Clinical and Mechanical Evaluation of a New All-Ceramic Restorative Material Turkom-Cera™

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The mechanical properties and clinical performance of Turkom-Cera system were evaluated in this study. The mechanical properties evaluated were: flexural strength, microhardness, shear bond strength, fracture resistance and marginal integrity.

The biaxial flexural strength and hardness of Turkom-Cera compared to two other allceramic systems (In-Ceram and Vitadur-N) were investigated. The Turkom-Cera exhibited significantly higher flexural strength (506.8 MPa) than In-Ceram (347.4 MPa) and Vitadur-N (128.7 MPa) ceramic materials. However, In-Ceram core has significantly higher hardness (1116.2 VHN) than Turkom-Cera (1002.1 VHN) and Vitadur-N (812.8 VHN) all-ceramic materials.

In order to find the optimal choice of luting cement and surface treatment for Turkom-Cera all-ceramic material, the shear bond strength of four different luting cements (zinc phosphate, glass ionomer, resin modified glass ionomer and resin cement) to the Turkom-Cera all-ceramic discs was evaluated. In addition, the effect of surface treatments (no treatment as control, sandblasting, silane application and combinations of these treatments) on the shear bond strength of resin cement to Turkom-Cera was also investigated. The shear bond strength increased significantly from zinc phosphate (0.92 MPa), glass ionomer (2.04 MPa), resin modified glass ionomer (4.37 MPa) to resin cement (16.42 MPa). Sandblasting followed by silanization of the Turkom-Cera specimens provided the highest bond strength value (19.13 MPa). The control group exhibited significantly lower shear bond strength (10.83 MPa) than the other three groups.

However, there were no significant differences in the shear bond strength of the sandblasting (16.42 MPa), silane (16.18 MPa) and sandblasting + silane (19.13 MPa) groups.

The occlusal fracture resistance of Turkom-Cera all-ceramic copings compared to Procera AllCeram and In-Ceram all-ceramic copings was evaluated using metal dies and natural teeth as a supporting structure. In both cases, using metal dies or natural teeth as a supporting structure, the mean load at fracture of Turkom-Cera (2184 N / 1341.9 N) was significantly more than Procera (1953.5 N / 975.0 N) (P<0.05). There were no significant differences in the mean loads at fracture between In-Ceram (2041.7 N / 1151.6 N) and Procera and also between Turkom-Cera and In-Ceram (P>0.05).

The effect of zinc phosphate, glass ionomer and resin cements on the occlusal fracture strength of Turkom-Cera all-ceramic copings were also assessed. The mean load at fracture of Turkom-Cera copings cemented with zinc phosphate, glass ionomer and resin cements were 1537.4 N, 1294.4 N, and 2183.6 N, respectively. There was a significant difference in the mean load at fracture between the three luting cements used (P<0.05). The effect of marginal design (chamfer or shoulder) and artificial ageing (30-day water storage and 500 thermocycles) on the occlusal fracture resistance of Turkom-Cera copings were also investigated. There was no influence of the finish line design and artificial ageing used in this study on the occlusal fracture resistance of Turkom-Cera all-ceramic copings (P>0.05).

The marginal adaptation of Turkom-Cera copings compared to In-Ceram and Procera copings was assessed. The mean marginal discrepancy for Turkom-Cera, In-Ceram and Procera were 49.2 μm, 71.5 μm and 34.4 μm, respectively. It was verified that there was a statistically significant difference among the marginal discrepancy of the three allceramic systems (p<0.05). In this study, there were no significant differences in the mean marginal discrepancy of Turkom-Cera crowns between the chamfer (49.2 μm) and shoulder (44.0 μm) groups (p>0.05).

A preliminary prospective study to evaluate the clinical performance of Turkom-Cera crowns was conducted. This study was carried out to complement the different mechanical tests that have been done on the Turkom-Cera all-ceramic material. In this study, 20 Turkom-Cera crowns were evaluated for a mean evaluation period of 21.5 months. During the whole observation period, 1 of the 20 Turkom-Cera crowns was found to have fractured after a service time of 14 months. The veneering porcelain chipped in 3 molar crowns, but did not compromise the integrity of the crowns. All patients expressed satisfaction with their restorations and did not report any sensitivity during or after treatment.
Synthesis of Urethane Acrylate Macromer from Palm Oil-based Polyol and its Application as a Resin for Dental Composite

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A slightly branched urethane acrylate macromer (UAM) was synthesized by reacting palm oil-based polyol with excess amounts of polymeric methylene diphenyl diisocyanate (MDI) to form urethane prepolymer, then reacted with 2-hydroxyethyl methacrylate (HEMA) and FT-IR spectroscopy confirmed the urethane and grafted acrylate groups. 0.2% by weight of camphoroquinone (CQ) and 0.8% by weight of ethyl-4-N,N-dimethylamino-benzoate (4EDMAB) by weight were added to render the experimental resins light-curable. Their viscosity, percentage of degree of conversion (%DC) and cross-linking density (CLD), percentage of volumetric polymerization shrinkage (%VPS), water sorption and solubility, flexural strength, modulus of elasticity and toughness were determined and compared to Bis-GMA.

