



UNIVERSITY OF OTAGO
FACULTY OF DENTISTRY
SIR JOHN WALSH
RESEARCH INSTITUTE
TE POKAPŪ RAKAHAU O TĀ JOHN WALSH

Research Day

Thursday 2 August 2012
Hutton Theatre
Otago Museum

Programme and Abstracts

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Programme and Abstracts

Keynote Speakers



Professor Deborah Greenspan

LDSRCSEng, BDS, DSc(Med), ScD(hc), FDSRCSEd(Hon), DSc(hc), DDS(hc)

Listed in Who's Who in America and the Dictionary of International Biography, Professor Deborah Greenspan is known as one of the world's leading investigators and clinicians in oral infectious diseases.

She is an international leader in oral science and has spoken extensively on oral cancer; oral candidiasis, AIDS, the oral manifestations of HIV infection and infection control and has given many radio, television and print media interviews.

Currently she is the Professor of Oral Medicine, the Leland A. and Gladys K. Barber Distinguished Professor in Dentistry and Chair, Department of Orofacial Sciences, School of Dentistry, University of California, San Francisco, California.



Professor John Greenspan

BSc, BDS, PhD, FRCPath, ScD, FDSRCS (ENG), FKC
University of California, San Francisco (UCSF)

Professor John Greenspan is the Associate Dean for Global Oral Health in the School of Dentistry at UCSF and a leading participant in the UCSF Global Health Sciences Program.

His research interests include the global health aspects of AIDS, with emphasis on work in East Africa and China where UCSF has major collaborations. His own work is rooted in studies of oral aspects of AIDS and the role of viruses in oral epithelial and salivary gland lesions.

He and his colleagues have made major contributions to HIV research and care, notably the discovery of the lesion hairy leukoplakia, its association with EBV, and the significance of this and other oral lesions in the natural history of HIV diseases.

Student Guest Speaker

Mr Steve Ting

Teaching Fellow, The Centre for Science Communication, University of Otago, Dunedin, New Zealand

Born and raised in the cosmopolitan metropolis known as Hamilton, Steve Ting is a former marine biologist who has traded in his wetsuit and ruler for a camera and tripod. Now a passionate science communicator he has explored various different mediums of science communication, from photography to video and even a live stage show featuring chemists. Now teaching at the Centre for Science Communication, Steve spends his free time trying to spread the importance of telling a good story

Student Presenters

Hannah Jack	Effect of incremental lip advancement on intraoral pressure
Kai Chun Li	Effect of multiple autoclaving cycles on the adhesion energy between yttria-stabilized zirconia veneered with porcelain
Cameron McNe	An electromyographic insight into the behaviour of neck and shoulder muscles of orthodontists in their natural working and non-working environments
LeanneXioa Li Hou	Oral yeast carriage and saliva protein patterns of xerostomia subjects and matched controls
Allauddin Siddiqi	A comparison of trabecular bone micro-architecture in the median palate and maxillary premolar alveolar sites of edentulous elderly cadavers: a radiomorphometric study
Sobia Zafar	Effects of bisphosphonate on angiogenic gene expression in human gingival fibroblasts
Ali Ukra	Relationship between TMJ clicking, malocclusion, and psychological traits in young adolescents
Reza Shah Mansouri	Qualitative and quantitative effects of 30% hydrogen peroxide on enamel
Latfiya Al-Harathi	The impact of periodontitis on OHRQoL
Praema Suppiah	Oral health characteristics and oral-health-related quality of life in ankylosing spondylitis patients
Langley Tasmania	Contact guidance of endodontic pathogens on micro-grooved polymethylmethacrylate discs
Amy Lee	<i>In vitro</i> investigation of wear behaviour of human enamel opposing lithium disilicate glass ceramic and type gold
Varayini Yoganathan	Effect of the antimicrobial peptide BM2 on <i>Enterococcus faecalis</i> biofilms

Faculty of Dentistry – Sir John Walsh Research Institute

Research Day Programme

Hutton Theatre, Otago Museum, Dunedin, 2 August 2012

- 8.30 Registration: Hutton Theatre Foyer, Otago Museum
- 8.40 Introduction: **Professor Jules Kieser**, Director,
Sir John Walsh Research Institute
- 8.45 Māori Welcome: **Professor John Broughton**, Director,
Ngai Tahu Māori Health Research Unit
- 9.00 Opening Address: **Professor Richard Blaikie**, Deputy
Vice-Chancellor; Research and Enterprise
- 9.15 Dean's Address: **Professor Gregory Seymour**, Dean,
Faculty of Dentistry

