other known risk factors (age, preoperative antibiotic coverage and tobacco use) the results were no longer statistically significant.

Conclusions: Post-extraction complications that were reported in the 4 studies varied in prevalence and included persistent bleeding, persistent pain, localized alveolitis, local wound infection, and delayed wound healing. Furthermore, the postoperative complications were rather minor and patients were treated on an outpatient basis. None of the authors suggested a need to take special precautions for HIV-positive patients who do not have a coagulopathy (hemophilia, thrombocytopenia or other known bleeding disorders). There currently is limited published scientific evidence available to guide clinicians in regard to possible increased risks of invasive oral procedures associated with the HIV status of the patient.

Perrot DH, Yuen JP, Andresen RV et al. Office-based ambulatory anesthesia: outcomes of clinical practice of oral and maxillofacial surgeons. J Oral Maxillofac Surg. 2003 Sep;61(9):983-95;

Purpose: The purpose of this report was to provide an overview of current anesthetic practices of OMSs in the office-based ambulatory setting.

Materials and Methods: The study sample was composed of a consecutive series of patients derived from the population of patients who underwent oral and maxillofacial surgery outpatient procedures between January 2001 and December 2001 in the United States. Eligible patients included all individuals who underwent oral and maxillofacial operative procedures in the office-based ambulatory setting involving local anesthesia, conscious sedation, or deep sedation / general anesthesia (DS/GA). Eligible office-based ambulatory settings included community, dental school, or hospital-based practices. There were no exclusion criteria for patients. The predictor variables were categorized as demographic, anesthetic technique, staffing, adverse events, and patient-oriented outcomes. Anesthetic risk was classified using the American Society of Anesthesiology (ASA) system. Appropriate descriptive and bivariate statistics were computed as indicated. Statistical significance was set at $P \leq 05$.

Findings: The sample was composed of 34,191 patients, of whom 71.9% received DS/GA, 15.5% received CS, and 12.6% received LA. The complication rate was 1.3 per 100 cases, and the complications were minor and self-limiting. Two patients had complications requiring hospitalization.
Demographics: Patients receiving local anesthesia were statistically older than those receiving either conscious sedation or DS/GA. Men more likely to choose local anesthesia than women. More patients with ASA III, IV, and V classifications received local anesthesia. Preanesthesia anxiety level was statistically associated with the anesthesia techniques used. Patients receiving DS/GA were more anxious than those receiving local anesthesia. In this study, the length of the procedure was less than 30 minutes in over two thirds of the cases.
Medications: Overall, 26% of the patients received some type of premedication. Most OMSs administered newer types of narcotics and benzodiazepines for conscious sedation and DS/ GA. Methohexital remained the intravenous anesthetic agent of choice, but propofol was used almost 17% of the time.
Intravenous access, fluid management, and monitoring methods: For most patients, IV access was established using a butterfly needle or angiocatheter, and the majority had continuous flow of IV fluids. The vast majority (_98%) of sites monitored blood pressure, oxygen saturation, and cardiac performance.
Staffing: In this study, the operating surgeon provided anesthesia services 96% of the time and was supported by 2 to 3 personnel.
Patient safety and complications: Local anesthesia had the lowest incidence of adverse outcomes, followed by conscious sedation. For DS/GA, the types of adverse outcomes recorded were similar to those found in other studies. Overall, 98.7% of cases had no adverse outcomes related to anesthesia. The complication rate ranged from 0.4% for local anesthesia to 1.5% for DS/GA. No deaths were reported in this study. D'Eramo reported

a mortality rate of 1:1 million after the administration of office-based anesthesia by OMSs.

Patient satisfaction: Most patients (94%) were very satisfied with the anesthetic technique used by the OMS and would recommend it to a loved one. Patient satisfaction increased with the complexity of the anesthetic technique (local anesthesia, 91.3% to 94.9% for DS/GA). More than 90% of patients receiving DS/GA had no recall of the operation. Overall, 35% of patients did not recall their discharge instructions. Almost 33% of patients who received local anesthesia did not remember their discharge instructions.

Before the operation, 82% of the patients had mild to severe anxiety about the planned operation. When queried after the procedure, almost 38% of the patients expressed mild to severe anxiety about future operations. There was almost a 50% reduction in the number of patients who reported mild to severe anxiety after the surgical procedure.

More than 94.7% of all patients would recommend the anesthetic technique to a loved one.

