Scientific abstracts from the American College of Oral and Maxillofacial Surgeons Second Annual Residents Meeting, November 9-10, 2013, Jefferson Medical College, Philadelphia, PA, USA

A total of 33 oral and maxillofacial surgery (OMS) residents from 17 programs presented abstracts and case reports at the American College of Oral and Maxillofacial Surgeons (ACOMS) Second Annual Residents Meeting.

We are pleased to announce the winners for Outstanding Oral Scientific Abstract and Outstanding Case Presentation, both of whom will receive complimentary registration and reimbursement for travel expenses for the ACOMS 35th Annual Scientific Conference and Exhibition, April 27-30, 2014, in Las Vegas, NV, USA. Honorable Mention presenters will receive their choice of complimentary registration for the ACOMS 35th Annual Scientific Conference and Exhibition in Las Vegas or the 2014 ACOMS Residents Meeting.

Please congratulate our winners:

**Outstanding Oral Scientific Abstract:**

The use of a transcutaneous CO2 monitor during moderate sedation in oral and maxillofacial surgery

Presented by: Sanjeet Chaudhary, DMD

Authors: Sanjeet Chaudhary, DMD, Ruba Khader, BDS, Matthew Finkelman, PhD, Daniel Oreadi, DMD, Marcin Jarmoc, DMD, Roman Schumann, MD, and Morton Rosenberg, DMD

Tufts University School of Dental Medicine

**Outstanding Case Presentation:**

Periosteal osteosarcoma of the mandible

Presented by: Osama Soliman, DMD

Virginia Commonwealth University

**Honorable Mention Abstract:**

Study of end-tidal CO2 physiologic monitoring with capnography in oral surgery patients

Presented by: Dhaival T. Patel, DDS

Authors: Dhaival T. Patel, DDS, Barry C. Boyd, DMD, MD, Joseph D. Park, and Thomas Mang, PhD

University of Buffalo School of Dental Medicine

**Honorable Mention Case Report:**

Surgical and medical management of aggressive central giant cell granuloma: case report and review of literature

Presented by: Brett Bezak, DMD

Authors: Brett Bezak, DMD, and Christopher Viozzi, DDS, MD

Mayo Clinic Department of Oral and Maxillofacial Surgery

All accepted scientific abstracts presented at the ACOMS Second Annual Residents Meeting are available in Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology at http://dx.doi.org/10.1016/j.oooo.2014.01.001.

**THE EVALUATION OF A NONINVASIVE RESPIRATORY VOLUME MONITOR IN PATIENTS UNDERGOING DENTAL EXTRactions DURING MODERATE SEDATION**

*Alirez A Ashrafi, DMD, Sepideh Saboorre, BS, Maria Papageorge, DMD, MS, Morton Rosenberg, DMD, Roman Schumann, MD, and Archana Viswanath, BDS, MS,* Tufts University School of Dental Medicine, Oral and Maxillofacial Surgery Department

**Purpose:** This study examined the clinical utility of the ExSpiroN Respiratory Volume Monitor (RVM, ExSpiroN: Respiratory Motion Inc, Waltham, MA, USA) in patients undergoing oral surgery during moderate sedation. Previous work demonstrated the ability of this novel technology to provide noninvasive, real-time, continuous measurements of respiratory parameters including tidal volume (TV), minute ventilation (MV), and respiratory rate (RR) in spontaneously breathing patients. Current respiratory monitoring in nonintubated patients undergoing oral surgery relies mostly on oximetry, capnography, and subjective clinical assessment. We studied the changes in ventilator rates and volumes during moderate sedation with this device.

**Method:** After institutional review board approval and written informed consent, participants were enrolled in this prospective, observational study. Tidal volume and vital capacity were measured with a handheld spirometer for baseline comparison with the RVM, which uses an impedance-based technology and proprietary algorithms to obtain respiratory values. MV, TV, and RR measurements were collected from the RVM ExSpiroN before and during moderate sedation, until discharge. Sedations were carried out using midazolam, fentanyl, and diazepam. Age, sex, body mass index, and sedatives (timing, type, and dose), along with vital signs, were recorded and correlated with the device data. For each participant, we determined an MV change to a threshold value of 80% from their baseline (10 minutes before sedation) at 2 time points: sedation start and 10 minutes after drug administration. Paired t test and multivariate analysis of variance were used for comparison of the groups and dependent variables.