Session 1 9.30 – 10.45 Chair: **Professor Richard Cannon**

- 9.30 Keynote Speaker: **Professor Deborah Greenspan**
HIV/AIDS At Thirty Years
- 10.00 Keynote Speaker: **Professor John Greenspan**
Partnering for Global Oral Health
- 10.30 Student Guest Speaker: **Steve Ting**
Science and Storytelling: How I gave up on tape measures
and picked up a camera
- 10.45-11.30 Morning Tea: Refreshments in the Shared Spaces Gallery with our
sponsor 3M's representative and display

Session 2 11.30 – 1.00 Chair: **Mr J. Neil Waddell**

- 11.30 3M presentation from **Mr Stephen Langdon**, 3M Scientific Affairs
Manager; Australia
- 12.00 **Hannah Jack**
Effect of incremental lip advancement on intraoral pressure
- 12.15 **Kai Chun Li**
Effect of multiple autoclaving cycles on the adhesion energy between
yttria-stabilized zirconia veneered with porcelain
- 12.30 **Cameron McNea**
An electromyographic insight into the behaviour of neck and shoulder
muscles of orthodontists in their natural working and non-working
environments
- 12.45 **LeanneXioa Li Hou**
Oral yeast carriage and saliva protein patterns of xerostomia subjects
and matched controls

1.00-2.00 Lunch: To be held in the Shared Spaces Gallery with our sponsor 3M's representative & display

Session 3 2.00 – 4.15 Chair: Professor W. Murray Thomson

- 2.00 **Allauddin Siddiqi**
A comparison of trabecular bone micro-architecture in the median palate and maxillary premolar alveolar sites of edentulous elderly cadavers: a radiomorphometric study
- 2.15 **Sobia Zafar**
Effects of bisphosphonate on angiogenic gene expression in human gingival fibroblasts
- 2.30 **Ali Ukra**
Relationship between TMJ clicking, malocclusion, and psychological traits in young adolescents
- 2.45 **Reza Shah Mansouri**
Qualitative and quantitative effects of 30% hydrogen peroxide on enamel
- 3.00 **Latfiya Al-Harathi**
The impact of periodontitis on OHRQoL
- 3.15 **Praema Suppiah**
Oral health characteristics and oral-health-related quality of life in ankylosing spondylitis patients
- 3.30 **Langley Tasmania**
Contact guidance of endodontic pathogens on micro-grooved polymethylmethacrylate discs
- 3.45 **Amy Lee**
In vitro investigation of wear behaviour of human enamel opposing lithium disilicate glass ceramic and type III gold
- 4.00 **Varayini Yoganathan**
Effect of the antimicrobial peptide BM2 on *Enterococcus faecalis* biofilms
- 4.15-5.00 **Closing remarks from Professor Jules Kieser, Director, Sir John Walsh Research Institute**

Announcement of the Best Student Presenter, awarded by Emeritus Professor Malcolm McMillan, Mr Hugh Trengrove and Dr Julitha Molepo

Drinks in the Shared Spaces Gallery

HIV/AIDS At Thirty Years

D Greenspan

Professor of Oral Medicine, the Leland A. and Gladys K. Barber Distinguished Professor in Dentistry and Chair, Department of Orofacial Sciences, School of Dentistry, University of California, San Francisco, California, United States of America

In the 30 years of HIV/AIDS pandemic, hopes have never been higher; nor needs greater. Basic science studies, insights into prevention approaches and the political will to act are coming together so that control is beginning to be considered possible. Throughout the decades of HIV/AIDS, the oral and related aspects, the roles of oral/craniofacial science and of dental health care workers have been important and will continue to be so. What is the current status of these topics and where might future developments take the field?

Partnering for Global Oral Health

J Greenspan

Associate Dean for Global Oral Health, School of Dentistry, University of California, San Francisco, California, United States of America

Aim: To work towards bridging the gap between those well equipped to prevent, diagnose and treat oral diseases and those who are not, either domestically or globally.

Methods: A discussion of the multiple approaches we are using to build our program in Global Oral Health, based significantly on partnerships at the local, state-wide, national and international levels.

Science and Storytelling: How I gave up on tape measures and picked up a camera

S Ting

Teaching Fellow, Centre of Science Communication, University of Otago, Dunedin, New Zealand

When people reminisce of their past they use stories. When they talk of their present they use stories and when people foretell their future they use stories. Storytelling is the fundamental key to effective communication and now in a world that seems to have turned its back to rationality and embraced denialism, scientists need now, more than anything, to understand the power of spinning a yarn.