Conclusions: This study of office-based ambulatory anesthesia is the largest ever reported. The findings show that office-based ambulatory anesthesia as practiced by OMSs is safe, with all of the anesthetic techniques. More than 95% of the time, the operating surgeon is the anesthetist and performs the operation with a support team of at least 2 or 3 additional individuals and modern monitoring techniques. Regardless of the anesthetic technique, patients and their escorts should receive oral and written discharge instructions. In addition to outstanding outcomes, patients were very satisfied with the anesthesia provided by OMSs. Adherence to recommended staffing levels, formal anesthesia training of OMSs, use of AAOMS anesthesia guidelines, onsite office evaluations, and the OMAAP all contribute to the low mortality and incidence of adverse outcomes and high levels of patient satisfaction associated with the anesthesia services provided by OMSs in the office-based ambulatory setting.

Ritchie CS. Obesity and periodontal disease. Periodontal 2000. 2007: 44; 158-63.

Purpose: To show the relationship between obesity and periodontal disease.

Materials and Methods: Review article.

Findings: A BMI of25-29.9 is considered overweight and a BMI ≥30 is considered obese. A high-risk waist circumference is considered to be ≥88 cm for women and ≥102 cm for men. More than 65% of the US adult population have a BMI of ≥25 kg/m ^{2} and 15.8% of children aged 6-11 years, and 16.1% of adolescents aged 12-19 years are overweight. There is evidence of the relationship between obesity and inflammation, some of which are related to adipokines, adiponectin (decreased in obese individuals → inverse relationship between adiponectin levels and serum markers for inflammation), and TNF-α (increased in obese → potent inhibitor of adiponectin). Mortality risks appear to be directly related to BMI (obese). Blood pressure is strongly correlated with BMI and obesity remains an independent risk factor for cardiovascular disease. The immunologic activity of adipose tissue may play an important role both in the development of insulin resistance and in periodontal disease. Given recent evidence regarding adipose tissue serving as a reservoir for inflammatory cytokines, it is possible that increasing body fat increases the likelihood of an active host inflammatory response in periodontal disease. Obesity may also negatively affect the safety of intervenous sedation the effectiveness of regional anesthetic blockade.

Conclusions: The prevalence of obesity has taken on epidemic proportions, both in the United States and internationally. There are many comorbidities associated between obesity and health of the oral cavity. Because many dentists see their dentists more often than their primary care physicians, the oral health provider can serve to screen and identify patients with obesity.

Rodgers SF. Safety of intravenous sedation administered by the operating oral surgeon: the first 7 years of office practice. J Oral Maxillofac Surg 2005; 63: 1478-83.

Purpose: To provide a 7-year summary of anesthesia-related problems experienced by the patients of oral-maxillofacial surgeon in private practice.

Materials and Methods: The surgeon administering the anesthesia is a diplomate of the American Board of Oral and Maxillofacial Surgery and the National Dental Board of Anesthesiology. The practice in this study uses licensed registered nurses and anesthesia assistants. The files on the number of sedation cases from December 1994 through November 2001 were reviewed. Patients received IV midazolam (1 to 10 mg titrated to effect, average dose: 5.4 mg). The narcotic used was typically fentanyl (25 to 100 mcg, average dose: 82.9 mcg).
All patients were monitored with noninvasive blood pressure, every 5 minutes, or more frequently needed; continuous pulse oximetry; and continuous ECG monitoring.

Findings: A total of 2,889 IV sedations were performed during the 7-year period. There were 1,743 (60.33%) patients in ASA Class I, 1,139 (39.43%) in ASA Class II, and 7 (0.24%) in ASA Class III.
There were 77 adverse events in 70 patients.

(Table) Adverse events during IV sedations for oral surgery procedures.

Presyncope / syncope	26
Restless / Combative	20
Nausea / Vomiting	10
Phlebitis	4
IV infiltration	4
Cardiac dysrhythmia	4
Airway / Respiratory	4
Others (Allergic reactions, seizure, incontinence, hypertension)	5

2.42% (70/2,889) patients of the sedation patients experienced complications. There was no deaths and no patients required emergency transport to a hospital.

Conclusions: The administration of IV sedation is safe and results in a low incidence of adverse events.

Sandler NA, Hodges J, Sabino ML. Assessment of recovery in patients undergoing intravenous conscious sedation using bispectral analysis. Journal of Oral and Maxillofacial Surgery 2001 June;59(6):603-11.