Light-curable experimental resin systems were also prepared by adding TEGDMA (T) and Bis-EMA (E) as reactive diluents and co-monomers. The following formulations of resin systems were investigated: BT (blending of Bis-GMA and TEGDMA); U/BT (blending of UAM and BT); U/E (3/1) (blending of UAM and Bis-EMA with mass ratio 3/1); U/E(1/1) (blending of UAM and Bis-EMA with mass ratio 1/1); and U/E/BT (blending of UAM and Bis-EMA and BT). The experimental flowable composites (FCs) were prepared by adding 60 % by weight of silanated barium borosilica glass to each of the experimental resin systems except for the U/E(3/1). The same light-initiators, 0.2% by weight CQ and 0.8% by weight 4EDMAB were used. The groups of FCs are as follows; FC-BT which acts as a control group amongst the experimental FCs (Exp-Cont); FC-U/BT; FC-U/E; and FC-U/E/BT. A commercially available Bis-GMA/TEGDMA-based flowable composite, Esthet.X flow (Dentsply, Caulk, USA) was selected as another control group (Com-Cont). The %VPS, percentage of volumetric change, water sorption and solubility, flexural strength, modulus of elasticity, toughness and cytotoxicity (percentage of viable cell) were determined for all the experimental FCs and Esthet.X flow.

UAM exhibited lower viscosity than Bis-GMA. In addition, the UAM resin showed a higher % DC, flexural strength, toughness and % VPS than the rigid Bis-GMA, while, the water sorption and solubility of Bis-GMA was lower compared to UAM. The viscosities of U/E and U/E/BT were lower than others. When compared to the commonly used resin system BT (Cont), the U/E showed higher % DC, CLD, flexural strength and toughness, and lower water sorption and solubility. When UAM was blended with BT as U/BT resin system, the % DC, CLD, flexural strength, and toughness was higher than BT. However, the U/BT resin system showed higher % VPS, water sorption and solubility than BT resin system. When both UAM and Bis-EMA were blended with BT resin, the U/E/BT resin system showed higher flexural strength, modulus of elasticity, toughness and lower water sorption and solubility.

All experimental FCs fulfilled the requirements of ISO 4049:2000 for flexural strength and water sorption and solubility. The FC-U/BT showed higher water sorption, water solubility and volumetric change than FC-BT (Exp-Cont). On the other hand, FC-U/E and FC-U/E/BT showed lower water sorption and solubility and higher % VPS than FC-BT. UAM-based experimental FCs showed low cytotoxic activity based on the percentage of viable cell determination and the results obtained for the experimental FCs were comparable with the commercial flowable composite, Esthet.X flow.

Within the limitations of this study, it can be concluded that UAM resin showed significantly higher % DC, flexural strength and toughness than Bis-GMA. The UAM resin has potential to be used as a resin system with significantly improved DC, CLD, flexural strength and toughness. The experimental UAM-based-flowable composites fulfilled the ISO 4049 requirements and satisfactory preliminary cytotoxicity screening showed no significant difference in percentage of cell viability compared to Esthet.X flow. However, future studies using different types of filler systems should be carried out to further enhance its properties.
Malocclusion Status and Orthodontic Treatment Needs of 14-year-old Yemeni Adolescents

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The aim of this study was to develop a national database on the prevalence, severity of malocclusion and orthodontic treatment needs among Yemeni adolescents. Other variables included were geographical zones, gender and urban-rural locations.

A multi-stage stratified random sample of 2400 subjects from 60 schools with equal proportion of male and female were selected from nine governorates covering the whole topography of Yemen (coastal, plateau, mountains, desert and islands). Measuring instruments were the conventional FDI/WHO method of occlusal traits (Baume et al., 1973; Berzoukov et al., 1979) and the Index of Orthodontic Treatment Needs (IOTN), (Brooke and Shaw, 1989; Richmond et al., 1995). Other occlusal traits included based on clinical oral examination were canine relationship and bimaxillary protrusion. Data collection was carried out by one examiner assisted by a recorder, using mouth mirror and the orthodontic ruler, with patient seating on a portable dental chair or classroom chair and natural light. Prior to the oral examination, the examiner was calibrated against a gold standard on children of the same age in Malaysia. A pilot study was again conducted on Yemeni children in Thamara a week before data collection began. All information gathered was checked for completeness and data was transferred into a laptop using the SPSS software data entry program. Analysis was carried out using the SPSS version 15 program.

