

2019 President's Summation – by Dr. Theodore Splaver

Within recent memory, the leadership of our Institute, Philip J. Boyne, DDS, MS, DSc and Shahrokh Shabahang, DDS, MS, PhD, set the bar high for the quality of continuing education programming provided by our Institute. Your president and Board of Directors, assisted by the Advisory Council, has attempted to emulate their high standards in faculty selection, and as evidenced by attendees' meeting evaluations, our 76th annual meeting was a success.

Thanks to all of you who supported our organization by your presence. So many of you are veteran attendees of many meetings as noted in our Newsletter. We pledge to continue to bring you the very best in continuing education, not only so you will remain current, but also ,that your knowledge base will be expanded by speakers who are truly on the “cutting *edge*”, who point the way to which biomedical knowledge, and our profession, dentistry, is headed.

No meeting summation would be complete without again thanking our Executive Secretary, June Barrientos, for her fine work and unwavering dedication to the organization. Much behind-the-scenes effort throughout the year is required to organize, communicate and manage the affairs of the AIOB and the result, as always is obvious to our attendees.

The Hermann Becks Lecture, which initiated the scientific session was delivered by Margaret Johnson, MD, Associate Professor of Medicine, Division of Pulmonary Medicine, Dean of Education, Mayo Clinic, Jacksonville, Florida, a specialist in Critical Care. Per her invaluable handout one gains an appreciation for the skill and devotion that Intensive Care Unit (ICU) staff impart, as, annually in the USA, 5 million patients are admitted to a hospital ICU with a remarkable 80% survival rate. However, since at least 1985, there has been concern about the quality of life enjoyed by these survivors, and Dr. Johnson described the “Post-ICU Syndrome” in which there is *new or worsening impairment in physical cognition or mental health status arising after critical illness and persisting beyond hospital stay*. Also concerning are *the acute and chronic psychological effects of critical illness on the family*. How many of us prior to this meeting were even aware of the pathophysiology which affects these patients and the economic and psychologic impact the long-term effects may have on them and their families? Among the lessons learned are attempts at early patient mobility should be made, nutrition is important, and delirium should be avoided if possible. It is also recognized that post discharge interventions are important, and *education of providers, patients and caregivers is mandatory*.

For her second presentation Dr. Johnson discussed “game-changing” innovations in both pulmonary and critical care medicine in the past decade.

The importance of pulmonary diseases worldwide was highlighted in the recently released World Health Organization's list of the 10 deadliest disease worldwide, which listed lower respiratory infections (#3), chronic obstructive pulmonary diseases (#4), respiratory cancers (#6) and tuberculosis (#9).

In her opinion, the biggest breakthrough in pulmonary medicine has been in treatment of cystic fibrosis, a genetic disease. A new triple drug combination will cover 90% of CF patients -who all have a single Phe508del allele -and will change this disease from one of children, to one of adults as survival beyond childhood will ensue. The drug, Trikafta (Elexacaftor-Tezacaftor-Ivacaftor) was approved by the FDA, shortly after our meeting at the end of October for

administration to people age 12 or older. Another innovation is the two endobronchial valves, which decrease the volume of hyperinflated pulmonary tissue in COPD. The importance of lung cancer screening with low dose CT for high risk patients was stressed as Dr. Johnson reminded us the lung cancer has the lowest survival rate of any cancers, since most are, unfortunately, diagnosed late. She then discussed targeted therapy and immunotherapy which have had some success when added to traditional chemotherapy in lung cancer treatment. Opportunities for lung transplantation and success will be expanded by ex-vivo lung perfusion, as lung tissue is viable for only six hours after perfusion, and this new technique doubles viability time. Another significant advance is the employment of extra corporeal membrane oxygenation (ECMO) in therapy for those with profound respiratory failure (ARDS).

Dr. Jeffrey Ebersole, PhD, Professor of Biomedical Sciences, and Associate Dean for Research, University of Nevada, Las Vegas chose, "Oral Health Sciences in the Era of Precision Medicine" as the topic of his first discussion. We are living in the age of Big Data, and scientists are using bioinformatics and computational biology to uncover potential relationships and best therapies. In particular, he focused upon periodontitis, which he stated may be "the collateral damage of bacterial attack on the oral tissues." Consequently, Dr. Ebersole postulated that periodontitis may contribute to poor aging, and there is a question of early periodontal disease accelerating aging in patients. Significantly shorter telomere length is found in patients with periodontal disease, and shorter telomeres are associated with more severe disease. A common metal, lead may be shown to have a role in severe periodontal disease. On the other hand, four mutant genes have been identified as being perio-protective.

His second lecture was entitled, Aging and Periodontitis: Immunosenescence/Inflammaging & the Oral Microbiome. Much of what he discussed is from collaborative research on periodontal disease using non-human primates as animal models. About 200 different microorganisms exist in any one individual's mouth, while 700+ species of organisms colonize the oral cavity of humans. With present techniques in DNA identification and deep sequencing, more and more of these are being identified, while their functions in oral biofilms, and plaque are yet to be fully elucidated. Study results have shown that periodontal disease promotes inflammatory, immunologic and humoral activities in those it affects. The biologic plausibility of the periodontal disease-systemic disease linkage appears to be unquestioned, however, most studies to date demonstrate association, not etiology. As periodontal disease progresses in an individual, there is a shift to the adaptive immune system. Dr. Ebersole also discussed inflammaging or Immunosenescence, which is the process of aging affecting our immune system.

