



2016 Resident & Dental Student Poster Session

Chair: Caroline T. Nguyen, DMD, MS, FACP

Thursday, Oct. 6, 2016

11:30 a.m. – 2:00 p.m.

Grand Hall

1 CE Credit

1. CAD/CAM Surgical Guides Use for Placement of Tilted Implants And Immediate Loading

Salahaldeen M. Abuhammoud, DDS
Second Year Prosthodontic Resident
University of Iowa

Treating atrophied arches is a challenging therapeutic problem. Several surgical procedures have been developed to augment bone volume. Patient's acceptance for these procedures is hampered due to their high cost and invasive nature which carry a high risk of morbidity, pain and discomfort. In addition, increased treatment time with delayed implant placement (> 4-6 months) to ensure good healing maybe needed. This clinical report describes use of CAD-CAM surgical guide and use of titled implants to avoid vital anatomical structures and eliminate need for additional augmentation. The maxillary arch received 2 implants to support a 3-unit FDP. The mandibular arch received 4-implants to support a full-arch implant supported complete denture (Hybrid). Increased A-P spread was obtained adding a prosthetic advantage by eliminating cantilevers. Immediate loading by conversion of the mandibular denture into a fixed complete denture was completed following computer-guided implant surgery.

2. Importance of Radiographic Assessment Prior to Removal of A Fixed Implant-Supported Prosthesis for Repair: Two Case Reports

Bryce P. Adamson, DDS
Third Year Prosthodontic Resident
University of Toronto

Maintenance and repair is an anticipated part of implant-supported prosthetic rehabilitation. Removal of implant-supported fixed prostheses may be required to address a range of biological and technical complications that may arise (e.g., prosthesis fracture or veneering material wear). Thorough radiographic assessment is an important part of a clinician's examination and treatment planning prior to the temporary removal of a fixed implant-supported prosthesis for assessment or repair. The two cases cited here illustrate how incidental findings from such radiographic examinations informed and guided patient care in a favorable and predictable manner. In the first case, lack of prosthesis fit to the implants was noted incidentally prior to planned removal of a fixed full-arch metal-acrylic prosthesis for refurbishing. In the second case, failure of multiple implants was noted incidentally prior to removal of a fixed full-arch metal-acrylic prosthesis for repair of multiple acrylic fractures.

3. Full Arch Provisional Prosthesis Utilizing CAD/CAM Technology: A Clinical Case Report

Haidar A. Alalawi, BDS
First Year Prosthodontic Resident
Boston University

Nael A. Eid, BDS
Boston University
Second Year Prosthodontic Resident

Current advances in dental and computer sciences made the fabrication of good CAD/CAM Restoration achievable. Nowadays, advanced in dental biomaterial facilitate Utilizing CAD/CAM technology in fabrication of restoration form numerous materials, including ceramics, metal alloys, and various

composites. This clinical case report describes chair side fabrication of full arch provisional prosthesis utilization of CAD/CAM technology. The evolution of biogeneric design techniques with CEREC CAD/CAM system provided predictable visualization of the final design of the prosthesis. In this regards, fabrication of full arch provisional prosthesis has difficulty in correlating the prepared teeth and the biogeneric reference. In this technique, reference points were created in the patient mouth with flowable composite resin and scanned to correlate the prepared teeth to the old provisional prosthesis to provide second set of provisional prosthesis.

4. Prosthodontic Rehabilitation For An Existing Transmandibular Implant System

Naser B. Alawadhi, DDS
Third Year Prosthodontic Resident
Indiana University

During the early period of dental implant evolution, the 1970's witnessed introduction of the transmandibular implant system, subsequently modified by Hans Bosker. It utilized implant-assisted prosthesis for the severely resorbed mandible. This system has been recently abandoned due to high-risk complications such as; pathological mandibular fracture, infection, post fracture, and prosthesis failure. Patients still present with this system in dental offices, but parts and tools for this system are no longer marketed. This case report presents prosthodontic rehabilitation for a seventy- two year old female with an inefficient Dolder bar[®] and implant-assisted complete denture on a surviving Bosker[®] transmandibular implant system.

5. Effect of Repeated Torqueing of Abutment Screws on The Internal Threads of Implants: An In vitro Study

Omar S. Alburawi, BDS
Third Year Prosthodontic Resident
New York University

Purpose: To determine if torqueing two times at 32Ncm, on the day of insertion, might alter the internal threads or hex of dental implants or the abutment screws.

Materials and Methods: Ten internal hex titanium implants (BL, RC 4.8X14mm SLA active Straumann) with their respective abutments and titanium screws were cemented into an embedded cylinder (∅ 5.95mm titanium sandblasted sleeve) with methyl methacrylate with inorganic extender and mounted in a custom titanium bracket. All implants were torqueed two times at 32 Ncm with a 10 minute wait period between each torqueing time.

Conclusions: There were no alternations on the hex and internal threads of dental implants and the titanium abutment screws after torqueing two times at 32 Ncm.

6. Fully Edentulous Ridges Restored with Full Implant Screw-Retained Porcelain Fused to Cobalt Chromium Prostheses: A Case Report

Muayad M. Al-Furaih, BDS, MS
Third Year Prosthodontic Resident
Rutgers University

An edentulous 75-year-old female patient presented to the postgraduate prosthodontic clinic at SDM-Rutgers University for treatment. The patient underwent multiple bone graft procedures and site preparation for future implant placement. A total of 12 implants (6 in maxilla/6 in mandible) placed by OMFS department. Complete screw-retained porcelain fused to cobalt-chromium prostheses were planned. Duplicated complete dentures were scanned to mill the cobalt-chromium framework. Precise fit of the frameworks were confirmed radiographically and digital perception. Porcelain was applied for the teeth with a small pink porcelain for the gingival margin. Again precise fit was verified, occlusion refined, and the screw openings were restored with cotton and composite restorations

7. The Effect of Mouth Rinses on Color Stability of Denture Teeth

Mohammad M. Alhaddad, DDS
Third Year Prosthodontic Resident
Harvard University

With the introduction of implant technology, new treatment options had become available for edentulous patients looking for more functional and stable prosthesis other than the conventional dentures. Hybrid prostheses have been utilized in the rehabilitation of completely edentulous patients. Maintenance is an important aspect in the long survival of any prosthesis. Patients treated with hybrid prostheses might have difficulties cleaning their prostheses, because they can only be removed by the dental professional. Anti-microbial mouth rinses are used widely among these types of patients in their routine oral hygiene procedures, to minimize malodor and biofilm accumulation. The study evaluates the effect of different commonly used mouth rinses on the color stability of denture teeth. This study aims to identify, if there is, a mouth rinse that will not alter the color of denture teeth, so patients with hybrid prostheses can use it safely in their routine oral hygiene.

8. Effect of the Third Point Reference on The Accuracy of Electronic Pantograph Reading

Lama R. Aljabr, BDS
Third Year Prosthodontic Resident
The Ohio State University

Prosthodontic rehabilitation requires careful attention to occlusion and occlusal relationships, in order to fabricate a harmonious prosthesis both functionally and esthetically. In such situations, pantographic tracings have been used to record condylar movements in order to customize the articulator to a given patient. Thereby record each condylar position in every plane of movement to facilitate proper excursive pathways and optimum form and position of teeth. Since spatial orientation of the maxillary cast onto an articulator requires three points to secure it in space, each articulator system specifies a different third reference point in addition to the 2 condyles. Such variation might potentially affect the position of the casts on the articulator, and influence the condylar guidances making the reliability of these anterior reference points for maxillary cast orientation questionable. This study compares the effect of the different locations of the third reference point to the accuracy of electronic pantographic reading.

9. Corrosion Behavior of Tizr (Roxolid®) Dental Implant Alloy Compared to cpTi and Ti6Al4V Alloys

Saad S. Alresayes, BDS

Second Year Prosthodontic Resident
University of Illinois at Chicago

Objective: To investigate the corrosion process of Roxolid® alloy at different saliva pHs by using electrochemical tests. **Materials and Methods:** In this in vitro study, three types of titanium alloys, commercially pure titanium (CpTi), titanium grade 5 (Ti6Al4V) and Roxolid® (Ti15Zr) were selected. Eighteen (18) samples were divided into six (6) testing groups; Standard electrochemical tests were conducted at two levels of saliva pH. Titanium surfaces were analyzed using light interferometry microscopy for surface roughness and scanning electron microscopy (SEM) for surface characterization before and after the corrosion test. ANOVA and t-test were used to evaluate the data ($p < .05$). **Results:** Low saliva pH significantly affected the corrosion behavior of all Ti types. Corrosion rate of Roxolid® was significantly lower than other Ti groups.

10. Rotational Path Partial Removable Dental Prosthesis: A Clinical Case Report

Sarah F. Alsadun, BDS
Second Year Prosthodontic Resident
University of Michigan

A partially edentulous patient may be rehabilitated with dental implants, partial fixed denture prosthesis, or partial removable denture prosthesis. Patients tend to prefer fixed treatment options; however, there are some situations where a partial removable dental prosthesis is the best choice of treatment. For example, patients who have large bony defects or financial concerns might be best treated with PRDP. This poster presentation illustrates the treatment of a partially edentulous patient (Kennedy's Class II Modification 1 in the maxillary arch and Kennedy's Class III Modification 1 in the mandibular arch). Because the lower teeth are tilted mesially a rotational path PRDP was fabricated with a posterior/anterior seating design in cobalt-chrome.

11. Alternative Treatment Approach of Inadequate Existed Implant Assist Overdenture for Ectodermal Dysplasia Patient

Hussain D. Alsayed, BDS
Third Year Prosthodontic Resident
Indiana University

A 55 year-old male presented with a diagnosis of Hypohidrotic ectodermal dysplasia (HED) and history of complete anodontia. He presented with 15 year-old maxillary complete denture and a mandibular implant-assist overdenture with cast Hader bar and distal cantilever ERAs attachments. Clinical findings: fibrous anterior maxillary ridge, hyperplastic tissue underneath the bar, and severely resorbed posterior mandibular ridge with minimum keratinized tissue. The bar was moderate worn with broken ERA attachment. The bar was removed to facilitate the surgical removal of the hyperplastic tissue and healing abutments were placed. Maxillary open tray impression for conventional complete denture was made with PVS. Mandibular open tray implants pick up impression was made with PVS. Wax try in dentures were fabricated and tried in. Conus abutments were fabricated. The SynCone Caps were picked up. The wax trial dentures were tried in again. Finally, the dentures were delivered and the patient was seen for follow up.

12. Revisiting A Method to Increase The Retention of The Mandibular Complete Denture on a Severely Atrophic Ridge

Malek R. Alshehri, BDS
Second Year Prosthodontic Resident
University of Maryland

Fabricating a mandibular complete denture on a severely atrophic alveolar ridge is an ever-challenging process. As a result, providing a stable and retentive denture that satisfies the patient becomes very difficult for the clinician. In this poster, a novel method of the past for increasing the retention of the mandibular complete denture will be reviewed.

13. Achieving Maximal Predictability And Esthetics, Fabricating an Immediate Complete Removable Dental Prosthesis Using Digital Smile Design

Luis M. Alvarado, DDS
Third Year Prosthodontic Resident
Louisiana State University

Hannah Knott
Louisiana State University
Third Year Predoctoral Dental Student

Patients with failing dentition that require immediate complete removable dental prosthesis (ICRDP) may pose a great challenge for the restorative dentist. These patients may lack adequate esthetic references to be replicated in a dental prosthesis; the inability to make an esthetic try-in prior to the prosthesis fabrication reduces the esthetic predictability of these cases.

Facial and intraoral pictures allow the clinician to plan and set esthetic parameters that will guide the laboratory to fabricate prosthesis that will satisfy the esthetic challenge of ICRDP fabrication. A calibrated two-dimensional image can help transfer the earlier designed esthetic position of the teeth into a master cast. Also, using this technique allows the dentist to select the adequate proportions and size of teeth. This not only makes tooth selection easier, but also provides everyone involved with a better visual perception of the final outcome, increasing predictability, and overall satisfaction.

14. Evaluation of Chipping with 3 Different Margin Designs for CAD/CAM Restorations

Khaled M. Alzahrani, DDS
Third Year Prosthodontic Resident
University of Southern California

The aim of this study is to compare the edge integrity of machined IPS e.max to Lava™ Ultimate restorations manufactured with CAD/CAM and to investigate the ability of Cerec 4 machine to produce restorations with acceptable margins at different marginal angles.

A single die was fabricated in Jet Acrylic with a three different finishing line (a 60° bevel, a 30° bevel and a 0° bevel). The CEREC MC XL software was used for scanning, and milling ten copings for each material. To determine the marginal integrity of the crowns, a estimation of the degree of marginal chipping was

performed by calculating the Chipping Factor of each restoration. Within the limitations of this study we could conclude that 60° finish line for both materials demonstrated higher chipping factor compared to 0° finish line which would compromise the marginal fit of the restoration.

