62 Soft Tissue Response Following Class II Divison I Surgical Treatment. M. EDD, M. MOW (National Dental Centre, Singapore)

Objective: To assess soft tissue profile changes and responses to hard tissue movements in patients undergoing orthognathic surgery.

Method: This study examined 52 lateral cephalometric radiographs of a cohort of 26 Chinese patients who had orthognathic surgery for Class II division I malocclusion. The radiographs were classified as T1 (after completion of pre-surgical orthodontics) and T2 (after completion of post-surgical orthodontics). They were digitized by a single examiner using the CASOS computer software. Method error analysis using Blund-Swan plots showed 90% accuracy between duplicate determinants. Soft tissue analysis using a modified Le Fort and Blanckton analysis at T1 and T2 were compared. Linear regression analysis was used to relate soft tissue changes to the hard tissue movements.

Results: There were significant reductions in facial convexity angle, upper lip protrusion, lower lip protrusion, vertical lip/chin ratio, upper incisor exposure and labial fold with significant improvement in overjet, overbite, incisor and mandible to lip ratio and soft tissue to hard tissue profile. The positive changes were quantified and related to the amount of tooth movement.

Conclusion: Orthognathic correction of Class II Division I patients significantly reduces convex facial profiles. Soft tissue movements can be reliably predicted using ratios and regression equations.

63 PTIHP and CB1α expression in condylar cartilage during palatal growth. ZH. JIU TANG*, ABM BABIE and U HAGG (Orbodentistry, University of Hong Kong, HK)

Recent findings on bone biology showed that parathyroid hormone related protein (PTIHP) and core binding factor 1 (CB1α) are key factors regulating the chondrocytes maturation during tooth development. To clarify whether these factors are also modulate the mandibular condyle growth during puberty, we examined their temporary expression in condylar cartilage. Mandibular condyles were harvested from 70 female Sprague-Dawley rats at age of 21, 26, 35, 42, 49, 56 and 65 days (10 in each age group). An immunohistochemical study was designed to evaluate the expression of PTIHP and CB1α in condylar cartilage. The positive staining was quantified and correlated to the amount of type II collagen. PTIHP was predominantly located in chondro-progenitors which was lack of collagen II staining, and chondroblasts with faint collagen II signal. Strong PTIHP staining was also detected in growing chondrocytes in the middle to outer region of the condyle. CB1α staining findings suggested that PTIHP and CB1α also regulate the process of chondrocytes proliferation and maturation and control the pace of endochondral bone formation in mandibular condyle during palatal growth. This study was supported by CRCs grant 020177622331/100000323.03 from the HKSU.

64 Critical Bending Moment of Implant Fixture-Absorbent Screw Joint Interfaces: Effect of Torque Levels and Implant Diameter. B.F. TAN*, K.B.C. TAN, E.I. NICHOLLS (National University of Singapore, Singapore and University of Washington, Seattle, USA)

Clinically, the bending moment torque level has been reported as a major cause of implant prosthetic component failure. This study defines Critical Bending Moment (CBM) - the bending moment at which applied axial load overcomes the screw joint preload and causes loss of contact between the mating surfaces of implant screw joint components. At this point, all external load will instantaneously be taken up by the screw shank and rapidly lead to screw failure. This study measured the CBM at the fixture-above screw joint for 2 fixture diameters (Nobel Biocare (NH) 3.75mm Regular RP, 5.0mm Wide (WP)) and 2 abutment systems (Ceramic (C) and Modified (M)) to give 4 fixture-above test groups. CBM was further increased at 50%, 50%, 75% and 100% of manufacturer recommended torque levels, NH 3.75mm x 5mm RP, and 5.0mm x 15mm RP. WP fixtures were used. Abutments were strain gauged and microstrain (ε) dynamically logged as vertical load applied (L) was applied on the abutment body at distance x mm from the fixture-above interface. Strain instrumentation utilized a Series II HP 75000 VXI multimeter and HP 113137 FFT multiplexer. A HP 76 program distal-loaded strain dynamically to determine point of gap-opening. All torque applications and strain measurements with loading to CBM were repeated 5 times and sample size of each fixture-above groups was 2. Results: Critical Bending Moment (CBM), Ncm (±)

Test Groups / Torque Level 25% 50% 75% 100%

C1RP 7.09(±2.11) 35.35 (±3.75) 45.63 (±5.82) 62.64 (±6.44)
C1WP 28.38 (±0.89) 62.97 (±4.62) 92.20 (±2.77) 127.41 (±3.35)
M1RP 16.08 (±1.11) 25.22 (±0.96) 34.12 (±2.21) 39.46 (±1.83)
M1WP 15.03 (±1.81) 32.86 (±2.43) 43.29 (±3.46) 61.55 (±1.73)

Two-way ANOVA (p<0.001) revealed significant effects for variables test groups (F=2738.3) and torque levels (F=2969.0). Subsequent multiple one-way ANOVA and Tukey HSD post-hoc tests confirmed that significant differences existed between test groups and torque levels. CBM was found to differ by abutment system, fixture diameter and torque level. CBM in all abutment systems was correlated to applied torque levels. It is recommended that manufacturer recommended torque levels be followed to ensure screw joint integrity.

