2017 Annual Research Day
Award Winning Posters

Dean's Research Award and
Dentsply Sirona Student Clinical Research Award
Poster #: 133
Title: Flavonoids for CMV-Induced salivary gland tumor therapy
Name: Courtnie Yun
Faculty Advisor: Tina Jaskoll
Background: Mucoepidermoid carcinoma (MEC) is the most common malignant tumor in major and minor salivary glands (SGs). Our laboratory has recently confirmed a causal relationship between human cytomegalovirus (hCMV) and SG MEC. Since current anti-CMV drugs are limited due to toxicity and the emergence of drug resistance, there is an urgent need for new anti-CMV treatments. **Purpose:** To determine the effect of bacalein, an "anti-viral/anti-cell signaling" flavonoid extensively used in Chinese herbal medicine, on CMV-host interactions and viral efficacy. **Methods:** Newborn ex vivo 3D submandibular gland (SGs) were cultured in the presence/absence of mouse CMV (mCMV) on day 0 for 24 hours and then in virus-free media for 10-14 days. Baicalein or the antiviral acyclovir, either singly or in combination, was added daily on days 6-14. SG phenotypes, viral distribution, viral-induced changes key genes and proteins were analyzed using H&E histology, qRT-PCR, and immunolocalization. **Results:** Baicalein treatment of virus-infected SGs induced a marked decrease in pathology, cell proliferation and viral infection, a substantial increase in cell death in virally-infected cells; and significant changes in gene expression. Although acyclovir treatment significantly reduces viral expression, apoptosis is not seen in tumor cells. Combination treatment was similar to those seen with baicalein alone.
Conclusion: Baicalein is an effective anti-CMV treatment due to the targeting the CMV-infected cells and gene pathways. What remains to be discovered is the molecular mechanism of flavonoid inhibition of viral infection and tissue pathology.

First Place – Advanced Specialty Program Resident Award
Poster #: 14
Title: Influence of a novel self-priming etchant on bond strength to glass-ceramics
Name: Haifa Alsobiyl
Faculty Advisor: Jin-Ho Phark
Background: For optimal bonding to glass-ceramics, the intaglio surface is treated with highly toxic hydrofluoric (HF) acid followed by silane application. A recently introduced self-etching ceramic primer (Monobond Etch&Prime) with less toxicity might be a suitable substitute. **Purpose:** To evaluate the influence of a novel self-priming ceramic etchant on micro-tensile bond strength (μTBS) compared to leucite reinforced glass-ceramic and lithium-disilicate reinforced glass-ceramic. **Methods:** Leucite reinforced glass-ceramic (Empress CAD) surface treatments: G1: no surface treatment, G2: 60 seconds HF acid, no silane, G3: 60 seconds HF acid, silane, G4: MBEP 20 seconds and left for 40 seconds, G5: MBEP 20 seconds and left for 100 seconds. Lithium-disilicate reinforced glass-ceramic (e.max CAD) surface treatments: G6: 20 seconds HF acid, silane, G7: MBEP 20 seconds and left for 40 seconds, G8: 20 seconds HF acid, no silane, G9: no surface treatment, G10: MBEP 20 seconds and left for 100 seconds. All ceramic specimens were cemented with a dual cure resin cement (RelyX Ultimate) to ceramic reinforced polymer specimens (Lava Ultimate), then sectioned and subjected to μTBS testing after 24 hours or 6 months of storage in distilled water. **Results:** For groups 1-5, μTBS ranged from 21.45 to 45.15 MPa for non-aged specimens and from 0 to 38.81 MPa for aged specimens. For groups 6-10, μTBS ranged from 0 to 49.50 MPa for non-aged specimens and from 0 to 32.10 MPa for aged specimens. **Conclusion:** Long-term efficacy of self-priming ceramic primer is highly dependent on the ceramics' composition and structural arrangement

