



# Conference Programme and Abstracts

QUEEN ELIZABETH II CONFERENCE CENTRE  
10-12 SEPT | LONDON 2008

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**Abstract 110962**  
**Myogenesis of Human Adult Masseter NCAM/CD56+ cells. A.C. SINANAN, M.P. LEWIS, UCL Eastman Dental Institute, London, United Kingdom**

**Objectives:** We have previously identified a population of NCAM+ve cells (the myogenic fraction) from human adult masseter muscle using magnetic activated cell sorting (MACS) to study muscle regeneration (Sinanan et al 2004). This study describes the growth dynamics of these cells and optimization of their myogenic differentiation.

**Methods:** Heterogenous cultures derived from masseter muscle biopsies were immunomagnetically sorted with CD56 microbeads and fractionated by dual-pass positive selection MACS. In addition to culture with unsorted parent cells or the CD56-ve fraction generated during cell sorting, multiple growth-augmented media were tested to optimize the survival, proliferation and myogenic differentiation of the cells; cultures were analyzed by immunofluorescence.

**Results:** Optimal proliferation of myogenic masseter muscle cultures required serum-free growth media supplemented with insulin-like growth factor-1 (IGF-1), hepatocyte growth factor (HGF), heregulin-beta-1 (HRG-B1) and fibroblast growth factors (FGF 2,4,6). Myogenic differentiation was encouraged by either adjacent co-cultures (of unsorted masseter muscle cells or CD56-ve cells) or by myogenic inducers (IGF-1 and HRG-B1), the latter resulting in frequent formation of force-generating multinuclear (>20 nuclei) myotubes. A molecular profile for mononuclear cells (MC) and myotubes (MT) was also revealed: CD34, vascular cell adhesion molecule-1,  $\alpha$ -smooth muscle actin, integrin  $\alpha$ 4 $\beta$ 1, MyoD1 (few MC); myf5, Thy1/CD90, integrins ( $\alpha$ v/CD51,  $\beta$ 3/CD61,  $\beta$ 5), syndecan-3 and heregulin receptor-2 (HER 2) (MC); NCAM/CD56, desmin, m-cadherin, integrins ( $\alpha$ 7,  $\beta$ 1/CD29), HGF-R (HER 3,4), HER (1,4), HER (3,4), vascular endothelial growth factor receptor-2, syndecan-4 and myogenin (MC and MT); nerve growth factor receptor and  $\alpha$ -sarcomeric actin (few MC, all MT); myf-6 and  $\alpha$ -sarcomeric actinin (MT).

**Conclusions:** These results indicate that MACS-selected human adult muscle-derived CD56+ cells are functional myogenic precursors but also co-express lineage markers of several non-myogenic muscle-associated cells; their survival, proliferation and myogenic differentiation are regulated by both autocrine and paracrine circuits, probably involving IGF-1, FGF, HRG-B1 and HGF.

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**Abstract 110739**

**Study of Apical Lesions in a Medieval Population. S. LUCAS, R. ESCASSAN, A. SEVIN, and A.M. GRIMAUD, Université Toulouse 3, France**

**Objectives:** The aim of this study was to determine the causes of apical lesions (periapical granuloma and cysts) on skeletal remains of a medieval sample (12th – 14th century A.D) from the south of France, in relation with tooth diseases.

**Methods:** The sample consisted of the skeletal remains of 60 individuals. Only mandibles in a good state of preservation were studied. All teeth were radiographed and observed macroscopically. Caries were diagnosed, and location and lesion level were noted. Wear was graded according to the Brabant index with two parameters, quantity and direction of wear. Apical lesions were classified into three groups: abscess (assumed if diameter <3mm), and cysts (assumed if diameter >3 mm), with or without fistulae. Two practitioners noted all data. The statistical significance of recorded values was tested. A P value of less than 0.05 was considered as statistically significant.

**Results:** Apical lesions affected 21 individuals and 36 lesions were diagnosed on the 788 teeth examined. 12 lesions were assumed to be periapical granulomas: 58.33% of teeth were not carious and attrition was more than level 3 in 58.33%. 14 lesions were cysts without fistulae: 64.28% were located on retained teeth and the quantity of wear was more than level 3 in the other cases. 10 lesions were cysts with fistulae: 70% with gross caries reaching the pulp but attrition was generally less than level 2.

**Conclusion:** To our knowledge no study has compared the association of coronal wear and dental caries in the development of apical lesions. These findings show that there could have been different ways of developing such a disease. Attrition has an important impact on small lesions. For cyst lesions, retained teeth and gross dental caries are the principal factors of disease. Presence or absence of fistulae is connected with coronal lesions.

**Abstract 110634**

**Maxillary Dimensions Change in Croatia from 6th Century till Today. I. SAVIC PAVICIN, M. VODANOVIC, J. KEROS, V. NJEMIROVSKI, and H. BRKIC, University of Zagreb, School of Dental Medicine, Croatia, University of Zagreb, School of Dental Medicine, Croatia, University of Zagreb, School of Dental Medicine, Croatia**

**Objectives:** It is well documented that the changes in the lifestyle, primarily nutrition influenced evolutionary changes of the size of human jaw. This research presented herein aims at identifying the possible changes in the size of the maxilla within the population inhabiting the area of today's Croatia.

**Methods:** We studied archeological remains of populations from antique period (AP, 6th - 7th century, cxtbinci, Osijek), early Middle Ages (EMA, 10th – 11th century, Bijelo Brdo), late Middle Ages (LMA, 18th – 19th century, Polžega), and the recent population (RP, 20th century, Zagreb).

Anterior and posterior upper dental arch widths and the palatal height were measured on 106 upper jaw archeological samples and 48 dental casts of contemporary population.