Purpose: The purpose of this study is to was to analyze and compare the quality of sedation (as determined by the patient and the operator) and the recovery profile of patients who were monitored using the BIS (BIS monitor is a compact, portable unit that translates information from an electroencephalogram to measure a patient's depth of consciousness, thereby reducing overmedication and related side effects) with those who were sedated without use of the monitor, and were assessed using the OAA/S scale (Observer's Assessment of Alertness/Sedation).

Materials and Methods Forty patients undergoing third molar extractions under intravenous conscious sedation were randomly assigned to 2 groups. In both groups, induction of sedation was performed using a standard dose of fentanyl (1.5 mg/kg) and midazolam (0.05 mg/kg). Propofol was then given in 10 to 20 mg boluses until a clinically desirable sedation level was achieved. In 1 group, the BIS was then monitored continually during surgery using and recorded at 5-minute intervals. The anesthetist provided additional propofol boluses to maintain a BIS level of 70 to 80. In the other group, the BIS sensor was applied, but the monitor was not used. In this group, the sedation was modified, and additional propofol was given based solely on the anesthetist's subjective assessment of the desired level of sedation (Observer's Assessment of Alertness/Sedation [OAA/S] scale level 2 to 3). Additional boluses of 1 mg of midazolam were given during the procedure if patients required repeated boluses of propofol at less than 5-minute intervals to maintain the desired sedation level (BIS level of 70 to 80 or OAA/S level of 2 to 3). These additional midazolam boluses, as well as the time of the last sedative dose (propofol or midazolam) were recorded to study the effect of these factors on recovery.

Findings and Conclusions: Of the 40 patients initially included in the study, 1 subject in the BIS-monitored group was excluded due to the loss of intravenous access at initiation of the case. For the remaining 39 subjects, 19 were assessed objectively using the BIS monitor, whereas 20 were assessed subjectively using the OAA/S scale. The BIS cases were slightly longer in duration than the OAA/S cases, lasting an average of 26minutes versus 22 minutes. Less propofol was used in the BIS cases, with an average of 98 mg for BIS cases versus 106 mg for OAA/S cases. The total dose in mg/kg/min was significantly less in the BIS group (0.054 mg/kg/min) than in the OAA/S group (0.074 mg/kg/min). There was no significant difference in the amount of midazolam administered after induction between the 2 groups. The surgeon, who was blinded to whether the monitor was used, ranked the third molar extractions more difficult in the BIS group. However, patients in the BIS group were on average more cooperative, with better maintenance of muscle tone. The difference in these parameters were nonsignificant. The straight-line test was completed significantly sooner in BIS patients. There was no significant difference between the BIS and OAA/S groups in perceptual speed or computation. There was essentially no difference between groups in patient-assessed comfort or recall of the

procedure. There were also no notable differences in anesthesia complications, return to activities of daily life, or pain medication use between the 2 groups. The BIS provides additional information for standard monitoring techniques that helps guide the administration of sedative-hypnotic agents. It appears that use of the BIS monitor can help to titrate the level of sedation so that less drugs are used to maintain the desired level. The trend toward an earlier return of motor function in BIS-monitored patients warrants further investigation.

Shimazaki Y, Shirota T, Uchida K, et al. Intake of dairy products and periodontal disease: the Hisayama study. J Periodontol 2008; 79(1): 131-137. (21 ref.)

Purpose: To examine the relationship between periodontal conditions and consumption of dairy products so as to identify the type of dairy products that may have a beneficial effect on periodontal disease.

Materials and Methods: 942 adult human subjects (369 males and 573 females) from Hisayama, Japan were enrolled in a cross-sectional epidemiological study to analyze the effects of dairy intake on periodontal health status. Methods utilized in this epidemiological analysis paralleled the methods implemented in the Third National Health and Nutrition Examination Study (NHANES III) conducted in the United States from 1988-94. Probing depths (PD) and clinical attachment levels were measured at mesio-buccal and mid-buccal sites for all teeth on one randomly selected maxillary quadrant and one randomly selected mandibular quadrant. Subjects were then instructed to complete self-administered surveys to assess average daily dairy food intake, types of dairy product intake (classified as "milk," "cheese," "lactic acid foods," and "other dairy products"), lifestyle habits, medication use, frequency of alcohol intake, and smoking habits. Blood pressure, blood samples, and BMI of all subjects were measured and analyzed by trained practitioners.