Second Place – Advanced Specialty Program Resident Award
Poster #: 24
Title: Does the maxillary sinus pneumatize following maxillary molar tooth extraction?
Name: Sabina Hameed
Faculty Advisor: Homa Zadeh
Background: Maxillary sinus pneumatization has been proposed to occur after maxillary tooth extractions. Dimensional changes occurring in the alveolar crest after extraction have been extensively studied; however, maxillary sinus pneumatization and its possible relationship to maxillary molar extraction have not been investigated. **Purpose:** The aim of this retrospective study was to investigate post-extraction spatial and dimensions changes in the maxillary sinus floor and alveolar crest. **Methods:** 25 pre- and post cone beam computed tomography (CBCT) scans of 24 individuals who had maxillary molar tooth extraction were analyzed using Simplant 17.0 software. Pre- and post-operative CBCTs were oriented and aligned by utilizing coincident reference lines. Measurements were made for mesiobuccal (MB), distobuccal (DB) and palatal (P) roots for the distance of the root apex to the sinus floor, width of root apex at 2mm from the apex, inclination of the root to the sinus floor, height of alveolar crest, and reference line to the maxillary sinus floor. **Results:** Results revealed that the mean sinus floor vertical height changes were 0.62, 0.37, 0.4mm and the mean crestal bone height changes were 3.07, 3.33 and 2.99 in the sites of MB, DB and P maxillary molar roots, respectively. No statistically significant correlation was found between the root anatomical factors and sinus height change. **Conclusion:** The results of the present study challenge the commonly held concept that maxillary sinus pneumatization occurs following extraction of maxillary molars. Instead, extensive alveolar crest dimensional changes were observed, consistent with published reports. Further research is needed to confirm these observations.

First Place, Graduate Post-Doctoral Trainee Award and
USC Stevens Center for Innovation "Most Disruptive" Award
Poster #: 61
Title: Synergism and antagonism between Aggregatibacter actinomycetemcomitans and other oral species
Name: Jade Sha
Faculty Advisor: Casey Chen
Background: Gram-negative facultative Aggregatibacter actinomycetemcomitans (Aa) is a member of the subgingival polymicrobial community associated with periodontitis. Our recent whole genome sequence analysis of 33 Aa strains has divided the species into 5 phylogenetic clades. It was hypothesized that distinct strains may have different phenotypes, such as their antagonistic or synergistic relationship with other oral species.
Purpose: To assess the synergistic or antagonistic relationship between distinct clades of Aa and other periodontal species. **Methods:** A 2-species mixed biofilm formation assay was performed by co-culturing each of 7 oral species with 11 Aa strains. The 7-oral species were: Streptococcus gordonii (Sg), Streptococcus parasanguinis (Sp), Porphyromonas gingivalis (Pg), Dialister pneumosintes (Dp), Fusobacterium nucleatum (Fn), Eikenella corrodens (Ec), and Filifactor alocis (Fa). The cultures were incubated for 3 or 7 days under anaerobic conditions at 37°C. The amounts of biofilm were determined by a biofilm formation assay. Laser scanning confocal microscopy (LSCM) was performed to visualize bacterial composition in the co-culture between Aa/ Dp and Aa/Pg. **Results:** An antagonistic relationship was found between Sp and 2 Aa strains, between Dp and 1 Aa strain, between Fa and 3 Aa strains, and between Ec and 1 Aa strain. A synergistic relationship was found between Pg and 5 Aa strains, between Fn and 1 Aa strain, and between Dp and 2 Aa strains. Dp and Pg couldn't form monoculture biofilm but formed prosperous biofilms when co-culturing with Aa. **Conclusion:** Synergistic or antagonistic relationship between Aa and oral species is both species-specific and strain-specific.