15. Management of Peri-Implant Induced Jaw Fracture by Single Implant Retained Overdenture

Nicole I. Andreini, DDS
Second Year Prosthodontic Resident
West Virginia University

A 75-year-old female presented to the WVU Graduate Prosthodontics Clinic following complications from treatment for failed dental implants. The patient had a complex medical history of diabetic coma necessitating a life-flight to the emergency room. Further evaluations led to the belief that the infection around two mandibular implants may have contributed to the loss of blood sugar control leading to the coma. The original overdenture utilized a Hader bar retained mandibular overdenture on three implants. The agreed upon treatment was surgical removal of the infected implants, which was complicated by pathologic jaw fracture. Extensive jaw reconstruction was performed at time of surgery utilizing screws and plates to stabilize the jaw. Following a protracted healing period, this clinical report shows the prosthetic management of the patient utilizing a single implant retained overdenture.

16. Comparison of Flexural Strength of Milled CAD/CAM PMMA and Conventional PMMA Provisional Restorations

Konstantina Angelara, DDS
Third Year Prosthodontic Resident
University of Washington

Statement of problem: Limited information is available concerning the properties of computer-aided designed/ computer-aided manufactured (CAD/CAM) interim materials. Purpose: The purpose of this study was to determine and compare flexural strength of monolithic polymethyl methacrylate (PMMA) CAD/CAM materials with the conventional PMMA. Null Hypothesis: The null hypothesis of the present investigation is that there is no difference in physical properties between CAD/CAM and conventional PMMA materials. Materials and Methods: Five materials were compared (Monochromatic, Gradient, Pink CAD/CAM PMMA, heat and auto polymerized PMMA). A CAD rectangular bar (25x2x2) was designed and 10 identical samples were fabricated for each of the groups tested. Specimens were fractured under 4-point loading test with a cross-head of 0.5 mm/min. Results: The mean flexural strength of the PMMA materials tested ranged from 355.8 to 544.2 Mpa. Conclusion: The auto-polymerized group exhibited statistically significant lower flexural strength compared to CAD/CAM groups and heat processed PMMA materials.

17. A Simplified Classification System for Partial Edentulism : A Theoretical Explanation

Rasoul Arbabi Kalalti, DDS, MS
First Year Prosthodontic Resident
NOVA Southeastern University

A single die was fabricated in Jet Acrylic with a three different finishing line (a 60° bevel, a 30° bevel and a 0° bevel). The CEREC MC XL software was used for scanning, and milling ten copings for each material.

To determine the marginal integrity of the crowns, a estimation of the degree of marginal chipping was performed by calculating the Chipping Factor of each restoration. Within the limitations of this study we could conclude that 60° finish line for both materials demonstrated higher chipping factor compared to 0° finish line which would compromise the marginal fit of the restoration.

18. Fabrication of Copy-Milled Maxillary Fixed Detachable Prosthesis with Individual Tooth Supports

Ashley Azizian, DDS
Second Year Prosthodontic Resident
Veterans Affairs Medical Center-New York

Treatment planning cases for fixed implant-supported restorations can be complicated by interocclusal space limitations and by mechanical limitations of the selected restorative material. Reported mechanical complications of fixed detachable implant-supported prostheses include, but are not limited to, separation or fracture of acrylic resin, separation of porcelain teeth from the prosthesis, and fracture of the substructure. A specific mode of mechanical failure in fixed detachable implant-supported prostheses is a failure to design mechanical support for each of the prosthetic denture teeth. In cases with limited interocclusal space where mechanical failure is more likely, it is possible to limit separation of the denture teeth from the prosthesis by including mechanical retention. The purpose of this presentation is to demonstrate a technique to mechanically support denture teeth in a fixed detachable implant-supported prosthesis with the goal of limiting mechanical failure of the prosthesis.

19. Management of Tooth-Induced Apical Peri-Implantitis

Khalid A. Azzouz, DDS
Third Year Prosthodontic Resident
West Virginia University

A 75 year old male presented to the Graduate Prosthodontics Program at the West Virginia University School of Dentistry complaining of an ill-fitting maxillary denture and toothache related to #29. Intraoral and radiographic examinations revealed an ill-fitting maxillary overdenture and grade II mobility of #21, 23, 24, and 25. Interestingly, the periapical periodontitis around #29 extended to the apex of the #30 implant. Periodontal consultation of the #30 implant found no signs of BOP, pocketing, or pain. Mobility was not assessed as the splinted prosthesis was stable and no evidence of coronal peri-implant disease was noted. Planned treatment was the extraction of #29 followed by mechanical curettage and irrigation with saline and chlorohexidine. The #30 implant was followed for more than one year with radiographic evidence of the periapical defect healing. Final restoration of the patient was completed with a maxillary overdenture and a mandibular overlay partial.

20. Effectiveness of a Protective Wedge on Prevention of Iatrogenic Damage of Adjacent Teeth During Tooth Preparation: A Prospective Cohort Study

Ahmed Ballo, BDS, PhD
First Year Prosthodontic Resident
University of British Columbia

This study aimed to determine the effectiveness of a novel protective wedge in preventing damage to adjacent teeth during crown preparation. Preclinical undergraduate dental students prepared teeth for

metal-ceramic crowns (MCC) on teeth #11 and #15, and for a full metal crown (FMC) and an MOD onlay on tooth #46 on manikin-mounted typodont arches. The students chose to operate with or without the protective wedge. Damage to the adjacent teeth was assessed extraorally by three calibrated faculty members blinded to student names and wedge use. Severe iatrogenic damage was found 15%, 49%, 36%, and 69% of the time without a protective wedge for the #11 (MCC prep), #15 (MCC prep), #46 (FMC prep) and #46 (Onlay Prep) respectively, which was significantly reduced to 6%, 12%, 5%, and 17% respectively when a protective wedge was used. Use of a protective wedge reduces the frequency of severe iatrogenic damage to adjacent teeth during crown preparation.

21. A Technique to Correct Discrepancy of Anterior-Posterior Tooth Position of an Immediate Complete Denture

Edmond A. Bedrossian, DDS
Second Year Prosthodontic Resident
University of Washington

Background: It is unacceptable to be rendered edentulous without being provided an interim prosthesis. However, immediate complete dentures (ICD) are difficult to deliver and perform normal oral function due to the inability of a "trial stage" and optimal fit to the newly-extracted ridge contours. **Case Report:** A 50-year-old female presented with a diagnosis of severe periodontitis. The patient was treatment planned for full mouth extraction and provided a maxillary ICD opposing an immediate load implant-supported prosthesis. After surgical intervention, the maxillary arch was completely edentulated with severe anatomical irregularity due to grafting and repair procedure. The prefabricated ICD could not be placed owing to lack of adequate vestibule, severe tissue undercut, and resulting in inappropriate vertical and anterior-posterior (A-P) tooth position. The purpose of this clinical case report is to provide a chair-side technique to resolve inappropriate A-P tooth position of a maxillary ICD.

22. Jaw Fracture Associated with the Use of Endosseous Implants: A Systematic Review

Elahe Behrooz, DDS, MBA
First Year Prosthodontic Resident
University of Toronto

Purpose: This study aimed to systematically review the published literature on jaw fractures associated with the use of dental implants. **Materials and Methods:** A search of electronic databases and a manual search of the published literature were conducted up to July 2016. **Results:** 75 articles were identified, and 16 case reports met the inclusion criteria. The aetiology of jaw fracture in association with dental implants is multifactorial and includes limited bone volume, compromised bone quality, suboptimal surgical execution, trauma and bone loss (subsequent to infection, implant failure, osteoradionecrosis or medication-related osteonecrosis of the jaws). Most reported cases of jaw fracture occurred in the mandible, in females, and in severely atrophic jaws. **Conclusions:** Jaw fracture associated with the use of dental implants is a rare but serious complication. Severely atrophic mandibles may be at an elevated risk of complications, and implant surgical interventions in this group need to be approached carefully.

23. The Effect of Ultraviolet Radiation on Candida Albicans Biofilm on Polymethyl- Methacrylate Resin: In Vitro Study

Randold A. Binns, DMD, DDS

Third Year Prosthodontic Resident
University of Illinois at Chicago

Polymethyl-Methacrylate (PMMA) resins are widely used materials for denture construction. Sodium perborate 3.8% (Polident) has been shown to be effective to disinfection of *C. albicans* on acrylic resins but it is likely to roughen the surface Ra. This increased in roughness has a substantial effect on plaque adherence, microbial colonization, and may influence denture stomatitis (candidiasis). Ultraviolet (UV) irradiation has been evaluated extensively for its germicidal effects. Several reports exist on the efficacy of different doses and times of exposure of UV light in inactivating *C. albicans* and rendering reduction on adherence and viability. In this study, UV 254nm with different total energy was applied to different PMMA samples containing *C. albicans* biofilm. The survival of *C. albicans* to UV irradiation showed no significant difference with that of sodium perborate.

24. Digital Workflow & Interdisciplinary Management of a Patient Affected by Oligodontia

Michele Buda, DDS
Third Year Prosthodontic Resident
University of Washington

Orthodontic therapy is a valuable tool to improve prosthetic outcome, from simple cases to full mouth rehabilitations. One of the most critical factors to increase efficiency of orthodontic treatment is the use of osseointegrated implants to obtain stable anchorage. Provisional restoration placed on implants can facilitate orthodontic movement and restore occlusal function. An orthodontic setup is required to determine post-orthodontic position of the teeth as well as the implant supported restorations. An innovative technique to transfer implant position in initial patients cast and utilize guided surgery to optimize implant placement.

25. Predictable Prosthetic Space Maintenance During Staged Complete Mouth Rehabilitation

Sarah A. Bukhari, BDS
Third Year Prosthodontic Resident
Loma Linda University

In this poster a staged complete mouth rehabilitation is presented to accommodate financial constraints during the first stage of treatment. The objective of complete mouth rehabilitation is to restore both function and esthetics. Determining factors for successful complete mouth rehabilitation are proper treatment planning, sequencing and full control over the progress of the restorative rehabilitation. A clear acrylic resin added to the anterior cameo surface of the maxillary fixed complete denture served as a space maintainer. By adding the space maintainer, potential over eruption of mandibular anterior teeth and encroachment of the prosthetic space was avoided. The transition to the final stage of the rehabilitation was simplified and more predictable with the use of the reversible process with the space maintainer. During the second stage of the complete mouth rehabilitation, zirconia restorations were used to restore the mandibular arch to the maxillary FCD after easy removal of the space maintainer.

26. Lithium Discilicate for #Cores?

Nathan E. B. Cain, DDS
Third Year Prosthodontic Resident

Montefiore Medical Center

High quality aesthetics, high performance and low cost continue to make lithium disilicate an attractive option when selecting restorative materials. The challenge of restoring endodontically treated teeth include pressed ceramic seals for RCT access and esthetic zone use of ceramic cores. The conceptual approach and rationale for this use of lithium disilicate will be demonstrated.

27. Management of the Compromised Dentition in the Esthetic Zone Involving Natural Teeth and Implant Supported Restorations Using Different Ceramic Materials

Luis Carracho, DDS
First Year Prosthodontic Resident
University of Michigan

The optical properties of dental ceramics available on the market and their rational use allow the practitioner to recreate a natural and esthetically pleasant dentition in the anterior region, even when different types of core substrates are present or adjacent teeth and implant restorations are planned. For a predictable result it's crucial to understand the relationship between the optical properties of teeth to be restored and the ceramic materials to use. Glass ceramics allow a high rate of light transmission therefore they are commonly indicated in the presence of favorable substrates. On the other hand, polycrystalline ceramics used to manufacture cores and substructures, tend to be less translucent or even opaque, and can be successfully used to mask discolored and metallic substructures. This case reports on the rehabilitation of the anterior maxilla using a logical diagnostic approach that results in a conservative treatment plan, using different restorative techniques and materials.

28. An Alternative Approach to Conventional Orthodontic Wax Up: A Case Report

Maria Chatzinikola, DDS
Second Year Prosthodontic Resident
Louisiana State University

Corey S. Romero
Louisiana State University
Third Year Predoctoral Dental Student

An intra-oral mock-up allows both the clinician and patient to play deciding roles in the final outcome of prosthodontic treatment. However, opportunities to perform a mock-up have been limited to additive procedures. When attempting to visualize outcomes that require subtractive treatment, an intra-oral mock-up generally falls short. This case study explores an alternative mock-up technique that does not involve temporary materials or bonding to the patient's teeth. When faced with insufficient mesio-distal restorative space for tooth #8, we chose to alter that space by means of digital interproximal reduction using the 3Shape Ortho Analyzer. The digitally adjusted arch form was then printed using a MakerBot Replicator Mini consumer 3D printer, which was then used to wax-up tooth #8 to its optimal contours.

29. Bond Strength Between Conventional and Injection Molded Denture Base Resins

Sharath Chedella
Third Year Prosthodontic Resident

University of Rochester

Removable dentures need relining or rebasing at regular intervals. Research has demonstrated that adequate long term bonding is necessary between the base layer and the relined layer for successful outcome. The latest injection molded acrylic materials are increasingly being utilized for denture fabrication. However there is paucity of information regarding optimum material or technique for relining/rebasing. Thus the current in vitro study aims at addressing the bond strength between different acrylics, thereby providing valuable information to the clinicians and technicians alike.