In this brief story I'll use my knowledge and background in documentary filmmaking to introduce you all to the fundamentals of creative storytelling and try to convince you that sometimes it's ok not to be such a scientist when what is called for is a science storyteller.

Effect of incremental lip advancement on intraoral pressure

H Jack*, J Kieser, M Farella

Sir John Walsh Research Institute, Faculty of Dentistry, University of Otago, Dunedin, New Zealand

Aim: During orthodontic treatment, the teeth are often displaced towards the perioral soft tissues. This may affect the equilibrium of forces acting on teeth with possible implications for long-term stability. The aim of this study was to investigate the effect of incremental advancements of the lower lip on lip and tongue pressures.

Methods: Intraoral lip and tongue pressures were measured using four miniature pressure sensors in eight participants (2 males, 6 females; 20-39 years). Custom-made acrylic trays for the lower arch were used, with sensors located adjacent to the midline and left canine. The lower lip was advanced incrementally by inserting trays with different labial thickness (0.5, 2.5 and 4.5mm). Each participant was requested to perform a task paradigm, which included at rest conditions, swallows, and maximum efforts. Data recorded were analysed by means of a mixed linear model.

Results: The baseline resting pressures at the mid- and canine-labial sites were 14.6 and 17.6 g/cm², respectively. With increasing tray thickness, the resting pressures increased significantly ($p < 0.001$) at the mid-labial site, but not at the canine site ($p > 0.05$), with a significant interaction participant \times tray ($p < 0.001$). Incremental lip advancement caused an increase of swallowing peak pressure at the canine-labial site, but did not influence the shape and timing of swallows.

Conclusion: Lip pressure generated at the midline increased as the lower lip is advanced. The pattern of intra-oral pressure changes, however, is highly individual-specific. The adaptation of the soft tissue pressure response needs to be investigated further in future studies.

Effect of multiple autoclaving cycles on the adhesion energy between yttria-stabilized zirconia veneered with porcelain

*KC Li, D Prior, M Swain, J.N Waddell

Sir John Walsh Research Institute, Faculty of Dentistry, University of Otago, Dunedin, New Zealand

Aim: To investigate the effect of multiple autoclaving cycles on the adhesion energy between yttria-stabilized tetragonal zirconia (Y-TZP) veneered with porcelain.

Methods: The strain energy release rate using a stable four-point bending fracture test was evaluated for two different porcelains [leucite containing porcelain (VM9) and glass porcelain (Zirox)] which had been subjected to 1; 5; 10 and 20 autoclave cycles. The specimens were manufactured to a total bi-layer dimension of 30 × 8 × 3 mm. Subsequent scanning electron microscopy/energy dispersive spectrometry (SEM/EDS), electron backscatter diffraction (EBSD) and x-ray diffraction (XRD) analyses were performed to identify the phase transformation and fracture behavior.

Results: The strain energy release rate of the VM9 specimens were higher compared to the Zirox specimens across all test groups. Incrementing autoclave cycles lowered the strain energy release rate significantly for both porcelains tested. SEM analysis showed that the Zirox specimens exhibited more interfacial fracture compared to the VM9 specimens in all cycle groups. XRD analysis confirmed a tetragonal to monoclinic (t-m) phase transformation at the higher autoclave cycles. The monoclinic phase regenerated back to tetragonal phase after undergoing conventional porcelain firing cycles. EBSD data showed significant changes on the grain size distribution between the control and autoclaved specimen.

Conclusion: Incrementing autoclave cycles strongly influenced the adhesion between the bi-layer interfaces. In addition, the conventional porcelain firing schedule was sufficient for complete regeneration of monoclinic to tetragonal-zirconia.

An electromyographic insight into the behaviour of neck and shoulder muscles of orthodontists in their natural working and non-working environments

C McNee*, M Farella, J Kieser

Sir John Walsh Research Institute, Faculty of Dentistry, University of Otago, Dunedin, New Zealand

Aim: Work related musculoskeletal disorders (WRMSDs) are common in dental workers including orthodontists. Aim of this study was to assess the contraction pattern of neck and trunk muscles of orthodontists in terms of intensity and duration during unrestrained conditions occurring in the natural working and non-working environments.

Methods: Electromyographic (EMG) activity of right sternocleidomastoid and trapezius muscle was recorded by means of portable recorders in eight postgraduate orthodontic students (5 males, 3 females; 27-39 years) during working conditions, and both active and resting non-working conditions. Recordings were analysed in terms of contraction episode (CE) count, amplitude and duration.