Second Place – Graduate Post-Doctoral Trainee Award
Poster #: 53
Title: Protein methylation in epithelial-to-mesenchymal transition of epicardial cells.
Name: Olan Jackson-Weaver
Faculty Advisor: Jian Xu
Background: The epithelial to mesenchymal transition (EMT) is an important cellular mechanism in diverse biological processes such as development, wound healing, cancer metastasis, and fibrosis. We focus on epicardial cells, for which EMT is a key mechanism in activation and differentiation. Epicardial cells are mesothelial cells lining the heart. They are important progenitors that give rise to cardiac fibroblasts and smooth muscles and a source of growth factors. Our recent work has established an important function for the protein arginine methyltransferase PRMT1 in EMT. **Purpose:** We tested the hypothesized that PRMT1 is required for EMT in epicardial cells. **Methods:** Cell culture, western blots, real-time PCR, siRNA, embryo culture, Cre-lox technology. **Results:** We found that silencing PRMT1 in epicardial cells prevented EMT protein changes and the migratory and invasive phenotypes that are characteristic functional outcomes of EMT. Silencing PRMT1 increased levels of p53 by reducing p53 turnover. Decreasing p53 expression, on the contrary, increased the induction of the mesenchymal factor Slug during EMT. Furthermore, silencing PRMT1 also inhibited epicardial EMT *ex vivo* in an embryo thorax culture model. Epicardial deletion of PRMT1 in *WT1CreERT;PRMT1$^{flox/flox}$;YFP^{flox}* mice also prevented epicardial EMT and reduced ventricular compact zone thickness. **Conclusion:** PRMT1-p53 pathway controls epicardial EMT. These studies establish a role for protein methylation in the EMT process and could lead to treatments for diseases affected by EMT.

First Place – Graduate Pre-Doctoral Candidate Award
Poster #: 76
Title: Fgfr2 regulates formation of attachment units in the craniofacial complex
Name: Ryan Roberts
Faculty Advisor: Amy Merrill
Background: Fibroblast Growth Factor (FGF) signaling plays a critical role in skeletal development, as mutations in Fibroblast Growth Factor Receptor 2 (*FGFR2*) manifest with at least 10 distinct skeletal birth defects. Loss of function mutations in FGFR2 causes Lacrimoauriculodentodigtal (LADD) Syndrome, which is characterized by a posterior shortening of the jaw; retro-micrognathia. **Purpose:** We hypothesized that the posterior jaw shortening in LADD indicates a role for *FGFR2* in the development of the jaw processes. **Methods:** To test this hypothesis, we employed a conditional knockout mouse in which *Fgfr2* is ablated within the neural crest-derived skeletal precursors of the jaw. **Results:** We found that *Fgfr2$^{flx/flx}$; Wnt1-Cre* mice have jaw deficiencies at sites of joint interfaces on the condyle, angular process and ramus at the tendon/ligament-to-bone attachment units. Histological and molecular markers indicate that at these regions, endochondral-like bone has replaced the developing enthesis. The enthesis has been shown to differentiate into chondrocytes, tenocytes or ligamentocytes. Lineage tracing analysis in addition to a tendon specific knockout of *Fgfr2* suggest that the change in cell fate is autonomous to the enthesis progenitor cells and not caused by the ablation of *Fgfr2* in the underlying bone. **Conclusion:** Altogether, this suggests a role for Fgfr2 in cell fate determination of the enthesis progenitor cells in the jaw.

Second Place – Graduate Pre-Doctoral Candidate Award
Poster #: 79
Title: Nuclear reorganization driving cell fate transition in neural crest cells
Name: Kaivalya Shevade
Faculty Advisor: Ruchi Bajpai
Background: Neural crest cells are an ectodermally derived multipotent population which along with generating neuroectodermal cells such as neurons and glia also give rise to mesenchymal cells such as cartilage, bone, muscle etc. It has been demonstrated that epigenomic changes accompany cell fate switches. We do not yet completely understand the mechanisms neural crest cells employ to change their epigenomes such that they can reprogram to mesenchymal cells. Transcription factor (TF) based strategies to reprogram cells have shown that, it is possible to change cell fates by mere expression of cell type specific transcription factors. However, the efficiency of such reprograming events is extremely low. We think that the mechanisms which neural crest cells employ to change their epigenomes, could possibly also underlie cellular reprogramming. **Results:** We can visualize for the first time nuclear reorganization, where we observe micron scale movements of DNA within the nuclei. Owing to the micron scale DNA movements the nuclei transiently expand and contract. We call this event nuclear reorganization. Nuclear reorganization correlates with acquisition of mesenchymal fate. We have identified CHD7, a chromatin remodeling protein to be necessary for nuclear reorganization and the subsequent mesenchymal transition. **Methods:** We generate human neural crest cells (NCC) in vitro from human embryonic stem cells using the protocol described in Bajpai et al.(2010). We induce mesenchymal transition in these neural crest cells by using defined media conditions. Transcriptomic characterization of the cells before and after induction is done by RNAseq. To check CHD7's role in this nuclear reorganisation we generated a shRNA CHD7 knock-down embryonic stem cell line and CHARGE patient ips lines and differentiated them to make neural crest cells. **Conclusions:** CHD7 dependent nuclear reorganization event is essential for neural crest mesenchymal transition. We hypothesize that a change in the higher order 3D chromatin structure may underlie the nuclear expansion in this CHD7 dependent nuclear reorganization responsible for inducing a mesenchymal transition in the Neural Crest.