30. Medical Grade Polymers as an Alternative RPD Framework

Sara E. Chen, DMD
Second Year Prosthodontic Resident
University of Illinois at Chicago

Advanced medical-grade polymers have the potential of serving as alternative precision fit RPD frameworks while utilizing digital workflows. Patient satisfaction related to comfort, speech, aesthetics, function, and preference were evaluated for two Ultaire AKP polymer RPD groups. The standard group followed a conventional metal framework design while the alternative group followed a framework design optimizing the polymer's properties. Seventeen patients were included. Patient satisfaction was measured on a Likert scale (1 to 5 = most satisfied); 64.7% and 62.5% of patients reported a 4 or 5 rating for the standard design and the alternative design, respectively. Patients preferred the alternative design to the standard design with regard to comfort (81.3% vs. 76.5%), weight (93.8% vs. 82.4%), color (81.3% vs. 76.5%), and aesthetics (87.5% vs. 58.8%). Overall, 53.3% preferred the alternative compared to the standard design (46.7%). AKP polymer RPD designs are a viable alternative and may be preferred by patients.

31. Marginal and Internal Adaptation of Lithium Disilicate Crowns: CAD/CAM Versus Heat-Pressed Technique

Sonchanin Chinsawananon, DDS
Third Year Prosthodontic Resident
University of Southern California

The objective of this in vitro study was to evaluate the marginal and internal adaptation of lithium disilicate restorations fabricated with a CAD/CAM system and compare them with the conventional heat-press technique. In addition, this study aimed to evaluate the influence of different spacer thicknesses on the accuracy of lithium disilicate restorations fabricated with the Sirona CEREC CAD/CAM system. The CEREC system was used to fabricate 30 crowns for the first 3 groups, with different spacer thickness settings: 30 mm, 60 mm, and 120 mm. In the fourth group, 10 lithium disilicate crowns were fabricated with the heat-press technique. Occlusal gap, axial wall gap, and marginal gap were evaluated by measuring the polyvinylsiloxane material captured in the gaps. The results showed that the heat-pressed group yielded superior marginal and internal crown adaptation. For the CAD/CAM groups, 30- or the 60-mm spacer settings could be recommended for the CEREC CAD/CAM system.

32. Digital Dentistry: Cost-Benefit Considerations for the Dental Practitioner

Robert H. Choe, DMD

Second Year Prosthodontic Resident
University of Maryland

As digital dentistry rapidly establishes its foothold in the field of dentistry, the dentists have been scrambling to incorporate the new technologies into dental practices and the new education curricula. Research and development in digital dentistry, thus far, have primarily involved determining and improving upon the accuracy/efficiency of the digital technology. Very little research has considered cost-benefit analyses of the dental practitioner. Due to the enormous hype surrounding digital dentistry, it is very easy to get caught up with the benefits and gloss over the costs. This poster presentation looks to offer cost-benefit considerations dentists need to make when incorporating new digital dentistry technologies into their practices.

33. Single Maxillary Complete Denture: A Case Report

Seung Kee Choi, DMD
Third Year Prosthodontic Resident
University of Maryland

Patients with single maxillary complete denture opposing dentate mandibular arch can be difficult to treat when compared to completely edentulous patients. Occlusal discrepancies and positions of the mandibular teeth may challenge the clinician's ability to control factors to obtain balance, which is crucial in providing patients with stability of the denture and ultimately satisfaction. This case report describes management of a patient with an existing maxillary complete denture opposing a dentate arch.

34. Implant Assisted Removable Partial Denture

Daniel A. Cortes Trevino, DDS
Second Year Prosthodontic Resident
University of Michigan

A 50-year-old female presented to the University of Michigan Graduate Prosthodontic clinic with a chief complaint of discomfort due to the lack of stability and retention of her maxillary removable partial denture and a desire to improve her appearance. A complete dental examination was performed along with a review of the patient's medical history. The clinical findings identified were: partial edentulism identified as a Class I, Kennedy classification and missing teeth from #1 to #4 and #12 to #16. Dental implants were placed in #4 and #12 and after the appropriate incorporation period uncovered and used in the treatment of the edentulous space. ERA attachments for retention of the prosthesis were used in place of traditional clasping to eliminate the need to have components visible upon smiling. This poster will outline the treatment protocol used to reconstruct the patient's dentition.

35. Think Blue

Shayla Dang, DMD
Third Year Prosthodontic Resident
Augusta University

Partially edentulous patients with microdontia often require a combination of orthodontic, surgical and prosthodontic interventions to restore their dentition to ideal esthetics and function. A common problem with such complex multidisciplinary treatment is the development and communication of the end goal between the different specialists, especially if the existing teeth are not in the ideal dimensions. Such complex planning can be enhanced by bonding composite to the existing teeth to create proper tooth dimensions to facilitate orthodontic spacing. Composite pontics can be temporarily bonded to adjacent teeth to maintain the mesial-distal space necessary for implant placement. When bonding indirect composite restorations, a blue resin can be used to distinguish the composite from enamel layer, enabling the clinician to remove the composite while preserving the enamel for bonding of final restorations.

36. Iatrogenic Dental Implant Complications: A Clinical Report

Laura J. Davila, DDS
Second Year Prosthodontic Resident
Veterans Affairs Medical Center – New York

A critical component in implant prosthodontics is the ability to manage implant-related complications. Implant complications are often categorized as either biological or mechanical and an algorithm for relatively predictable treatment is adopted by the practitioner. However, patients may present with iatrogenic complications that do not have predictable treatment approaches. Additionally, there are reports of an association between implant failure and iatrogenic factors; which includes: divergent implants, presence of a gap between the fixture and the prosthetic components, failure to remove residual cement. The purpose of this presentation is to demonstrate a technique to manage an iatrogenic dental implant complication, and to create a biologically acceptable treatment condition from a compromised restorative site.

37. In-Office 3D Printing and Clinical Indications

Jonathan H. Dawson, DMD
Third Year Prosthodontic Resident
University of Louisville

Desktop stereolithography (SLA) 3D printers have become an affordable option for use in a dental office. Although they are limited in their material choices, they have a higher resolution than the Fused Deposition Modeling (FDM) that has dominated the affordable printer market, making SLA a more appropriate printer to manufacture diagnostic casts acquired from intra-oral scanning, diagnostic cast modified with digital waxing (or tooth arrangement), dental appliances, and surgical templates for alveolar surgery and implant placement. This poster will present examples of clinical indications for a desktop SLA printer in the dental office.

38. Evaluation of Dimensional Accuracy of Digital Implant Impression Technique Using Intraoral Scanning versus Traditional Pick Up Technique

Nicole L. Deakins, DMD
Third Year Prosthodontic Resident
Columbia University

Using the digital workflow is increasing in implant dentistry. Advances in surgical planning, surgical guide fabrication, digital impressioning and restoration fabrication result in improved final outcomes. While digital technology has been supported for tooth-supported and single implant crown restorations, it is unknown as to whether or not digital impression techniques and cast fabrication are accurate enough to fabricate a clinically acceptable short-span fixed partial prosthesis. The purpose of this in vitro study is to investigate the 3-dimensional and rotational accuracy in the x, y and z planes of the digital impression technique using scan body abutments and 3D printed casts compared to that of the conventional open tray impression techniques with elastomeric impression material. With the limited studies on direct intra-oral digital implant impressions using scan bodies, it would be advantageous to continue to research current advancements in digital implant impression techniques to confirm its clinical reliability.

39. How to Restore a Missing Tooth with a Sleeping Implant Beneath?

Andrew N. Dill, DDS
Third Year Prosthodontic Resident
University of Michigan

An 80-year-old male presented to the University of Michigan Graduate Prosthodontics clinic with missing teeth #9, and #10. The patient wanted a fixed dental prosthesis and not removable. The adjacent teeth consisted of an implant supported single crown for #8, and a conventional crown on a natural tooth #11. Radiographically, the edentulous space consisted of a sleeping blade implant in the position of #10, and adequate vertical height. The recommendation was made for a single implant supported prosthesis in the position of #9, with a cantilevered #10 pontic restoration. A single implant was placed in the position of #9, with a titanium custom abutment and porcelain fused-to-metal FDP. By cantilevering a single lateral incisor off of the implant supported crown, the edentulous space was restored without complication

40. Use of Existing Implants for Retention of a Non-Restrictive Surgical Guide

Andrey V. Doroshenko, DDS
Third Year Prosthodontic Resident
University of Maryland

A patient presented to University of Maryland Prosthodontic clinic with a hopeless mandibular dentition. Two implant restorations were present in the posterior mandible. Existing implant crowns were converted to locator abutment and utilized in retention of an immediate denture. Post healing, locators were used to retain a radiographic guide and a surgical guide, in aiding of placing two fixtures in anterior mandible, for overdenture use.

41. Pilot Study: Fracture Strength of Implant Screw-Retained All Ceramic Crowns with the Use of the Nobel Angled Screw Channel

Alexander S. Drew, DMD
Third Year Prosthodontic Resident
Columbia University

Due to the anatomic angulation of the pre-maxilla, the presence of buccal concavities, and the resorption of the maxillary alveolus towards the palate, implants often require cement retained crowns

with custom abutments to correct for angulation discrepancies. Screw retained restorations are preferred to minimize peri-implantitis concerns from residual cement and the desire for retrievability. The purpose of this study was to evaluate the fracture strength of a newly designed monolithic zirconia crown with a 25-degree angled screw channel. Two CAD/CAM monolithic zirconia crowns were fabricated by Procera. Crown 1: Monolithic zirconia crown with titanium insert and straight screw channel. Crown 2: Monolithic zirconia crown with titanium insert and 25-degree angled screw channel. The screw-retained restorations were directly attached to Nobel Active implants. Specimens were subjected to an off-axis compression load from a MTS cyclic loading machine until failure.

42. Development of an Antimicrobial Soft Denture Liner with In Situ-Generated Silver Nanoparticles for the Prevention and Treatment of Candidiasis

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United States Air Force Medical Center

OBJECTIVE: To develop an antimicrobial soft denture liner with in situ-generated silver nanoparticles (AgNPs) for the prevention and treatment of candidiasis. **METHODS:** Silver benzoate (0.25, 0.5, 1, and 2 wt%) was used to generate AgNPs in situ in a soft denture liner (Visco-gel, Dentsply). Atomic absorption spectrometry measured in vitro Ag⁺ ion release. A growth inhibition assay measured antifungal activity against four *Candida albicans* isolates (x5314, x1215, 88-111, and azole drug-resistant strain 13-2559). Data were analyzed via ANOVA and a Neuman-Keuls post hoc test. **RESULTS:** Increased AgNP-loading was accompanied by increased Ag⁺ ion release. All AgNP-loaded groups displayed in vitro fungal inhibition approaching 100% for all strains of *Candida* through 24 hours, with decreasing antifungal activity thereafter. Increased AgNP-loading enhanced growth inhibition and extended the duration of action. **CONCLUSIONS:** A novel antimicrobial soft denture liner with in situ-generated AgNPs has been developed for the prevention and treatment of oral candidiasis.

43. Resistance Form of Lithium Disilicate Full Coverage Restorations Fabricated Using 3-Axis and 5-Axis Milling Units: A Comparison Study

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Third Year Prosthodontic Resident
Naval Postgraduate Dental School

This table clinic evaluated the resistance form of lithium disilicate full coverage restorations fabricated using two different milling units. A single cobalt chromium die was scanned and restorations were digitally designed. Two restorations were milled by a 3-axis milling system (inlabmcxl, sirona) and by a 5-axis milling system (ceramil motion 2, amann girrbach). The four restorations were cemented on the chromium cobalt die with calcium hydroxide and loaded using the MTS insight universal testing machine with an angled lateral force until dislodgement. The peak loads were recorded and the data was analyzed.

44. Implant Surgical Training Within an Advanced Education Program in Prosthodontics: Rationale and Significance

Sergio Florencio, DDS
Third Year Prosthodontic Resident

Harvard University

CODA has approved the proposed revisions to the Accreditation Standards for Advanced Specialty Programs in Prosthodontics, effective July 1st, 2016, which assures that all those who pursue specialty training in prosthodontics will be competent in the surgical placement of dental implants. How to effectively educate prosthodontic residents in surgical implant placement within a 3-year program, without overcrowding the existing curriculum, is a challenge many are now facing for the first time. The objective of this poster is to describe an elective program, developed in the Advanced Graduate Education Program in Prosthodontics at the Harvard School of Dental Medicine, designed to focus on implant surgery for complete jaw reconstruction. This program gave prosthodontic residents the opportunity to be involved in all phases of treatment, where they were able to learn not only implant insertion for complete jaw reconstruction, but also advanced aspects of the completely edentulous restorative treatment, enhancing their curriculum.