Results: The sternocleidomastoid and trapezius muscles contract about 40-60 times per hour in the natural environment. Their EMG activity pattern mainly consists of short-lasting, low-amplitude contraction episodes. For both muscles investigated, the median duration of CEs ranged from 4.6 to 11.8 seconds. The amplitude of the large majority (95%) of CEs was less than 25% of maximum voluntary activity. There were no significant differences ($p > 0.05$) in overall counts, or intensity of contraction episodes across the three experimental conditions. There were strongly significant ($p < 0.001$) differences in duration of contraction episodes across experimental conditions, with two to threefold increases in average duration of contraction of the trapezius muscle found in the vocational setting.

Conclusion: During orthodontic work, operators commonly hold muscular contractions for significantly longer periods than are encountered in non-vocational settings. This behaviour may be associated causally with the increases seen in WRMSDs through proposed pathophysiological mechanisms occurring at the motor unit level.

Oral yeast carriage and saliva protein patterns of xerostomia subjects and matched controls

L Li Hou*, A Holmes, A Nolan, K Lyons, R Cannon

Sir John Walsh Research Institute, Faculty of Dentistry, University of Otago, Dunedin, New Zealand

Aims: To investigate if there is a significant association between increased oral colonisation by yeast species, such as *Candida albicans*, and a sensation of dry mouth, and if there is a difference in the saliva proteins detected in xerostomia subjects from those in age- and gender-matched controls.

Methods: This was a cross-sectional study (ethical approval: LRS/10/09/034) in which oral yeast carriage and saliva proteins were investigated in saliva wash samples. Mouth rinses (10 ml bottled water for 30 s) were obtained from 20 individuals attending an Oral Medicine clinic; inclusion criteria included self-reported dry mouth. Samples were also obtained from 20 age- and gender-matched controls. Yeast numbers and species were identified using the chromogenic agar CHROMagar *Candida*. Saliva samples were subjected to SDS-PAGE. Salivary proteins were visualised with both EZblue and silver stain, and provisionally identified by calibrated visual detection and the Gel Doc EZ gel analysis system.

Results: The prevalence of yeasts in saliva samples from individuals reporting a dry mouth was significantly greater ($p < 0.05$) than in control samples, with both a greater number of yeast species and more yeast cells in the patient saliva samples. There was, however, no significant difference in the salivary proteins detected in the two groups.

Conclusion: Within the limitations of this project, we conclude that patients with xerostomia may be more susceptible to oral yeast infections, but that there is no significant difference in the salivary proteins between xerostomia patients and healthy controls. This project was supported by a Fuller scholarship.

A comparison of trabecular bone micro-architecture in the median palate and maxillary premolar alveolar sites of edentulous elderly cadavers: a radiomorphometric study

A Siddiqi*, W Duncan, J Kieser, R Kumara De Silva

Sir John Walsh Research Institute, Faculty of Dentistry, University of Otago, Dunedin, New Zealand

Loss of teeth leads to irreversible atrophy of the alveolar bone, the rate of which varies between individuals and jaws. Alveolar ridge atrophy limits the oral rehabilitation of edentulous patients and thus poses a clinical challenge to prosthodontists and implant surgeons.

Aim: The present research aimed to investigate whether the median-palate of elderly edentulous subjects is anatomically suitable for implant placement.

Methods: A total of 32 samples were harvested from the maxillae of 16 human cadavers. Bone quality and quantity were analysed at two regions; the median-palate and the edentulous maxillary alveolar ridge. The cadaveric samples were scanned through micro-CT and the region of analysis (ROA) identified and dissected. Bone volume to tissue volume ratio (%BV/TV), trabecular thickness (Tb.Th), trabecular separation (Tb.Sp), and trabecular number (Tb.N) were evaluated for the two regions using Skyscan CTAn®.

Results: The %BV/TV and Tb.N of the median-palatal region showed higher values than the respective premolar sites in 11 of 15 (73%) and 9 of 15 samples (60%) of edentulous samples respectively. On the other hand, trabecular thickness for 11 of 15 (73%) premolar samples showed greater thickness compared to the median-palatal region. While the data suggested that the median-palatal region had denser bone than the premolar site, this difference was statistically non-significant.

Conclusion: The results indicate that the anterior median-palate is structurally better than their respective maxillary premolar region in elderly edentulous persons and an implant can be placed to anchor an overdenture.

