82 **Estrogen Enhances the Effect of IL-1β/TNF-α in Human PDL Cells. T. YONGCHAITRAKUL* and P. PAVASANT (Department of Anatomy, Faculty of Dentistry, Chulalongkorn University, Bangkok, Thailand.)**

The purpose of this study is to investigate the responses of human periodontal ligament (PDL) cells after activating with estrogen, IL-1β or TNF-α alone or activating with the combination of estrogen and IL-1β or estrogen and TNF-α. After 48 hours of activation, the levels of NOS-3 expression and MMP-1 in the medium were examined using RT-PCR and Western analysis, respectively. The results indicated that estrogen alone had no effect on NOS-3 and MMP-1, while IL-1β and TNF-α increased both expression of NOS-3 and secretion of MMP-1. Interestingly, when cells were activated with estrogen and IL-1β simultaneously, the level of NOS-3 and MMP-1 increased up to 5 and 2.3 folds, respectively, compared with 4.2 and 1.3 folds when cells received IL-1β alone. Similarly, activation with estrogen and TNF-α increased the level of NOS-3 and MMP-1 from 1.8 and 2.2.folds up to 2.5 and 3.2.folds, respectively, in comparing with TNF-α treated alone. The results showed that increasing level of estrogen could enhance the effect of pro-inflammatory factors, which consequently enhanced periodontal tissue destruction.

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83 **Elastic-inelastic properties of laminated mouthguard materials. [1]Danny LOW*, [2]M.V. SWAIN, [3]K. ISHIGAMI and [3]T.TAKEDA ([1]Conservative Dentistry, The University of Hong Kong, Hong Kong, Biomaterials Science Research Unit, [2]The University of Sydney, Australia, [3]Department of Sports Dentistry, Tokyo Dental College, Japan)**

Mouthguards are essential for protection of teeth during dental trauma. However, the literature on deformation properties of mouthguard materials is limited. An ultra micro-indentation system has been used to evaluate elastic-inelastic properties of these materials (Low *et al., Dent Mater* 2002; 18: 211-215). Two bands of mouthguard materials with 3mm thickness (DC & EC) were selected and two layers of materials were heat pressed to form the laminated specimens (DL & EL). Specimens were tested according to the method previously described. The elastic modulus value (E) at maximum depth and the energy absorption ratio during loading and unloading is given by Wi/Wt where Wt is the area under the loading force displacement and Wi is the area between the loading and unloading curves. The higher the ratio, the greater energy absorption capacity of a material. The E values in MPa and Wi/Wt ratio in % are summarised (mean SD) in the Table below.

	DC	DL	EC	EL
E (MPa)	19.89 ± 0.44	15.83 ± 0.06	15.93 ± 0.09	14.39 ± 0.31
Wi/Wt (%)	9.92 ± 0.68	11.08 ± 0.04	11.48 ± 0.16	12.34 ± 0.18

All materials gave significantly different E values and energy absorption ratios between standard and laminated specimens ($p<0.05$). Present study showed that the elastic modulus was decreased and energy absorption capacity was increased with laminated mouthguard materials.

84 **Influence of Dietary Simulating Solvents on Hardness of Provisional Materials. P.L.LOH*;M.K.S.MAH, C.P.W.LYE,A.U.J.YAP (Faculty of Dentistry, National University of Singapore)**

This study evaluated the influence of dietary simulating solvents on surface hardness of provisional crown and bridge materials. Six provisional crown materials were used. Specimens of provisional materials (Temporary Bridge Resin (TBR) [Dentsply]; Protemp Garant (PG) [ESPE-3M]; Luxatemp Automix (LA) [DMG]), Unifast LC (UF) [GC]; Luxatemp Solar Plus (LS) [DMG]), and Provipoint DC (PP) [Vivadent]) were made and stored in various solutions at 37°C for 1 week. Specimens stored in air were used as control. The hardness testing (KHN; n = 6) was done with a digital microhardness tester (load = 100 gf; dwell time = 15 seconds). Hardness ratios were plotted against the solubility parameter of the solvents and the Environmental Index was computed. Data was subjected to ANOVA/Scheffe's test at significance level 0.05. The results showed that all materials conditioned in the various aqueous ethanol solutions (ES) resulted in significantly lower hardness.