45. Peri-Implant Inflammations and Possible Treatment Methods: An In-Vitro Study

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University at Buffalo

Violet I. Haraszthy, DMD, MS, PhD
University at Buffalo
Vice Chair of Prosthodontics Department

Objective: Peri-implantitis is caused by oral microorganisms and can result in failure of implant therapy. This in vitro study compared modalities to remove biofilm from titanium disk surfaces. Methods: Smooth surface titanium disks, were incubated in brain-heart infusion broth mixed with saliva. The disks were removed, and treated with either; 1) Dental curette; 2) Sandblaster; 3) Titanium brush; 4) Implantoplasty; 5) Diode laser. From each treatment group specimens were 1) Cultured in BHI media for CFUs; 2) ATP assay to test for the presence of bacteria; 3) Endotoxin Assay Kit to test for endotoxins; 4. SEM microscope to visualize the surface. Results: All treated titanium discs had lower percentage of surface covered with adherent microorganisms. The most effective treatments were sandblasting and implantoplasty in reducing or eliminating bacteria and endotoxin from the surfaces. Conclusions: These treatment methods might be efficacious in vivo to treat infected dental implants and peri-implantitis.

46. Restoring an Edentulous Patient with CAD/CAM Fabricated Complete Dentures: A Case Report

Jose Miguel Garcia Loera, DDS
Second Year Prosthodontic Resident
University of Iowa

Within the last 10 years, computer-aided design/computer-aided manufacturing (CAD/CAM) technology has been incorporated into the design and fabrication of numerable dental restorations, including complete dental prostheses. The fabrication of milled complete dental prostheses with digital scanning technology presents multiple advantages over conventional complete denture prosthetics, including (but not limited to): 1) Reduced number of patient visits; 2) Superior strength and fit of dentures due to use of pre-polymerized acrylic resin blocks for milling; 3) Reduced potential for dentures to harbor microorganisms and minimize resultant infections; 4) Easily reproducible (creation of duplicate dentures)

due to stored digital data; etc. A case report is presented in which a 79-year-old female patient was rehabilitated with CAD/CAM fabricated complete dentures; the step-by-step technique used is presented as well as the results of the treatment (stability, retention, esthetics, phonetics, and patient satisfaction).

47. Overview of the Two Generations of Locator Removable Attachment Systems

Loreta Geneviciute, DDS
Third Year Prosthodontic Resident
New York University

The therapeutic advantage of using implants to increase the stability and retention of mandibular dentures has been well documented.^{1,2} This has encouraged many practitioners to adopt the overdenture as the standard modality of care for patients suffering from mandibular edentulism.^{3,4} ZEST Anchors' self-aligning Legacy Locator overdenture attachments offer several advantages including the fact they are among the lowest profile attachments available. After over a decade of continuing research ZEST has recently announced the debut of the new generation of Locator attachments, the Locator R-Tx. The design of Locator R-Tx improves upon the features of the Legacy Locator, offering clinicians a stronger and more prosthetically convenient removable attachment system. The purpose of the following review is to compare and contrast Locator R-Tx attachment system with the previous generation of Legacy Locator attachments.

48. A Technique for Forming Accurate Screw Access Channels When Angle Correction Screws are Utilized in an Implant-Supported Fixed Dental Prosthesis

Petrina Gerogianni, DDS
Third Year Prosthodontic Resident
University of Texas Health Science Center at San Antonio

The implant-supported fixed dental prosthesis (hybrid) has become a popular treatment modality. However, implant location can create complications in fabricating an esthetic and predictable prosthesis. Depending upon the location and orientation of implants, the screw access channels may exit unfavorably on the cameo surface. Several companies are using angle corrected screw channels to provide flexibility with regards to function and esthetics. This technology allows for the access channels to be redirected to exit through more favorable locations. The purpose of this poster is to demonstrate the fabrication technique for a resin jig that accurately records the path of an angle corrected screw channel before processing and allows for its accurate transfer after processing. This greatly facilitates screw retrieval through well-defined screw openings and prevents undue removal of acrylic circa the screw channels.

49. Preparation Sequence for Full Mouth Restoration with Crown and Bridge

Brandon A. Gordon, DDS
First Year Prosthodontic Resident
University of Michigan

Full mouth rehabilitation using traditional crown and bridge restorations are a challenge. In such patient treatments successful results are achieved when practitioners gain a complete understanding, prior to

picking up the handpiece, as to why there is a need for restoring the full dentition. Success also comes from proper assessment of occlusal parameters, aesthetic concerns and the maintenance of proper function. The use of a complete diagnostic wax up, and knowing in which area to begin preparing the teeth are important factors. This poster aims to evaluate three approaches to preparation sequences; 1. Anterior to posterior; 2. Posterior to anterior and 3. Complete arch preparation. By understanding each approach and when they can be implemented practitioners will have the best chance at producing long term stability, with proper function and excellent aesthetics.

50. Key Features to Evaluate in an Aesthetic Smile Regarding Objectives and Subjectives Parameters

Diogo N.M. Gouveia, DDS
First Year Prosthodontic Resident
University of Michigan

The aesthetic is considered the science that studies the "beauty", so as a science it needs standards and procedures to measure and reproduce what has been studied. Several references are already well consolidated in the scientific literature regarding the key issues in the aesthetic perception of the smile. Accordingly, facial features, lips, teeth and attachment tissues are related and are able to modify each other. Even though, for example, incisal line, gum line, soft tissue harmony and dental symmetry are fundamental for the aesthetic treatments, it is important to find a common denominator with respect to aesthetic treatment, considering both the functional requirements of the patient and their expectations. The objective of this poster is to discuss inter-relationship between aesthetic parameters well established in the literature and subjective perception of patients and clinicians.

51. Implant-Supported Fixed Prosthesis Loosening Due to Fracture of Prosthetic Components: A Case Report

Noorein Hajira, DDS, Msc
Second Year Prosthodontic Resident
University of Toronto

Implant-based care is a popular and generally effective treatment modality for replacement of missing teeth. However, mechanical complications associated with implant-supported restorations do occur and may manifest as loosening of the prosthesis. This case report describes the diagnosis and management of a loose screw-retained implant-supported fixed dental prosthesis due to fracture of an abutment screw and fracture of an abutment. The diagnostic and management challenges in the treatment of patients with old generation implant components and the significance of radiographic and exploratory assessment are also discussed.

52. Completely Digital Workflow for a Fixed Partial Dental Prosthesis: A Clinical Case Report

Daniel J. Hammaker, DDS
Second Year Prosthodontic Resident
University of Michigan

Digital impression and CAD/CAM work flow are advertised as an innovative alternative to conventional techniques. Arguably, digital dentistry has resulted in a more efficient workflow, increased patient acceptance, and the ability to visualize preparations and prostheses pre- fabrication. Studies have

shown that fixed partial dental prosthesis frameworks fabricated from a digital impression demonstrated better internal fit than those fabricated from a conventional impression. Additionally, fixed partial denture frameworks fabricated with the use of CAD/CAM techniques have demonstrated marginal and internal fit similar to conventionally fabricated frameworks. Using each of these techniques, in combination, aids the clinician in providing an excellent prosthesis via a completely digital workflow. This poster will illustrate the process, from the first appointment to delivery, of using digital dentistry to restore a partially edentulous patient.

53. Evaluation of Small Group Learning: A Facilitator's Perspective

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University of Illinois at Chicago

Dental schools participate in curriculum reform periodically as a way to re-evaluate the effectiveness of current curricula. The University of Illinois at Chicago (UIC) evaluated its program back in the early 2000s. As a result, the school made an important decision to change its educational course and implemented a small group learning (SGL) program in 2011. As the first class of SGL students recently graduated in 2015, now is a critical time to evaluate the new program. Facilitators, in particular, have a complex role in SGL; therefore, their point of view in SGL deserves careful review and should be used for assessment of UIC's curricula. This study's aim is to clarify dental faculty facilitator attitudes and beliefs about SGL.

54. Prosthetically Driven Implant Surgery in a Dual Arch Fixed Hybrid Case

Samuel J. Hickman, BDent
Third Year Prosthodontic Resident
University of Minnesota

In this clinical case study, a 67-year-old woman with advanced periodontal disease and notable bone loss presented with 6 remaining maxillary teeth and 8 remaining mandibular teeth. Following digital treatment planning, the maxilla and mandible were edentulated and immediate conventional complete dentures were delivered to the patient. After a period of healing, maxillary and mandibular alveoloplasty was performed to achieve the desired restorative space and 5 implants were surgically placed in both arches. Following a period of osseointegration, the maxilla and mandible were restored with fixed hybrid implant-supported prostheses. This clinical case study discusses prosthetically-driven implant surgery, the importance of digital treatment planning in advanced surgical treatment, and the role of the prosthodontist in such cases.

55. How Much Do We Know About Possible Prosthetic Risk Factors for Peri-Implant Disease?

Yuanlynn Hsieh, DDS
First Year Prosthodontic Resident
University of Michigan

The first dental implant product was released to the market in the 1960s, and until now it has gradually become the priority of choice to restore edentulous ridge. The more implants we use in daily practice, the more new scenarios we need to deal with— for example, peri-implant diseases. The etiology

between peri-implant diseases and periodontal diseases were considered similar. (Meffert, 1996) Recent study by Dr. Atieh (2013) showed the prevalence of peri-implant diseases in implant level and patient level were 40.3% and 82.2%, separately. With such high prevalence, etiologies of peri-implant diseases are widely discussed. Besides host and periodontal risk factors, how much do we know about prosthetic risk factors? In this poster, we are going to review recent studies with clinic cases regarding to peri-implant diseases and some possible prosthetic risk factors including excess cement, implant overloading, microleakage, crown-implant ratio and prosthesis design.

56. X-Linked Oligodontia: A Case Report

Amanda G. Hughart, BSDH, DDS
Third Year Prosthodontic Resident
University of Texas Health Science Center San Antonio

Although agenesis of teeth is a common dental anomaly, the occurrence of severe hypodontia is rare, especially in the primary dentition. Oligodontia is defined as the agenesis of six or more teeth and may be classified as isolated or syndromic. In severe cases where primary and permanent teeth are affected, frequent complications include esthetic, psychological, speech, and masticatory functional disorders. Treatment considerations vary from early intervention to multidisciplinary depending on the severity of the case. This case report describes the prosthodontic treatment of a severe case of X-linked oligodontia with development of only 5 primary teeth and complete agenesis of the permanent dentition.

57. A Comparison of Two Attachment Types on the Stresses to the Mandibular Residual Ridge: A 3D Finite Element Analysis

Mohammad Imani Emadi, DDS
First Year Prosthodontic Resident
NOVA Southeastern University

Purpose: The aim of this study was to compare two types of attachments on the basis of the stresses introduced to the mandibular posterior residual ridge by two implant-retained overdenture. Methods: The basic model was generated from the data provided by a CT-scan of the patient's mandible with two implants, and existing overdenture. Models were used in order to simulate two situations: 1. An edentulous mandible supporting an overdenture retained by two implants connected with a bar system, 2. two implants with solitary ball attachments were modeled. The occlusal load of 35 Newton was introduced to the first molar region of each group. The stresses in the mandibular ridges under the first molar region was measured using the Ansys software. Results: The bar overdenture model demonstrated higher stresses as compared to the ball overdenture model. Conclusion: The mandibular overdenture introduced less stress to the posterior ridge using ball attachments.

58. A Decision Making Tree for Fractured Implant Screws

Faris Z. Jamjoom, BDS
Third Year Prosthodontic Resident
The Ohio State University

Implant supported prostheses have become a reliable treatment modality with high success rates and follow-up periods up to 20 years. Despite their reliability, implant-supported prostheses may present with complications and challenges. Fractured abutment and prosthetic screws is one of these complications, occurring at a rate of 2-6% and 4-12% respectively. Managing fractured screws can be extremely challenging for the clinician, which may lead to burial or removal of the implant. Therefore, this complication needs to be addressed to maintain the implant functionality. The literature is replete with techniques designed to assist the clinician with fractured screw retrieval. A comprehensive decision making guideline for these techniques may be helpful to facilitate the fractured screw retrieval when possible. The purpose of this presentation is to introduce different screw fracture management techniques in the form of a decision making tree that can serve as a guide for the clinicians when managing screw fractures.

59. Comparison of Verification Jigs for Full Arch Prostheses

Geoffrey R. Johnston, DDS
Third Year Prosthodontic Resident
The Ohio State University

As full arch implant supported prostheses become more and more popular, the need for a passively seating prosthesis becomes more and more apparent. In the past, with cast frameworks for a full arch prosthesis, if it was deemed impassive, it could be corrected by a section and solder technique. With the advent of milled frameworks, the importance of having an accurate cast before framework fabrication has increased. The verification jig will verify your model and ensure an accurate cast when fabricated correctly. This poster will compare different modes of fabricating a verification jig, and outline some common shortcomings with each technique.

60. A Novel Digital Workflow to Fabricate Temporary Restorations

Carlos A. Jurado, DDS
Second Year Prosthodontic Resident
University of Alabama at Birmingham

The fabrication of provisional restorations is a crucial step in oral rehabilitation. Digital dentistry has evolved the fabrication of provisional restorations improving precision, efficiency, material performance, and ease of fabrication. Methods of provisional fabrication are described leverage current technologies. Entering the digital workflows with laboratory or intraoral scanning are demonstrated followed by design with both conventional and digital waxing of final design. Limitations of modelless fabrication are shown. Nonetheless, provisional restorations made through the digital workflows have demonstrated excellent outcomes.