**Results:** Whereas the differences in anterior upper width between the samples were negligible, the differences in posterior upper widths (PUW) were significant. PUW of RP ( $51.33 \pm 2.69$  mm) was found to be significantly higher than that of both Middle Ages samples, whilst that of the LMA sample ( $48.88 \pm 3.53$  mm) was significantly higher than the one from the EMA ( $47.18 \pm 2.32$  mm). The AP sample had significantly larger PUW ( $50.26 \pm 2.96$  mm) than those from the EMA. The palatal height was significantly higher in the RP ( $18.88 \pm 2.00$  mm) than in medieval samples, whereas the Antiquity sample was higher than the EMA sample ( $16.19 \pm 2.52$  mm).

**Conclusion:** The deviation within the Antiquity sample could be caused by the mixing of different populations - Romans who inhabited the location until the 7th century when Croats (South Slavs) permanently displaced them. Our findings indicate that both posterior upper width as well as palatal height of the jaw increased in the analyzed population. Whether it is result of different genetic expression of one population or interbreeding of different nations on area of today's Croatia, still needs to be researched.

**Abstract 110346**

**Comparison of facial measurements among three Malaysian ethnic groups. W.C. NGEOW, and S.T. AL-JUNID, University of Malaya, Kuala Lumpur, Malaysia**

**Objectives:** This study was done to establish the quantitative norms and proportion indices of the face for the three major ethnic groups in Malaysia, namely the Malay, Chinese and Indians.

**Methods:** The study group consisted of convenient samples with a total of 100 participants in each group and an equal number of female and male subjects. The age ranged from 18 to 25 years. The participants were generally healthy and exhibited no craniofacial abnormalities and had no history of plastic or reconstructive surgery. Subjects of mixed parentage were excluded from this study. Standard anthropometry instruments and methods were employed.

**Results:** The facial index (facial length/breadth x100) was between 83 and 86 in all the three groups, indicating a mesoprosop-type face. Classically this is categorised as a short and broad face. The mean upper face index was between 53 and 55 in the whole sample indicating a mesen or medial type upper face. The Malay generally had the widest upper face. The lower face to face height index also indicated a more balanced relationship between the two measurements and was seen in all three races.

**Conclusion:** The Malays and Chinese have more similar facial features than the Indians.

**Abstract 111307**

**TEM interface characterization of a low-shrinking composite bonded to enamel/dentin. A. MINE, J. DE MUNCK, K. VAN LANDUYT, P. LAMBRECHTS, and B. VAN MEERBEEK, Leuven BIOMAT Research Cluster, Catholic University of Leuven, Belgium**

The low-shrinking composite composed of combined siloxane-oxirane technology (Filtek Silorane, 3M ESPE) required the development of a specific two-step self-etch adhesive (Silorane System Adhesive), in particular because of the high hydrophobicity of the silorane composite.

**Objectives:** to characterize using transmission TEM the interaction of this adhesive with enamel/dentin to elucidate the underlying mechanisms of adhesion.

**Methods:** Non-demineralized/demineralized 70-90 nm sections were prepared following common TEM-specimen processing procedures.

**Results:** Corresponding to the two-layered application of Silorane System Adhesive, including two separate light-curing steps, TEM revealed a typical two-fold build-up of the adhesive resin, resulting in a total adhesive layer thickness of about 20  $\mu$ m. At bur-cut enamel, a tight interface was formed, mostly with only tiny micro-tags and without distinct dissolution of hydroxyapatite observable. Immersion of specimens in AgNO<sub>3</sub> did reveal traces of Ag along some part of the enamel-adhesive interface and/or between the two adhesive resin layers. At bur-cut dentin, a relatively thin hybrid layer of maximum a few hundreds of nanometer was formed without clear surface demineralization. No clear resin tags were formed. At fractured dentin, the interaction of Silorane System Adhesive appeared very superficial. Distinct resin tags were formed due to the absence of smear plugs. Silver-nitrate infiltration showed a varying pattern of both spot- and cluster-like appearance of nano-leakage. This nano-leakage appearance has been observed to vary widely with the region. Substantially more Ag-infiltration was observed along the dentin-adhesive interface of bur-cut dentin, as compared to that of fractured dentin.

**Conclusion:** The nano-interaction of Silorane System Adhesive should be attributed to its relatively high pH of 2.7. The obtained tight interface at both enamel and dentin indicates that the two-step self-etch adhesive effectively bridged the hydrophilic tooth substrate with the hydrophobic silorane composite.

**Abstract 110162**

**Effect of cavity-configuration and thermo-cycling on adhesion of low-shrinking composite. A. MINE, J. DE MUNCK, K. VAN LANDUYT, A. POITEVIN, T. KUBOKI, Y. YOSHIDA, K. SUZUKI, P. LAMBRECHTS, and B. VAN MEERBEEK, Leuven BIOMAT Research Cluster, Catholic University of Leuven, Belgium, Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences, Japan**

**Objectives:** Polymerization shrinkage stress can impair bonding effectiveness, especially at the bottom of a high C-factor occlusal class-I cavity. The purpose of this study was 1) to evaluate the effect of a low-shrinking composite on the bonding effectiveness in a high polymerization shrinkage stress environment and 2) to evaluate the effect of thermo-cycling on these pre-stressed interfaces.

**Methods:** A new low-shrinking composite (els, Saremco) was bonded into standardized occlusal class-I cavities (4.5x4.5x2.5 mm) using a 3-step etch-and-rinse adhesive (cmf, Saremco). A 2-step etch-and-rinse adhesive (XP Bond, Dentsply) and a conventional composite (Z100, 3M ESPE) served as control. The restored teeth were subjected to 20,000 thermo-cycles or 3 weeks of water storage. Then, the teeth were sectioned to 1x1 mm sticks by an automated, water-cooled diamond saw (Accutom).