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FOREWORD BY VICE-DEAN (RESEARCH)

FOR THE YEAR AHEAD, THE FACULTY WILL CONTINUE TO ASPIRE AND PERSEVERE TO ACHIEVE BREAKTHROUGHS IN OUR ORAL HEALTH RESEARCH PROGRAMME



A significant milestone for the Faculty of Dentistry was reached in July 2004 when its research arm moved into new research laboratory premises. As a first in its 75 years of history, the Faculty now has dedicated space for oral health research housed in one location. This development affirms the important and substantive role oral health research plays in the Life Sciences research endeavours of NUS and Singapore. Located and occupying half the floor space with an area of 425 sq metres at level 31 in the Defence Science Organization IDSO) building, dental researchers and staff can call this new state-of-the-art research laboratory 'home', where they will be able to fully realise the potential of the new facilities to cultivate research skills and make a positive contribution towards oral health care through mission-driven research.

The research directions taken by the Faculty in the context of Life Sciences have resulted in the strengthening of key research focus areas. Research in these focus areas of Regenerative Biology, Cariology/Dentine Research using Biophotonics, Biomaterials, Oro-facial Pain, and Craniofacial Imaging and other developing areas such as Oral Microbiology and systemic issues in periodontal health research have matured steadily over the past twelve months. In the competitive landscape of research funding, faculty staff have continued to secure research funds within NUS and at the national level.

Higher-degree students involved in research contribute substantively to the research endeavours of the Faculty. The emphasis on PhD research training in Dentistry is a conscious move in line with NUS' direction to produce quelity researchers. There are currently 20 full-time research scholars and 3 part-time research candidates of whom 10 are on the PhD track. In the Master of Dental Surgery (MDS) programme, every clinical resident conducts meaningful research and completes a research thesis in partial fulfilment of the MDS degree. The appointment of Research Thesis Committees to ensure scientific rigour of the MDS Theses is an important development in the MDS programme to nurture future researchers from our clinical residents.

Despite the limitations in Faculty strength, meaningful collaborative partnerships with colleagues from the NUS Life Sciences faculties and other local and internationally renowned institutions have contributed to the Faculty's growing impact in research. The Faculty highly values these collaborations which are vital for breaking new ground in oral health research.

The infrastructure is now in place for the Faculty of Dentistry to make a stronger impact in niche areas both locally and globally in oral health research. For the year ahead, the Faculty will continue to aspire and persevere to achieve breakthroughs in our oral health research programme.

Assoc Prof Kelvin Foong Vice-Dean (Research)

RESEARCH DIRECTIONS

The Faculty of Dentistry conducts mission-driven research in five key areas to improve oral and craniofacial health, and the delivery of care. Research in each of the five key areas of:

- (i) Tissue Engineering and Regenerative Biology
- (ii) Mechanisms of Oro-facial Pain
- (iii) Biomaterials and Biomechanics
- (iv) Cariology/Dentine Research using Biophotonics
- (v) Craniofacial Imaging and Simulation

are driven by teams comprising Faculty staff and students in close collaborative partnerships with colleagues from other NUS Life Sciences faculties such as Engineering, Medicine, Science and Computing. The Faculty's research endeavors in periodontal oral microbiology and systemic relationships of periodontal disease are progressively emerging as important research directions contributing to the improvement of oral health.

5 Key Mission-Driven Research Areas in the Faculty of Dentistry

- Tissue Engineering and Regenerative Biology
- Mechanisms of Oro-Facial Pain
- Biomaterials and Biomechanics
- Cariology Research/Biophotonics
- · Craniofacial Imaging and Simulation



IMPROVE

Oral and Craniofacial Health, and Delivery of Care

THE INFRASTRUCTURE IS NOW IN PLACE FOR THE FACULTY OF DENTISTRY TO MAKE A STRONGER IMPACT IN NICHE AREAS BOTH LOCALLY AND GLOBALLY IN ORAL HEALTH RESEARCH

RESEARCH HIGHLIGHTS

Laser-induced Prevention Of Enamel Erosion Caused By Acidic Soft Drinks

Ms Y.C. Ng, Ms S. Veerasamy, Mr H.C. Sng, Mr C.K. Wee, Ms H.C. Zheng, Assoc Prof S.B. Keng, Assoc Prof C.S. Hsu

In the last few decades, global consumption of acidic soft drinks and prevalence of enamel erosion have significantly increased especially in developed countries. Lasers have also demonstrated preventive effects on enamel demineralisation.

Objective:

To evaluate the laser-induced reduction of enamel demineralisation caused by an acidic soft drink in an in-situ model.

Methods:

Four non-carious premolars were selected and lased with Er:YAG laser (VSP, 40MJ, 3Hz, 3s, 2940nm) with fine-water spray. Enamel sections of each tooth were varnished except the natural surfaces, before being placed in palatal plates. Three subjects wore the plates containing four sections each and one subject wore one with eight sections for 12 hours every night for 28 days. The subjects with different caries risk profiles rinsed with 50ml of CoacCola® (pH=3) for five minutes, four times a day. Stereoscopy and Polarised Light Microscopy were used to quantify the change in lesion depth. The Wilcoxon signed rank test with a 95% confidence level was used for statistical analysis.

Results:

There is a significant difference (p<0.001) between the change in lesion depths in the lased sections (101.18µm) and the corresponding non-lased sections (252.50µm).

Conclusion:

The Er:YAG laser treatment may have a preventive effect on enamel erosion caused by frequent use of acidic soft drinks. This project was supported by grants from Academic Research Fund, Ministry of Education, Singapore.

Novel PCL-based Scaffolds As Delivery Systems For Periodontal Tissue Engineering Ms Bina Rai, Prof Teoh Swee Hin, Prof Hutmacher Dietmar, Dr Cao Tong, Assoc Prof Ho Kee Hai

A prerequisite for placing dental implants is that sufficient amount of bone must be available to fully cover the implant and for the implant to support a fixed prosthetic restoration. The **long-term goal** of our study is to accelerate bone regeneration of the defect, specifically the reconstitution of lost alveolar bone, tooth root cementum and periodontal ligament to improve the long-term prognosis of the implant. We hypothesise that a bone tissue engineering partaegy that adopts bioactive three-dimensional polycaprolactone (PCL) scaffolds in combination with fibrin tisseel sealant and growth factors could suffice as the ideal bone regenerative device. We base this proposition on **preliminary data** obtained as described:

(1) The Effect of rhBMP-2 on Osteoblasts Seeded onto 3D Bioactive PCL Scaffolds

Our group evaluated the influence of varied concentrations (0, 10, 100 and 1000 ng/ml) of human recombinant bone morphogenetic protein-2 (rhBMP-2) on the osteogenic expression of canine osteoblasts, seeded onto po/-aprolactone 20% tricalcium phosphate (PCL-TCP) 3D saffolds in-vitro. Biochemical assay revealed that groups with rhBMP-2 displayed an initial burst in cell growth that was not dose-dependent. However, after 13 days, cell growth declined to a value similar to control. Significantly less cell growth was observed for construct with 1000ng/ml of rhBMP-2 from 20 days onwards. Confocal microscopy confirmed viability of osteoblasts and at day 20, groups seeded with rhBMP-2 displayed heightened cell death as compared to control Phase contrast and scanning electron microscopy (SEM) revealed that osteoblasts heavily colonised surfaces rods and pores of the PCI -TCP scaffolds. (Fig. 1). This was consistent for all groups. Finally. Von Kossa and osteocalcin assays showed that cells from all groups maintained their osteogenic phenotype throughout the experiment. Calcification was observed as early as four days after stimulation for groups seeded with rhBMP-2. Thus, rhBMP-2 seems to enhance the differentiated function of canine osteoblasts in a non-dose dependent manner. This resulted in accelerated mineralisation. followed by death of osteoblasts as they underwent terminal differentiation. Notably, PCL-TCP scaffolds seeded only with osteoblasts sustained excellent osteogenic expression in-vitro.

(2) Novel PCL-based Honeycomb Scaffolds as Drug Delivery Systems (DDS) for rhBMP-2

The specific aim of the second study was to investigate the suitability of PCL-based scaffolds in combination with fibrin sealant as DDS for rhBMP-2 at the concentrations of 10 and 20 g/ml for a period of 21 days, PCL and PCL-TCP-fibrin composites displayed a loading efficiency of 70 and 43% respectively, independent of rhBMP-2 dosage. Confocal and SEM revealed sparse clumps of rhBMP-2 particles non-uniformly distributed on the surface of PCL-fibrin composites. In contrast, individual rhBMP-2 particles were evident and uniformly distributed on the rods of the PCL-TCP-fibrin composites, PCL-fibrin composites loaded with 10 and 20 g/ml rhBMP-2 demonstrated a tri-phasic release profile as quantified by an enzyme-linked immunosorbent assay (Fig.2). This consisted of burst releases at 2 h, days 7 and 16. A bi-phasic release profile was observed for PCI -TCP-fibrin composites loaded with 10 g/ml rhBMP-2, consisting of burst releases at 2 h and day 14. PCL-TCP fibrin composites loaded with 20 _g/ml rhBMP-2 showed a tri-phasic release profile, consisting of burst releases at 2 h, days 10 and 21. Hence, the addition of TCP caused a delay in rhBMP-2 elution. Sodium-dodecyl sulphate polyacrylamide gel electrophoresis and alkaline phosphatase assay verified the stability and bioactivity of eluted rhBMP-2 at all time points.

 Rai B., Teoh S.H., Chen F., Yacob K., Hutmacher D.W., Tong C., Ho K.H. The Effect of rhBMP-2 on Canine Osteoblasts Seeded onto 3D Bioactive Polycaprolactone Scaffolds. Biomaterials 2004; 25: 5499-5506.

(2) Rai B., Tech S.H., Hutmacher D.W., Cao T., Ho K.H. Novel PCL-based Honeycomb Scaffolds as Drug Delivery Systems for rhBMP-2. Submitted.



Fig. 1. Scarning electron micrograph of osteoblast adhering onto PCL-TCP scarlids 2: veeks attrc cell seeding JG. Control cellidesofield construct without hBMP-31 (B) Cellidesoffold construct with 10 mg/ml /HBMP-21 (C) cellidesoffold construct with 100 gm/ml of HBMP-21 (C) cellidesoffold construct with 100 gm/ml of HBMP-21 (C) scarbids completely filled with cellidesoffold construcsatoffolds completely filled with cellidesoff with the presence of globular accretions.