Measurement of occlusal traits based on FDI/WHO objective method showed that dental discrepancies was observed in 14.6% (impacted 5.7%, congenitally absent 2.2%, retained deciduous 3.2%, missing due to extraction or trauma 2.8% and supernumerary 0.7%) of the sample examined. Crowding was observed in 53.3% of the sample, of whom 27.8% had crowding of ≥ 2 mm. Spacing was observed in 2.9% of the sample, mostly in the maxilla. Midline diastema was also found to occur in 5.4% of the sample examined. Asymmetrical molar relationship was only observed in 11.3% of the sample, mostly of Class I/Class II relationship (9.4%). Overjet was observed in 9.1% of the sample. Only a small proportion (2%) had anterior crossbite, deepbite (10.3%), anterior openbite (4.5%), posterior openbite (2.9%), posterior crossbite (5.2%) and 2.7% scissor bite. Other occlusal traits measured clinically were partially erupted teeth (6.5%), Class II canine relationship (right 17.4%, left 18.4%), Class III canine relationship (right 1.8%, left 1.7%) and bimaxillary protrusion (9.3%).

Normative orthodontic treatment needs as assessed using the Dental Health Component criteria of (IOTN) showed that slightly less than half (44.3%) of the adolescents needed some form of orthodontic treatment (Grades 3, 4 and 5). Of this a quarter (26.8%) ‘definitely’ needed treatment. Assessment of whether examiner or subject perceived orthodontic treatment need was made using the Aesthetic Component of IOTN. Findings showed that examiner perceived at least 28.9% of the adolescents in this study needed orthodontic treatment (18.8% ‘borderline’ and 10.1% ‘definite’ need); on the contrary subjects themselves perceived a much lower proportion (13.4%). Further analysis was carried out to compare the findings according to gender, urban-rural areas and country’s topography.

In conclusion, findings showed the prevalence of malocclusion was 74.4% when measured using the conventional WHO/FDI criteria. But when measured with Index of IOTN, the prevalence of malocclusion observed was 68.2%. Although both examiner measurements of normative and aesthetic perceived need indicated a relatively high, subjects self-perceived needs was however low. These findings suggest a need for a more conservative treatment approach in dealing with malocclusion problems among Yemeni adolescents.
The Comparison of Protaper® and K-flexofiles In Preparation of Curved Canals – In Vitro Study

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Objective: To compare the performance of ProTaper® rotary instruments and stainless steel K-Flexofiles in preparing curved root canals in terms of changes in angle of curvature, apical transportation and production of canal aberrations and also to record the rate of separation of ProTaper® files.

Study Design: Forty-one human mandibular first molars (mesial roots only each with 2 canals) with canal curvature of 15 to 18 degrees were divided into two groups. Forty-one canals were prepared using ProTaper® rotary instruments while forty-one canals were prepared using K-Flexofiles and Gates-Glidden drills. Digital radiographs obtained were analyzed with various image-analyzing programs. The parameters evaluated were reduction in canal curvature, apical transportation, lateral perforation, ledge, and apical zip, elbow, over-instrumentation and instrument separation. The statistical tests used were both independent and paired t-test, general linear models repeated measures, cross-tabulation with Pearson’s chi-square test and Fisher’s exact test. Significance level was set at 5% (α= 0.05).

Results: Significant difference (P< 0.05) was found in the mean curvature reduction and in the occurrence of elbows. Five ProTaper® files fractured during canal preparation procedures; three of them were F3, and two were F2 instruments.

Conclusions: ProTaper® rotary instruments maintained the curvatures better however it performed equally in terms of apical canal transportation when compared with stainless-steel instruments. For procedural errors and canal aberrations, ProTaper® instruments produced more elbows. Incidence of fractures was enhanced with increasing size of ProTaper® files, with most fractures occurring with file size #30 (F3) and #25 (F2).

Mechanical Properties of Laser Welded Joints in Dissimilar Alloys

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Aim: The objectives of the present study were as follows: (i) to investigate the feasibility of laser welding in fusing a dissimilar joint of cobalt-chromium and titanium metal alloys (ii) to evaluate the properties of the welded joints between cobalt-chromium and titanium alloys.