Effects of bisphosphonate on angiogenic gene expression in human gingival fibroblasts

S Zafar*, D Coates, G Seymour, B Drummond, T Milne, M Cullinan

Sir John Walsh Research Institute, Faculty of Dentistry, University of Otago, Dunedin, New Zealand

The mechanisms underlying bisphosphonate related osteonecrosis of the jaw (BRONJ) are poorly understood. Current concepts in BRONJ pathogenesis include inhibition of bone remodeling, effects on soft tissues and anti-angiogenic effects. Data on the effect of bisphosphonates on angiogenic gene expression in human gingival fibroblasts (HGFs) are lacking.

Aim: This study aimed to determine the effect of the bisphosphonate, zoledronic acid (ZA), on five angiogenic HGF genes.

Methods: Primary cell lines of HGFs (n=5) were cultured from gingival tissue excised during gingivectomy/crown-lengthening surgeries. The HGFs were cultured with and without 30µM ZA for 24, 48, 72 and 96 h and cells were collected. A trizol-based extraction method was used to isolate total RNA. The RNA was further purified on a silica-based spin column. Complementary DNA was synthesized from the RNA with the reverse transcriptase MultiScribe™ MuLV and qRT-PCR gene expression assays for vascular endothelial growth factor A (VEGFA), bone morphogenic protein 2 (BMP2), Ras homolog gene family member B (RHOB), epiregulin (EREG) and interferon-alpha (IFNA1) were run.

Results: ZA caused significant up regulation of VEGFA ($p < 0.05$, Fold Induction $> \pm 2$) and RHOB mRNA at 24, 48 and 72 h post treatment, BMP2 at 48 and 72 h, and EREG at 48, 72 and 96 h post treatment. No effect was observed on IFNA1 gene expression levels at any time point.

Conclusion: The results suggest that ZA has the potential to alter angiogenic expression in HGFs. Further research is required to establish whether these effects contribute to the development of BRONJ.

Relationship between TMJ clicking, malocclusion, and psychological traits in young adolescents.

A Ukra*, M Farella, W.M Thomson, R.G Knight

Sir John Walsh Research Institute, Faculty of Dentistry, University of Otago, Dunedin, New Zealand

Aim: Many orthodontic patients report temporomandibular joint (TMJ) sounds before, during or after treatment, but the role of occlusal factors is controversial, however. We hypothesised that self-reports of TMJ clicking are positively associated with psychological traits, but not with malocclusion severity.

Methods: A cross-sectional study was carried out in 353 young adolescents (48.4% female) who were recruited from five schools and from an University Orthodontic Clinic. Each participant completed a self-administered questionnaire and underwent a clinical examination. Assessments included somatization scores, body image dissatisfaction scores, the source of motivation for orthodontic treatment and malocclusion severity. Statistical analysis included analysis of variance, chi-square tests and logistic regression.

Results: TMJ clicking was self-reported by 18.9% (95% CI = 14.9-23.1%) of the sample. TMJ clicking was associated with higher somatization as well as with body image dissatisfaction ($p < 0.001$). TMJ clicks were more common in adolescents with mild or no malocclusion (31.1% with clicks) than in those with a moderate (17.6%) or handicapping malocclusion (12.1%; $p = 0.018$). Relative to patients sent by their parents, adolescents who were self-motivated to seek orthodontic treatment showed higher scores for somatization and body image dissatisfaction ($p < 0.001$), and tended to report TMJ clicking more often (26.3% vs. 7.7%; $p = 0.41$). No significant association was found between malocclusion severity, somatization scores, and body image dissatisfaction.

Conclusion: Self-reports of TMJ clicking are significantly associated with psychological factors. Adolescents keener to have braces show increased somatization, body image dissatisfaction, and a tendency to report more often TMJ clicking.

Qualitative and quantitative effects of 30% hydrogen peroxide on enamel

R ShahMansouri*, M Swain, B Monk, K Lyons, R Farah, C He

Sir John Walsh Research Institute, Faculty of Dentistry, University of Otago, Dunedin, New Zealand

Aim: Assess the effect of 30% hydrogen peroxide on the nanomechanical properties and protein content of enamel.

Methods: The effect of bleaching for 30 minutes on the mechanical properties and protein content of enamel was investigated. Enamel hardness and elastic modulus was measured using nanoindentation testing before and after bleaching, and the amount of protein was quantified using the Lowry, the Bicinchoninic acid and the Bradford protein assays following protein extraction by precipitation with trichloroacetic acid.