Fig. 2. The amount of rhBMP-2 released from experimental prougin invitor as a function of time. Released medium was removed at 20, followed by 1.24,71,014 and 21 days and quantified by ELSA (n=4, mean 5, SD), PCIficini competence taxabat with 10 g/ml (Group 1) and 20 g/ml (Group 1) 20, g/ml (Group 4) of rhBMP-2. Controls showed no release of rhBMP-2 at al time points.

RESEARCH HIGHLIGHTS

Comparison Of Problem-based Learning Versus Traditional Lecture

Dr Soh Jen, Assoc Prof Lim Lum Peng, Dr Chng Hui Kheng, Dr Betty Mok, Dr Hilary Thean, Dr Victor Ho, Assoc Prof Kelvin Foona

Problem-based learning (PBL) has been introduced as an approach to learning since 1996. While earlier reports by Faculty members have indicated that PBL is useful and well-received by students no studies have been conducted to compare the learning outcomes of PBL as compared with traditional learning. A pilot project was carried out amongst third year dental students to compare the effectiveness between problem-based learning (PBL) and traditional lecture (TL) method on the learning outcomes. The class was divided into 4 groups of which 2 groups (n=16) had PBL while the other two groups (n=16) had TL. The measure of effectiveness of teaching method was assessed based on the test results. from multiple-choice questions (MCO) and short questions (SQ) related to a chosen topic. A total of 4.5 hours of official learning sessions was given for both PBL and TL. The lecturer PBL facilitators and students. had no prior knowledge of the tests that would be conducted at the end of the learning sessions. The MCQ and SQ test results of the PBL and TL groups were compared using Mann Whitney U Test (2-tailed, p< 0.05). There was no significant difference in the MCO results.



PBL session in progress

(P>0.05). However, a significant difference was found in SQ results (p<0.05). Students who had PBL scored better than those who had TL. Students' self perceptions on the effectiveness of the approach to learning were positive, no differences were found between the PBL and traditional learning group. In conclusion, within the confines of this study, PBL was found to be a more effective teaching method than TL in the learning outcome of dental students. However, factors than the learning approach per see would have contributed to the outcome of the student's learning experiences.

Preliminary Findings Of Periodontal Health Of Patients With Diabetes

Assoc Prof Lim Lum Peng, Dr Fidelia Tay, Dr Sum Chee Fang, Dr Thai Ah Chuan, Dr Hla Myint Htoon, Dr Tan Wah Ching, Dr Khurram Ataullah

There is an emerging global awareness on the relationship between periodontal disease and systemic health. Of the systemic conditions, diabetes has been ranked as one of the key risk factors associated with destructive periodontal disease, a risk ratio ranging from 2-4 has been reported. Singapore has one of the highest prevalence of diabetes which affects over 9% of the adult population in Singapore. The purpose of this collaborative projects its of ndo uct:

- the periodontal health status of diabetic patients from two diabetic centres in Singapore and to correlate the findings with clinical and laboratory markers
- the effectiveness of an intervention programme to improve the periodontal health of a cohort of patients with diabetes



Oral examination in progress

Informed consent were obtained from the patients prior to commencement of study. Preliminary periodontal examination of 110 patients with diabetes shows that over 50% of subjects aged 21-65 presented with probing depths of at least form, a higher prevalence as compared with population based study. Severity of periodontal disease amongst the individuals examined is affected by glycaemic control; those with unacceptable glycaemic control presented with higher plaque and bleeding scores and more sites with deeper pockets. The findings concurred with studies reported by other investigations. Investigations are currently on-going to correlate certain laboratory markers with the clinical parameters as well as the impact of the intervention programme on periodontal health and glycaemic control. The research findings are likely to yield useful information and provide guidelines for health promotion strategies relevant to improving the periodontal health of diabetic patients in Sinapore.

Photo-modulation Of Micro-diffusion In Human Enamel

Ms Deng Yin, Assoc Prof G K Chuah, Assoc Prof C S Hsu

Micro-diffusion in human enamel has been a mystery with little information available even with the help of the modern sophisticated technologies. Many oral diseases and clinical issues have been related to this less-known phenomenon. In the past few decades laser-induced caries prevention has been well documented: however, the mechanisms remain unclear The surprising results of our previous studies have given rise to an innovative "organic blocking theory", elucidating the statistically significant effect of organic matrix (OM) in the laser-induced caries prevention. The aim of this particular study was to further investigate the role of organic matters in the laser-induced porosity changes. The human enamel samples were characterised by thermogravimetric analysis (TGA) and No physicoadsorption. TGA results confirmed that our NaClO treatment had removed a sizeable portion of the OM in the enamel sample. The surface area and pore volume of normal enamel powder decreased significantly after Er:YAG laser treatment (as shown in Fig. 1). In contrast, in the NaClO-treated enamel powder, the surface area did not significantly decrease (p>0.05) and the pore volume remained almost unchanged. The substantial difference in porosity changes between the control and the experimental groups after laser treatment (as shown



Fig. 1: Pore distribution of normal enamel powder and laser treated enamel powder

in Table confirmed the importance of OM in the photomodulation of micro-diffusion channels in enamel. In other words, the photo-thermal and/or photo-chemical effect of Er:VAG laser has modified the micro-diffusion pathway, in particular those intra-primatic spaces with pore size of 4 nm, and hence impede the demineralisation (tooth decay). In conclusion, the findings in this study have substantiated the "organic blocking theory" as one of the major mechanisms in the laser-induced caries prevention.

Sample	Surface area (m²/g)	Pore volume (cc/g)	
Normal enamel powder	6.83	0.024	
NaCIO treated enamel powder	7.85	0.024	
Laser treated enamel powder	6.02	0.020	
NaCIO & laser treated enamel powder	7.44	0.024	

Table: Surface area and pore volume calculated from the sorption isotherms

RESEARCH HIGHLIGHTS

Stem Cell Research

The makings of future news headlines about tomorrow's life saving therapies starts in the biomedical research laboratory. Ideas abound: early successes and later failures and knowledge gained from both: the rare lightning bolt of an unexpected breakthrough discovery - this is a glimpse of the behind the scenes action of some of the world's most acclaimed stem cell scientists' quest to solve some of the human body's most challenging mysteries. A new era in stem cell biology began in 1998 with the derivation of cells from human blastocyst and fetal tissue with the unique ability of differentiating into cells of all tissues in the body, i.e., the cells are pluripotent. Since then, several research teams have characterised many of the molecular characteristics of these cells and improved the methods for culturing them. In addition, scientists are just beginning. to direct the differentiation of the human pluripotent stem cells and to identify the functional capabilities of the resulting specialised cells. Although in its earliest phases, research with these cells is proving to be important to developing innovative cell replacement strategies to rebuild tissues and restore critical functions. of the diseased or damaged human body. To join this cutting edge research in life science front, a team lead by Dr Cao Tong of Faculty of Dentistry is currently working on the osteogenic, chondrogenic (Fig. 1) and cardiomyogenic differentiation from colonies of human embryonic stem cells (Fig. 2, 3). The team has planned and will start the keratinocyte and hepatocyte differentiation.

Collaborations:

- Howard Hughes Medical Institute and President and Fellows of Harvard College, Harvard University
- WiCell Research Institute, University of Wisconsin Madison
- · Genome Institute of Singapore
- Faculty of Science, NUS
- Faculty of Medicine, NUS
- · Division of Bioengineering, NUS
- · Center for Oral Biology, Karolinska Institute

Human Embryonic Stem Cell Lines under Investigation:

- · HUES-1, Harvard
- · HUES-7, Harvard
- · HUES-12, Harvard
- · HUES-17, Harvard
- H-9, WiCell

Recent Related Publications:

- Strategies for directing the differentiation of stem cells into the osteogenic lineage in-vitro. J Bone Miner Res. 2004 Sep;19(9):1379-94. Epub 2004 26 July
- Strategies for directing the differentiation of stem cells into the chondrogenic lineage in-vitro. In Press, Stem Cells, 2004 June
- An overview and synopsis of techniques for directing stem cell differentiation in-vitro. Cell Tissue Res. 2004 March;315(3):291-303. Epub 2004 31 January
- Strategies for directing the differentiation of stem cells into the cardiomyogenic lineage in-vitro. Cardiovasc Res. 2004 Apri 1;62(1):34-42. Epub 2004 25 January
- Can RNA interference be used to expand the plasticity of autologous adult stem cells? In Press, J Mol Med. 2004 June
- Mineralised bone loss in partially edentulous trabeculae of ovariectomised rabbit mandibles. J Periodontal Res. 2004 February;39(1):37-41
- Scaffold design and in-vitro study of osteochondral co-culture in a three-dimensional porous polycaprolactone scaffold fabricated by fused deposition modeling. Tissue Eng. 2003;9: S103-12
- Down-regulation of transcription factors by RNA interference. A novel approach to extend the multipotency of autologous adult stem cells? In Press, in-vitro Cell Dev Biol Anim. 2004 June
- Factors influencing stem cell differentiation into the hepatic lineage in-vitro. In Press, J Gastroenterol Hepatol. 2004 August
- Directing stem cells into the keratinocyte lineage in-vitro. In Press, Exp Dermatol. 2004 August

- · The differentiation status of stem cells and their derivatives - a key consideration in transplantation medicine. In Press. ASAIO J. 2004 July
- · Potential utility of cell permeable transcription factors to direct stem cell differentiation. In Press, Stem Cells Devel, 2004 June
- · Reprogramming autologous skeletal myoblasts to express cardiomyogenic function. Challenges and possible approaches. In Press, Int J Cardiol. 2004 June
- · Possible use of human embryonic stem cell-derived cardiomyocytes to direct autologous adult stem cells into the cardiomyogenic lineage. In Press, Acta Cardiol 2004 June

Reference: U.S. Department of Health and Human Services. Stem Cells: Scientific Progress and Future Research Directions. June 2001.

ogenic: Von Kossa sta







Fig. 2 A huge undifferentiated colony of human embryonic stem cells



RESEARCH HIGHLIGHTS

The Expression Of Insulin-like Growth Factor-I In Periodontal Healing Of Replanted Teeth

Dr M.C.F.Morales and Dr V. Sae-Lim

Tooth avulsion, the total displacement of a tooth out of its socket, can cause extensive damage to the tooth pulp and the supporting periodontium (PDL). Irreversible damage to the PDL at the tooth/bone interface can lead to ankylosis with bone in direct contact with and gradually replacing the root substance (replacement resorption) **Fig 1.** This would lead to malocclusion, weakening of the crown support and eventually crown fracture or tooth loss, compromising function and esthetics, notwithstanding psychological impact as well as a financial burden. To date, there are no predictable therapeutic measures to manage the sequalae of replacement resorption. Regeneration of the functional periodontium is the ultimate objective of tooth replantation following avulsion injury.