61. Prosthodontic Management of a Patient with Parry-Romberg Syndrome

Jesse S. Kane, DDS
Third Year Prosthodontic Resident
University of Michigan

Parry-Romberg syndrome is a rare disorder characterized by slowly progressing unilateral facial atrophy. The common clinical manifestations include: atrophy of skin, soft tissue, muscles and underlying bony

structures. The common oral manifestations include: short roots, hypodontia, crossbite and hyposalivation. Facial deformity and functional impairment are often present. Oral prostheses provide improvements in both intra- and extra-oral esthetics as well as mastication. This poster will present an ongoing prosthodontic treatment plan for a 60-year-old female patient with Parry-Romberg syndrome. Treatment thus far has consisted of full mouth extractions, and immediate dentures. Though there have been no documented cases of dental implants in a patient with Parry-Romberg syndrome, a thorough literature review and surgery consultation revealed no biologic contraindications. A CBCT was performed in order to fabricate a surgical guide and 4 mandibular dental implants were placed. The treatment will be finalized with a maxillary complete denture and implant assisted mandibular overdenture.

62. Functional and Esthetic Oral Rehabilitation of Severely Worn Dentition and Restored Vertical Dimension

Peerapat Kaweewongprasert, DDS
Third Year Prosthodontic Resident
Indiana University

Left untreated, a worn dentition may result in pulpal inflammation, tooth sensitivity, and a loss of vertical dimension. Proper prosthodontic rehabilitation of patients with severely worn dentitions requires adequate diagnostic tools, accurate monitoring and interdisciplinary treatment planning, especially if dental implants are included in the overall management. This presentation demonstrates the use of computer-aided design and computer-aided manufacturing (CAD/CAM) technology in the prosthodontic rehabilitation of a severely worn dentition with decreased vertical dimension. Treatment included the utilization of dental implants, custom titanium abutments, cement retained fixed restorations and a removable partial denture that was supported and retained via Locator[®] attachments.

63. Differences Between Conventionally and CAD/CAM Fabricated Complete Removable Dental Prostheses – Objective & Subjective Analysis

Krystle Kendall, DMD
Third Year Prosthodontic Resident
University of Illinois at Chicago

Chris Coffey, DDS
University of Illinois at Chicago
Third Year Prosthodontic Resident

Methods of denture fabrication have not progressed substantially for the past 70 years, since PMMA was introduced in 1936. Computer-aided technology is an emerging method for fabricating complete dentures. The purpose of this study is to determine if there are any differences between conventional and CAD/CAM (digital) fabricated dentures. The study will focus on: denture fabrication process, esthetics, phonetics, function, and overall patient satisfaction. Twenty edentulous patients who are in need of removable complete dentures will be selected. One set of conventional complete dentures and one set of CAD-CAM dentures will be fabricated. After completion of each different process, the subjects will be asked to complete a survey regarding the denture fabrication experiences. This will be the first

study in this regard and the results to be obtained are expected to serve as a guideline to the clinician and as a foundation for future researchers in the fields of prosthodontics.

64. Micro-Movement of Full Zirconia CAD/CAM Abutments Within Titanium Implants

Florian R. Kernen, Dr. Med. Dent.
Third Year Prosthodontic Resident
University of Connecticut Health Center

Implant dentistry is trending towards aesthetics, leading to the development of ceramic abutments. One ceramic materials of choice is zirconia due to its flexural strength, fractural toughness and white color. Failure behavior and origins of commercially-available CAD/CAM abutments have been examined in cyclic fatigue to gain insights into the role of abutment design. One potential failure mechanism involves micro-movement at the screw seat (or elastic bending) allowing contact between the zirconia and the inner implant surface. This research aims to determine if failure of zirconia abutments is attributable to micromovement at the screw seat or internal binding leading to an increased lever arm. It is hypothesized that if we look physically, by 3D x-ray, optical microscopy and finite element analysis at full zirconia CAD/CAM implant abutments within titanium implants, the abutments may demonstrate micro-motion or bending causing fracture below the screw seat due to an extension of the lever arm.

65. Bacterial Adhesion to Novel Implant Surfaces

Navpreet K. Khatra, DDS
Second Year Prosthodontic Resident
University of Maryland

Streptococcus mutans and staphylococcus aureus adhesion to five different implant surfaces.

66. When to Place an Implant? Prosthodontic Retreatment of an Implant Crown

Thomas L. Kwun, DDS
Third Year Prosthodontic Resident
University of Michigan

Ideal timing of the implant procedure is clinically assumed to be after the dento-alveolar growth has completed. However recent literature suggests interproximal contact loss between implant prosthesis and natural teeth does occur even when implant treatment was done after completion of dento-alveolar growth. This poster will review the literature present a treatment of prosthodontic rehabilitation of an implant crown with loss of proximal contact and incisal level discrepancy. The 57 year old female patient presented at University of Michigan Graduate Prosthodontic Clinic for retreatment of a 26 year old implant crown. Clinical inspection revealed a loss of proximal contact and incisal level discrepancy. The initial implant restoration was undertaken past bone maturation/growth at age of 30. Prosthetic treatment involved reshaping of emergence profile, a new custom abutment, new implant screw retained crown and veneering of anterior dentition.

67. Bond Strength of Oxirane/Acrylate Resins Using Commercial Bonding Systems

Stephen P. Lambert, DDS

Third Year Prosthodontic Resident
United States Air Force Medical Center

Overall Objective: To develop an Oxirane/Acrylate interpenetrating network resin System (OASys) to double the clinical lifetime of current dental restoratives. Specific Objective: To determine the dentin shear bond strength of OASys resins using commercial bonding systems. Methods: Unfilled OASys resins (100:0 Epoxidized Hydrogenated Bisphenol A (Epalloy 5000):dipentaerythritol penta/hexaacrylate (DPHA), 75:25 Epalloy:DPHA, 50:50 Epalloy:DPHA, 25:75 Epalloy:DPHA, and 0:100 Epalloy:DPHA) were bonded to dentin using three commercial bonding system and shear bond tests were performed. Results: The bond strength of BisGMA:TEGDMA control to dentin using Scotchbond and All-Bond was ~9 MPa, but ~5 MPa when using the Filtek LS adhesive. OASys resins did not bond well to dentin using Scotchbond and All-Bond, but 100:0, 25:75 and 0:100 Epalloy:DPHA groups had bond strengths of ~9 MPa using the Filtek LS. OASys resins do not bond well to dentin with methacrylate-based bonding systems, so an oxirane/acrylate bonding system must be developed for OASys resins.

68. Customizing Clinical Protocols for Fabrication of Digital Complete Dentures

Evangelia Lampraki, DDS
Third Year Prosthodontic Resident
University of Rochester

Computer-aided design and manufacturing (CAD/CAM) technology was recently introduced to Removable Prosthodontics. Digital denture systems have increased. The effective adaptation of the digital denture systems and incorporation in clinical practice can become a cost effective and time efficient procedure for the clinicians. Reported advantages of such systems include: reduced number of clinical appointments and total treatment time, reduced costs, decreased residual free monomer, absence of polymerization shrinkage resulting in improved fit, less porosity, decreased Candida Albicans retention, easy re-fabrication from stored digital data and increased patient satisfaction. The purpose of this poster is to introduce new alternative customized clinical protocols for the fabrication of complete dentures using digital technology.

69. The Dentist's Role in the Multidisciplinary Approach to Head and Neck Cancer Management: A Literature Review

Sarah K.Y. Lee, DDS
Second Year Prosthodontic Resident
University of North Carolina

This literature review evaluates the current understanding of the dental role in multidisciplinary team management of head and neck cancer. Recent studies have described improved coordination and outcomes for cancer patients who are managed in this collaborative approach. Multidisciplinary teams involve surgical, radiologic, and chemotherapeutic providers that work jointly in tumor board meetings and multidisciplinary clinics. The intent of this management strategy is to effectively improve diagnosis, planning, and treatment and thereby enhance overall care. Dentistry is a significant component of care in head and neck cancer treatment. The dentist plays a critical role throughout phases of treatment - pre-operative evaluation, in-treatment stabilization, and rehabilitation of head and neck cancer patients. Through this review, the state of integration of dentistry within multidisciplinary management

can be better assessed and how it may impact the overall quality of care and outcomes in head and neck cancer patients.

70. Mandibular Implant-Supported Fixed Prosthesis: A 30-Year Success Story

James Lee, BDS (Hons)
Second Year Prosthodontic Resident
University of Minnesota

In this fresh human cadaver study, an 86-year-old woman donated her body to the University of Minnesota Anatomy Bequest program after successfully wearing a 5-implant-supported mandibular fixed detachable prosthesis for 30 years. The original mandibular prosthesis was in use for 26 years and opposed a maxillary complete denture. In 2012, a new set of maxillary and mandibular prostheses was fabricated due to fracture of the mandibular framework distal cantilever. No other significant treatment was completed until her passing in 2016. Digital periapical radiographs, photographs, and impressions were made before the mandibulectomy was performed. Implant stability using resonance frequency analysis was measured prior to sectioning. In addition, push-in failure tests were performed on implants #20, 22, and 24, and a histomorphometrical analysis was performed on implants #27 and 29 along with calculation of the implant:bone contact. The study results demonstrate this treatment modality can function with minimal complications for the long-term.

71. Fatigue Resistance of Various Thicknesses of Lithium Disilicate Occlusal Veneers Luted to Enamel and Dentin Substrates

Michael R. Lituchy, DDS, BS
Third Year Prosthodontic Resident
Columbia University

As the aged population grows the demand to treat the worn dentition will increase. Previously, these teeth involved aggressive full coverage restorations. Advances in minimally invasive prosthetic principles allow us to restore worn posterior teeth with occlusally bonded lithium disilicate (Li Di) veneers. The purpose of this in vitro study is to investigate the fatigue resistance of CAD/CAM Lithium Disilicate (LiDi) occlusal veneers adhesively luted to enamel compared to dentin at veneer thicknesses of .5mm, .7mm, 1.2mm and 1.5mm. Specimens will be evaluated using a chewing simulator and subjected to 100,000 cycles at 3,6,9 and 12 kg loads. Specimens will also be subjected to static loading until failure. Modes of failure will be analyzed using SEM and stereomicroscopic evaluation.

72. Modern Implant Prosthetic Solutions

Joseph A. Lucero, DDS
Third Year Prosthodontic Resident
University of Minnesota

In this clinical case study, an 86-year-old woman presents with a heavily restored dentition and worn removable dental prosthesis. The patient is interested in a solution that will allow her to enjoy the dynamics of a fixed restoration and have the liberty to remove the prosthesis for ease of hygiene. The option proposed and accepted by the patient was to replace her dentition with a maxillary complete denture and a mandibular implant-retained prosthesis. The mandible was restored with patient-specific

overdenture abutments utilizing four implants angled to maximize anterior-posterior spread with avoiding mandibular flexure complications. The surgical approach and aspects of this patient-specific system will be featured along with the laboratory fabrication techniques. This clinical case study discusses a modern solution to restore angled implants while facilitating oral hygiene.

73. Interdisciplinary Treatment to Manage Complex Maxillary Anterior Missing Teeth and Preservation of a Fractured Tooth

Joshua A. Manchester, DDS
Third Year Prosthodontic Resident
University of Washington

A 67-year-old male patient presents with missing teeth #7-10 and a fractured tooth #11. The anterior teeth relationship is currently in poor relationship with a large vertical overlap between the existing partial removable dental prosthesis. The patient chose to restore his missing teeth with a fixed dental prosthesis on two implants and desired to restore the fractured tooth if possible. Due to the lack of vertical space for implant-supported restorations, the comprehensive treatment plan called for limited orthodontic therapy to intrude the mandibular incisors. The fixed dental prosthesis would be supported by two implants and #11 would be preserved by root canal therapy, extrusion, post & core and crown. A novel extrusion device supported by the two new implants carried out the extrusion of #11. The benefit of this interdisciplinary treatment approach is the reduction of future prosthetic complications by restoring the incisors in a more favorable position.

74. The Prosthodontic Blueprint: Utilization of Digital Smile Design for Advanced Prosthodontic Treatment

Dane C. McMillan, DDS
Second Year Prosthodontic Resident
University of Minnesota

Treatment planning and patient communication are two pillars of successful prosthodontic treatment. Through the use of dental photography and digital dentistry planning software, prosthodontists can effectively analyze and plan complex interdisciplinary cases. This technology then guides the design of the diagnostic wax-up and final restorations. Currently, some clinicians are also expanding its use and incorporating it into a completely digital workflow. Another advantage of this method is the ability to communicate with patients, educating them on the treatment and the potential outcome. This case report will utilize digital smile design to create a functional and esthetic restorative result.

75. Surgical and Prosthetic Protocol of Fully-Guided Implant Placement for Mandibular Implant-Supported Fixed Prosthesis

Kale B. McMillan, DDS
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University of Minnesota

With the progression of dental implant treatment in the field of prosthodontics, enhanced technology and protocols have allowed for more effective and predictable implant-supported prosthetic treatments. Prosthetically-driven, fully guided implant surgery can allow for not only improved implant

treatment planning and surgical execution, but also more predictable and efficient conversions of the implant-supported interim prosthesis and improved outcomes for the final prosthesis. Although fully guided implant treatment does not negate a need for rigorous and extensive surgical training, it can be effectively utilized to improve treatment outcomes as well as enhance surgical and prosthetic instruction opportunities for graduate level prosthodontics residents. This poster features the protocol for a fully-guided, prosthetically-driven implant surgery and interim prosthesis conversion.