First Place – Biokinesiology and Physical Therapy Candidate Award
Poster #: 91
Title: Mobile-based ecological momentary assessment of paretic hand use following stroke
Name: Yi-An Chen
Faculty Advisor: Carolee Winstein
Background: Limited use of the paretic hand after stroke can severely constrain an individual's daily function. The presence of the non-use phenomenon, which describes the discrepancy between motor capability and daily hand use, underscores that fact that motor capability, while a necessary factor, may not be the only influence on paretic hand use. Recent studies demonstrate that social-cognitive factors (SCFs), which characterize an individual's psychological perceptions, play an essential role in functioning after stroke. However, a significant knowledge gap exists in understanding the relationship of self-efficacy, affect, and social environment to paretic hand use. **Purpose:** Our goal is to investigate the impact of SCFs on paretic hand use in stroke survivors' daily environment, by employing an innovative application of a mobile-based prompt methodology – Ecological Momentary Assessment (EMA). **Methods:** In this 5-day community study, participants received 6 EMA prompts/day. EMA prompts include questions capturing participants' real-time responses of SCFs and paretic hand use. **Results:** On average, 30 individuals with chronic stroke responded to 84.5% of the 30 total prompts during participation. Hierarchical linear regression revealed that self-efficacy was a critical factor (p < 0.001) in paretic hand use in addition to motor capability. The statistical model with both self-efficacy and motor scores explained an additional 6% of the variance in paretic hand use over the model with motor scores alone (p = 0.0006). **Conclusion:** Our results suggest that self-efficacy is a critical factor affecting individuals' paretic hand use in the day-to-day environment. Self-efficacy may be an important construct to be considered when designing stroke rehabilitation regimens.

Second Place – Biokinesiology and Physical Therapy Candidate
Poster #: 88
Title: Resistance exercise improves skeletal muscle outcomes in prostate cancer survivors
Name: Jacqueline Kiwata
Faculty Advisor: Todd Schroeder
Background: Androgen deprivation therapy (ADT), a primary treatment for prostate cancer, is associated with adverse metabolic changes that can lead to sarcopenia, decreased strength and altered anabolic and metabolic signaling in skeletal muscle. Resistance training has been shown to increase strength in prostate cancer survivors (PCS) on ADT, but no interventions have concomitantly improved sarcopenia or examined mechanisms underlying skeletal muscle changes. **Purpose:** To determine whether a 12-week intervention of periodized resistance training (PRT) can positively alter skeletal muscle-related outcomes in PCS on ADT. **Methods:** Thirty-two PCS on ADT were randomized to PRT (n=13) or control stretching (CS; n=19). Sarcopenia index was calculated from dual-energy x-ray absorptiometry as appendicular skeletal mass (ASM)/height^2. Strength was assessed by 10-repetition maximum on leg press and seated row. Gene expression for IGF1, PGC-1α and GLUT4 was analyzed from muscle biopsy samples (PRT n=9, CS n=8) using quantitative real-time PCR. Kruskal-Wallis and linear mixed models adjusted for baseline values were used to compare group differences at baseline and post-intervention. **Results:** No differences in baseline characteristics or daily protein intake were found between groups (P>0.05). Significant increases in ASM (mean±SE; 0.65±.27 kg; P=0.01), sarcopenic index (0.23±.01 kg/m^2; P=0.005), leg press (114.7±16.7 kg; P<0.001), and seated row (21.53±2.8 kg; P<0.001) occurred in PRT compared to CS. PRT exhibited non-significant changes in IGF1 (-57.2±60.8; P=0.386), PGC-1α (41.1±44.0; P=0.441) and GLUT4 (14.5±8.2; P=0.178) compared to CS. **Conclusion:** A 12-week PRT intervention increased skeletal mass and strength in PCS on ADT. Future studies are warranted to elucidate molecular mechanisms underlying skeletal muscle changes in this population.