It is recognised that cellular and molecular events are uniquely coordinated in the wound healing process regulated by the biological mediators/growth factors. Our study investigated the early expression of Insulin Growth Factor-I (IGF-I), implicated in cell proliferation, migration and metabolism, in the periodontal healing following tooth replantation using immunohistomorophometric assay Our results (Fig. 2 - 5) showed differential temporal expression of IGF-I in cementum, PDL and bone in normal periodontium as well as in the healing periodontium under optimal (immediate tooth replantation) and adverse (delayed tooth replantation) conditions. The expression of IGF-I implicates its role in periodontal healing of replanted teeth. Knowledge of such would allow insights into its contribution and potential to induction of cellular events that may lead to periodontal regeneration of replanted tooth.



Fig. 1 Root substance is being replaced by bone (replacement resoration)



Fig. 2 Immunohistomicrograph of a representative section of non-experimental group showing cellular cementum and PDL. The cementocytes (A) are mildly stained. Counterstained with haematoxviin.



Fig. 3 Immunohistomicrograph of a representative section of immediate replentation group at day 2 showing cellular comentum and PDL. The comentocytes (A) are mild to moderate to intensely stained. Mild extracellular staining of PDL is seen (B). Counterstained with haematoxylin;



Fig. 4 Immunohistomicrograph of a representative section of non-experimental group showing bone. The bone cells are mildly stained. Counterstained with haematoxylin.



Fig. 5 Immunchistomicrograph of a representative socion of delayed replantion group at 4 days showing the PDL and bone. Intense staining of periodontal ligament (A) inserting into the bone (B), connected to a blood vessel (C). Endothelal cell lining and cellular contents are immunoreactive to IGF-1. Intense staining of ECM of bone seen. Counterstained with harmatoxylin.

PATENTS / RESEARCH AWARDS

Awards

- 2003 LADR Pulp Biology Group Student Travelling Award: Ms Saw Tzuen Yih, Dr Cao Tong, Dr Liu Hua, Assoc Prof Yap Adrian, Assoc Prof Ng Mah Lee. Maintenance of Odontoblasts and Pulp Fibroblasts in Incisor Silce Culture for Pulpcytotoxicity Testing of Dental Materials. The 81st International Association for Dental Research General Session and 2nd Meeting of the Pan European Federation, Goteborg, Sweden, 24th - 28th June 2003.
- Assoc Prof Stephen Hsu was the winner of the "Finalist Award-for Excellence in Research Enhancing the Specialty of Pediatric Dentistry", conferred by the American Association for Pediatric Dentistry, June 2003.
- Ms Tan Kai Soo. (PhD candidate), Research Assistant, Department of Preventive Dentistry, supervised by Dr Keang Peng Song and Assoc Prof Grace Ong, won the First Prize of the 18th South-East Asian Division International Association for Dental Research Travel Award in Vietnam, September 2003 for the project entitled "Cytolethal-distending Toxin of Actimobacillus Actinomycetemcomitans - A Self-splicing Intron"; to represent the South-East Asian Division at the International Hatton Competition at 82nd International Association for Dental Research, General Session in Honolulu, Hawaii, USA in March 2004.
- Dr Saikin Zuffkri (MDS Orthodontics resident), supervised by Assoc Prof Kelvin Foong, was the recipient of Oraniofacial Biology Award at the International Association for Dental Research South-East Asian Division meeting in Vietnam, September 2003 for his research project entitled 'A Non-contact Surface Laser Scanning Technique - A 3D Validation Study'.
- Assoc Prof Ho Kee Hai won the Best Poster
 Presentation Award at the Asia-Pacific 2004
 Conference on Dental Implant held in Melbourne

in March 2004 for his research project entitled 'Regeneration of Bone Using a Bioresorbable 3D Scaffold-Osteoblast Project'. The other collaborators are Ms Bina Rai, Mr Kamal bin Yacob, Dr Cao Tong and Prof Teoh Swee Hin.

- Assoc Prof Stephen Hsu and Dr Veerappan Girija dinched the Best Oral Science Poster Merit Award at the 7th National University of Singapore-National University Hospital Annual Scientific Meeting in Singapore for his poster "Symergistic Effect of Er:YAG Laser and Fluoride on Inhibition of Caries Formation in Ename" on 3rd October 2003.
- Dr Zou Xiaohui, whose poster entitled The Effect of Heparan Sulfate and Chondroitin Sulfate On Palatal Fibroblast Activities' (supervised by Assoc Prof Kalvin Foong, co-supervised by Dr Cao Tong and Dr Gorgey Pip) won the Best Oral Science Poster Award at the 7th National University of Singapore-National University Hospital Annual Scientific Meeting in Singapore.
- Ms Bina Rai was awarded Best Paper Award (Postgraduate Category) for her paper on "The Effect of hBMP-2 on Canine Osteoblasts Seeded Onto 3D Bioactive Polycaprolactone Scaffolds" at the 3rd Scientific Meeting of the Biomedical Engineering Society (Singapore) on 21st May 2004. The co-authors are Assoc Prof Ho Kee Hai, Prof Tech Swee Hin, Dr Cao Tong, Dr Dietmar W. Hutmacher, Mr Kamal bin Yacob and Dr Chen Fulin.

Patents

- Prof Chew Chong Lin and his research team (Dr Loh Peoy Ling, Assoc Prof Seeram Ramakrishna, Dr Ganesh Vijay Kumar and Assoc Prof Teoh Swee Hin) filed a Singapore patent on "Fibrereinforced Composite Dental Post with Graded Stiffness". Patent ID No: P-No 79227 dated 27th February 2004.
- Dr Chng Hui Kheng and her research team (Dr Tong Yen Wah and Assoc Prof Adrian Yap) filed a US Provisional patent on "Viscosity Enhanced Root Repair Material" on 24th October 2003.

EDITORIAL APPOINTMENTS

Prof Chew Chong Lin Editorial Board, Journal of Dentistry

Prof Loh Hong Sai Section Editor, Oral Medicine, Oral Pathology, Oral Surgery Section Editor (Oral & Maxillofacial Surgery), Singapore Dental Journal

Assoc Prof Adrian Yap Editorial Board, Operative Dentistry Chief in Editor, Singapore Dental Journal Editorial Board, American Journal of Dentistry

Assoc Prof Grace Ong Editorial Board, European Journal of Dental Education

Assoc Prof Ho Kee Hai Editorial Board, Asian Journal of Oral and Maxillofacial Surgery

Assoc Prof Jennifer Neo Editorial Board, Operative Dentistry Editorial Board, Asian Journal of Aesthetic Dentistry

Assoc Prof Kelvin Foong Section Editior (Preventive Dentistry), Singapore Dental Journal

Assoc Prof Keson Tan Editorial Board, Journal of Oral Rehabilitation

Assoc Prof Lim Lum Peng Editorial Board, Singapore Dental Journal Editorial Board, Oral Health & Preventive Dentistry

Assoc Prof Stephen Hsu Science Advisory Board, Life Science Web Portals

Assoc Prof Yeo Jin Fei Guest Editor, Annals, Academy of Medicine Singapore Editorial Board, Singapore Dental Journal

Pr Anil Kishen Section Editor (International Publications), Singapore Dental Journal

Dr Rashid Tahir Associate Editor, Singapore Dental Journal

Dr Varawan Sae-Lim Editorial Board, Journal of Dental Traumatology Scientific Advisory Panel of Editorial Board, Journal of Endodontics

RESEARCH COLLABORATIONS

Academic Year 2003 - 2004

S/N	International/Local	Name of University	Principal Investigator	Collaborating Dept in Faculty	No of Collaborations
1	International	University of Washington	Assoc Prof Keson Tan	Restorative Dentistry	1
2	International	Universitas 21	Assoc Prof Keson Tan	Dean's Office (Dentistry)	2
3	International	Center of Oral Biology, Karolinska Institue	Dr Cao Tong	Dean's Office (Dentistry)	1
4	Local	Nanyang Technological University	Dr Anil Kishen	Restorative Dentistry	1
5	International	Saratov State University	Dr Anil Kishen	Restorative Dentistry	1
6	International	University of Otago	Dr Anil Kishen	Restorative Dentistry	1
7	International	3D Labs, University of Copenhagen	Assoc Prof Kelvin Foong	Preventive Dentistry	1
8	International	Johns Hopkins, USA	Assoc Prof Kelvin Foong	Preventive Dentistry	1
9	International	Dows Institute for Dental Research, University of Lowa,USA	Assoc Prof Stephen Hsu	Preventive Dentistry	1
10	International	Modern Optics Lab, Nat Sun Yat-Sen University, Taiwan	Assoc Prof Stephen Hsu	Preventive Dentistry	1
11	International	Division of Periodontology, Prince Philip Dental Hospital, Hong Kong	Assoc Prof Lim Lum Peng	Preventive Dentistry	1
12	International	Cleft Lip Centre, University of Helsinki	Assoc Prof Kelvin Foong	Preventive Dentistry	1
13	International	University of Wisconsin Madison	Dr Cao Tong	Dean's Office (Dentistry)	1
14	International	Harvard University	Dr Cao Tong	Dean's Office (Dentistry)	1
				TOTAL	15

Collaborations with other Universities

Collaborations with Industry

S/N	International/Local	Name of Company	Principal Investigator	Collaborating Dept in Faculty	No of Collaborations
1	International	3M	Assoc Prof Jennifer Neo	Restorative Dentistry	1
				TOTAL	1

Collaborations with Research Institutions

S/N	International/Local	Name of University	Principal Investigator	Collaborating Dept in Faculty	No of Collaborations
1	Local	Genomic Institute of Singapore, A*Star	Dr Cao Tong	Dean's Office (Dentistry)	1
2	International	NASA - Stamford Biocomputing Lab	Assoc Prof Kelvin Foong	Preventive Dentistry	1
3	Local	I ² R, A*Star	Assoc Prof Kelvin Foong	Preventive Dentistry	1
4	International	CNRS-Medical Imaging Inst (TIMC), France	Assoc Prof Kelvin Foong	Preventive Dentistry	1
				TOTAL	4

Financial Year 2003 - 2004

New Research Projects funded by Academic Research Fund

Role of Brain Phospholipases A₂ in Orofacial Pain

Principal Investigator: Assoc Prof Yeo Jin Fei Amount: \$178,000

Aims

To elucidate the role of central phospholipase A₂ in pain transmission.