**Results:** 22 participants (13 male, 9 female) completed the study for this analysis. For all patients, MV decreased to below 80% from baseline immediately after drug administration. At 10 minutes after initial drug administration, MV of 11 participants remained below 80% of baseline, and the other 11 had recovered to above this limit. The demographics and sedation variables between these 2 groups were not independently significantly different; all P values were > .05.

**Conclusions:** Our study found an early decline of MV to below 80% of baseline immediately after sedative administration, and 50% of patients recovered to above this threshold within 10 minutes. It is not clear from these preliminary data which factors influence this outcome. Further study is needed to determine how this new technology could improve monitoring and patient safety outcomes in this setting.
PATIENT-CENTERED QUALITY OF LIFE MEASURES AFTER TEMPOROMANDIBULAR TOTAL JOINT REPLACEMENT SURGERY          Dale Baur, DDS, Faisal Quereshy, MD, DDS, FACS, Xena Alakailly, DDS, FIBMS, Daniel Schwartz, DMD, Yeliz Kilinc, PhD, and Catherine A. Demko, PhD, Case Western Reserve University

Purpose: This study aimed to evaluate patient-reported outcome measures assessing the quality of life (QOL) for patients with end-stage temporomandibular joint (ESTMJ) disease who have undergone unilateral or bilateral TMJ prosthetic replacement.

Method: After obtaining approval from the institutional review board, the records of 28 patients who had undergone either unilateral or bilateral alloplastic joint replacement procedures were retrospectively analyzed. All patients were treated using either TMJ Concepts or Biomet/Lorenz prosthetics at the Case Medical Center during the years 2007–2012. The indications to perform TMJ replacement were intolerable chronic TMJ pain and joint dysfunction that failed to respond to medical or previous surgical therapies. The patients were asked to complete an 18-item TMJ-S-QOL survey, which encompassed questions pertaining to pain, speech, chewing function, and various aspects of social life and mental health. The questions were answered on a 5-point scale as they pertained to both preoperative and postoperative status. The data were collected during postoperative clinic appointments, by mail, and via phone calls. Paired preoperative/postoperative data were then statistically analyzed using the Wilcoxon signed rank test.

Results: Among 28 patients (4 male, 24 female), 18 patients responded to our QOL survey. The markers of QOL after surgery were compared with the preoperative period. Pain, chewing, speech, anxiety, activity, recreation, and mood were significantly improved. Available on request is a table listing the numbers and percentages of improved patients, as well as the P value for each marker.

Conclusions: TMJ prosthetic replacement significantly enhanced the QOL among patients with chronic pain, limited range of motion, anxiety, impaired speech, and impaired chewing due to ESTMJ disease in this small sample of surgical patients.

THE USE OF A TRANSCUTANEOUS CO2 MONITOR DURING MODERATE SEDATION IN ORAL AND MAXILLOFACIAL SURGERY          Sanjeev Chaudhary, DMD, Ruba Khader, BDS, Matthew Finkelman, PhD, Daniel Oreadi, DMD, Marcin Jarzoc, DMD, Roman Schumann, MD, and Morton Rosenberg, DMD, Tufts University School of Dental Medicine, Department of Oral and Maxillofacial Surgery

Purpose: Continuous monitoring of end-tidal CO2 (ETCO2) is a requirement for deep sedation and general anesthesia during oral and maxillofacial surgery (OMFS) in 2014, and it may be expanded to moderate sedation in the future. In intubated patients, the ETCO2 measurement usually closely resembles the arterial partial pressure of CO2 (PaCO2). In nonintubated patients undergoing OMFS, ETCO2 measurements are unreliable with respect to the PaCO2, owing to technical limitations in capturing exhaled gases. Transcutaneous CO2 monitors measure the PtCO2 with electrochemical technology independent of expired breaths. This technology closely reflects PaCO2 and captures the end result of clinical breathing patterns, including respiratory efficiency in nonintubated patients, by continuous PtCO2 assessment and its trend during sedation.