Findings: Data obtained from this epidemiological study reveals that consumption of "lactic acid foods" (i.e. yogurt and lactic acid drinks) has a statistically significant relationship to PD and CAL. In fact, the relationship is dose-dependent: for every 10-g/day increment of "lactic acid-food" intake, there is a 0.010 mm decrease in mean PD and a 0.014 mm reduction in CAL. Furthermore, subjects routinely consuming 55.0 grams or greater of "lactic acid foods" per day have a significantly lower prevalence for deep PD and severe CAL compared to those not eating "lactic acid foods." However, *when factoring in a positive smoking habit*, the routine consumption of "lactic acid foods" is not significantly associated with PD and CAL. The investigators attribute this finding to the fact that smoking has detrimental effects on the periodontium that may supersede the benefits of a diet high on "lactic acid foods."

Conclusion: Routine daily consumption of "lactic acid food" has beneficial effects on the periodontal health status, especially in nonsmokers. The investigators surmise that the benefits of a "lactic acid food" diet may come from the high concentration of probiotic species, such as lactobacilli. This particular microorganism is only present in "lactic acid foods," (such as yogurt), but not in milk or cheese. Dairy products high on calcium, such as milk and cheese, however, are not found to be significantly associated with periodontal health. Nevertheless, the investigators caution that since the results were obtained from a cross-sectional study, no cause-and-effect relationship can be established.

Staretz LR, Otomo-Corgel J, Lin JI. Effects of intravenous midazolam and diazepam on patient response, percentage of oxygen saturation, and hemodynamic factors during periodontal surgery. J Periodontol 2004;75:1319-1326.

Purpose: To compare the effects of midazolam and diazepam on patient recall, hemodynamic factors, psychomotor response, and percent oxygen saturation in surgical patients.

Materials and Methods: The study design consisted of 17 periodontitis patients. The study represented a randomized, double masked, cross-over study. Each patient was either an ASA I or ASA II who required 2 or 3 periodontal surgical procedures to treat moderate to advanced periodontal disease. Patients who underwent 2 procedures were randomized to receive either midazolam or diazepam for the 1st procedure and the alternate drug for the second procedure. Patients who underwent 3 procedures were randomized to receive midazolam, diazepam, or a placebo (D5W: dextrose 5% in water). Hemodynamic parameters (oxygen saturation, heart rate, diastolic and systolic blood pressures) and clinical conditions were monitored and observed. For sedation technique, Midazolam was titrated at 0.5 mg/minute and diazepam at 2.5 mg/minute. The level of sedation was assessed according to a scale described by Shepherd et al. (+1 to +3). The drugs were titrated to a +3 sedation level which was selected as the clinical endpoint. When the clinical endpoint for diazepam and midazolam was achieved, no further drugs were administered and a 1 minute time period was allowed for the evaluation of side effects. All hemodynamic parameters, heart rate and oxygen saturation were monitored and recorded every 15 minutes. Before sedation and periodically during surgery, patients were presented with common objects (pen, cup, and keys). Objects were shown to patients 5 minutes prior to administration of the drug or placebo and 1, 5, 10, 15, 30, and 60 minutes after administration in order to assess recall. The overall percentage of recalled objects was determined for each patient and then compared between the midazolam and diazepam drug groups. A perceptual speed test (PST) was provided to patients at 5 time points (prior to IV sedation, 15, 30, and 40 minutes after administration, and at completion of surgery) in order to determine psychomotor skills. Two PST measures, accuracy and distance, were used to derive 2 other variables, deterioration and recovery. For each variable, the difference between midazolam and diazepam was calculated.

Findings: The average titrated dosages of midazolam and diazepam were 3.3 mg and 12.1 mg, respectively. On average, it took roughly 3.7 times more diazepam to reach the same therapeutic dose as midazolam. There were few differences observed between the medications with regard to oxygen saturation, hemodynamic variables, and overall percentage of objects recalled by patients sedated with either midazolam or diazepam. Most patients either responded to both drugs or failed to respond to either one, displaying few discordant responses. Pulse rate was demonstrated to substantially increase while patients were sedated with either diazepam or midazolam. This response roughly occurred within the 1st 15 to 30 minutes and then returned to baseline levels. Patient recall was assessed by an overall percentage of seven objects recalled while undergoing sedation via the medications and placebo administered. There was no significant