	Air	Heptane	100%ES	75%ES	50%ES	25%ES	Water
TBR	10.50(0.41)	9.47(0.78)	1.00(0)	1.00(0)	4.08(0.33)	7.02(0.29)	10.18(0.67)
UF	14.51(0.29)	13.10(0.39)	1.18(0.17)	1.00(0)	4.85(0.49)	8.10(0.21)	11.32(1.06)
PP	14.67(0.45)	9.20(0.52)	1.15(0.16)	1.58(0.31)	1.73(0.05)	3.00(0.26)	13.43(0.56)
PG	8.63(0.28)	9.07(0.84)	3.58(1.23)	4.93(0.12)	5.00(0.29)	4.57(0.18)	9.08(0.30)
LS	8.21(0.38)	8.55(0.75)	4.97(0.16)	5.38(0.18)	6.13(0.20)	5.50(0.26)	8.78(0.63)
LA	12.10(0.47)	12.43(0.08)	5.70(0.74)	6.57 0.40)	7.75(0.47)	9.80(0.21)	12.43(0.28)

Conditioning in heptane significantly softened TBR, UF and PP. The hardness ratios of bis-acryl resin composites were generally higher than methylmethacrylate or urethane dimethacrylate based materials. Ranking of Environmental Index was as follows: LS > LA > PG > TBR > UF > PP. In conclusion, all provisional materials were significantly softened by aqueous ethanol solutions. Materials based on bis-acryl resins were generally more resistant to damage from dietary solvents.

85 **Comparison of shear-peel bond strength of orthodontic brackets to various ceramic systems. S.H.CHAY*, P. Wattanapayungkul, A.U.J.YAP, P.L. Loh, S.M. Chung. (Faculty of Dentistry, National University of Singapore)**

The aim of the study was to evaluate the shear-peel strength of orthodontic brackets to various ceramic systems namely the all-ceramic systems, Finesse and Empress II and porcelain-fused-to metal system, Vita Omega 900 and their mode of failure. Forty-five glazed ceramic disks with flat surfaces equally divided into the 3 groups (n=15) were fabricated and potted into acrylic moulds. They were then pumiced, etched and primed with silane (Rely X, Unitek/3M ESPE) before bonding of flat-based brackets onto the surfaces using chemical cure composite adhesive (Unite Bond, Unitek/3M ESPE). After being stored in distilled water for a week, the specimens were debonded with a shear-peel load by an Instron testing system. The ceramic surfaces were examined under light stereomicroscope to establish the amount of composite resin left behind and this was quantified using the *Image Pro Plus* software and classified using the Adhesive Remnant Index (Artun and Bergland, 1984). This ARI classifies the amount of composite left behind as follows: 0: no adhesive left on the ceramic, 1: less than half of the adhesive left on the ceramic, 2: more than half of the adhesive left on the ceramic, 3: all adhesive left on ceramic with clear imprint of bracket base. Results showed that Finesse had the highest shear-peel bond strength (15.03 ± 1.90 MPa) followed by Vita Omega 900 (11.51± 2.35 MPa) and Empress II (11.12 ± 1.78MPa). These findings were found to be statistically significant using ANOVA and Tukey analyses. Kruskal-Wallis analysis showed that there was no relationship between the various groups of ceramic systems and the amount of adhesive left behind. Subsequently, the mode of failure indicated that it was a mixed failure of adhesive and cohesive failures for all the groups. In conclusion, Finesse ceramic system demonstrated better shear-peel bond strength of bonded orthodontic brackets compared to Vita Omega 900 and Empress II. The mode of failure was a mixture of adhesive and cohesive failures. This study was supported by NUS Academic Research Fund R-222-000-009-

86 **Children's satisfaction with dental appearance, and its association to quality of life. H.N. PANG*,C. McGrath and E.C.M. LO (Faculty of Dentistry, University of Hong Kong, Hong Kong SAR, China)**