First Place – Biokinesiology and Physical Therapy Student Award
Poster #: 98
Title: An exploration of skill transfer in the DOSE study
Name: Helen Bacon
Faculty Advisor: Carolee Winstein
Background: Transfer of training is important for rehabilitation, as there is insufficient therapy time to practice every task that a person might wish to perform. Thus, we need to understand how training should be structured and which tasks should be practiced in order to maximize transfer. The recent DOSE study utilized functional task practice, and so can be used to examine the relationship between task practice and transfer to unpracticed tasks. **Purpose:** Examine the effect of task practice on transfer to outcome measure tests such as the Wolf Motor Function Test **Methods:** Therapy logs from the DOSE clinical trial were reviewed to determine which tasks were practiced, how often they were practiced, and how well subjects were able to perform them. Outcome measure scores on the Wolf Motor Function Test (WMFT) were also reviewed, and re-scored using a novel method to quantify movement quality (WMFT-RPS). **Results:** Extracting task data from therapy logs is challenging, particularly given the personalization of tasks to each participant and the progression of task difficulty concurrent with performance improvement. However, we expect to find that the amount of practice of tasks falling into general categories such as strengthening or dexterity will predict transfer to WMFT tasks that fall into the same categories, as shown by an improvement in movement quality. **Conclusion:** This project will go some way to addressing the question of where we can expect transfer to occur from therapy, which could ultimately influence the choice of tasks to practice in limited rehabilitation time.

Second Place – Biokinesiology and Physical Therapy Student Award
Poster #: 117
Title: Arm-use patterns in chronic stroke survivors:observations from covert bimanual task-performance.
Name: Rini Varghese
Faculty Advisor: Carolee Winstein
Background: Arm use patterns in chronic stroke survivors is modulated by a number of factors including side of stroke lesion, pre-existing brain-behavior asymmetries, and prior experience. Despite growing evidence pertaining to arm use after stroke, little is known about how stroke survivors solve ecologically relevant bimanual tasks (e.g.placing letter in envelope). **Purpose:** Our primary aim is to identify volitional arm use patterns adopted for asymmetric bimanual tasks and compare these patterns between left-(LHP) and right-hemiparetic (RHP) individuals across several levels of motor impairment. **Methods:** We conducted a retrospective classification analysis of video data from two bimanual tasks (i.e.letter/envelope, photo/album) performed as part of the Actual-Amount of Use Test. Use patterns of 47 pre-morbidly right-handed stroke survivors were classified, first by pattern of use (i.e.unimanual or bimanual), and second by the role in which the paretic arm was engaged (i.e.stabilization or manipulation). Group differences in the probability of bimanual engagement were analyzed using logistic regression. **Results:** There was a significant difference between LHP and RHP groups averaged across motor impairment (Upper-Extremity-Fugl-Meyer:19-66). Probability of bimanual-engagement was higher for the RHP compared to the LHP group, and this difference was greater for those with moderate-to-severe impairment. Further, of those who chose a bimanual solution, a greater proportion of the RHP group used their paretic hand for manipulation, compared to that of the LHP group, which engaged it for stabilization. **Conclusion:** After stroke, we observed arm use patterns for bimanual tasks that depended on the hemisphere affected and the degree of motor impairment. Future research will systematically explore the mechanism(s) underlying these observations.