65 The Identification of RANKL in Bone-Resorbing Lesions of the Jaws. J.Y.Y. TAY*, J.F. YEO, M. HARRIS, B.H. BAY (Dept of OMS, National Dental Centre, Singapore; Dept of OMS, Medical University of South Carolina and Dental School, USA; Dept of Anatomy, National University of Singapore, Singapore)

The RANKL/OPG system is the dominant mediator of osteoclastogenesis and its discovery in 1998 shed a long awaited understanding in bone mineralization biology, namely the precise mechanisms by which preosteoclasts/ stromal cells control osteoclast development. It is now known that RANKL promotes osteoclast differentiation, stimulates osteoclast activity, prolongs osteoclast survival and its adherence to bone surface. Abnormalities of the RANKL/OPG system have been implicated in a range of diseases including osteoporosis, rheumatoid arthritis, Paget's disease and periodontal disease. To date, no work has been done in osteolytic lesions of the facial skeleton. The objective of this study was to elucidate if osteolytic processes in bone-resorbing lesions of the facial skeleton are mediated via the RANKL pathway. Specimens of ameloblastoma, dentigerous cysts, odontogenic keratocyst, radicular cysts and giant cell granulomas of demonstrated distinct stained cells to RANKL and TRAP. Single nucleated cells were localized to the region just below the epithelium with fusion of these cells to form multinucleated cells towards the connective tissue stromas of the lesion. RANKL mediates bone-resorbing processes in osteolytic lesions of the facial skeleton.

66 Chemical Composition of the Enamel after Exposure to Bleaching Agent. U.T.K. HA*, L.C. RICHARDS and H.C. NGO (Faculty of Odonto-Stomatology, Ho Chi Minh city University of Health Sciences, Vietnam; Dental School, Adelaide University, Australia)

The objective of this study is to investigate the changes in chemical composition of the enamel after exposure to carbamide peroxide for periods corresponding to advocated vital bleaching protocols. In this study ten extracted, clinically normal, human third molar teeth were collected, the roots removed and the crowns sectioned mesio-distally. The resultant twenty tooth halves were divided randomly into four groups (1, 2, 3 and 4). Each tooth half was subsequently sectioned bucco-lingually and the resultant paired specimens were randomly assigned to experimental or control groups. The control specimens were stored in artificial saliva. The experimental specimens were subjected to bleaching with 15% carbamide peroxide for either 1 hour per day with Opalescence® (Group 1), 2 hours per day (Group 2) or 3 hours per day (Group 3) or with Platinum® (Group 4), on seven consecutive days. Electron probe microanalyzer (EPMA) was conducted to obtain information about calcium, oxygen and phosphorus contents of the bleached and unbleached experimental specimens, the depth of 150 μm. Analysis of Variance revealed significant differences in the relative amount of each component between the control and experimental groups in relation to the exposure time (p<0.05). Calcium and oxygen weight percentage varied with depth in specimens treated with Opalescence® but not in specimens treated with Platinum®. Hence, it is concluded that bleaching with 10% carbamide peroxide can result in elemental alterations which are associated with depths and times of exposure, with some differences between Opalescence® and Platinum®.

67 Influence of Flowable Composite Liner Thickness on Marginal Quality. J.C. STUP, C.L. YANG, Y.T. JIN (University Cheng Kung University Hospital, Tainan, Taiwan)

The aim of this study is to investigate the effect of flowable composite liner thickness on marginal morphology and interfacial microleakage of Class II composite restorations. 32 intact molars, each prepared with two box-only Class II cavities, were separately lined with various thicknesses of flowable composite (Filtek Flow, 3M Dental) and filled with posterior composite (Porv, 3M). They were randomly divided into four groups (n=16) as Group 1, no lining; Group 2,Bon lining/filling-cured with P60; Group 3, Bulk lining/ pre-cured; and Group 4, thick lining/pre-cured. These teeth were thermocycled for 1500 cycles (5-60°C), and immersed in dye for 24 h. Replication of these fillings were fabricated before and after thermocycles, following By SEM examination. Cervical marginal morphology was classified in 5 patterns as excellent, deficient, opening, overfilling and overhanging margins. Length of each pattern was measured as the ratio to the whole cervical wall. These teeth were subsequently mid-sectioned and interfacial microleakage was recorded as the extent of dye penetration with a 0-4 scoring system. One-way ANOVA test and the Mann-Whitney test were separately used to analyze the marginal morphology and microleakage. Results from SEM examination revealed that Group 4 presented the highest opening margin percentage both before and after the thermocycles. No significant difference in the overhanging margin was found among these groups. Group 2 showed the least interfacial microleakage and the difference from the other two groups showed that the minimal thin flowable composite liner improved the cavity adaptation and marginal sealing without increasing marginal overhanging. While a thick lining may impair the marginal seal.