difference in overall percentage of objects recalled while patients were sedated with either midazolam or diazepam. The average recall of patients was 59%, 52%, and 82% for diazepam, midazolam, and placebo, respectively. Midazolam had a negative effect on recall at every time point except for the 60 minute time point. Diazepam had only a short term effect on recall, with no significant decreased recall up to the 10 minute time point. There was no significant difference between midazolam and diazepam at the 15 minute time point. For PST accuracy, the average percentage deterioration was 14.7% for midazolam and 8.8% for diazepam. The observed 5.8% difference between the 2 drugs was not significant; even though it appeared that the deterioration was greater for midazolam. The PST recovery time was 56 minutes for diazepam and 41 minutes for midazolam. Patients on diazepam required an average of 15 minutes longer to recover accuracy as measured by the PST. Also, midazolam was found to cause a greater incidence of amnesia lasting up to 30 minutes.

Conclusions: Both midazolam and diazepam have clinical advantages in IV sedation. Midazolam may be utilized in shorter procedures for faster onset of action, have a relatively rapid recovery, and predictable amnesic effects. Midazolam was found to be 3.5 times more potent than diazepam. Procedures utilizing midazolam resulted in patients being more active and alert towards the midpoint of the surgical procedure. The quality of amnesia was found to be consistently better as determined by recall testing after the use of midazolam and lasted up to 30 minutes as compared to only 10 minutes after the use of diazepam. Diazepam appears to have a wider margin of safety during titration in procedures lasting over 45 minutes.

Vogel J. What role does an individual's nutritional status play in periodontal disease? JADA 1984; 109: 26.

Purpose: To evaluate the role that an individual's nutritional status plays in periodontal disease.

Materials and Methods: Informational paper.

Findings:

Dr. Vogel:

- Nutrition can affect systemic factors that modify a host's response to the primary etiologic agent of periodontal disease (bacterial plaque) by either positively or negatively influencing such factors as the inflammatory process, bone metabolism, collagen metabolism, and epithelial barrier function
- The sulcular epithelium is of prime importance in the prevention and control of periodontal disease → since it has a significant turnover rate and is constantly being assaulted by bacteria, it is especially sensitive to nutritional alterations
    - Nutritional compromise of this epithelium barrier can result in increased toxic or antigenic challenge to the gingival connective tissue and attachment apparatus → leads to increased inflammation and destruction in the presence of plaque
- Collagen production is dependent on ascorbic acid, iron, and zinc → subclinical deficiencies of any of these could compromise collagen metabolism = decreasing the resistance of gingival tissue to plaque
- Calcium and phosphorus are predominant nutrients involved in bone mineralization (ideal C:P is 1:1) → some evidence that a low C:P ratio is assoc. w/ increased alveolar bone resorption in the presence of inflammation but the data is in no means sufficient to prove the hypothesis
- Deficiencies of several nutrients can alter the inflammation and immunologic responses of the host resulting in decreased resistance
    - Subclinical ascorbic acid deficiency as well as mild iron deficiency can cause defects in polymorphonuclear leukocyte (PMN) function
    - Mild iron deficiency has been associated with macrophage dysfunction
    - Deficiency in folic acid and zinc affects cell-mediated immunity

Dr. Depaola:

- Inadequate nutrition can modulate the initiation and progression of periodontal disease → broad spectrum of nutrients needed to maintain optimum host response
- Interesting concept that the local nutrient requirement of the healing periodontal tissues may be considerably more elevated relative to normal tissues
- Role of nutrients in maintaining barrier function and adequate repair function
- Supplementation of Vitamin C and folic acid decreases gingival fluid flow

Dr. Robinson:

- Has found no believable evidence that nutritional deficiency can initiate inflammatory periodontal disease and little, if any, concrete substantiation that of nutritional deficiency being a significant modifying factor
- Must be made quite clear that periodontal disease is an infectious disease caused by bacteria and can be successfully prevented and treated by the elimination of bacteria (plaque)

Conclusions:

- Dr. Vogel → nutritional deficiencies and subclinical deficiencies will decrease host resistance to plaque; important for the periodontist to consider the patient's nutritional status as a etiological factor for periodontal disease
- Dr. Depaola → nutritional deficiencies may be a contributing factor to periodontal disease
- Dr. Robinson →until further studies are done, believes that nutritional deficiencies are not significant in causing periodontal disease