76. A Risk-Based Approach to Retrieving Broken Prosthetic and Abutment Screws

Ryan M. Mizumoto, DMD
Second Year Prosthodontic Resident
The Ohio State University

The use of implant-supported prostheses in the replacement of missing teeth is an effective and reliable treatment option. Despite having high success rates, implant therapy is not problem-free and complications can occur. The estimated rates of abutment and prosthetic screw fracture are reported to be between 2-6% and 4-12% respectively. Though relatively uncommon, fractured screws are a challenging technical complication in implant dentistry. If the broken screw is not retrieved, the implant/abutment could become useless. As a result, numerous screw retrieval techniques have been published. Currently, however, no report has attempted to review the techniques with regards to risk and/or degree of difficulty and provide clinical recommendations based on the findings. The purpose of this poster is to introduce a risk-based approach to retrieving broken prosthetic and abutment screws, and to provide a framework for a decision making tree that will help guide the clinician when managing this complication.

77. Immediate Implant Placement and Immediate Loading: A Clinical Report

Firas Mourad, DDS, MS
Third Year Prosthodontic Resident
University of Alabama

Immediate implant placement and loading after extraction is a common clinical practice with a success rate similar to healed sites. Advantages include preservation of crestal bone with the interdental papillae, reduction of treatment time, and maintenance of functional and esthetic outcomes. A meticulous protocol for the surgical and prosthodontic procedures is necessary. In this case, a fractured maxillary lateral incisor #10 was extracted, and a surgical-guided implant was immediately placed with flapless technique and loaded. Simultaneous autogenic bone graft was placed to fill the space between the socket and the implant. Definitive primary stability of the implant body was confirmed. Connection of a straight abutment and fabrication of a provisional Bis-Acryl resin crown without occlusal contact were also completed in the same appointment. After intensive follow-up and soft-tissue molding for 6 months, the customized zirconia abutment and all-ceramic crown were definitively fabricated.

78. A Comparative Analysis Between CAD-CAM Designed and Manufactured Materials

Joseph R. Muckenthaler, DDS
Third Year Prosthodontic Resident
Naval Postgraduate Dental School

The design and manufacturing of different CAD-CAM materials may incorporate a range of error leading to varying levels of misfit. To minimize potential misfit, material selection may play a key role. This project will investigate the manufacturing differences of four materials using the Exocad (IMilling) workflow. The differences in subtractive manufacturing for dental implant hybrid frameworks were analyzed using the following materials: Zirconia (Zr), Titanium (Ti), Chromium Cobalt (Cr-Co), and Polymethylmethacrylate (PMMA). Digital analysis of manufacturing accuracy between the CAD files and physically manufactured products were assessed. The frameworks were scanned and processing deformation was measured by 3D metrology. Framework files were overlaid and global analysis was performed. This study identified the potential range for misfit of CAD-CAM frameworks in different materials. More research is needed.

79. Guided Surgery for Immediate Implant Placement in the Esthetic Zone Replacing Ankylosed Teeth

Walter E. Odisho, DDS
Third Year Prosthodontic Resident
Boston University

This case report presents a completely digital workflow for replacement of two maxillary lateral incisors with dental implants. The workflow utilizes intraoral scan of the patient's maxillary and mandibular arches. This includes CBCT and digital planning for immediate implant placement with a guided surgical approach. This digital workflow utilizes SICAT[®] biteplate for the CBCT. The planning of the implants was conducted through the Galileos[®] Implant Software and later it was sent to SICAT[®] using the Classic Guide workflow. The surgical guide was fabricated in Germany and returned with surgical instructions. Extraction was done with a flapless approach for teeth #7 and #10 which had external root reabsorption and ankylosis. The surgical guide was held in place while the osteotomies were performed with the guided surgical protocol. The implants ISQ was 31 for #7 and 30 for #10. An essix retainer was provided immediately after the surgical procedure.

80. Complete Arch Zirconia Framework: Implant-Supported Oral Rehabilitation

Sana A. Peerbhoy, BDS
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University of Southern California

Rehabilitation of edentulous arches with implant-supported restoration remains a complex treatment challenge due to a number of variables that affect both the esthetic and functional results. In recent years, fixed dental restorations based on zirconia have become more widespread due to its excellent biocompatibility and good esthetics. Clinical studies are lacking on the long-term outcome of complete-arch implant supported monolithic zirconia prosthesis. Despite greater accuracy with CAD/CAM techniques, fabrication of complete arch zirconia framework is carried out by conventional impression making. The provisional restoration can be made by CAD/CAM - the parameters of incisal length, mid line etc can be established then provided to the CAD - after confirmation that the provisional fits then a virtual or actual cutback can take place then the frame milled. Benefits include minimal framework distortion, reduced material costs, decreased volume of veneering porcelain, and the ability to re-mill the prosthesis.

81. Digital Workflow for Computer-Guided Immediate Implant Placement and Provisionalization

Chin Chun Peng, DDS
Second Year Prosthodontic Resident
University of Washington

Immediate implant placement and provisionalization are well documented in the literature as a predictable way to achieve esthetic result in anterior area. Not only does it allow the preservation of patients' gingival architecture but also eliminate patients' need for wearing temporary removable partial dental prosthesis during the healing phase, which could satisfy patients' functional and esthetic needs promptly. With the advent of digital technology, a more precise and efficient way of placing and restoring implants become possible. This case report demonstrates a digital workflow for computer-guided surgical implant placement and provisionalization to replace severely compromised teeth. Surgical drilling guide was fabricated by utilizing virtual-designed, prosthetically-driven surgical plan and computer-aided design and computer-aided manufacturing (CAD/CAM) technology. The implant provisional prostheses are made of milled polymethyl methacrylate (PMMA) to obtain optimal shape and shade.

82. Digital Solution for Fabricating an Interim Complete Arch Fixed Implant Supported Prosthesis

Mitchell J. Persenaire, DMD
Second Year Prosthodontic Resident
University of Connecticut Health Center

Complete arch fixed implant supported prostheses are an excellent treatment option for edentulous patients. When an interim fixed prosthesis is not available during repair of a definitive prosthesis, fabrication of a new interim prosthesis can be difficult and time consuming using traditional analog methods. This poster presents a digital laboratory technique to efficiently and accurately duplicate a patient's existing complete arch fixed implant supported prosthesis using milled polymethylmethacrylate material (PMMA) via CAD/CAM methods. Two different digital techniques along with their advantages, disadvantages and cost analysis will be discussed.

83. Double Crown Telescopic Implant Supported Maxillary Full Arch Restorations

Adrien Pollini, DDS
Third Year Prosthodontic Resident
University of Louisville

Implant supported rehabilitations of maxillary edentulous arches are complex and require thorough treatment planning due to the anatomy and the bone resorption pattern of this arch consecutive to teeth extractions. The maxilla presents a specific relationship with the upper lip, which will have an impact on function and esthetics including speech and facial harmony. The main decision criteria that will lead to the choice of a removable restoration will be the need for a vestibular prosthetic extension to support the upper lip and the facial soft tissues. In this context, the recommended prosthesis design will belong to the group of the implant-supported overdentures. Among this broad category, the overdentures retained by telescopic attachments provide two main advantages. They can be used in limited vertical prosthetic space and function like fixed implant supported restorations. This poster will present an example of a clinical indication for this type of prosthesis design.

84. Digital Planning and Construction of an Implant Supported Removable Dentoalveolar Prosthesis (ISRDP) for Full-Arch Restoration

Anthony P. Prudenti, DDS
Third Year Prosthodontic Resident
University of North Carolina

Key to providing lasting implants for at-risk patients, is providing access for hygiene. Delivering robust and esthetic prostheses that may be removed daily for such access demands alternative methods for retention compared to current fixed implant prostheses. This presentation will introduce a prosthesis that is fully supported by widely distributed implants and retained by use of paralleled conical abutments, which facilitates its removability. When using 5 degree tapered conical abutments for retention and support, digital precision in planning, manufacture and delivery is required. Implant placement should be planned based on a defined tooth and mucosal form that provides esthetics and function. Construction of the Implant Supported Removable Dentoalveolar Prosthesis (ISRDP) involves a stepwise approach. Delivery requires careful assessment of occlusion and the patient's ability to remove the highly retentive ISRDP. The main advantage of the ISRDP approach for full arch restoration is daily home care access to hygiene and maintenance.

85. Bond of Dual Cure Resin Cements to Enamel and Dentin in Self-Cure Mode

Rashmi Radhakrishnan, BDS, MS
Second Year Prosthodontic Resident
The Ohio State University

Dual cure resin cements polymerize in the self-cure mode when light cannot pass through. Purpose: Measure bond strength of 4 dual cure resin cements to dentin/enamel in self – cure mode. Method: Pretreated e.max rods were cemented to molars ground to flat dentin/enamel using 4 adhesive/cement combinations under force (100g) for 8 minutes. The experiment repeated with specimens in incubator (37°C) for 10minutes. Samples debonded after 24 hours storage in incubator using a universal testing device. Statistical analysis was performed. Conclusions: Temperature increase improved bond strength with highest bond strength for Panavia V5.

86. Implant Rehabilitation of Six Missing Teeth in the Anterior Maxilla

Neha Rajput, BDS
Third Year Prosthodontic Resident
Tufts University

Background: The placement of multiple adjacent implants may lead in a reduced inter proximal height of the bone crest with a resulting shorter papilla. These discrepancies were often solved either by fabricating restorations with long inter proximal contacts or by adding pink porcelain. Aim: To present the rationale and treatment considerations to ensure an esthetic result for patients receiving implant rehabilitation for multiple missing anterior maxillary teeth. Material and methods: A 60-year old female patient presented after the loss of the 6 maxillary teeth in a car accident. Comprehensive diagnostic work-up, the placement of 4 prosthetically-driven implants for definitive rehabilitation. The final rehabilitation consisted of screw-retained single crowns in the canines and one 4-unit FDP supported by

2 laterals. Results: Pink porcelain was used as a nonsurgical option of hard and soft tissue replacement that provided lip support, restored symmetrical gingival architecture, and replaced lost papillae.

87. Modified Impression Technique for Full Arch Implant Framework

Ali H. Ramadhan, BDS
Third Year Prosthodontic Resident
Marquette University

A clinical and laboratory steps are described in this poster for recording final impression and creating an accurate master cast. This technique can be used when one-piece full arch implant restoration is considered on multiple non-parallel implant.

88. A Multidisciplinary Approach to Complex Prosthodontic Care: A Case Report

Azadeh Rastikerdar, DMD
First Year Prosthodontic Resident
University of Toronto

To achieve long-lasting and predictable success in complex prosthodontic care, a multidisciplinary approach is essential. This report demonstrates the use of systematic and sequential interdisciplinary treatment approach to achieve a healthy, functional, and esthetic dentition. A 54 years-old healthy male with a history of irregular dental care presented with a chief complain of fractured teeth and unsatisfactory esthetics. Clinical assessment revealed heavily restored dentition, multiple fractured teeth, generalized chronic periodontitis, and malocclusion. Following a detailed treatment planning process, a detailed sequence of care was established. Phase 1 care focused on addressing the intraoral disease conditions (chronic periodontitis and apical periodontitis). Phase 2 care involved a lengthy provisional stage followed by the placement of full coverage restorations on all posterior teeth in order to begin to meet the patient's functional and esthetic needs. The next step in the patient's care is going to be aesthetic enhancement of the anterior dental segment.

89. CBCT-Derived Surgical Plan for Dental Implant Position And Angulation In A Genial Tubercle Advancement Treated Patient (Case Report)

Nuntaporn Rojanasakul, DDS
Second Year Prosthodontic Resident
University of Michigan

A 64-year-old female edentulous patient presented to the University of Michigan Prosthodontic clinic with a chief complaint of inability to wear her dentures due to high gag reflex with the maxillary denture and lack of stability in the mandibular denture. Clinical and radiographic examination revealed the fibrous scar tissue which cover the bone defect with stabilizer plates and screws underneath in the anterior mandibular area, consequence of the sleep apnea correction with jaw surgery 10 years ago. The implant supported complete dentures were planned in order to reduce the palatal coverage and crate more stability. The CBCT was performed in order to achieve the proper location of the implants especially in the high precision required area between the bone defect and anterior loupe of mandibular canal.

90. Clinical Workflows of Digitally Designed Metal Restorations

Leah K. Romay, DDS
First Year Prosthodontic Resident
University of Maryland

Seung Kee Choi, MS, DMD
University of Maryland
Third Year Prosthodontic Resident

The goal of this presentation is to review the different workflows available for the fabrication of metal restorations using CAD/CAM technology. Several examples of patient treatment, using digitally designed and manufactured restorations will be presented. The digital workflow for the fabrication of metal inlays, onlays and metal substructure for metal-ceramic restorations will be discussed. In addition, advantages and disadvantages will be reviewed.