Materials and method: Thirty plastic models of (1x3x42) mm were prepared with conical shoulder shape as following ISO 6871-dental base metal casting alloys. Models were divided equally into two experimental groups (15 cobalt-chromium and 15 titanium) and one control group of 26 specimens of cobalt-chromium. Each model was invested and moulded into mould rings with a special investment material. The specimens were placed in oven at room temperature. Temperature of the oven was then increased gradually for each alloy following manufacturer’s recommendations. Following casting, the specimens were allowed to cool down at room temperature. All cast specimens were then retrieved from the investment and finished. Each specimen was cleaned utilizing acetone solution. All specimens of titanium were then checked by using X-ray to ensure that all specimens were porosity free before cutting and laser welding. Specimens of each alloy were laser welded using Nd-YAG (Manfredi Jewellaser 50, Italy) laser welding machine under power voltage of 270W, pulse duration of 10ms, and welding spot diameter of 1.0mm. Tensile strength and three-point bending tests were carried out using Universal Testing Machine (Shimadzu Autograph AG-X, Japan). Two specimens were selected randomly for examination under Scanning Electron Microscope to investigate the topography of the specimen after laser welding. All data were then statistically analysed using t-test and/or Mann Whitney test.
Results: Tensile strength tests results showed that the value of stress was significantly lower in laser welded specimens 401.87MPa, (124.64) when compared to the control specimens 813.07MPa, (50.075), at p=0.000. The mean flex. strength of laser-welded joints was 714.38MPa (165.73) was significantly less than control unwelded specimens 2211.07MPa (442.64) at p=0.000. However the modulus of elasticity values were not significantly different (p = 0.254) between the welded and control specimens. The t-test showed no significant difference in the modulus of elasticity between welded specimens (5046.42MPa ± 2262.52) and control specimens (5635.05MPa ± 2138.47). SEM shows some porosity inside laser welding joints.

Conclusion: The results showed that the flexural and tensile strengths in laser welded joint of cobalt-chromium and titanium alloys were significantly lower than in control group. However, there were no significant differences between both groups for modulus of elasticity. Fusing titanium and cobalt chromium in removable partial dentures (RPD) would be feasible for repair work.

**Coronal Microleakage of Different Post Systems Used in Endodontically Treated Teeth**

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Objective: The purpose of this study was to investigate the effectiveness of two different traditional luting cements and one adhesive system on the microleakage in endodontically treated teeth restored with different post systems.

Methods: A total of seventy single-rooted mandibular premolar teeth were selected and endodontically treated with standard root length of 14 mm. The teeth were then randomly divided into three groups, two of them consist of 30 teeth and were restored with two different post systems; Fiber Lux ParaPost (F), and ParaPost XH (P). Then each group was subdivided into 3 subgroups of 10 teeth, each one cemented with different luting agents; RelyX™ U100 Self-Adhesive Universal Resin Cement (R), Elite Zinc Phosphate Cement (ZP), and Fuji I- Glass Ionomer Luting Cement (GI). For the third main group which consisted of 10 teeth, only endodontic treatment was done to it and was made as the control group (RCT).

All the samples were then restored with a composite core (Synergy D6 universal composite, Coltene/Whaledent, USA) and then thermocycled. All the specimens were coated with a double layer of nail varnish to cover the entire root surface except for 2mm around the coronal orifice, covered with a tin foil and the apical foramen was sealed with sticky wax. The specimens were immersed in 2% solution of methylene blue dye for 24 hours. The specimens were then cross sectioned perpendicular to the long axis of the root into discs 1mm thick starting from the coronal part and descending corono-apically up to a total of 6 mm. The microleakage was evaluated by investigating the coronal surface of each section under a stereomicroscope (Olympus, Japan) and the data were analyzed with Kruskal-Wallis test and Mann-Whitney U test.

Results: For different types of cements, there was significant differences in microleakage between them and RCT group (p=0.018). Pairwise comparison showed that significant difference in microleakage was only found between glass ionomer cement groups and root canal treatment group (control group) p=0.03 but no significant difference between the other pairs. For post systems, there is a significant difference in microleakage between Fiber Lux ParaPost and ParaPost XH and RCT group (p=0.005).

Conclusions: There was statistically significant difference in coronal microleakage between different types of post systems. However, there was no statistically significant difference in coronal microleakage between the different types of cements.

**Expression of GNA12 and IFITM3, and their Roles on Oral Carcinogenesis**

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Introduction: Oral squamous cell carcinoma (OSCC) is a major health problem worldwide. The heterogeneity of the disease is the main challenge for the improvement of current treatment modalities. Efforts in our laboratory have focused on the molecular profiling of oral cancer in order to understand the mechanisms underlying this disease. Based on the previous microarray data, Guanine nucleotide binding protein alpha-12 (GNA12) and Interferon inducible transmembrane protein 3 (IFITM3) were identified to be up-regulated in oral cancer.

Objectives: This study aims to validate the expression of GNA12 and IFITM3 at the mRNA and protein levels in oral cancer tissues and to determine the effects of their over-expression on the biology of oral cancer cells. Methodology: Real-time quantitative PCR (QPCR) was conducted for relative quantification of GNA12 and IFITM3 mRNA expression in 47 OSCC in comparison to 18 non-malignant oral tissues. GNA12 and IFITM3 protein expressions were accessed by immunohistochemistry (IHC) on tissue microarrays (TMA) consisting of 44 tumours and 23 non-malignant tissues. Target molecules were exogenously expressed in oral cancer cell lines via virus-transduction, and further examined for *in-vitro* cell
proliferation, migration and invasion to determine their functional roles in oral cancer.