Method: After institutional review board approval and written informed consent, we prospectively collected demographic, anesthetic, and outcome data in patients undergoing moderate fentanyl and midazolam sedation for third molar removal. All patients were monitored using a transcutaneous CO2 monitor (SenTec DMS; Thervil, Switzerland) that employs a simple ear clip. A bispectral index monitor (BIS; Coviden, Mansfield, MA, USA) assessed the depth of sedation. We correlated the sedation depth with the PtCO2 using the Pearson correlation. A value of P < 0.05 was significant.

Results: There were 18 adult participants who completed the study. During moderate sedation, the PtCO2 increased with an increasing sedation level. PtCO2 and level of sedation were negatively correlated (Pearson correlation, r = −0.3); however, this correlation was not statistically significantly different (P = 0.072).

Conclusions: Transcutaneous CO2 monitoring may be attractive during moderate sedation for OMFS procedures, because its location on the ear does not interfere with the surgical field and because the CO2 monitoring is not affected by the need to capture expiration. Our data show an inverse correlation between PtCO2 and sedation level. This trend did not reach statistical significance in our small cohort. PtCO2 monitoring may have a role as an additional safety monitor to reliably assess ventilation during sedation in nonintubated patients. A larger study with an increased variety of sedation techniques is warranted.

STUDY OF END-TIDAL CO2 PHYSIOLOGIC MONITORING WITH CAPNOGRAPHY IN ORAL SURGERY PATIENTS          Dhaval T. Patel, DDS, Barry C. Boyd, DMD, MD, Joseph D. Park, and Thomas Mang, PhD, University at Buffalo School of Dental Medicine

Purpose: In the oral surgery conscious sedation setting, sidestream capnography monitoring is used by obtaining expired gas samples at flow rates ranging from 50 to 250 mL/min. However, the gas sample may be mixed with ambient air entering through the oropharynx during routine oral surgical procedures, especially when the gas flow rate falls below the constant sample flow. Additionally, the presence of a higher amount of moisture in the oral cavity secondary to increased salivation and irrigation during a procedure may also affect the gas sampling. Thus, the accuracy of the capnography reading may be compromised. In this study, we evaluated whether there was a difference between end-tidal CO2 (PetCO2) values with the open-mouth vs closed-mouth settings.

Method: Twenty patients (9 men, 11 women; age range, 21–55 years) were included. Each patient was seated on a standard dental chair reclined at 60°, with the head slightly extended. End-tidal CO2 measurement was performed for 20 minutes with each patient, once with the mouth closed (control) for 10 minutes and then with the mouth open (study arm) for 10 minutes. A divided cannula with integrated sidestream capnometric probe was placed nasally with 1 L/min oxygen delivery and with the PetCO2 sampling at a flow rate of 200 mL/min. The apparatus was attached to the capnography monitor. End-tidal CO2 measurements were recorded in 1-minute intervals. To simulate clinical conditions, standard 2 × 2-inch gauze was placed in the anterior oral cavity and suction at a standardized flow rate was placed in the oral cavity every 30 seconds during the open-mouth arm.
Mouth opening was standardized to interincisal distance of 37 mm using a rubber bite block. A paired-sample t test was used to analyze data.

Results: The mean of open-mouth end-tidal CO2 measurements (38.95 mm Hg) differed from the mean of closed-mouth measurements (43.06 mm Hg) by 4.11 mm Hg (−9.5%) (P = .0001; 95% CI, 2.545–5.675), which reached statistical significance. The range of end-tidal CO2 measurements was 31.6% greater in the open-mouth arm vs the closed-mouth arm. The mean of the minimum end-tidal CO2 values was 13% lower in the open-mouth arm vs the closed-mouth arm. The mean of the maximum end-tidal CO2 values was 1.5% lower in the open-mouth arm vs the closed-mouth arm.