Trigeminal neuralgia is a disorder of middle age and later life and consists of paroxysms of intense, stabbing pain in the distribution of the mandibular and maxillary divisions of the fifth cranial nerve Anticonvulsant drugs such as phenytoin. valproic acid, clonazepam, and particularly carbamazepine, alone or in combination, suppress or shorten the duration of the attacks. The fact that many of the above drugs are anti-epileptic drugs suggest that there is significant central nervous changes in trigeminal neuralgia, but thus far. little is known about possible changes in central nervous signalling pathways which might underlie the disease.

The release of glutamate from sensory terminals evokes fast synaptic potentials in second order neurons by activating the glutamate receptors (reviewed in Basbaum and Jessell 2000). An early event following receptor stimulation is the activation of phospholipases A₂, C and D. This activation results in generation of second messengers such as arachidonic acid, eicosanoids, plateletactivating factor, lysophosphatidic acid, diacylglycerol, and inositol-1,4,5tisphosphate (Faroqui et al. 2000).

Our recent in-vitro studies have shown that external application of Group IIA sPLA₂ (crotoxin B or purified human synovial sPLA₂) to PC12 cells and cultured rat hippocampal neurons results in an immediate increase in membrane capacitance and exocytosis, and neurotransmitter release (Wei et al. 2003). It is postulated that this effect on facilitating neurotransmitter release could have an effect on pain transmission. The purpose of the project is therefore to elucidate the roles of CNS phospholpases A, (PLA), in the development of allodynia/hyperalgesia after facial carragenean incections in mice.

Clinical Relevance:

It is hoped that the results of this study would serve to clarify the roles of PLA₂ on affecting nociceptive transmission, and the effectiveness of centrally administered (or CNS permeable) PLA₂, inhibitors as anti-nociceptive agents. The knowledge gained from the study would pave the way for further development of PLA₂, inhibitors as specific drug targets for the treatment of hyperalgesia, and possible use of some of the developed compounds in the clinical management of trigeminal neuralgia.

Production of User-centric Intelligent Clinical Support System for Temporomandibular Disorders and Other Chronic Pain Conditions Principal Investigator: Assoc Prof Adrian Yap Amount: \$70,000

Aims:

- To conduct user-centered analysis over the existing user interface and current usage patterns of NUS TMDv1.1 and identify new usability requirements.
- To establish a multi-lingual and multiplatform system enabling system usage across the world.
- To develop a user-centric design for the user interface. This includes replacing the current text-based interface with a more intelligent graphical interface that will simplify both data entry and review.
- To conduct domain analysis to identify treatment types and decision models for their application.
- To re-architect existing NUS TMDv1.1 application (including user defined field generation) and information architecture

- to include a module for patient tracking and prognosis, and a rule-base that defines the rules for diagnosis.
- To implement new user interface, produce a prototype and conduct usability testing.

Chronic facial pain is a multi-disciplinary problem. Amongst the four recognisable orofacial chronic pain complexes (Temporomandibular disorders ITMD). Atypical Facial Pain, Atypical Odontalgia and Oral Dysaesthesia), TMD is the most prevalent TMD refer to a collection of medical and dental conditions affecting the temporomandibular joints and/or the muscles of mastication, as well as contiguous tissue components. The total number of people experiencing TMDrelated pain is estimated at more than 10 million in America alone. Concerns regarding the welfare of TMD sufferers as well as safety and efficacy of TMD care have prompted NIDCR (National Institutes of Health, USA) to target TMD as one of its high priority research areas for 2003

A critical obstacle to the further understanding of TMD is the lack of standardised diagnostic criteria for defining subtypes of TMD. The Research Diagnostic Criteria for TMD (RDC/TMD) was established by Dworkin & co-workers (1992) to address this lack, RDC/TMD allows for the standardisation and replication of research into the most common forms of muscle and joint-related TMD. Its dual axis approach also allows physical diagnosis to be coordinated with operationalised assessment of pain-related behaviors, psychological distress and psychosocial function associated with TMD and other chronic pain conditions.

RDC/TMD is usually administered by pen and paper. The data collected are then entered manually and batch processed by a mainframe computer. A time lag between patient history taking/ examination and the generation of diagnosis is thus inevitable. A project to

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create an on-line diagnostic tool based on the RDC/TMD was undertaken by NUS. This computerised diagnostic system (NUS TMD/1.1) allowed for direct data input by patients/clinicians, chariside generation of Axis I and II findings, and automatic archiving of data is SPSS or other tab-delineated formats for data mining and global exchange.

A trial program involving 17 international centers in American, Europe, Asia and Australia was conducted. Preliminary findings of this program and the future evolution of RDC/TMD, warrants the development of the next generation of multi-lingual, clinician centered support system with intelligent multimedia interfaces and patient prognosis/treatment tracking engines.

Clinical Relevance:

Tool developed will help faciliate global research in TMD leading to better understanding of the disorder, its associated risk factors and progression.

Production of Bone Cells from Embryonic Stem Cells for Transplantation Therapy and Drug/Biomaterial Screening Principal Investigator: Dr Cao Tong Amount: \$\$71,020

Aims:

To explore the possibility of stimulating and directing differentiation of human embryonic stem cells (hESCs) toward bone cells.

Undifferentiated and immortal pluripotent cells are an ideal source of cells for the study of cell/tissue/organ/body development and gene contol, for gene/cell therapy as gene/protein deliverers or repairing cells, for the development of toxicity screening tests of biomaterials and drugs, and for coll/tissue/organ transplantation therapy. To serve this promise, human embryonic sam (ES) cells have been devolped. By manipulating the culture conditions under which ES cells differentiate it has been possible to control and restrict the differentiation pathways of the cell types within the embryoid body and thereby generate cultures enriched for lineagespecific precursors. Using this approach some animal and human ES cells have been used to generate a range of distinct phenotypes including hematopoietic precursors neural cells adipocytes muscle cells, and chondrocytes, Based on the technology we have developed of differentiating human adult stem (AS) cells toward osteogenic cells, this project explores the possibility of stimulating and directing differentiation of human ES cells toward osteogenic cell lineages, with the final hope of producing new bone cells for transplantation therapy for various bone diseases and drug/biomaterial screening

Clinical Relevance:

Bone cells from hESCs are ideal unlimited source of human bone cells for (1) the study of development and gene disorder of bone diseases, (2) for gene/cell therapy as gene/protein deliverers or repairing cells for bone diseases, (3) for the development of safety/biocompatibility screening tests of bone related biomaterials and drugs, as well as (4) for cell/tissue/organ transplantation therapy of bone regeneration and reconstruction.

Oral Health Attitudes and Periodontal Disease Risk Profile of Adult Diabetics in Singapore Principal Investigator: Assoc Prof Lim Lum Peng

Amount: \$168,065

Aims.

- To investigate the periodontal health status of adult diabetics in Singapore.
- To identify periodontal disease risk profile of adult diabetics in Singapore.
- To correlate systemic risk factors of diabetics with the severity of periodontal disease.

 To implement an oral health promotion programme for adult diabetics and to evaluate the short term effects of the programme in terms of patients; compliance with oral hygiene recommendations and improvement of periodontal health.

It has been well documented that patients with diabetes are more susceptible to destructive periodontal disease. A pilot study conducted amongst adult patients with diabetes indicated a high prevalence of destructive periodontal disease in the local population. In view of the high prevalence of diabetes in the adult population in Singapore, there is a need to address the periodontal health problem of this category of patients. To understand the problem better, information is required on the oral health attitudes, the profile of the disease in terms of the biological process associated with tissue destruction and periodontal healing mechanisms The aim of this study is to investigate the periodontal disease profiles and oral health attitudes of adult patients with diabetes using clinical and laboratory markers as well as Questionnaire data. Adult patients from two Diabetic centres will be recruited for the study. Informed consent will be obtained from patients prior to commencement of project. 30 Adult patients attending periodontal treatment will serve as controls. Full mouth oral/periodontal assessment and oral hygiene education will be given. Blood and salivary samples will be obtained. A questionnaire will be administered to assess the oral health attitudes and practices of the participants. Subjects will be evaluated using similar assessment criteria at the end of 6 months. The data will be entered into SPSS Software. For the data analysis. individuals will be categorised into groups according to the level of glycaemic control. Between groups comparison will be analysed for periodontal health status. biochemical markers and compliance with oral health practices using parametric and non-parametric tests.

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Clinical Relevance:

The research could have significant implications in the management of diabetic patients at a community level in the following areas:

- Periodontal disease risk assessment of diabetic patients.
- Achieve a better understanding of the biological processes associated with periodontal healing and tissue destruction in diabetics with potential future development of strategies targeting at improving periodontal healing responses of diabetics.
- Establish effective oral health promotion and intervention programmes for diabetics through a better understanding of the general and oral health attitudes of diabetics.

Advanced Non Invasive Light Therapy to Eradicate Bacteria Flora in Dentine Principal Investigator: Dr Anil Kishen Amount: \$145,250

Aims:

- To establish an effective microbiological model for the in-vitro evaluation of bacterial kinetics.
- To evaluate various structural changes induced in dentine by pathology and endodontic therapy.
- To examine the effectiveness of a noninvasive low-level light based approach to eradicate bacterial flora in dentine.