Tara Aghaloo, DDS, MS, PhD, Professor, Section of Oral and Maxillofacial Surgery, and Assistant Dean for Clinical Research, UCLA School of Dentistry delivered the Philip J. Boyne Lecture whose topic was, "The Role of Growth Factors in Dental Practice." "Reconstruction of craniofacial defects was the focus of Dr. Philip Boyne's research and clinical career and he was a recognized authority in the field. In fact, he was a friend and sometime collaborator of Dr. Marshall Urist, who initially isolated BMP from bovine bone and who was an AIOB faculty member many years ago. Dr. Aghaloo reviewed the state-of-the-art and said that the future lies in application of cells, factors, scaffolding and vascularity. Among the factors, BMP upregulates VEGF which increases vascularity in the graft site, though its big disadvantage is its cost. Among the alternatives used at UCLA and elsewhere is platelet-rich-fibrin (PRF) which can be simply and inexpensively sourced from a small volume of autologous blood, provides improved handling of graft materials and can be utilized either as a membrane or as "sticky bone."

Medication-related osteonecrosis of the jaws (MRONJ) was the topic for Dr. Agahaloo's second presentation. Bisphosphonates, denosumab and other anti-resorptive medications have a valuable role in patient therapy, specifically, primary bone cancers, metastatic cancers, hypercalcemia of malignancies, osteoporosis and Paget's disease. Bisphosphonates remain within bone for 10 years while denosumab's half-life is 3-6 months, both thereby, possibly presenting difficulties for the treating dentist. Osteonecrosis of the jaws while seen in a small percentage of people taking potentially causative medications has caused considerable problems for the delivery of dental care in affected patients. Dr. Aghaloo runs a clinic following several hundred patients with MRONJ at her institution, and she described her very conservative approach to treatment of exposed bone, which involves vigorous cleaning with chlorhexadine, antimicrobials and finally removal of a fully formed sequestrum.

Some of us vividly remember the 1981 introduction of the digital Sony Mavica camera and the derision heaped upon it by film purists who declared that digital photography would never find a market. Fast forward to 2019 and try to buy film for your old camera or find a resource to develop and print any unprocessed rolls you may have. Electronic records, digital intraoral cameras, and digital radiographic imaging were, arguably, in the forefront of the conversion of our modes of treatment.

Dr. Brian Goodacre, DDS, MSD, Assistant Professor, Loma Linda School of Dentistry, spoke to us on "Digital Planning in Implant Dentistry: From Treatment Planning to 3D Printing." Implant therapy has evolved from the directive to "place the implant where the bone exists" to prosthetically -driven treatment planning. Cone Beam CT is increasingly utilized and may be the *de facto* standard of care for treatment planning. Dr Goodacre discussed his techniques for capturing maximal patient information and he discussed the DICOM format which is becoming the standard for integration of digital devices within medicine and dentistry. Dynamic surgical guides for implant placement allow intraoperative changes and can be fabricated by 3D printers, of which five types for dentistry now exist.

Dr. Charles Goodacre, DDS, MSD, FSCP, Distinguished Professor, Restorative Dentistry and Former Dean, School of Dentistry, Loma Linda University addressed the hotly debated topic, "Tooth Retention through Root Canal and/or Periodontal Treatments vs Tooth Replacement Using Dental Implants or Fixed Partial Dentures: Which Treatment is Best?" Implant survival rates, in the main, appear quite high, however, problems and complications may arise the longer the implant remains in place. Endodontic therapy and crown restoration are not inexpensive, and he stated that the success rate of crowns is not as good as implants, and it is recognized that crowns have an expected service life after which redo is necessary. Important considerations in treatment planning include consideration of continued facial growth with age and evaluation of bone in the adjacent natural tooth as he stated that papilla preservation is best accomplished by tooth retention. Untoward developments may include peri-implantitis, fracture of implants, implant screws and abutments over time. Late loss of implants, especially in the posterior maxilla, grafted or ungrafted, has been well documented

The Drs. Goodacre collaborated on a presentation entitled, "Computer-Aided Engineering of Complete Dentures and Implant Prostheses: From Traditional Impressions to Intraoral Scanning. "Fabrication of complete denture prostheses has also been affected by the digital revolution and while many still prefer traditional impressions, pouring and trimming models and setting teeth by hand the patient's anatomy can now be captured, in exquisite detail, by intraoral scanning, and the entire process digitized. The Goodacres discussed the AVA Dental

Digital Denture System in which dentures can be fabricated by a monolithic design or the denture base can be fabricated sans teeth, which are subsequently glued on. There is apparently no polymerization shrinkage with this technique. They believe that 3D printing is superior to milling as there is less waste. Technical aspects such as differentiation of tooth colors from acrylic base will surely be surmounted and we will undoubtedly gain the technical ability to characterize the teeth themselves on the computer. A game-changer, indeed.