Conclusions: Dilution error in end-tidal CO2 sampling exists in sidestream capnometry with the openmouth variable in the oral surgery setting, which may be clinically significant.

SINGLE-USE VS MULTIUSE IMPLANT DRILLS: IS THERE A BENEFIT? Sumit Nijhawan, DDS, MD, Faisal Quershry, MD, DDS, FACS, Dale Baur, DDS, and Michael Horan, MD, DDS, PhD, Case Western Reserve University, Department of Oral and Maxillofacial Surgery

Purpose: The Veterans Affairs (VA) Office of Dentistry recently mandated that single-use implant drills become the new standard of care within the VA nationwide. In addition to the proposed benefit of reduction of infectious disease, manufacturers propose that the use of sharp, fresh drills in the single-use system ensures a clean osteotomy for the implant with promise for better prognosis. A major potential downfall for the system is the increased burden of cost. The purpose of this study was to determine whether the use of single-use Zimmer implant drills affected the overall outcome of implant placement relative to the standard, multiuse drill system and to determine whether this is a cost-effective means of treating a patient population that requires a high volume of implants.

Method: A prospective study was conducted in the Oral and Maxillofacial Surgery Clinic at the Veterans Affairs Medical Center in Cleveland, OH, USA. Both single-use and multiuse Zimmer implant drills for the Tapered Screw-vent System were used. The site of implant placement was stratified into type I, type II, type III, or type IV bone. All surgery was conducted in a similar fashion, and implant stability quotient (ISQ) values were taken using the Osstell system. An average ISQ value was obtained at time of placement and at 1 week. Only patients with overall Osstell values showing initial stability (≥50) were included in the study. Two-tailed t test was used to compare the means between the respective groups. The null hypothesis was that there would be no difference between the multiuse implant drill system and the disposable drill system. The alternative hypothesis was that there would be a difference between the 2 systems. In addition, a cost-benefit analysis was performed to determine whether single-use drills were a cost-effective means of treating the military veteran patient population relative to multiuse drills.

Results: When comparing disposable implant drills in type I bone vs multiuse systems in type I bone at immediate placement of the implant, the P value was found to be .08. When the same calculation was conducted in type II bone, the P value was found to be .37. There were no ISQ data available for placement of implants with the multiuse system in type III bone. When comparing immediate ISQ values in implant placement in type IV bone, the P value was found to be .24. When comparing the ISQ readings at 1 week in implants placed in type I bone between the 2 drill systems, the P value was found to be .045. The P value in comparing placement at 1 week in type II bone between the single-use and multiuse drills was found to be .39. All of the aforementioned results were not deemed to be statistically significant. Based on a cost-benefit analysis, the cost to transition from multiuse to single-use drills was approximately $1.5 million per year across the Veterans Affairs health care system.

Conclusions: Overall, there was a trend for higher ISQ values in implants placed with single-use drills when compared with multiuse drills, but this difference was not found to be statistically significant. These preliminary results indicate that there is no clinically significant difference between implant stability and viability with single-use vs multiuse Zimmer implant drills, although longer follow-up is required for more definitive results.

PATIENT STANDARDIZATION FOR DIAGNOSIS, TREATMENT, AND OUTCOMES OF OSTEOARTHRITIS OF THE TEMPOROMANDIBULAR JOINT Richard J. Hammond, DMD, and John Vorassi, DDS, Christiana Care Hospital

Purpose: The purpose of this study was to form a standardized osteoarthritis (OA) grading scale for the temporomandibular joint (TMJ) region analogous to contemporary tools reported in the orthopedic literature. A literature search was performed to identify a scale or survey that encompassed pain, function, and psychosocial factors similar to those measured in the knee and hip. This scale could be validated and implemented for identifying appropriate surgical candidates and evaluating patient outcomes.