First Place – Occupational Science and Occupational Therapy
Poster #: 127
Title: Barriers and facilitators to primary care for individuals with ASD
Name: Christine Tran
Faculty Advisor: Leah Duker
Background: Individuals with autism spectrum disorder (iASD) report dissatisfaction with primary care (PC), while providers report a desire for additional training to work with iASD. Limited research exists examining the challenges and potential solutions for these challenges. **Purpose:** To explore environmental barriers and facilitators impacting PC for iASD across the lifespan. **Methods:** Eleven databases were searched using the terms: Autism, medical/primary care, and environment. Data from articles were organized into environmental factor categories defined by the International Classification of Functioning, Disability, and Health (WHO, 2009). **Results:** Seventeen articles reported on PC for iASD (adults n=7 and children n=10). The first category, Products and Technology, highlighted tools to aid in determining appropriate accommodations to address communication barriers between iASD and providers. The next category, Natural Environment, emphasized sensory-based challenges and adaptations to decrease discomfort for iASD. Support and Relationships focused on barriers to iASD accessing adequate support from providers and the advantages of specialized PC clinics. The Attitudes category discussed the impact of provider misconceptions about iASD. Health Services, Systems and Policies detailed the financial disincentives providers face for accommodating iASD in PC practice. Lastly, Education Services, Systems and Policies highlighted limited provider knowledge and training regarding iASD and educational programs to address this. **Conclusion:** A variety of environmental barriers to PC are documented for iASD; however, there is limited literature on solutions for attitudinal and policy-related barriers. This review has implications for PC environment design, health care policy, and resource/training needs for providers. Further research investigating environmentally-based interventions for iASD within PC is warranted.

Second Place – Occupational Science and Occupational Therapy
Poster #: 120
Title: Strategies for improving dental encounters for children with ASD
Name: Dominique Como
Faculty Advisor: Sharon Cermak
Background: Oral health is important to physical and psychological health. Children with autism spectrum disorders (cASD) experience significant oral care challenges; however, little research on efficacious interventions to improve care for this population exists. **Purpose:** To gather information on current strategies used to facilitate successful oral care encounters for cASD. **Methods:** Focus groups of parents of cASD (5-18 years; n=2) and dentists treating cASD (n=2) were conducted to elicit details about the strategies employed to address oral care-related challenges. Thematic analysis following a grounded theory approach was employed. **Results:** Three themes emerged from parent stories: (1) What Makes a Good Dentist focused on dentist knowledge and experience; (2) Tricks, Tactics, and Diversions described different techniques dentists used to help improve dental visits; and (3) Preparation, Preparation, Preparation which explored strategies parents/caregivers could implement to increase the chance of a successful dental encounter. Four themes emerged from dentists' accounts: (1) Parents Know Best described how dentists valued parental expertise; (2) Desensitization explored preparing the child for visits by encouraging practicing oral routines at home and in the office; (3) Network of Colleagues referred to dentists seeking out the advice of other healthcare professionals regarding working with cASD; and (4) Flexibility which focused on dentists altering their traditional treatment methods to accommodate the individualized needs of cASD. **Conclusion:** Findings provide insight into techniques perceived by parents and dentists that support successful dental encounters for cASD. This information has the potential to improve care for this population by identifying future areas for intervention.