Dentine may act as a barrier and also as a permeable system due to its distinct porous structure. This nature of the dentine is attributed to the dentinal tubules that traverse is entire structure. Bacterial penetration within the dentinal tubules has always been an issue when invading bacteria comes in contact with open dentinal tubules. These microorganisms may dwell in such clinically cocluded and inaccessible areas. Although mechanical removal of dentine, and application of chemicals, antiseptics or antibiotics are conventionally employed to disinfect root canal dentine, denth of penetration of the irrigants, effects of chemicals and antiseptics on the mechanical properties of the dentine, altered micro-environment in the dentine, development of antibilotic resistant bacterial strain and persistence of bacteria at a greater depth within dentinal tubules have all been long standing causes of concern. This study aims to address some of these issues by understanding the endodontic bacterial kinetics and to develop a low-level light based treatment approach to achieve greater depth and total kill of bacteria within dentine.

Clinical Relevance:

This research will pave way for an advanced non-invasive light based therapy for effective disinfection of the root canal systems.

An Assessment of Orthodontic Treatment Need and Demand in Chinese Adolescents

Principal Investigator: Dr Soh Jen Amount: \$66,705

Aims

- To determine the objective need for orthodontic treatment in Singapore Chinese adolescents as assessed by an orthodontic clinician.
- To establish the extent to which dentofacial attractiveness has in determining the subjective patient demand and objective clinician-derived need for treatment in the same adolescents.
- To determine the level of parental awareness of malocclusion, orthodontic treatment and perception of dentofacial attractiveness in the context of treatment demand.

The attainment of good basic dental care in developed countries has led to a natural progression of a shift towards aesthetic dental procedures of which orthodontic treatment is one of the most commonly utilised services both in the public and private sectors. Orthodontic treatment is expensive in terms of cost and time Comprehensive fixed appliance therapy is usually carried out at adolescence. Injudicious delivery of treatment can harm the dental tissues in addition to a waste of valuable public health care resources. One of the key motivations for patients to seek treatment is the desire to improve dentofacial aesthetics. It is important to assess both subjective and objective need for treatment. The Index of Orthodontic Treatment Need is a well-established occlusal index that has been used for need assessment in the U.S. and U.K. Currently the level of orthodontic treatment need in Singaporean adolescents has yet to be determined. There is little information in the literature regarding the relationship between facial aesthetics, orthodontic treatment need and the perception of malocclusion in Chinese subjects. This project is the first to establish baseline data on objective and subjective orthodontic treatment need in Singaporean adolescents, the perception of malocclusion in children and parents and the influence of dentofacial attractiveness on treatment need assessment

Clinical Relevance:

- Orthodontic treatment need and demand appraisal has implications on treatment uptake and the availability of resources for the delivery of quality care.
- The perception of malocclusion by adolescents and parents can help clinicians better understand the level of concerns, satisfaction and emphasis given to dental aesthetics.

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New Research Project funded by Biomedical Research Council

Innovative Non-Invasive Laser Treatment for Prevention of Enamel Demineralisation (Tooth Decay) Principal Investigator: Assoc Prof Stephen Hsu Amount: 579 450

Aims:

- Characterisation of heat-induced physicochemical changes in enamel HA crystals.
- Computational modeling of laserinduced heat flow and the subsequent transient three-dimensional profile of the temperature rise in enamel.

Despite the significant decline of caries rate in the last few decades in the developed countries, dental caries is still reported to be the single most common chronic childhood disease (Report of US Surgeon General 2000) In Asia more than 80% caries rate has been reported. in many epidemiological studies (Stephen. 1993) Since 1960's accumulated evidence has clearly demonstrated the laser-induced caries prevention (LICP) in enamel. However, many clinicians are still concerned about a potential pulpal damage caused by the high-energy laser irradiation used in melting and/or sealing the enamel as advocated by the highly regarded "enamel melting hypothesis" in the last few decades. By avoiding enamel melting, a multidisciplinary research team has recently succeeded in using low energy laser to provide significant caries prevention in enamel and quantified two major mechanisms, "crystal purification" and "organic blocking", in LICP (Hsu et al., 2000). Although this breakthrough may precipitate the clinical development of LICP, the laser parameters capable of maximising these two mechanisms remain unknown. The purpose of this study is to comprehensively characterise the laser-enamel interaction and subsequently identify the optimal laser parameters for LICP. The program will first qualitatively and quantitatively characterise the physicochemical

properties of heated enamel at consecutive temperature ranges. The second step is to build a computational model to simulate the four dimensional profiles of laser-induced heat flow and temperature rise in enamel. Both CO₂ and Er:YAG lasers will be used to investigate the overall benefit-damage ratio from the correlated optical-thermalmechanical-chemical-crystallographic perspectives. The simulation model will be systemically validated and refined based on these experimental data and subsequently used to select the optimal range of laser parameters to maximise the LICP As a result, this study may pave the road for the development of an innovative non-invasive laser device for caries prevention

Clinical Relevance:

This project, if aims achieved, will bring in new therapies for preventing decays in human teeth.

New Research Project funded by National Medical Research Council

Prospective Study of Periodontal Disease Risk Markers and Treatment Outcome of a Periodontal Programme for Adult Diabetics in Singapore Principal Investigator: Assoc Prof Lim Lum Peng Amount: 3114 125

Aims

- To Investigate the effects of simple periodontal treatment like oral hygiene and scaling on periodontal health in a cohort of patients with diabetes in Singapore.
- To investigate the influence of behavioural factors on periodontal treatment outcomes in diabetics.
- To correlate the treatment outcome with metabolic control and periodontal disease risk markers.

Diabetes has been recognised as one of the key systemic risk factors in destructive periodontal disease. While it is generally accepted that patients with poor glycaemic control have poorer periodontal health, there is no consistent agreement as to whether improved periodontal health would help to improve glycaemic control. It has been well established that simple periodontal therapy like scaling and oral hygiene can be effective in controlling periodontal disease. However, few studies have been conducted in patients with diabetes. In view of the high susceptibility to periodontal disease in diabetic patients, early diagnosis and management are likely to improve the periodontal health of this group of patients. The aim of this study is to investigate the effects of an intervention programme on the periodontal health status of adult diabetics attending treatment at two diabetic centers in Singapore. Informed consent would be obtained prior to commencement of study. All subjects would receive full mouth periodontal assessment and will be randomly allocated into three groups: Oral hygiene and Scaling, Oral hygiene education and a control. Blood and saliva samples will also be collected. Subjects will be evaluated at 3 months and 9 months. Questionnaire will be administered at the different time points to explore factors which may influence oral health behaviour of the individuals. The outcome to the intervention programme will be determined using the following clinical parameters: Plaque, Bleeding on probing, probing depths. The biological responses will be evaluated by analysis of blood and saliva samples for the common inflammatory markers. Change in attitude and behaviour will be evaluated through questionnaire.

Clinical Relevance:

The research could have significant implications in recommendation of appropriate treatment strategies in the management of periodontal disease as an integral component of diabetic care. The study would provide useful information in the following areas:

- Effects of non-surgical periodontal treatment on gingival responses in patients with diabetes.
- Identify biological and behavioural factors affecting healing responses of patients with diabetes following periodontal therapy.

REFEREED PUBLICATIONS

Calendar Year 2003

Premium

Cao, T., K.H. Ho and S.H. Teoh

Scaffold Design and in-vitro Study of Osteochondral Co-culture in a 3D Porous Polycaprolactone Scaffold Fabricated by Fused Deposition Modeling.

Tissue Engineering, Suppl 1:S103-12, 9 (2003). (United States).

Griggs, J.A., A. Kishen and Kim Nga Le

Mechanism of Strength Increase for a Hydrothermal Porcelain.

Dental Materials, 19 (2003): 625-631. (United States).

Griggs, J.A., J.C. Wataha and A. Kishen

Effect of Hydrolysed Surface Layer on the Cytotoxicity and Chemical Resistance of a Low Fusing Procelain.

Dental Materials, 19, 5 (2003): 353-358. (United States).

Ho, C.H., A. Khoo, R. Tan, J. Teh, K.C. Lim and V. Sae-Lim

pH Changes in Root Dentin Following Intra-canal Placement of Improved Calcium Hydroxide Containing Gutta Percha Points.

Journal of Endodontics, 29, 1 (2003): 4-8. (United States).

Huang, Z.M., R. Gopal, K. Fujihara, S. Ramakrishna, P.L. Loh, K.W.C. Foong, V.K. Ganesh and C.L. Chew Design and Development of a New Composite Orthodontic Archwire

Biomaterials, 24 (2003): 2941-2953. (United Kingdom).

Lim, T.S., T.Y. Wee, M.Y. Choi, W.C. Koh and V. Sae-Lim

Light and Scanning Electron Microscopic Evaluation of Glyde File Prep in Smear Layer Removal.

International Endodontics Journal 2003 May;36(5):336-43. (United Kingdom).

Ma, K.M. and V. Sae Lim

The Effect of Topical Minocycline on Replacement Resorption of Replanted Monkeys' Teeth.

Dental Traumatol. 2003 Apr;19(2):96-102. (United States)

Ng, V.A.C., D.S.Q. Koh, B.Y.Y. Mok, S.E. Chia and L.P. Lim

Salivary Biomarkers Associated with Academic Assessment Stress Among Dental Undergraduates.

Journal of Dental Education, 67, no.10 (13 May 2003):1091-1094. (United States).

Quek, S.L. and K.C. Lim

Pattern of Third Molar Impaction in a Singapore Chinese Population: A Retrospective Radiographic Survey.

International Journal of Oral & Maxillofacial Surgery (2003):32/5 pp 548-552. (United Kingdom).

Rohner, D., S.M. Chung, D.W. Hutmacher and K.T. Tsai

Bone Response to Unloaded Titanium Implants in the Fibula, Iliac Crest, and Scapula: An Animal Study in the Yorkshire Pig.

International Journal of Oral & Maxillofacial Surgery, 2003 August; 32(4): 383-9. (United Kingdom).

Soh, M.S., A.U.J. Yap and K.S. Siow

Effectiveness of Composite Cure Associated with Different Curing Modes of LED Lights.

Operative Dentistry, 28, 4 (2003): 371-377. (United States).

Soh, M.S., A.U.J. Yap and K.S. Siow

Effectiveness of Cure of LED Curing Lights at Varying Cavity Depths.

Operative Dentistry, 28, 6 (2003):707-715. (United States).

Tang G., H.K. Yip, L.P. Samaranayake, G. Luo, E.C. Lo and C.S. Teo

Actinomyces spp. in Supragingival Plaque of Ethnic Chinese Preschool Children with and Without Active Dental Caries.