91. Incidence of Acrylic Fracture in Full-Arch Fixed Metal-Acrylic Implant-Supported Prostheses: A Literature Review

Shaya Sadeghi, DDS
Second Year Prosthodontic Resident
University of Toronto

Abstract Purpose: The aim of this literature review is to investigate the incidence of acrylic fracture in full-arch fixed metal-acrylic implant-supported (FAFMAIS) prostheses. **Materials and Methods:** A search of electronic databases and a manual search of the literature were conducted up to June 2016. The search was restricted to English-language publications and clinical studies reporting complications with FAFMAIS prostheses. **Results:** The search yielded 29 articles, of which 18 met inclusion criteria. These studies reported on 905 FAFMAIS prostheses that sustained 1651 acrylic fractures over a mean follow-up of 6.8 years (range 3.3 to 21.4 years). The estimated rate of acrylic fracture varied widely in the studies (range: 0.8 to 38.5). In almost all studies, acrylic fracture was the most frequent technical complication. **Conclusion:** Acrylic fracture is an important technical complication with FAFMAIS prostheses. The possibility of this complication must be taken into account in the design of the prostheses

92. The Effects of Cigarette Smoking on the Shade of CAD/CAM Restorations

Stuart R. Schelkopf, DDS
Third Year Prosthodontic Resident
University of Illinois at Chicago

With the advent of CAD/CAM dentistry, the paradigm of dental materials used for indirect restorations is shifting towards materials that can be designed and milled. Various aspects of the properties of these materials have yet to be investigated, including stainability. The purpose of this study is to investigate the color stainability of e.max (Lithium Disilicate) CAD, milled zirconia, and Telio (acrylate polymer PMMA [apPMMA]) CAD when exposed to cigarette smoke. The null hypothesis entails that the inter-material comparison of ΔE values of the e.max CAD, zirconia, apPMMA restoration materials before and after smoke exposure will not display a significant difference. In this study, discs of 5 different

CAD/CAM surface-finish were prepared (e.max glazed, e.max polished, zirconia glazed, zirconia polished and apPMMA). A negative pressure custom-made smoking chamber was constructed to replicate smoke exposure to the samples. Changes in color were quantitatively measured with a spectrophotometer and analyzed using L*a*b values.

93. Evaluation of Patient Satisfaction Comparing Conventional Denture, Implant Retained Overdenture, and Palateless Implant Retained Overdenture Using Guided Maxillary Implant Placement

Kimberly K. Schlam, DMD, BS
Third Year Prosthodontic Resident
University of North Carolina

Placement of implants for improvement in quality of life is well documented in mandibular dentures as well as removable partial dentures. However, reports for the treatment of the edentulous maxilla are less frequent. In this single cohort prospective study, Oral Health Impact Profile (OHIP-49) questionnaires were distributed at various time points to evaluate changes in patient satisfaction for 20 maxillary edentulous patients that will be restored with 4-implants and palateless maxillary overdentures. New dentures were made for every patient, the placement of maxillary implants was completed using a fully guided approach to ensure accurate transfer of implant position and angulation. Preliminary observations seem to support the treatment of edentulous maxilla with a 4-implant retained overdenture as a viable option to improve patient's satisfaction.

94. Extending the Prosthetic Dental Arch in a Post-Surgical Cancer Patient With Trismus: A Case Presentation

Steven R. Schmid, DDS
Third Year Prosthodontic Resident
University of Michigan

A 55 year old female patient with history of squamous cell carcinoma in two different intraoral locations within the last three years presented to the clinic with a chief complaint of "...not being able to chew well..." with her current prostheses. Her second SCC required partial resection of her right posterior mandible, and at the time of surgery four implants were placed in the anterior mandible. In the post-operative period, the patient developed moderate trismus which prevented the previous prosthodontist from being able to utilize the most distal implant in her fixed implant denture. Part of her chief complaint was to have the distal implant utilized to give her two more teeth in the mandibular prosthesis to improve her chewing ability on her non-resected side. This poster outlines the clinical and laboratory techniques utilized to fulfill the patient's chief complaint, and extend her shortened dental arch to first molar occlusion.

95. Modern Application of an Historic Technique: The Functionally Generated Path Complete Denture Opposing an Intact Natural Dentition

Wesley Shute, DDS
Third Year Prosthodontic Resident
United States Air Force Medical Center

The functionally generated path technique is attributed to Dr. Fred Meyer, who introduced the procedure in the 1930's for fixed and removable prosthodontic applications. The technique has evolved over time and in the 1970's reemerged as a method of generating exquisitely balanced single-arch complete dentures opposing intact natural dentitions. This presentation highlights patient treatment using this technique as well as the integration of CAD/CAM processes to create custom occlusal surfaces in modern dental materials.

96. Osteotomy Preparation Using Dynamic Navigation: A Case Report

Bashar S. Snober, DDS
Third Year Prosthodontic Resident
Louisiana State University

Hollis A. Clark
Third Year Predoctoral Dental Student

Many techniques have been described for implant placement. From free hand methods to completely guided surgery with CT generated surgical stents. The use of Ct generated stents although not flawless, make surgery more precise, reducing the chances of trans surgical mistakes that can alter the adequate implant position in a 3D perspective. The fabrication of CT generated guides is done by specific companies that require files to be sent to them and a certain amount of fabrication period, which may delay surgery. The use of a dynamic navigation system would be an accurate, more cost-effective and time efficient option for placing dental implants than the traditional methods. This poster will demonstrate the placement of two implants using a dynamic navigation system.

97. A Practical and Scientific Guide to Choosing Lithium Disilicate vs. Zirconia Restorations

Akanksha Srivastava, BDS, Msc
Second Year Prosthodontic Resident
University of Connecticut Health Center

Louisiana State University

Currently, there is much clinical deliberation about the use of zirconia and lithium disilicate for fixed prostheses. The primary objective of this poster is to describe a comparative analysis of existing systematic reviews on the specific indications, advantages and disadvantages of zirconia and lithium disilicate. The secondary objective is to provide a laboratory based cost-comparison of the two materials for different types of restorations. A literature search was conducted to identify published systematic reviews. Outcomes from selected systematic reviews were divided into 'primary outcomes' including specific indications, survival rate and prosthodontic complications. Other advantages and disadvantages were categorized under 'secondary outcomes'. A comparison of laboratory cost estimates are tabulated for the two materials. Given the increased demands of all-ceramic systems, this poster will serve as a decision-aid for clinicians regarding the procurement and/or expanded use of zirconia and lithium disilicate in their clinical practice.

98. Utilization of Neutral Zone Technique in Fabricating Complete Denture for the Severely Resorbed Edentulous Patient

Ryushiro Sugita, DDS
Second Year Prosthodontic Resident
University of Texas Health Science Center At San Antonio

The patient is a 56 year old male with severely resorbed maxillary and mandibular edentulous ridges. Patient had previously undergone radiation therapy for squamous cell carcinoma on the basal surface of the tongue. Given the history of radiation therapy, surgical intervention such as placing implants was contraindicated. To stabilize the complete denture, the operator utilized the neutral zone technique to determine buccal lingual position of the denture teeth and develop the contour of the cameo surface.

99. Internal Sinus Membrane Elevation In Patients With Less Than 5mm Residual Bone Height - Rationale And Protocols

Tyler J. Thomas, DMD
Third Year Prosthodontic Resident
University of Connecticut Health Center

Lateral window sinus membrane elevation has traditionally been used in situations with less than 5mm height of residual bone. This procedure adds time, expense, and morbidity to patient treatment. For this reason, internal sinus elevation represents an attractive treatment option, though this is typically reserved for patients with a minimum of 5 mm residual bone height. New literature has shown promising results for internal sinus elevation when residual bone height is less than 5 mm. This poster describes the UCONN Prosthodontic Program's experience implementing internal sinus membrane elevation protocols when residual bone height is less than 5 mm.

100. A Comparison between Conventional Manual Waxing and CAD/CAM Generated Waxing for Fixed Restoration

Owen V. Trinh, DMD
Second Year Prosthodontic Resident
University of Minnesota

The advancement of CAD/CAM technology introduced a capability of digital waxing by either utilizing the teeth anatomy database within the CAD/CAM software. The purpose of this case report was to determine whether CAD/CAM software is sufficient to produce esthetically pleasing fixed restorations without manual modification by technicians and clinicians. A conventional diagnostic wax-up was performed to restore worn and discolored maxillary teeth and a stereolithography (SLA) plastic model of the proposed teeth shape and contour was fabricated by utilizing teeth anatomy database, as well as a digitally-produced wax copings for the final restorations over a scan of the prepared teeth. Esthetic comparisons were performed between the conventional wax-up and the SLA model, and between modified and unmodified wax copings. Conventional and CAD/CAM waxing methods did not differ significantly. Digital waxing capability in the CAD/CAM software produced full-contour wax-ups that were as highly detailed and esthetically pleasing as those produced manually.

101. Immediate Loading of Telescopic Fixed Prosthesis with Conical Abutment System: A Case Report

Chia-Chen Tsai, DDS
Second Year Prosthodontic Resident

Louisiana State University

The telescopic conical abutment retained prosthesis is a unique implant supported system that provides all the benefits of the conventional screw retained hybrid denture. In addition, this type of prosthesis is more versatile, cleansable and maintainable. The screw-retained full arch prosthesis has been proven to be successful. However, many complications are associated with this therapy: gingival inflammation, halitosis, prosthesis fracture, expensive maintenance among . The conical abutment system is an alternative of full arch implant supported fixed prostheses. It allows the patient to remove it for cleaning and yet provides the same features as the screw retained. This may improve the success and implant survival rate. This type of friction retained fixed prosthesis also provides the cross-arch stabilization needed for immediate loading protocols. This case report will focus on the simplicity of the immediate loading protocol with this type of prosthesis.

102. Tooth Borne Overdentures: Still Relevant in the Age of Implant Dentistry

Elyse A. Wagner, MS, DMD
Second Year Prosthodontic Resident
Montefiore Medical Center

A 31 year old female patient with cleidocranial dysplasia and no previous dental intervention presented for treatment. A reversible, minimally invasive treatment was chosen. Overdentures were fabricated using classic technique and were supported by the patient's unaltered existing dentition. This is a viable approach for managing some patients during the surgical phases of treatment, and should not be overlooked as a definitive treatment option.

103. "CAD-on" Crowns – A Fracture Mechanics Characterization

Peter Walker, DDS
Second Year Prosthodontic Resident
University of British Columbia

The "CAD-on" technique, a bi-layered restoration composed of a CAD/CAM processed lithium disilicate veneer fused with a connecting glass to a CAD/CAM processed Y-TZP framework, has shown promise in increasing veneer fracture resistance. The fusion approach is purported to result in stronger bonding between veneer and framework and may result in higher loads to failure and improved intraoral performance. This investigation used the notchless triangular prism specimen fracture toughness (KIC) test to determine the interfacial KIC of the interfaces present in "CAD-on" crowns and SEM to characterize fractured surfaces. The data from three test groups and a pressed control group was analyzed via one-way ANOVA, Scheffé multiple means comparisons and Weibull statistics. The "CAD-on" groups had higher interfacial KIC than the pressed control group. The interfacial KIC of "CAD-on" groups appeared to be limited by KIC of the connecting glass. The control group was more reliable than the CAD-on groups.

104. Comparison of Shear Bond Strength of Milled PMMA to Reline Material with Different Surface Conditioning Chemical Properties

Geoffrey L. Ward, DDS
Third Year Prosthodontic Resident

Naval Postgraduate Dental School

CAD/CAM provisional restorations can be made from premanufactured PMMA milling “pucks”. Millable PMMA exhibits enhanced physical properties when compared to traditional PMMA. Due to manufacturing, PMMA “pucks” are believed to have little, or no, free monomer available for auto-polymerizing PMMA additions. This is believed to inhibit chemical bonding and relies on surface conditioning for mechanical retention. Manufacturers recommend relining or repairing milled PMMA with a combination of air abrasion, bonding agent application, and light-polymerized UDMA/Bis-GMA repair. My objective is to compare shear bond strength (SBS) of milled PMMA bonded to light-polymerized UDMA/Bis-GMA and auto-polymerizing PMMA, with different surface conditioning (in a pilot study setting). Tests will be conducted with an MTS Shear testing machine.

105. Computer-Guided Implant Planning For Partial Edentulous Maxillae: A Case Report

Ya-Ting Yu, DDS
Third Year Prosthodontic Resident
Boston University

This case report presents a treatment option for maxillae rehabilitation involving digital treatment planning and guided surgery of multiple dental implants to achieve more accurate and precise restorative driven three-dimensional dental implant positions. A 43-year old female presented with multiple missing teeth and extensive carious lesions due to poor oral hygiene. Following initial caries control and oral hygiene instructions, remaining teeth were of good prognosis. Utilizing Galileos[®] conventional classic guide workflow for partially edentulous ridge, CBCT scan was completed with radiographic guide attached to a SICAT[®] biteplate. Digital treatment planning of five dental implants was accomplished by utilizing Galileos[®] implant software. Due to the limitation of bone, crestal approach sinus augmentation as well as tunneling guided bone regeneration techniques were simultaneously performed. The result demonstrated that Computer-guided technology can optimize dental implant position. It also provides greater patient satisfaction and enhances the accuracy of the surgical procedure.