Nikita Ruparel, DDS, MS, PhD, Professor and Chair, Endodontics, School of Dentistry, University of Texas Health Science Center, San Antonio commenced her lecture on 'Regenerative Endodontics' by stating that present conventional endodontics has an 85-95% success rate. To truly regenerate viable pulp tissue a strict treatment protocol which she elucidated, must be followed. Presently the technique is most successful in those patients whose root formation and apexification has not occurred. Trauma patients are less than ideal she stated as root development is usually seen.

Dr. Ruparel's second topic was, "Dental Drugs," and she called for a paradigm shift away from our current thinking in selection and prescribing of both antimicrobial agents and analgesics. The importance of proper selection and prescribing of antibiotics is underscored by the CDC 2019 report in which it is stated that 2.8 million antibiotic resistant infections are seen annually in the US with more than 35,000 people dying as a result. Additionally, 223,900 cases of *c. difficile* were reported in 2027 and at least 12,800 people died. This is an important topic for us as dentists prescribe 10% of all antibiotics in this country. Once an appropriate antibiotic has been selected there is still the question of duration of treatment and in treating virtually all focused bodily infections, a shortened course of medication is now urged. Resistance to beta-lactam antimicrobials starts within 3 days of administration and antibiotic prescribing for 2-3 days is often now suggested in certain circumstances, rather than the customary 7-10-day course.

Our country has experienced an opioid crisis these past several years and prescription drug abuse is in the news. A recent CDC report estimates that 21-29% of individuals who are prescribed opioids misuse them and 8-12% become addicted. Our profession has come in for unwanted attention as many believe that we, overall, either inappropriately or over-prescribe opioids for procedures which are not expected to cause significant patient pain. The efficacy of NSAIDS, either alone, or in combination with acetaminophen for acute pain following wisdom tooth removal was well established by Dr. Ray Dionne - AIOB speaker 2001 and 2009-and colleagues at NIH however, wide practice acceptance did not follow. Concern that the pain of hospitalized patients, in particular, was not being properly addressed, led to promotion of narcotic analgesics by prominent physicians and the Joint Commission on Hospital Affairs, and the development of more powerful narcotics which found their way into both practice and the abuse pipeline, led to the present crisis. How many librarians could have imagined that as part of their duties they might be administering narcotic antagonists to save lives, in their workplace? Dr Ruparel expounded upon intelligent dosing of NSAIDS /acetaminophen compounds as well as discussed problematic clinical situations in which achieving full and adequate analgesia might be difficult.

Judging by the sheer number of dedicated societies, journals and scientific articles, dental implants have truly influenced and revolutionized the practice of dentistry in so many ways. Originally, the scientific-based system developed by Dr. Per Ingvar Branemark could be sold only to “Course trained, “oral and maxillofacial surgeons who were to deliver this treatment solely in their hospital operating rooms under aseptic conditions. Later the system was opened to hospital-privileged and other periodontists, and ultimately any dentist who took the prescribed course, and the requirement for hospital OR was dropped in favor of in-office placement under clean conditions. It was not long before numerous competing companies developed root-form /cylindrical implants of widely varied pricing and various claims of superiority.

As with any surgical procedure, proper planning, precise execution and careful long-term follow-up are critical to success.

My topic, “Unusual Complications of Dental Implant Therapy: Patient Morbidity and Mortality,” reported on infections of both hard and soft tissues which may follow implant placement, may be immediate or delayed and involve the brain or mediastinum, among other sites. Many of the unusual complications of implant therapy are iatrogenic in nature, such as placement in an unusual site, such as the cranial vault or orbit, aspiration or ingestion of an implant or implant armamentarium which may be life-threatening in nature, with prompt referral and follow-up mandatory. Significant hemorrhage, from implant placement in either of the jaws may ensue and may embarrass the airway, requiring intubation or tracheostomy.

Dentists are seeing a virtual tsunami of cases of peri-implantitis, due to several causes, per Dr. Sreenivas Koka, a 2018 AIOB speaker. We reported on a small number of both primary and secondary oral squamous carcinomas ultimately diagnosed in the peri-implant cuff. Most cases were seen in people with concurrent risk factors for oral squamous carcinomas, however, diagnosis was delayed in several cases, since the implant sites were not the usual ones for occurrence or metastases. Virtually all cases of both primary and secondary carcinomas were refractory to usual care within two weeks and the message derived is that the clinician should have both a low threshold for either biopsy or referral for care.

Four known deaths attribute to implant therapy are attributed to two practitioners, one of which was responsible for a patient, with a pre-existent esophageal narrowing, ingesting an implant wrench, whose removal was the first of a series of events of further complications, which ultimately led to the patient’s demise. A second dentist was responsible for a series of three deaths and two potentially fatal complications due to air embolism, caused by the employment of a non-implant system handpiece, which allowed a mixture of water-air to enter the mandible through hollow drills.

Complications are inherent to any surgical procedure, however, some of the unusual complications of dental implant therapy should prompt one to carefully adhere to treatment protocols, and be ever vigilant in follow-up, no matter the number of implants placed nor how adept one has become in planning and placement.