Caries Research, 37, no.5 (2003): 381-390. (United States).

Wattanapayungkul P. and A.U.J. Yap

Effects on In-office Bleaching Products on Surface Finish of Tooth-colored Restoratives.

Operative Dentistry, 28, 1 (2003): 15-19. (United States).

Yap, A.U.J., W.Y. Tan, L.C. Tay, K.M. Chang, T.K. Loy and B.Y.Y. Mok

Effect of Mouth Rinses on Microhardness and Wear of Composite and Compomer Restoratives.

Operative Dentistry, 28, 6 (2003): 740-746. (United States).

REFEREED PUBLICATIONS

Calendar Year 2003

Yap, A.U.J., C.T. Lim, M.K. Lee, S.M. Chung and K.T. Tsai

Effect of Food-simulating Liquids on Shear Punch Strength of Composite and Polyacid-modified Composite Restorative.

Operative Dentistry, 28, 5 (2003): 529-534. (United States).

Yap, A.U.J., K.S. Siow and M.S. Soh Thermal Emission by Different Light-curing Units.

Operative Dentistry, 28, 3 (2003): 262-268. (United States).

Yap, A.U.J., A.C.S. Tan, A.T.S. Goh, D.C.G. Goh and K.C.T. Chin

Effect of Surface Treatment and Cement Maturation on Dentin Bond Strength of Resin-modified Glass lonomers.

Operative Dentistry, 28, 6 (2003):728-733. (United States).

Yap, A.U.J., P. Wattanapayungkul and S.M. Chung

The Polymerisation Process on Composite Resistance to Chemical Degradation by Food-simulating Liquids.

Operative Dentistry, 28, 6 (2003): 723-727. (United States).

Yap, A.U.J., N.Y. Wong and K.S. Siow

Composite Cure and Shrinkage Associated with Very High Intensity Curing Light.

Operative Dentistry, 28, 4 (2003): 357-364. (United States).

Yap, A.U.J., S.H. Yap, J.C.K. Teo, C.M. Tay, K.L. Ng and H.P.Y. Thean

Microwave Drying of High Strength Dental Stone: Effects on Dimensional Accuracy.

Operative Dentistry, 28, 2 (2003): 193-199. (United States).

Yap, A.U.J., W.Y. Yap, E.J.C. Yeo, J.W.S. Tan and D.S.B. Ong

Effects of Finishing/Polishing Techniques on Microleakage of Resin-modified Glass lonomer Cement Restorations.

Operative Dentistry, 28, 1 (2003): 36-41. (United States).

Yap, A.U.J., E.J.C. Yeo, W.Y. Yap, D.S.B. Ong and J.W.S. Tan

Effects of Instrumentation Time on Microleakage of Resin-modified Glass lonomer Cements.

Operative Dentistry, 28, 1 (2003): 47-52. (United States).

Veerappan, Girija and C.S. Hsu

Characterisation of Lipid in Mature Enamel Using Laser Scanning Confocal Microscopy.

Journal of Dentistry, 31 (2003): 303-311. (United Kingdom).

Leading

Kishen, A., M.S. John, C.S. Lim and A. Asundi

Development and Application of a Fiber Optic Biosensor to Monitor Mutans Streptococci Activity in Human Saliva.

Biosensors & Bioelectronics 2003; Oct 18 (11), 1371-1378. (United States).

Kishen, A., V.M. Murukeshan, V. Krishnakumar, C.S. Lim and A. Asundi

Digital Speckle Pattern Interferometry and Thermographic Analysis on the Thermal Response of Human Teeth.

Journal of Optics & Lasers in Engineering, 2003; 39 (4), 489-500 (United Kingdom).

Lo, T.S., S.H. Chay, T. Cao, Janee Lim and S.H. Teoh

Osteogenic Role of Vascular Endothelia Growth Factor in Bone Regeneration.

Annals, Academy of Medicine, Singapore, \$50-51, 32 (2003). (Singapore).

Ong, K.S. and S.B. Keng

The Biological, Social and Psychological Relationship Between Depression and Chronic Pain.

Cranio: The Journal of Craniomandibular Practice, 21 (October 2003): 286-294. (United States).

Yap, A.U.J., P.H.N. Cheang and P.L. Chay

Mechanical Properties of Two Restorative Reinforced Glass Ionomer Cements.

Journal of Oral Rehabilitation, 30, 1 (2003): 1-8. (United Kingdom).

REFEREED PUBLICATIONS

Calendar Year 2003

Yap, A.U.J., S.F. Dworkin, E.K. Chua, T. List, K.B.C. Tan and H.H. Tan Prevalence of TMD Subtypes, Psychological Distress and Psychosocial Dysfunction in Asian Patients.

Journal of Orofacial Pain, 17, 1 (2003): 21-28. (United States).

Yap, A.U.J., K.C. Shah and C.L. Chew Marginal Gap Formation of Composites in Dentin: Effect of Water Storage.

Journal of Oral Rehabilitation, 30, 3 (2003): 236-242. (United Kingdom).

Yap, A.U.J. and S.H. Teoh

Comparison of Flexural Properties of Composite Restoratives Using the ISO and Mini-flexural Tests.

Journal of Oral Rehabilitation, 30, 2 (2003): 171-177. (United Kingdom).

Reputable

Ataullah, K. and L.P. Lim Power-driven Scalers for Periodontal Instrumentation - A Review.

Singapore Dental Journal 2003; 25(1): 75-81. (Singapore)

Chng, H.K.

Root Canal Therapy: Single-visit or Multiple-visit Approach?

Singapore Dental Journal, 25 (2003): 31-34. (Singapore).

Lim, L.P.

Periodontal Health Status of the Singapore Population.

Singapore Dental Journal 2003;25(1): 58-59. (Singapore).

Preejith, P.V., C.S. Lim, A. Kishen, M.S. John and A. Asundi

A Fiber Optic Evanescent Wave Based Biosensor for Total Protein Detection.

Biotechnology Letters, 25, 2 (2003): 105-110. (United Kingdom).

Soh, J. and A. Sandham

Factors Influencing Orthodontic Treatment Uptake.

Singapore Dental Journal, 25 (2003): 7-10. (Singapore).

Thean, H.P.Y. and M.L. Wong

Removable Prosthodontics and the Noninstituitonalised Chinese Elderly in Singapore.

Singapore Dental Journal 2003 25(1): 26-30. (Singapore).

Others

Ong, K.S. and S.B. Keng Evaluation of Surgical Procedures for Trigeminal Neuralgia.

Anesthesia Progress, 50, 4 (2003): 181-188. (United States).

CONFERENCE PAPERS

Calendar Year 2003

Ng, Y.C., H.C.J. Sng, S. Veerasamy, Wee, C.K.E., H.Y.C. Zheng, S.B. Keng and C.S. Hsu

Preventive Effect of Er:YAG Laser on Demineralisation by Coke in Human Enamel: A Pilot Study.

7th National University of Singapore-National University Hospital Annual Scientific Meeting - New Frontiers in Medicine, 2nd - 3rd October 2003, National University of Singapore, Singapore.

Ng, V.A.C., D.S.Q. Koh, B.Y.Y. Mok, S. Choo and L.P. Lim Salivary Biomarkers Associated with

Academic Examination.

The 17th Asian Conference on Occupational Health, 2nd - 4th November 2003, Taipei, Taiwan.

Ng, V.A.C., D.S.Q. Koh, B.Y.Y. Mok, Q. Fu, L.P. Lim and S.E. Chia Stress and Stressors Among Dental Undergraduates over the Course of

the Academic Year. 1st International Conference on Occupational and Environmental Health,

12th - 14th November 2003, Hanoi, Vietnam.

Quek, C.E.Y., K.B.C. Tan and J.I. Nicholls

Load Fatigue Performance of a Singletooth Implant-abutment System: Effect of Diameter.

18th Annual Scientific Meeting, International Association for Dental Research (South-East Asian Division), 25th - 27th September 2003, Ho Chi Minh City, Vietnam.

Quek, V.K.L., S.B. Keng, K.W.C. Foong and S.H. Ong Validation of 3D Analysis of

Edentulous Arch Shapes and Contours.

18th International Association for Dental Research (South-East Asian Division) Annual Scientific Meeting, 25th - 27th September 2003, Ho Chi Minh City, Vietnam.

Ramli Bin, H.N., C.T. Lim, H.K. Chng and A.U.J. Yap

Nanoindentation Study of Human Premolars Subjected to Bleaching.

World Congress on Medical Physics and Biomedical Engineering, 24th - 29th August 2003, Sydney, Australia.

Ramakrishna, S., K. Fujihara and V.K. Ganesh

Dental & Orthopaedic Applications of Polymer Fibrous Composites.

8th Japan International SAMPE Symposium & Exhibition, 18th - 21st November 2003, Tokyo Bigsight, Tokyo, Japan.

Sadique, S.E., S. Ramakrishna and V.K. Ganesh

Modeling the Biomechanics of the Craniofacial Structures Using Boundary Element Method - A New Approach.

4th International Conference on Biological Mechanisms of Tooth Movement and Craniofacial Adaptation, 18th - 21st August 2003, USA.

Sae-Lim, V., W.Y. Ong, Z.M. Li, K. Lam, M. Khin, K.S. Wong and J. Neo The Effect of Basic Fibroblast Growth Factor on Delayed-replanted Monkeys' Teeth.

81st General Session of the International Association for Dental Research, 25th -28th June 2003, Goteborg, Sweden. Journal of Dental Research (USA) 2003.

Salikin, Z, K.W.C. Foong and S.K. Chua Non-contact Surface Laser Scanner -

A 3D Validation Study.

18th International Association for Dental Research (South-East Asian Division) Annual Scientific Meeting, 25th - 27th September 2003, Ho Chi Minh City, Vietnam.

Saw, T.Y., T. Cao, Hua Liu, A.U.J. Yap and M.L. Ng

Maintenance of Odontoblasts and Pulp Fibroblasts in Incisor Slice Culture for Pulp-cytotoxicity Testing of Dental Materials.

81st Conference of International Association for Dental Research, 25th -28th June 2003, Goteborg, Sweden.

Sethu, S., P. Wattanapayungkul and P.L. Loh

Ability of Composite Core Materials to Mask the Color of Pre-fabricated Postes Under All-ceramic Crowns.