First Place – DDS Student Basic Science Award
Poster #: 133
Title: Flavonoids for CMV-Induced salivary gland tumor therapy
Name: Courtnie Yun
Faculty Advisor: Tina Jaskoll
Background: Mucoepidermoid carcinoma (MEC) is the most common malignant tumor in major and minor salivary glands (SGs). Our laboratory has recently confirmed a causal relationship between human cytomegalovirus (hCMV) and SG MEC. Since current anti-CMV drugs are limited due to toxicity and the emergence of drug resistance, there is an urgent need for new anti-CMV treatments. **Purpose:** To determine the effect of bacalein, an "anti-viral/anti-cell signaling" flavonoid extensively used in Chinese herbal medicine, on CMV-host interactions and viral efficacy. **Methods:** Newborn ex vivo 3D submandibular gland (SGs) were cultured in the presence/absence of mouse CMV (mCMV) on day 0 for 24 hours and then in virus-free media for 10-14 days. Baicalein or the antiviral acyclovir, either singly or in combination, was added daily on days 6-14. SG phenotypes, viral distribution, viral-induced changes key genes and proteins were analyzed using H&E histology, qRT-PCR, and immunolocalization. **Results:** Baicalein treatment of virus-infected SGs induced a marked decrease in pathology, cell proliferation and viral infection, a substantial increase in cell death in virally-infected cells; and significant changes in gene expression. Although acyclovir treatment significantly reduces viral expression, apoptosis is not seen in tumor cells. Combination treatment was similar to those seen with baicalein alone. **Conclusion:** Baicalein is an effective anti-CMV treatment due to the targeting the CMV-infected cells and gene pathways. What remains to be discovered is the molecular mechanism of flavonoid inhibition of viral infection and tissue pathology.

Second Place – DDS Student Basic Science Award
Poster #: 131
Title: AMOR in the repair for extraction socket with dehiscence defect
Name: Taewan Kim
Faculty Advisor: Seiko Min
Background: Tissue engineering approaches to bone repair involved with scaffolds, stem cells and exogenous growth factors. An alternative was proposed involving anti-Bone Morphogenetic Protein (BMP)-2 monoclonal antibodies (mAbs) immobilized on a scaffold which captures endogenous BMP to mediate bone formation. This strategy is termed antibody mediated osseous regeneration (AMOR). **Purpose:** The aim of this study sought to evaluate the ability of AMOR with the extraction socket devices called SocketKAP and SocketKAGE utilized for graft protection as well as space maintenance for bone regeneration. **Methods:** The buccal plate of extraction socket was removed up to apex of tooth to create an extraction socket with buccal dehiscence defect in canine model. All experimental sites were randomly assigned to following four groups: G1: absorbable collagen sponge (ACS) + AMOR; G2: ACS + Iso; G3: Anorganic Bovine Bone Mineral (ABBM); G4: unassisted healing. The experimental animals were euthanized at 3 month for histologic and histomorphometric analysis. **Results:** Histologic and histomorphometric observation revealed that AMOR group maintained the contour of the alveolar crest while the knife edge appearance was seen in other groups. AMOR group demonstrated statistically greater amount of new vital bone compare to unassisted wound healing group. Iso and unassisted wound healing groups demonstrated statistically higher number of osteocyte and bone multicellular unit (BMU) than other groups. **Conclusion:** Our present data revealed the efficacy of the application of AMOR for the repair of extraction socket with dehiscence defect in canine model.

First Place – DDS Student Clinical Science Award
Poster #: 137
Title: Emergency management of traumatic dental injuries among school nurses
Name: Armin Afshar
Faculty Advisor: Julie Jenks
Background: Dental trauma is one of the important problems to be addressed in schools. Falls, fights, and sport injuries are some of the common causes of dental trauma in schools. **Purpose:** The purpose of this study is to determine school nurses' and school health clerks' educational experiences, opinions and professional behavior related to the management of traumatic dental injuries (TDI), specifically tooth avulsion, in school children before and after an educational intervention to increase TDI knowledge among school nurses and health clerks. **Methods:** A twenty-three question survey instrument will be administered to elementary and middle school nurses and health clerks separately during their monthly meeting to determine whether there is a need for training in the management of traumatic dental injuries. The questionnaire contains objective questions regarding the frequency of traumatic dental injuries and specifically avulsions. Participants are questioned regarding their history of education of TDI. In addition, the survey also contains questions regarding nurses' knowledge level and management skills in treating dental avulsion. There are also questions designed to obtain demographic data from the health clerks and school nurse population in Pasadena and South Pasadena, California. Each survey will be presented to an elementary or middle school nurse employed by the Pasadena Unified School District and will be collected the same day at one of their monthly meetings. The survey contains no questions leading to any identifiable data on an individual level. **Results:** The result of the surveys will be interpreted after the completion of the study in mid-March. The results from nurses collected in February 2017 suggests the school nurses are not familiar with handling dental trauma with children at school. **Conclusion:** First part of the study suggests there is a need for CE courses for school nurses to familiarize and train them to handle dental trauma properly.