Results: In comparison to non-malignant tissues, OSCC tissues exhibited high mRNA levels of GNA12 (p<0.001) and IFITM3 (p=0.003). Over-expression of GNA12 was observed in 55% (n=26) OSCC tissues, and IFITM3 over-expression was found in 46% (n=21) OSCC tissues. Consistently, IHC analysis also detected high levels of GNA12 and IFITM3 protein expressions in 75% (n=33) and 79% (n=34) of OSCC, respectively. Their expression was primarily localized to the cytoplasm. Conversely, more than 80% of the non-malignant cells showed negative staining for GNA12 and IFITM3. Following this, the in-vitro functional studies showed that expression of activated GNA12 (GαQ231L) in oral cancer cell markedly increased cell migration in monolayer wound healing assay (p<0.001) and invasion through matrigel barrier (p=0.015) but have no effect on cell proliferation. However, IFITM3-transformed oral cancer cells lost the ability to form confluent monolayer and showed inhibition of cell growth. Moreover, over-expression of IFITM3 significantly reduced oral cancer cells migration (p=0.019) and invasion (p=0.004).

Conclusion: To the best of our knowledge, this is probably the first study that demonstrated the expression of GNA12 and IFITM3 at the mRNA and protein levels in oral cancer. Over-expression of GNA12 and IFITM3 are associated with oral cancer, since high levels of these genes were found to be present in a large proportion of Malaysia’s oral cancer patients. Expression of activated GNA12 induced oral cancer cell migration and invasion hence warrant further investigations in the in-vivo model to determine if it could be targeted for therapy to prevent the spread of oral cancer. Over-expression of IFITM3 has inhibitory effects on oral cancer cell growth, migration and invasion. Thus, its role as oncogene or anti-tumour gene remains unclear.

The Effect of Phenotypic Switching on The Biological Properties of Candida Krusei

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Candida krusei has been identified as an emerging pathogen after Candida albicans and Candida glabrata. Until today, the ability to switch its phenotype in unfavourable environment has not been reported in Candida krusei. This study was carried out in order to evaluate the phenotypic switching ability of Candida krusei and to access how this ability affects the biological properties, adherence capacity and susceptibility towards chlorhexidine (CHX), amphotericin B, nystatin, Piper betle and Nigella sativa aqueous extracts. To induce the switched generations, Candida krusei was cultured on yeast extract potato dextrose (YPED) agar containing 0.05% of phloxine B. Following a 5-day incubation, the colony forming units (CFU/mL) were examined and determined. This phenotypically switched colony was designated as the 1st cell generation. The cells from the 1st generation were subcultured following the same protocol to produce the 2nd, 3rd and 4th generation of switched cells.

The 1st and 2nd switched generations were observed to exhibit similar colony morphology comparative to the unswitched Candida krusei. The percentages of recovery population for the 1st and 2nd generations were reduced to 46.6% and 36.4%, respectively. The colonies from the 3rd and 4th switched generations were found to be highly myceliated with the former exhibiting lobate margin and the later with filamentous margin. Interestingly, the percentage of recovery for the 3rd generation showed a tremendous increased to 85.7% but was reduced to 70.8% in the 4th generation. SEM micrographs revealed the surface appearance of the unswitched Candida krusei, 1st and 2nd generations as smooth, with the 2nd generation having more extended pseudohyphae compared to the other generations. In contrast, the surface of the 3rd and the 4th generations were with rough surfaces. The 4th generation also exhibited pimpled or punctate morphology with short pseudohyphae. The unswitched Candida krusei and the 3rd switched generations were also observed to have deposits of extracellular matrix on its surfaces. The adherence capacity of Candida krusei also showed variations in all cell generations. The 2nd switched generation showed the highest adherence with total population of (154.0 ± 60.2) x 10² CFU/mL to the saliva-coated glass beads while the unswitched Candida krusei showed the least adherence at (5.65 ± 0.5) x 10² CFU/mL.

Based on the disc diffusion test, the degree of susceptibility towards CHX, amphotericin B, nystatin and Piper betle were found to differ in all generations of Candida krusei. The unswitched Candida krusei was found to be the most susceptible towards CHX and the 2nd generation was the least susceptible. The 3rd unswitched Candida krusei was found to be the most susceptible towards amphotericin B and the unswitched generation was the least susceptible. The 4th generation was determined as the most susceptible towards nystatin in contrast to the 2nd generation which showed the least. In the susceptibility study towards Piper betle results indicated that the 1st generation was the most susceptible while the 4th generation was the least. The MIC and MFC of Candida krusei for the unswitched and all switched generations towards CHX, amphotericin B, nystatin and Piper betle were determined at 0.4 μg/μL, 50 μg/μL, 10 unit/mL and 12.5 mg/mL respectively. From the growth curve study, the unswitched and all switched generations of Candida krusei showed varying degree of responses towards CHX, amphotericin B and Piper betle treated environment.
These results suggested that *Candida krusei* is able to switching ability is a virulence factor of *Candida krusei* which affects the biological properties, adherence ability and susceptibility towards CHX, amphotericin B, nystatin and *Piper betle*. Thus, it leads to the pathogenic property in the oral cavity.