106. #Diastemata: Kool Or Not?

Hui Wen Yu, DDS
Third Year Prosthodontic Resident
Stony Brook University

A 30-year-old male patient presented to Stony Brook Dental School for extraction of a hopelessly fractured left central incisor. A Bolton discrepancy existed and the patient is pleased with his long existing maxillary anterior distemata. Both the surgeon and the patient preferred a non-removable prosthetic replacement. The decision was made to fabricate a cantilevered resin bonded FDP as the first phase of prosthetic treatment. The clinical and laboratory procedures that resolved these challenging clinical circumstances will be elucidated.

107. The Survival Rate of Lithium Disilicate Crowns Fabricated and Cemented Through the UIC Pre-Doctoral Implant Program

Yale D. Cho, BA

Fourth Year Predoctoral Dental Student
University of Illinois at Chicago

The use of computer-assisted design and computer-assisted manufacturing (CAD/CAM) indirect restorations in clinical practice is increasing across dental schools. The pre-doctoral implant program at the University of Illinois at Chicago currently uses CAD/CAM technology to fabricate implant restorations. There are a limited number of studies that evaluate the long-term success of CAD/CAM, single tooth implant (STI)-supported restorations. Purpose: To evaluate the success rate of STI-supported CAD/CAM restorations fabricated and delivered through the UIC pre-doctoral implant program at the University of Illinois at Chicago. Methods: Each CAD/CAM e.max lithium disilicate all-ceramic crown fabricated and delivered through the UIC pre-doctoral implant program was identified using electronic health records. These restorations will be evaluated at recall appointments. Results: The data collection process is ongoing and will be completed in the next month. Conclusion: TBD Key Words: Pre-doctoral Implant Program, Digital Dentistry, CAD/CAM, E.max, Implant-supported

108. Quality of tooth Preparations for Monolithic Zirconia Restorations Submitted Local Dental Laboratories

Robert G. Cox, BS
Fourth Year Predoctoral Dental Student
University at Buffalo

This study was designed to assess the quality of posterior teeth prepared for CAD/CAM Monolithic Zirconia that were recorded and designed by local laboratories during a one-month period. A total of 47 3D images of posterior teeth were evaluated (thirty-one molars and sixteen premolars) for finishline type, finishline width, axial wall height, total occlusal convergence (TOC), occlusal angulation, preparation roughness, and undermined enamel. 95% of the preparations had modified shoulder or chamfer finishline design with 0.3 to 1.6 mm finishline width. Undercut was observed in 74% of the preparations. 57% of the preparations had unsupported enamel. None of the molar preparations had resistance form required (100% molar <4mm axial wall, 100% >10° TOC). 31.25% of premolar preparations had the required resistance form (68.75% premolar <3 mm axial wall, 100% > 10° TOC). When axial wall height is short, an ideal TOC =6° should be prepared to increase retention and resistant form.

109. Partial Coverage: Which Do You Prefer, IPS E

Thomas G. Fuschetto
Fourth Year Predoctoral Dental Student
Stony Brook University

With an abundance of restorative options available today for partial coverage, it can be difficult for a clinician to choose. Lithium disilicate, specifically Ivoclar's e.max Press and CAD are popular options and the clinician's choice is strongly influenced on their choice to take an impression or scan. In regards to marginal fit, studies have shown that there is no significant difference between the two materials however, e.max Press has been shown to have a superior internal fit. Although marginal fit is an important factor for determining clinical success, internal fit is another parameter of importance due to the possibility of cementation surface crack initiation.

110. Dimensional Differences between the Posed Social Smile and Enjoyment Smile

Rokhsareh Hassanzadehmahaei, DMD
Fourth Year Predoctoral Dental Student
University of Louisville

Objective: The objective of this study was to evaluate the dimensional differences between the posed smile and the enjoyment smile. **Material and methods:** 47 dental students (age: 20 to 40) participated. Participants were asked to smile (posed), and then induced to smile (enjoyment) by showing a humorous video through a teleprompter. Digital video was taken and frames of interest were analyzed using computer software. **Result:** The humorous video successfully induced an enjoyment smile in 33 (70.21%) participants. Average measurements were (posed/enjoyment): Incisal edge to upper lip (7.74 mm /9.53 mm); Incisal edge to lower lip (1.51 mm /2.78 mm); Interlabial gap height (9.26 mm/12.31mm); Intercommisural width (54.38 mm/56.91 mm); Smile index (6.24/5.03); Display zone area (6358.32 mm²/8543.33 mm²). All were significantly different (one-way ANOVA). **Conclusion:** The dimensions of the posed and enjoyment smiles are different. In particular, there is a 1.79 mm difference in upper lip position.

111. Prosthodontic Management of Patients with Epidermolysis Bullosa: A Literature Review

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Recessive Dystrophic Epidermolysis Bullosa (RDEB) is a rare vesicobullous genetic disorder presenting with systemic bullae formation in response to minor friction. Oral features include repeated blistering, mucosal fragility and scarring leading to microstomia, poor oral hygiene, decay, periodontal disease, and challenging dental care delivery. Prosthodontic rehabilitation of these patients using traditional removable prostheses is problematic due to frequent mucosal blistering from friction. Review of the literature revealed 4 studies (2 case series and 2 case reports) documenting successful placement and restoration of endosseous implants in 9 patients with RDEB. Patients were treated with both fixed and removable implant-supported prostheses and were followed up from 9 to 60 months. Surgical management is challenging, and the use of removable implant-supported prostheses may lead to mucosal ulcerations in contact with the prostheses. In conclusion, osseointegration appears to be unaffected by RDEB, and fixed implant-supported prostheses may be preferred in this patient group

112. Research Productivity of US Advanced Prosthodontics Program Directors

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The purpose of this study was to measure scientific productivity of US advanced prosthodontics program directors via quality of peer-reviewed research publications. H and i10 indices are useful metrics for determining the impact of professionals in the field of prosthodontics. Many specialties in medicine, and few in dentistry use these indices to assess credibility of their educators. We hypothesize that H and i10 indices provide pertinent information on research productivity amongst US advanced prosthodontics program directors. Data collection included educational merits, academic rank and bibliometrics.

Statistical analysis indicated 36% of program directors hold an academic rank of associate professor, 50% of those have an DMD/DDS. Based on educational merits, majority of professors hold an MS degree (68%), and have highest averages for both H & i10 indices. Therefore, we conclude that this study sufficiently provided quantification of research contributions made by advanced prosthodontics program directors in the US.

113. Aging of Coping Influences Appearance of Ceramic Crown

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Adverse environment of the oral cavity seems to affect the ceramic color over time via low temperature degradation. Accelerated aging in a 121°C autoclave for five hours simulated ten years in the 37°C oral cavity. IPS e.max Press and IPS e.max ZirCAD were used as coping materials, and B1 and A2 shades of IPS e.max Ceram were used as veneering ceramics. Minolta colorimeter measured the color, and the change was calculated using the International Commission on Illumination system. After five hours, Δa was 0.972 for B1 and 1.128 for A2 veneering ceramic on zirconia. The Δa was 0.054 for B1 and -0.08 for A2 veneering ceramic on e.max coping. After aging ten years, the samples with zirconia coping approached red while the samples with e.max coping demonstrated color stability in the red to green chromatic coordinate. The ceramic coping influences the ceramic color over time in the moist oral cavity.

114. Shear Bond Strength of Zirconia-Titanium Using Different Resin Cements

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The objective of this study was to evaluate the effect of resin cements on the shear bond strength of Titanium-Zirconia. One hundred Ti discs were wet-ground then randomly divided into 3 groups of 30 and 2 groups of 20. Each group was assigned to one of the following resin cements: Panavia-F2.0, Multilink, RelyX-Ultimate and Panavia-SA. The cement was used to lute Y-TZP cylinders to titanium discs: 1) non-stained Y-TZP; 2) stained Y-TZP; 3) non-stained Y-TZP with pre-cemented PMMA-Ti. For the Panavia SA cement stained zirconia bond was not evaluated. Zr cylinders and Ti disks underwent sandblasting with 50Micron Al₂O₃ They were then thermocycled for 1,000 cycles between 5°C and 55°C. UltrTester machine (Ultradent Inc.) was used to apply perpendicular force to the bonded interface until debonding occurred. The data was analyzed using 2-way ANOVA (p=0.05). The study will present the outcome of the shear bond strength in MPa.

115. Shear Bond Strength of New Polyacryl Locator Pick-Up Materials

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This study was conducted in order to compare/evaluate the shear bond strength of poly-acryl locator materials, specifically, Zest Chairside[®], which was tested with and without the use of a varnish layer as a bonding agent. An additional objective was to compare the difference in shear bond strength between

select poly-acryl pickup materials bonded to a roughened surface versus a polished surface. Shear forces were then applied to determine the SBS of each material to denture acrylic resin. There were clinically significant differences in shear bond strength of the Zest Chairside[®] samples without varnish when compared to Zest Chairside[®] with varnish, Jet PMMA and EZ PickUp[®]. EZ PickUp[®] had a higher shear bond strength when bonded to a smoother surface, whereas Zest Chairside[®] with varnish and Jet PMMA had a higher shear bond strength when bonded to a rougher surface.

116. Development of Rubrics For Quantitative Assessment in Preclinical Fixed Prosthodontics Using A Comparison Software

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For decades students have had their pre-clinical tooth preparations evaluated by faculty. This inherently induces a level of subjectivity, and makes it difficult for students to comprehend the given grade. By introducing 3D Comparison software, students are given feedback that is understandable and unambiguous. It provides students with a quantifiable measure of how their preparation compared related standard preparation. In this study students' preparation with various designs were assessed against their respective standard preparation (as the master). Graded rubric with 3D comparison software was compared to traditional rubric graded by faculty member. The result showed correlation between the traditional rubrics and the ones were developed for 3D comparison software.

117. The Effect of CAD/CAM Systems on Fit of Single Crown

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The objective of this experiment was to compare the marginal-internal fit of lithium disilicate crowns scanned-designed using 2 intra oral scanners and manufactured in 2 modes. Five prepared teeth were scanned using TRIOS and Planmeca-E4D intraoral scanners, and a crown was designed for each preparation using 3shape and Plan Design software, respectively. Each crown was manufactured in standard and detailed modes using a Plan Mill Machine. The internal-marginal fit of each crown was measured indirectly on a PVS impression, which was applied to the internal surface of the crown while it was seated. These internal impressions were sectioned axially and 4 points were measured under a stereomicroscope. The results of this experiment showed that detailed mode produced crowns with a better marginal fit than standard mode. The restorations designed by 3shape produced a crown with a better marginal fit compared to Plan design in the detailed mode of manufacturing.

118. How Good is Goodacre: A Literature Review of Goodacre's "The Prosthodontic Management of Endodontically Treated Teeth", Part 2

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Dr. Charles J Goodacre's discussion on maintenance of apical seal has set the precedent for post preparation for the past 20 years. With the introduction of recent materials and technologies, new insight may be considered in terms of prosthodontic treatment planning of endodontically treated teeth. As part two of the two-part literature review series, this article will investigate the dimensions of post preparation and placement, the period of time in restoring after endodontic treatment, the variations in materials that could affect prosthodontic success, and tooth preparation for core placement.

119. Microbial Adhesion to Y-TZP, PMMA, and CP Ti After Polishing

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Objective: The purpose of this study is to evaluate the microbial adhesion of peri-implant pathogens to the surface of Y-TZP, PMMA, and CP Ti. **Methods:** Disc-shaped specimens (D = 15 mm, H = 3 mm) were fabricated from Y-TZP, PMMA, and CP Ti, and polished following a standard protocol. Cultures of *Aggregatibacter actinomycetemcomitans*, *Candida albicans*, *Porphyromonas gingivalis*, *Prevotella intermedia*, and *Tannerella forsythia* were evaluated for this study. The optical density of the bacterial solutions was set to 0.5 spectrophotometrically and diluted by a factor of 10 before inoculating specimens for 72 hours. After incubation, specimens were placed in Ringer's solution then ultrasonicated and vortexed for 60 seconds respectively. 50 μ L of undiluted aliquots were plated on non-selective blood agar media and the results were reported as colony forming units per mL. **Results:** Y-TZP showed lower amount of microbial adhesion compared to CP Ti and PMMA

120. How Good is Goodacre: A Literature Review of Goodacre's "The Prosthodontic Management of Endodontically Treated Teeth", Part 1

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Post and core placement is necessary for therapeutic restoration of endodontically treated teeth with minimal coronal tooth structure. Over 20 years ago, Dr. Charles J Goodacre discussed protocols that have been applied to clinical practices in prosthodontic restoration of endodontically treated teeth. Dr. Goodacre explores the variations in post design for core retention that remained inconclusive based on current research at the time of his review. The well-recognized guidelines will be critically reviewed to ascertain any updates or newly valid approaches in a two-part critical literature review.