Second Place – DDS Student Clinical Science Award
Poster #: 139
Title: Comparative performance of composite-resin inlays vs. short-fiber reinforced direct restorations
Name: Tan Khuu
Faculty Advisor: Pascal Magne
Background: Restoring large MOD defects can be challenging due to polymerization shrinkage stresses. **Purpose:** To compare mechanical performance and enamel-crack propensity of direct, semi-direct, and CAD/CAM approaches for large MOD composite resin restorations. **Methods:** 45 extracted maxillary molars underwent standardized slot-type preparation (5-mm depth and bucco-palatal width) including immediate dentin sealing (Optibond FL) for the inlays (30 teeth). Short-fiber reinforced composite resin (EverX Posterior covered by Gradia Direct Posterior) was used for the direct approach, Gradia Direct Posterior for the semi-direct, and Cerasmart composite resin blocks for CAD/CAM inlays. All inlays were adhesively luted with light-curing composite resin (preheated Gradia Direct Posterior). Shrinkage-induced enamel cracks were tracked by transillumination photography. Cyclic axial isometric chewing (5-Hz) was simulated, starting with a load of 200N (5,000 cycles), followed by stages of 400, 600, 800, 1000, 1200, and 1,400N (maximum 30,000 cycles each) until fracture or to a maximum of 185,000 cycles. Survived specimens were subjected to fatigue-to-failure test at 30-degree angle on the palatal cusp. **Results:** Shrinkage-induced cracking rates were 47%, 7%, and 13% for direct, semi-direct, and CAD/CAM inlays, respectively. Survival to accelerated fatigue was similar for all three groups (Kaplan Meier $P>.05$), ranged between 87% (direct) to 93% (semi-direct, CAD/CAM). Similarly, fatigue-to-failure test values did not differ significantly (Life Table analysis, $p>.05$) at 1,775N, 1,900N, and 1,675N, respectively. **Conclusion:** All three restorative techniques yielded excellent mechanical performance above physiological masticatory loads. Direct restorations performed as good as inlays when a short-fiber reinforced composite resin base was used.

USC Stevens Center for Innovation "Best Commercial Potential" Award
Poster #: 49
Title: The role of PRMT1 in craniofacial development
Name: Yongchao Gou
Faculty Advisor: Jian Xu
Background: Protein arginine methyltransferases 1 (PRMT1) catalyzes asymmetric arginine methylation of proteins, which regulate pre-mRNA splicing, DNA damage signaling, mRNA translation, cell signaling, and cell fate decision. PRMT1 is known to methylate SMAD6, SMAD7 and AXIN, therefore it can regulate the BMP/TGF-beta and WNT signaling pathways and modulate craniofacial development through regulation of BMP/TGF-beta and WNT signaling pathways. **Purpose:** We hypothesized that PRMT1 regulates craniofacial development.
Methods: Conditional gene knock-out, Western blots, immunofluorescence staining, immunohistochemistry staining, HE staining, Micro-CT. **Results:** Conditional knock-out of Prmt1 in neural crest cells led to a smaller head and complete cleft palate, but the ossification of craniofacial bone was not inhibited. The migration of neural crest cells was not affected. Palatal shelves failed to elevate and face each other at E14.5, however they could elevate after removing the mandible and tongue in organ culture. Proliferation of palate mesenchymal cells was reduced, meanwhile the apoptosis was not affected. Beta-catenin was significantly increased in palate mesenchymal cells. **Conclusion:** PRMT1 is necessary for craniofacial development. Deletion of Prmt1 stabilizes beta-catenin and enhances nuclear beta-catenin level. We propose that overactivation of beta-catenin led to insufficient proliferation of palatal mesenchymal cells and premature differentiation therefore causing cleft palate.