**Cyclin D1 Amplification in Tongue and Buccal Mucosa Squamous Cell Carcinoma**

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Introduction: Oral cancer is a significant health problem worldwide with almost 300,000 new cases are diagnosed each year. Despite the numerous studies done, even with the best treatment option utilized, more than 50% of patients with oral cancer will experience relapse. In search for better options for prognostication, researchers are now focusing on the molecular biology of cancer, for instance in search of reliable tumor markers. Among the markers reported in the literatures, Cyclin D1 is actively studied protein. Cyclin D1 regulates the cell cycle progression by forming a complex with different cyclin dependant kinase. Dysregulation of cyclin D1 can result in loss of normal cell growth and tumor development. The aim of this study is to determine and compare the amplification of Cyclin D1 in buccal mucosa and tongue oral squamous cell carcinoma (OSCC) and to associate its amplification in buccal mucosa and tongue OSCC with tumor depth, tumor front, histopathological grading, pathological tumor size, lymph node status, TNM staging and survival rate.

Materials and methods: The study samples were paraffin-embedded OSCC surgical specimens obtained from the archives of the Department of Oral Pathology, Oral Medicin and periodontolgy and Oral Pathology Diagnostic Laboratory. Fifty samples of patients with primary OSCC of buccal mucosa and tongue were included in the study. The sociodemographic and clinical data were obtained from the Malaysian Oral Cancer Tumor and Database System coordinated by the Oral Cancer Research and Coordinating Centre (OCRCC), University of Malaya. There were 31 (62%) female and 19 (38%) male with the overall age ranging from 26 to 94 years with a mean age of 60 years.

The OSCC samples were from 44 (68%) Indians, 10 (20%) Malays and 6 (12%) Chinese. The fluorescent-in-situ hybridization (FISH) technique was used to detect the amplification of Cyclin D1 using the Vysis protocol. Fluorescence evaluation of Cyclin D1 was performed using the image analyzer where the Cyclin D1 amplification signal appears as a small spot. At least 200 nuclei were scored using a 100X objective in each defined histological area, and each nucleus was assessed for the chromosome copy number.

Statistical correlations of Cyclin D1 and certain clinicopathological parameters of OSCC were analyzed using the chi-square method or Fisher's exact test.

Results: The present study found positive amplification of cyclin D1 in 72% (36) of OSCC. Detection of positive amplification for cyclin D1 was observed in 88% (22) and 56% (14) of the tongue and buccal mucosa OSCC respectively where the difference was statistically significant (p=0.012). There was a significant correlation between Cyclin D1 positivity and ethnicity for the OSCC of the buccal mucosa (p=0.037); larger pathological tumor greatest dimension (pT) (p = 0.019), higher pTNM stages (p=0.014), tumor depth ≥ 5mm in tongue cases (p<0.001) and survival rate (p=0.009) for overall SCC cases and (p<001) for buccal mucosa SCC cases.

Conclusion: There is a significant correlation between amplification of Cyclin D1 with tumor depth and size of the tumor for tongue SCC; ethnicity and survival rate for buccal mucosa SCC.

**Comparison of Spectrophotometer, Digital Camera and Scanner in Reproducing Facial Skin Colour**

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Introduction: The success of a well-fitting and anatomically correct maxillofacial prosthesis is compromised if the colour does not match the adjoining tissues.

Objectives: The purpose of this study was to examine the ability of the spectrophotometer, digital camera and scanner in reproducing skin colour and to create a system of classifying skin colour in a sample of the Malaysian population.

Materials and methods: Two image capturing devices (digital camera and flat-bed scanner) and a colour measuring device (spectrophotometer) were used to characterize the shade of the forehead in 90 adults from 3 ethnic groups in Malaysia – Malays, Chinese and Indians. Their ages ranged from 20-57 years. Readings from the digital camera and scanner were compared to the readings from the spectrophotometer using CIELAB measurements. The skin shade of each subject captured by each of the 3 devices was then printed on matt photographic paper. 4 observers with normal colour vision were allowed 1-2 minutes to match the printed skin shade to the actual shade of each subject’s forehead. They were asked to rate each of the printed colour matches as good, acceptable or poor. Data were analysed using descriptive analysis, independent test and Chi square test.
Prevalence of Oral Mucosal Lesions and Related Risk Habits in Outpatient Dental Clinics in Malaysia and Yemen