81st General Session of the International Association for Dental Research, 25th -28th June 2003, Goteborg, Sweden.

Soh, M.S. and A.U.J. Yap

Post-gel Polymerisation Shrinkage of "Low-shrinkage" Composite Resins. 81st General Session of the International

Association for Dental Research, 25th -28th June 2003, Goteborg, Sweden.

Soh, J. and M.T. Chew

Comparative Assessment of Facial Profile Aesthetics by Professionals, Dental Students and Laypersons.

103rd Annual Session American Association of Orthodontists, 2nd - 6th May 2003, Hawaiian Islands, USA.

Tan, K.S., K.P. Song and G.H.L. Ong Transcript Analysis of the Leukotoxin Operon in Highly and Minimally Leukotoxic Strains of Actinobacillus Actinomycetemcomitans.

81st General Session and Exhibition of the International Association for Dental Research, 25th - 28th June 2003, Goteborg, Sweden.

Veerappan, G. and C.S. Hsu The Effects of CO₂ Laser Irradiation on Enamel Demineralisation: An In-vitro Study.

7th National University of Singapore-National University Hospital Annual Scientific Meeting - New Frontiers in Medicine, 2nd - 3rd October 2003, National University of Singapore, Singapore.

CONFERENCE PAPERS

Calendar Year 2003

Wattanapayungkul, P., A.U.J. Yap and S.M. Chung

Influence of Curing Lights on Composite Resistance to Chemical Degradation Byfood-simulating Liquids.

81st General Session of the International Association for Dental Research, 25th -28th June 2003, Goteborg, Sweden.

Yang, M., S.H. Ong and K.W.C. Foong Three-dimensional Craniofacial Landmark Detection.

World Congress 2003 on Medical Physics and Biomedical Engineering, 24th - 29th August 2003, Sydney, Australia.

Yang, M., S.H. Ong and K.W.C. Foong Computer-based Detection of Craniofacial Landmarks.

7th National University of Singapore-National University Hospital Annual Scientific Meeting, 2nd - 3rd October 2003, National University of Singapore, Singapore.

Yap, A.U.J.

An Introduction to TMD: The Biopsychosocial Approach.

1st Malaysian Orofacial Disease Study Group - University of Malaya Meeting, 19th - 20th April 2003, Kuala Lumpur, Malaysia.

Yap, A.U.J. Diagnostic Criteria and Clinical Examination for TMD.

1st Malaysian Orofacial Disease Study Group - University of Malaya Meeting, 19th - 20th April 2003, Kuala Lumpur, Malaysia.

Yap, A.U.J. Management of TMD

1st Malaysian Orofacial Disease Study Group - University of Malaya Meeting, 19th - 20th April 2003, Kuala Lumpur, Malaysia.

Yap, A.U.J. TMD for the General Dental Practitioner.

Singapore Dental Association Convention 2003, 12th - 13th April 2003, Singapore.

Yap, A.U.J.

Understanding and Enjoying Research.

South Zone Science and Technology Centre STaR (Science Training and Research) Symposium 2003, 8th January 2003, Singapore.

Yap, A.U.J., E K Chua and K.B.C. Tan Depression and Somatisation: Influence on Self-report of Pain and Disability.

81st General Session of the International Association for Dental Research, 25th -28th June 2003, Goteborg, Sweden.

Yap, A.U.J., K.B.C. Tan and E.K. Chua Association between Depression and Somatisation in TMD Patients.

81st General Session of the International Association for Dental Research, 25th -28th June 2003, Goteborg, Sweden.

Yap, A.U.J., PBL and EBM Synergy The Future Approach to Teaching the Practice of Dentistry?

1st Asia-Pacific Evidence-Based Medicine Workshop and Conference, 22nd - 25th January 2003, Singapore.

Yeo, J.F. and W.Y. Ong

Cannabinoid Receptor Expression in Rat Brainstem After Facial Carrageenan Injections.

81st General Session and Exhibition of the International Association for Dental Research, 25th - 28th June 2003, Goteborg, Sweden.

Yeo, J.F.

Applying Evidence-based Medicine in the Dental Practice.

PITEKGI Moestopo 2003 (Science & Technology Meeting in Dentistry), 26th -28th June 2003, Jakarta, Indonesia.

Yeo, J.F. The Evidence Base of Dental Implantology.

19th International Symposium of Asian Oral Implant Academy, 11th - 13th December 2003, Jakarta, Indonesia.

Zhao, B., S.H. Ong and K.W.C. Foong Registration of 2D Cephalograms to 3D Facial Shape.

7th National University of Singapore-National University Hospital Annual Scientific Meeting, 2nd - 3rd October 2003, National University of Singapore, Singapore.

Zou, X.H., K.W.C. Foong, G.W.C. Yip, T. Cao, B.H. Bay and H.W. Ouyang Expression and Functionality of Heparan Sulfate on Soft Palatal Wound Healing.

1st - 5th September 2003, Stuttgart, Germany.

Zou, X.H., K.W.C. Foong, G.W.C. Yip, T. Cao, B.H. Bay and H.W. Ouyang Expression and Function of Chondroitin Sulfate on Palatal Wound Healing.

2nd National Healthcare Group Annual Scientific Congress, 4th - 5th October 2003.

Zou, X.H., K.W.C. Foong, G.W.C. Yip, T. Cao, B.H. Bay and H.W. Ouyang The Effect of Heparan Sulfate and Chondroitin Sulfate on Palatal Fibroblast Activities.

18th International Association for Dental Research (South-East Asian Division) Annual Scientific Meeting, 25th - 27th September 2003, Ho Chi Minh City, Vietnam.

Academic Year 2003 - 2004

Graduate Residents in MDS Programmes

Endodontics

Year 3 Dr Goh Kwee Chien, Benny The Early Expression Profile of Platelet Derived Growth Factor in a Tooth Replantation Model

Supervised by Dr Varawan Sae-Lim

Dr Maria Cristina F. Morales

The Expression of Insulin-like Growth Factor-1 in Periodontal Healing of Replanted Teeth

Supervised by Dr Varawan Sae-Lim

Year 2 Dr Ang Ee Choon. Richard

Analysis of VEGF Expression in Immediate and Delayed Replanted Teeth

Supervised by Dr Varawan Sae-Lim

Dr Kuah Hong Guan The Effects of Chelating Agents on

Smear Layer Removal With and Without Ultrasonics at the Apical 1/3 of the Root Canal: A SEM Study

Supervised by Dr Patrick Tseng

Dr Lee Chee Wee PDLF/Tooth Co-culture

Supervised by Dr Varawan Sae-Lim

Prosthodontics

Year 3 Dr Lee Kong Fei, Frank Critical Bending Moment of Four Fixture-Abutment Interface Designs

Supervised by Assoc Prof Keson Tan Prof Jack Nicholls

Dr Ng Hsu Ching, Lynette Fatigue Loading of Selected Post and Core Systems

Supervised by Prof Chew Chong Lin

Dr Quek Heng Chuan Load Fatigue Performance of Four Fixture-abutments Interface Designs

Supervised by Assoc Prof Keson Tan Prof Jack Nicholls

Dr Uy Joanne Ngo Load Fatigue Performance of Full Gold Crowns Cemented with Resin Cements

Supervised by Assoc Prof Jennifer Neo Assoc Prof Keson Tan

Year 2 Dr Leong Woei Jian, Elvin The Effect of Tooth Preparation Height and Taper on the Resistance Form

Supervised by Assoc Prof Keson Tan Dr Chua Ee Kiam Dr Wong Keng Mun

Dr Mirza Rustum Baig

Evaluation of Marginal Fit of Cerec 3 OR Other Contemporary CAD/CAM All Ceramic Full Coverage Crowns

Supervised by Assoc Prof Keson Tan

Oral and Maxillofacial Surgery

Year 3 Dr Hur Wei Tieng Patched Mutation Detection in Archival Paraffin Embedded Specimens

Supervised by Assoc Prof Yeo Jin Fei Assoc Prof Raymond Peck Dr Winston Tan

Dr Tan Ben Poon, Danny A Retrospective Study to Determine The Clinical Usefulness of The Osstell System In Predicting Implant Treatment Outcome

Supervised by Assoc Prof Yeo Jin Fei

Assoc Prof Raymond Peck Dr Winston Tan Kwong Shen

Dr Yong Loong Tee A Quantitative Study of VEGF Expression in Membranous and Endochondral Bone Grafts

Supervised by Assoc Prof Yeo Jin Fei Assoc Prof Raymond Peck Dr Goh Bee Tin

Year 2 Dr Lai Juen Bin The Effects of Locally Injected Steroid on Palatal Wound Healing

Supervised by Dr Goh Bee Tin

Dr Ng Chee Hon Requirement of Cox-2 Inhibitor and

Surgical Difficulty of Wisdom Teeth Operation

Supervised by Dr Myra Elliott Assoc Prof Yeo Jin Fei

Academic Year 2003 - 2004

Graduate Residents in MDS Programmes

Dr Seah Tian Ee

Effects of Chemical Injury on the Inferior Alveolar Nerve of the Rat

Supervised by **Dr Andrew Tay**

Year 1 Chew Shen Hui, Bertrand

A Double Blind, Randomized, Clinical Trial to Compare the Efficacy of an Alcohol-based Mouthwash, Peridex with an Alcohol-free Mouthwash, Trihexid, on Dental Plaque Accumulation, Gingival Health, and Healing After Wisdom Tooth Surgery

Supervised by Assoc Prof Yeo Jin Fei Dr Sylvia Tay

Dr Deepthy A Nair Neurosensory Disturbance Following Orthognathic Surgery - A Clinical Audit

Supervised by Assoc Prof Yeo Jin Fei

Orthodontics

Year 3 Dr Lim Janee Bone Regeneration Using VEGF with VICRYL as Scaffold

Supervised by Dr Chay Siew Han Dr Cao Tong

Dr Lo Tong Soon Bone Regeneration Using VEGF with PCL as Scaffold

Supervised by Dr Chay Siew Han Dr Cao Tong

Dr Salikin Zulfikri

A Non-contact Surface Laser Scanner -A 3D Validation Study

Supervised by Assoc Prof Kelvin Foong

Dr Vic-Pearly Wong 3D Analysis of Mandibular Asymmetry

Supervised by Assoc Prof Kelvin Foong

Year 2 Dr Mok Tong Bee A Cephalometric Study of Cranial Bases in Chinese Adults

Supervised by Dr Mimi Yow Dr Chew Ming Tak

Dr Poon Kee Hoon Evaluate the Effectiveness of Mandibular Advancement Device on Chinese Patients with Obstructive Sleep Apnoea

Supervised by Dr Chay Siew Han

Dr Woo Mei Yee 3D Assessment of Facial Expression (Posed Smile).