Method: A literature search of the Ovid, PubMed/Medline, and Cochrane databases was performed using multiple search variables for scales or surveys used in the treatment of OA of the TMJ. These searches yielded no study of a scale or survey that investigated pain, function, and psychosocial factors in the treatment of TMJ OA. The literature search was expanded to include current orthopedic resources in standardization of patients with OA with knee and hip pain.

Results: The Ovid, PubMed/Medline, and Cochrane searches yielded no studies of surveys or scales that focused specifically on pain, function, and psychosocial factors in treatment of OA of the TMJ. There are many scales and surveys that collect data for pain associated with temporomandibular disorders, such as the Wilkes classification, the Multidimensional Pain Inventory (MPI), or the Graded Chronic Pain (GCP) scale, but there are none specific for OA of the TMJ. These areas have been studied extensively in the orthopedic literature on the treatment of OA of the knees and hips. The Western Ontario and McMaster University Osteoarthritis Index (WOMAC) is a well-validated orthopedic scale that evaluates many variables, including pain, stiffness, psychosocial factors, and physical function before, during, and after treatment. The WOMAC has been expanded to include even more variables, such as body mass index, race, and gender, and to gauge their effect on the final score of an individual’s survey. These are all variables that must be taken into consideration when treating complicated OA in the TMJ. Other scales that are being studied are the Hip Osteoarthritis Outcome Score, the Knee Osteoarthritis Outcome Score, and the Lower Extremity Function Scale.

Conclusions: Owing to the lack of research and evidence, there is a need to create and study the use of a scale or survey in the standardization and treatment of OA of the TMJ. Our study proposes a survey analogous to those found in the orthopedic
BEHAVIOR OF ORAL AND MAXILLOFACIAL INFECTIONS: WHERE ARE WE IN 2013? Veronica Teslyn Barreto, DMD, Temple University Hospital

Purpose: Unquestionably, oral and maxillofacial infections have changed dramatically in recent years. More and more, bacteria are developing resistance to more “modern” antibiotics such as clindamycin, and there is a shift toward using passé antibiotics such as penicillin G. As newer antibiotics are appearing on the market, few if any play a role in facilitating the management of orofacial infections. Understanding the behavior of the ever-evolving infectious process is key in managing these patients and avoiding lengthy hospital stay, cost, morbidity, and mortality. The present study reviewed and compared (1) admissions to Temple University Hospital for oral and maxillofacial infections from July 2012 to July 2013 with (2) admissions to the same hospital for orofacial infections from July 2002 to July 2003. The purpose was to analyze the behavior of orofacial infections at present; to determine what differences, if any, can be noted between the 2 patient cohorts; to determine who is susceptible; and to evaluate how these infections are affecting current hospital expenses.

Method: A retrospective analysis of the 2 cohorts was performed. Demographic variables, previous use of antibiotic therapy (before admission), response to antibiotic regimen, and need for antibiotic change were noted, along with Gram stain and susceptibility results.

Results: The number of severe infections has increased, requiring increased length of stay in an intensive care unit setting. There was no difference in variables such as age, race, and sex. The number of antibiotic changes during hospital stay has increased. C-reactive protein, an acute inflammatory marker, has been introduced in the recent patient cohort, facilitating the management and prediction of outcome of orofacial infections. Those infections with increased markers of inflammation (such as increased leukocyte count, increased core temperature on admission, and, more recently, elevated C-reactive protein) were found to be correlated with increased lengths of stay. This is in line with previously published data.

Conclusions: As the advent of newer antibiotic drugs with fewer side effects is dwindling, the bacterial resistance in oral and maxillofacial infections is skyrocketing. Patients with increasing numbers of comorbidities are presenting with more severe orofacial infections, lengthier hospital stays (especially in an intensive care unit setting), and increased operating room time. Certain strides (such as aggressive surgical management, as well as incorporation of acute inflammatory markers such as C-reactive protein) have facilitated a reduction of unnecessary operating room time and overall length of stay. A better understanding of the current behavior and the trends occurring in oral and maxillofacial infections, incorporation of C-reactive protein assessment, and a more aggressive approach have helped our department in reducing morbidity and length of stay in recent patient cohorts.