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The purpose of this study is to determine and compare the prevalence of oral mucosal lesions (OML) and related risk habits and the influence of these habits on oral mucosal lesion prevalence among dental outpatients in Malaysia and Yemen during the period from May to October 2009. A total of 554 and 520 dental outpatients from Malaysia and Yemen with mean ages of 41.9±17.04 years and 36.6±15.62 years respectively were interviewed and examined. The prevalence of OML namely (oral malignant lesions, potentially malignant disorders and other lesions) in Malaysia was 23.29% while the prevalence of oral mucosal lesions in Yemen was 22.30%. Among the Malaysian dental outpatients, 19.5% (n=108) were smokers, 1.8% (n=10) were betel quid chewers and 4.3% (n=24) had alcohol drinking habit. In Yemeni dental outpatients, the most frequent habit was qat chewing (40.8%; n=212), followed by smoking (19%; n=99) and shammah (tobacco quid) chewing (4.4%; n=23). Fifty-five percent (134) of all participants with mucosal lesions indulged in risk habits and the influence of these habits on oral mucosal lesions among the dental outpatients who have risk habits as compared to those without habits and this relationship was found to be statistically significant (p < 0.001).

Metrical Analyses of the Location of the Mandibular Canal Using CBCT

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Introduction: The increased neurosensory disturbances and hemorrhage after surgical intervention in the mandibular canal region increased the demand for presurgical planning and proper assessment to avoid those complications.

Aims: Determine the path and course of the mandibular canal of dentate Malaysian patients, mandibular canal diameter, mandibular foramen diameter and the incidence of bifid canal using the Cone Beam Computed Tomography (CBCT).

Materials and Methods: The subjects for this study included imaging of 60 patients (30 males and 30 females) from the Division of Oral radiology, with ages ranging from 20 to 60 years (mean age, 47 years). The samples were selected according to gender, race and age groups. The position of the mandibular canal and mandibular canal diameter were measured at five different locations. Linear measurements were done in the coronal view just posterior to the mental foramen at 10 mm interval (D1, D2, D3, D4 and D5). Mandibular foramen diameter and incidence of bifid mandibular canal were also recorded. The samples were imaged using CBCT and SimPlant software and data analyzed through SPSS (v.12).

Results: In this study the mandibular canal was identified in all samples with 100% good visibility. The measured data were expressed as minimum, maximum, median, K-S value and mean ± standard deviation. The results showed that the position of the right mandibular canal is similar to the position on the left side of the jaw.

Apicocoronal position of the mandibular canal showed that the superior measurements were 14.85 ± 3.64 mm at D1, 13.94 ± 3.85 mm at D2, 12.99 ± 4.08 mm at D3 and 14.22 ± 1.52 mm at D4. The inferior measurements of the canal was 9.37 ± 1.69 mm at D1, 8.24 ± 1.69 mm at D2, 7.96 ± 1.93 mm at D3, 9.65 ± 2.54 at D4 and 15.21 ± 4.18 mm at D5. The buccolingual position were 3.89 ± 1.00 mm (buccal) and 4.33 ± 1.25 mm (lingual), 5.59 ± 1.20 mm (buccal) and 3.35 ± 1.20 mm (lingual), 6.71 ± 1.34 mm (buccal) and 3.25 ± 1.32 mm (lingual), 5.68 ± 1.63 mm (buccal) and 3.08 ± 1.46 mm (lingual), 4.24 ± 1.59 mm (buccal) and 2.12 ± 1.40 mm (lingual) at D1, D2, D3, D4 and D5 respectively.
The minimum mandibular canal diameter recorded was 2.00 mm and the maximum was 3.40 mm. In this study the average mean was 2.16 ± 0.30 mm with the least mean diameter at D2 location (2.01 ± 0.42 mm) and the largest mean diameter at D1 (2.25 ± 0.47 mm) and D5 (2.25 ± 0.43 mm). The average mandibular foramen diameter was measured to be 2.55 ± 0.43 mm.

The incidence of bifid mandibular canal was greatest in Malays (n=18), followed by Indians (n=9), while no bifid canal was noticed in the Chinese.

Conclusion: Position of the canal changes due to changes in the mandibular bone. Measurements showed that the mandibular canal curves toward the lingual side the more distal it is away from the mental foramen. Apicocoronal assessment of the canal reveals that it is curving downward towards the inferior mandibular border until D3 and then it curves upwards. This CBCT study reveals there are variations in the position of the mandibular canal. It is highly recommended that careful assessment and planning using computed tomographic imaging is done prior to any surgical intervention in the mandibular canal region to avoid untoward complications.

A Study to Determine the Location and Morphology of Incisive Canal and Foramen

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Objectives: (1) To obtain the mean dimensional measurements of the incisive canal structures and anterior maxillary bone thickness and the incisive foramen location of Malaysian Malays and Chinese. (2) To determine and compare incisive canal length and width between the Malays and Chinese. (3) To measure and compare the incisive foramen diameter and nasal foramina diameter between the Malays and Chinese. (4) To measure and compare maxillary bone thickness anterior to the incisive canal between the Malays and Chinese. (5) To determine and compare incisive foramen location between Malays and Chinese. (6) To classify and compare incisive canal according to its direction between Malays and Chinese. (7) To classify and compare the canal according to the number of channels in the middle portion between the Malays and Chinese. (8) To determine the effects of advancing age on the dimensions of the incisive canal and related structures.