OBJECTIVES: To assess the impact of oral health on the life quality of 12-year-old children in Hong Kong, and to identify association between life quality and reported satisfaction with dental appearance. METHODS: A random sample of 547 12-year-old Hong Kong children participated in a study of satisfaction with dental appearance and quality of life. Children self-completed a questionnaire incorporating the 36-item Child Oral Health related Quality of Life questionnaire (COHQOL), covering four domains: *symptoms, functional limitations, emotional-well-being (EWB) and social-well-being (SWB)*. In addition, children were asked about their overall satisfaction with their dental appearance and questioned about satisfaction with the shape, colour and alignment of their teeth. RESULTS: Five hundred and four of the questionnaires were usable (92%, 504/547). Impact of oral health on life quality was immense: most reported one or more oral symptoms (98%, 496/504), functional limitations (82%, 413/504) and that their oral health affected them emotionally (68%, 348/504) and socially (62%, 314/504). Overall satisfaction with dental appearance was associated with their life quality (domain scores): symptoms ($P<0.001$), functional limitations ($P<0.01$), EWB ($P<0.001$) and SWB ($P<0.05$). Satisfaction with shape of teeth was associated with symptoms ($P<0.001$), functional limitations ($P<0.05$), EWB ($P<0.001$) and SWB ($P<0.05$). Satisfaction with colour of teeth was associated with symptoms ($P<0.001$), functional limitations ($P<0.01$), EWB ($P<0.001$) and SWB ($P<0.01$). Satisfaction with alignment of teeth was associated with symptoms ($P<0.01$), functional limitations ($P<0.001$) and EWB ($P<0.001$). The impact of oral health on the life quality of children in Hong Kong is immense. Satisfaction with the shape, colour and alignment of teeth is associated with their life quality.

87 **Effect of Ozone on Microbial Colonization of Dental Unit Waterlines. S. THAWEBOON, B. THAWEBOON* and P. SUPPAKPATANA. (Mahidol University, Bangkok, THAILAND)**

Microbial contamination of dental unit waterlines is thought to be the result of colonization within the waterlines. Ozone has been used for many years in water disinfection. This study assesses the effectiveness of ozone generated from the dental unit ozonator (Germiphene, Canada) to reduce the surface-attached microorganisms of the dental unit water tubing by using the scanning electron microscope (JEOL-1200 EX, accelerating voltage of 80 kV). The new water tubing of dental water unit was installed in both the control and experimental groups and the ozonators were set up in the experimental group. Under the scanning electronmicroscope, after 30 days installation of ozonator, it was found that microbial colonization at the inner wall of dental water tubing of the experimental group was with lower density (0.61 cells/μm^2) than that of the control (3.68 cells/μm^2). This result gives an evidence that application of ozone could serve as an alternative method to eliminate the microbial colonization in the dental unit waterlines. This study was supported by the Mahidol University Grant 2001.

88 **Diagnosis reliability of odontogenic keratocyst and ameloblastoma from the radiographs. T VIVITKUNAKORN*, W CHOLIGUL, A PONGPATTARIN, A TOOMCHAT. (Faculty of Dentistry Chulalongkorn University, Bangkok, Thailand)**

The aim of this study was to determine the reliability of the dentists in detecting the lesions of odontogenic keratocyst and ameloblastoma from the radiographs. Ten dentists with the experience in diagnosis and oral surgery were asked to diagnose the lesions twice in a period of one month. They were divided randomly into two groups with the first group (5 of each) being informed about the radiographic features of both lesions while the other was not informed. The results showed that the informed group has more accuracy yield in diagnosis than the non informed one with no difference statistically ($p>0.05$) and the first diagnostic period for both groups seem to be superior to the second period with difference statistically ($p<0.05$). The kappa index of the non-informed group in detecting lesion of odontogenic keratocyst was 0.469 and for ameloblastoma 0.213, whereas for the informed group was 0.003 and 0.078 respectively. From this study it may conclude that the reliability of the ten dentists in detecting these two lesions was poor. The accuracy in diagnosis depended on backgrounds and experiences of the individuals. Supported by Dental Research Fund, Dental research project 3205-312/2001 Faculty of Dentistry, Chulalongkorn University