Supervised by Assoc Prof Kelvin Foong

Year 1 Dr Oh Sin Yin Geraldine 3D Analysis of Palatal and Arch Form Changes Associated with Orthodontic Treatment

Supervised by Dr Soh Jen Assoc Prof Ong Sim Heng

Dr Poon Kee Hwang

Cephalometric Dimensions of the Width of the Anterior Alveolus in Chinese

Supervised by Assoc Prof Kelvin Foong

Dr Tang Sin Yee Anna

3D Analysis of Orthodontic Tooth Movement with First and Second Premolar Extractions

Supervised by Assoc Prof Kelvin Foong

Periodontics

Year 2

Dr Khurram Ataullah Effect of Non-surgical Periodontal Therapy on High Sensitive CRP in Patients with Diabetes

Supervised by Assoc Prof Lim Lum Pen

Dr Tan Wah Ching

Effects of Simple Periodontal Therapy on Periodontal Disease and Glycaemic Control in Patients with Diabetes

Supervised by Assoc Prof Lim Lum Peng

Year 1 Dr Chee Hoe Kit Longitudinal Evaluation of Periodontal Healing Response in Patients with Diabetes

Supervised by Assoc Prof Lim Lum Peng

Dr Tan Ching Ching Periodontal Research in Patients with Diabetes

Supervised by Assoc Prof Lim Lum Peng

Academic Year 2003 - 2004

PhD and MSc Candidates

PhD

Assoc Prof Kelvin Foong

Early Palatal Shape Changes in Complete Unilateral Cleft Lip and Palate Following Primary Lip Surgery

Supervised by Prof Andrew Sandham

Dr Hla Myint Htoon Oral Health Promotion Programme for Diabetics in Singapore

Supervised by Assoc Prof Lim Lum Peng

Dr Khoo Suan Phaik Racial Differences in Clinical TMD Subtypes, Psychological Distress and Psychosocial Dysfunction in an Urban Malaysian TMD Population

Supervised by Assoc Prof Adrian Yap Dr Chan Yiong Huak

Dr Li Zhimei Optimisation for PDLF/AO Double Construct

Supervised by Assoc Prof Lim Tit Meng Dr Varawan Sae-Lim Dr Dietmar W. Hutmacher

Dr Wang Xiaoyan Environmental Effects on the Physico-Mechanical Properties of Glass Ionomer Cements

Supervised by Assoc Prof Adrian Yap Dr Zou XiaoHui Proteoglycans and Palatal Wound Healing

Supervised by Assoc Prof Kelvin Foong Dr Cao Tong Dr George Yip

Mr Chung Sew Meng Development of Micro-mechanics Strategies for Characterisation of Dental Composites

Supervised by Assoc Prof Adrian Yap Assoc Prof Tsai Kuo Tsing Dr Lim Chwee Teck

Ms Gao Xiaoli Laser Application on Caries Prevention

Supervised by Assoc Prof Stephen Hsu

Mr Saji George Advanced Non-invasive Light Therapy to Eradicate Bacterial Flora in Dentine

Supervised by Dr Anil Kishen

Ms Soh Mui Siang Synthesis and Characterisation of 'Nonshrinking' Nanocomposites for Dental Applications

Supervised by Assoc Prof Adrian Yap Dr Alan Sellinger

Dr Sum Chee Peng Structural and Functional Characterisation of Dentine for Endodontic Retreatment

Supervised by Dr Anil Kishen

MSc

Dr Abhiram Maddi The Effect of PRP on Osteointegration of Dental Implant

Supervised by Assoc Prof Ho Kee Hai

Dr Deng Bin Finite Element Analysis of Angulated Implant Systems

Supervised by Assoc Prof Keson Tan Assoc Prof Liu Gui Rong

Dr Edelmiro De Hoyos Gonzalez Long-term Caries Inhibitory Effects of Fluoride Releasing Tooth-coloured Restorative Materials

Supervised by Assoc Prof Adrian Yap Assoc Prof Stephen Hsu

Dr Faisal Moeen Effect of Varying Height and Taper on

the Fatigue Performance of Fullcoverage Tescera ATL Ceromer Crowns

Supervised by Assoc Prof Jennifer Neo

Dr Intekhab Islam Marginal Adaptation of Retrograde Filling Materials

Supervised by Dr Chng Hui Kheng Assoc Prof Adrian Yap

Dr Joseph Antoniraj Jude Aarthi Genetic Profile of Regenerated Periodontal Tissue

Supervised by Dr Varawan Sae-Lim Dr George Yip

Academic Year 2003 - 2004

PhD and MSc Candidates

Dr Kalaiselvi Kuppusamy

Expression of Basic Fibroblast Growth Factor During Periodontal Healing of Replanted Dog's Teeth

Supervised by Dr Varawan Sae-Lim

Dr Li Zhimei Pulp Responses to Acidic Fibroblast Growth Factor in Monkey

Supervised by Dr Varawan Sae-Lim

Dr Liu Hua Allogenic Immunoreaction of Mesenchymal Stem Cell and Its Differentiated Osteogenic Lineage

Supervised by Dr Cao Tong

Dr Meenakshi Ultra Structural Changes in Arulsed Periperal Nerves Involved in Trigeminal Neuralgia

Supervised by Prof Loh Hong Sai Assoc Prof Yeo Jin Fei

Dr Nyi Lay Maung Characterisation of Enamel Diffusion Modulated by Er:YAG Laser

Supervised by Assoc Prof Stephen Hsu

Dr Shi Zheng

3D Osteogenesis Using Stem Cells and Absorbable Scaffolds

Supervised by Dr Cao Tong

Dr Swaminathan Sethu Influence of Underlying Substrate Color on the Esthetics of All-ceramic Crown Restorations

Supervised by Dr Pranee Wattanapayungkul Dr Loh Poey Ling

Dr Veerappan Girija Characterisation of Organic Matrix in Lased Enamel

Supervised by Assoc Prof Stephen Hsu

Dr Wajiha Habib Zuberi Oral Facial Pain

Supervised by Assoc Prof Yeo Jin Fei

Ms Bina Rai Effect of Growth Factors on Bone Regeration on 3D PCL-TCP Scaffolds

Supervised by Assoc Prof Ho Kee Hai Prof Teoh Swee Hin

Ms Saw Tzuen Yih

Comparison Between Tooth Slice Organ Culture and Established Cell Line Culture Models for Cytotoxicity of Dental Materials

Supervised by Dr Cao Tong Assoc Prof Ng Mah Lee, Mary Assoc Prof Adrian Yap

Ms Soh Mui Siang Composite Cure and Post-gel Shrinkage with Different (Halogen and LED) Curing Lights

Supervised by Assoc Prof Adrian Yap Assoc Prof Siow Kok Siong

Mr Toh Wei Seong Stimulations and Modulations of Osteogenic Differentiation from Human Embryonic Stem Cells

Supervised by Dr Cao Tong

Ms Wu Xiaowa Physical Enhancement of Glass Ionomer Cements

Supervised by Assoc Prof Adrian Yap Dr Zeng Kai Yang

Mr Ye Chaopeng Characterisation of Osteogenic Cells Differentiated from Human Embryonic Stem Cells

Supervised by Dr Cao Tong

UNDERGRADUATE RESEARCH OPPORTUNITIES PROGRAMME

Academic Year 2003 - 2004

Effects of Surface Treatment and Materials on Class II Open Sandwich Technique.

Low Gim Hong Peh Gek Chuan Seetoh Yoong Liang Tan Cheng Boon, Alvin

Supervised by: Dr Pranee Watanapayungkul Assoc Prof Adrian Yap

Repair Strength of Provisional Materials.

Chew Madeline (Ms) Chin Shou King Goh May Yee, Maryelle (Ms) Koh Chee Keong, Ivan

Supervised by: Dr Loh Poey Ling Assoc Prof Adrian Yap

Effect of Food Stimulating Liquids on Tooth-coloured Restorative Materials.

Ashraf Ali Lim Yow Long Yang Terh Yiau

Supervised by: Assoc Prof Adrian Yap Mr Chung Sew Meng

In Situ Evaluation of Laser Effect on the Prevention of Enamel Demineralisation Using an Intra-oral Model.

Ng Yuk Ching (Ms) Selvajothi d/o Veerasamy (Ms) Sng Hong Cheong, Jeffrey Wee Chun Kheng, Eugene Zheng Hongyan, Cecilia (Ms)

Supervised by: Assoc Prof Stephen Hsu Assoc Prof Keng Siong Beng

Surface Roughness of Conventional, Resin-modified and Highly Viscous Glass Ionomer Cements After Prophylaxis.

Sandra Chelvan (Ms) Tan Sok Fun, Edelweis (Ms) Wu Shiling, Serene (Ms)

Supervised by: Assoc Prof Adrian Yap

The Effects of Glyde File Prep™ on Radicular Dentine Microhardness.

Chan Feng Yi (Ms) Lee Swee Keow, Pauline (Ms) Mak Kean Voon Ng Cher Hui, Mervyn

Supervised by: Dr Varawan Sae-Lim Dr Chng Hui Kheng

Bond Strength of Post and Resin Core.

Almad Bin Hassan Chia Su Wei (Ms) Fu Jia Hui (Ms) Nandabalan Panneerselvam

Supervised by: Dr Loh Poey Ling

The Effect of Food Simulants on the Bond Strength of Orthodontic Bracket Using Resin Modified Glass Ionomer Cements.

Lim Sze Kheng Low Hwee Hiang (Ms) Tong Huei Jinn (Ms) Wong Liping, Florence (Ms)

Supervised by: Dr Chay Siew Han Assoc Prof Adrian Yap

Alternative Therapy for Oral Lichen Planus - Herbal Therapy.

Chan Sing Yin (Ms) Tan Chor Yew, Allan Tho Loo Yee (Ms) Wang Meiying (Ms)

Supervised by: Assoc Prof Yeo Jin Fei



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