Materials and Methods: Ninety-four Cone Beam Computed Tomography (CBCT) images were selected based on the inclusion and exclusion criteria. From sagittal views the incisive canal morphology, location and the anterior maxillary bone thickness were identified and evaluated using CBCT. The length of the canal was measured as a distance between the nasal foramen and the incisive foramen, and the inner width of the canal measured at three levels (the mean was calculated). The anterior maxillary bone thickness was measured from the outer canal wall to the outer cortical plate of the buccal bone. While the location of the incisive canal was the measured distance between the incisive foramen and the most antero-inferior point of the maxillary buccal bone. A horizontal cross-section slice was studied in the middle portion of the canal to determine the number of channels. Subsequently, employing the interactive SimPlant software the incisive canal direction and course were studied and classified.

Results: The mean length of the canal was 16.24 (±2.96) mm. The right incisive canal was longer than the left canal (the mean of the right canal-16.65 (±4.46) mm and the mean of the left canal-15.98 (±4.71) mm). Incisive canal was wider in males than females especially in Malays (the mean in males- 4.05 (±1.57) mm and the mean for female-3.16 (±0.77) mm). The mean anterior maxillary bone thickness - 7.54 (±1.65) mm with Chinese females having a thickness of 6.76 (±1.41) mm. However, there was a reduction of the bone thickness with age affecting the position of the incisive foramen. When gender comparisons were made, the general bone thickness was greater in males than females, especially in Chinese (the mean bone thickness in males=8.21 (±1.82) mm and in females=6.76 (±1.41) mm). The majority of the cases had slanted-curve canal with one channel at their middle portion.

Conclusion: There are many anatomical variations in morphology and location of the incisive canal and foramen. The right incisive canal is always longer than left canal regardless of gender, ethnicity and age group. Malay males exhibit large canals, thereby causing thin maxillary bone when compared with Chinese males. Interestingly Chinese females have the thinnest anterior maxillary bone thickness. The majority of the Mongolid population have slanted-curve canal with one channel at their middle portion.

Conclusion: There are many anatomical variations in morphology and location of the incisive canal and foramen. The right incisive canal is always longer than left canal regardless of gender, ethnicity and age group. Malay males exhibit large canals, thereby causing thin maxillary bone when compared with Chinese males. Interestingly Chinese females have the thinnest anterior maxillary bone thickness. The majority of the Mongolid population have slanted-curve canal with one channel at their middle portion of the incisive canal. These findings may be of clinical importance during surgical procedures, especially implant placement. For that reason, a careful assessment of this area during the pre-operative planning procedures is important.
Effect of Ferrule Height and Glass Fibre Post Length on Fracture Resistance of Endodontically Treated Teeth

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Objectives: 1. To evaluate the effect of ferrule height (FH) and post length (PL) on fracture resistance of endodontically treated teeth (ETT) restored with glass fibre post, composite resin core and crown. 2. To assess the effect of FH and PL on the failure mode of these teeth.

Methods: Ninety endodontically treated maxillary central incisors were randomly divided into three groups of 30 according to their FH: 4, 2 and 0 mm. Post space was prepared according 2/3, 1/2 and 1/3 of the root length (N = 10 each). RelyX™ fibre posts (3M/ESPE, USA) were then cemented with self adhesive resin cement (RelyX™ Unicem, 3M/ESPE, USA). Core build-ups were done using composite resin (Filtek™ Z350, 3M/ESPE, USA). Cast metal crowns were cemented on the prepared specimens using RelyX Unicem. The specimens were thermocycled and compressive static load was applied at an angle of 135 degrees to the crown. The load (N) at failure and mode of failure were recorded. Statistical analysis was performed with Two-way ANOVA.

Results: No significant interaction between ferrule heights and post lengths was observed ($p = 0.801$). Significant difference in the failure load was found in the ferrule height groups ($p < 0.001$) but not in the post length groups ($p = 0.102$). 4 mm ferrule group had significantly higher failure load (FL) (536.7 N ± 195.4) compared to 2 mm (414.6 N ± 133) and 0 mm ferrule groups (319.8 N ± 54.7) ($p = 0.018$, $p < 0.001$). 2 mm ferrule group had significantly higher FL than 0 mm ferrule group ($p = 0.002$). More favourable failure modes were observed in almost all subgroups.

Conclusion: Increasing the FH significantly increased the fracture resistance of ETT restored with glass fibre post, composite resin core and a crown. Post length had no significant effect on the fracture resistance. Most groups had favourable failure mode.