Results: The elastic modulus of enamel before and after bleaching was $101.00 \text{ GPa} \pm 11.18$ and $102.00 \text{ GPa} \pm 9.87$ respectively, and enamel hardness was $4.09 \text{ GPa} \pm 0.28$ and $4.25 \text{ GPa} \pm 0.32$. The microhardness tests showed no statistically significant difference following exposure to the bleaching agent. The amount of protein detected using the Lowry, the Bicinchoninic acid and the Bradford assays was $50.56 \mu\text{g} \pm 0.06$, $33.04 \mu\text{g} \pm 0.02$ and $3.08 \mu\text{g} \pm 0.01$ respectively. After surface treating the enamel with 30% hydrogen peroxide, the mean protein values using the same three protein assays were $9.2 \mu\text{g} \pm 0.04$, $2 \mu\text{g} \pm 0.02$ and $1.2 \mu\text{g} \pm 0.004$ respectively. These results indicate that bleaching treatment with 30% hydrogen peroxide resulted in a significant reduction in protein content.

Conclusion: Bleaching with 30% hydrogen peroxide for 30 minutes does not affect the microhardness of enamel despite reducing its protein content. Within the limitations of this study, the protein modified or extracted from enamel by bleaching does not appear to affect the mechanical properties of enamel.

The impact of periodontitis on OHRQoL

L Al-Harhi*, W.M Thomson, M Cullinan, J Leichter

Sir John Walsh Research Institute, Faculty of Dentistry, University of Otago, Dunedin, New Zealand

Aim: Despite numerous studies on the prevalence of periodontal diseases in geographically diverse populations, there are currently no data on their prevalence in Oman. The aim of this study was to describe the occurrence of periodontitis in an Omani population, together with its impact on oral-health-related quality of life (OHRQoL).

Method: The sample comprised randomly selected teachers from the Muscat region in Oman. Clinical examination of 315 teachers was undertaken. OHRQoL was measured using the 14-item Arabic version of the Oral Health Impact Profile questionnaire (OHIP-14A).

Results: More than one-third of participants had at least one site with 5+mm clinical attachment loss (CAL), and more than one-quarter had at least one site with 5+mm probing depth (PD). Regression modelling revealed no association between periodontal attachment loss and either the prevalence of OHIP-14A impacts or the mean OHIP-14A score.

Conclusion: The present study indicates that the prevalence of periodontitis in Omani teachers is higher than those reported from industrialised countries such as Australia, New Zealand and the USA. Contrary to the findings of most previous studies, there was no association between periodontitis and OHRQoL.

Oral health characteristics and oral-health-related quality of life in ankylosing spondylitis patients

P Suppiah*, M Cullinan, A Nolan, W.M Thomson, S Stebbings, G Seymour

Sir John Walsh Research Institute, Faculty of Dentistry, University of Otago, Dunedin, New Zealand

Aim: Recent evidence suggests that patients with rheumatoid arthritis have advanced chronic periodontitis. However, few studies have looked at the periodontal status of individuals with ankylosing spondylitis (AS) and some have reported the coexistence of Sjögren's syndrome in association with AS. Hence, the oral health and quality of life could be compromised further in this group. The aim of this study was to compare periodontal disease occurrence, the overall oral health status and the impact of these in AS patients and healthy controls.

Method: A total of 41 AS patients and 49 healthy controls individually matched for age, gender and ethnicity participated in this study. The clinical parameters obtained included probing pocket depth (PPD), clinical attachment loss (CAL), bleeding on probing (BOP), plaque index (PI), oral mucosal conditions, dentition status (DMFT) and salivary flow rate (SFR). The socio-demographic characteristics, medical history and the oral-health-related quality of life (OHIP-14) were assessed through questionnaires.

Results: Patients with AS had a higher prevalence of chronic periodontitis (≥ 2 sites with PD ≥ 4 mm) than healthy controls (83% and 61% respectively, $p < 0.05$). Mean BOP, plaque score, severity of chronic periodontitis and OHIP-14 scores were significantly higher in patients than controls ($p < 0.05$). The other oral health characteristics and the mean SFR were similar in the two groups.

Conclusion: The results of this study suggest that AS patients have a higher prevalence of chronic periodontitis and their oral-health-related quality of life is compromised.

Contact guidance of endodontic pathogens on micro-grooved polymethylmethacrylate discs

L Tasmania*, R Love, R Cannon

Sir John Walsh Research Institute, Faculty of Dentistry, University of Otago, Dunedin, New Zealand

Aim: to observe the colonisation of micro-grooved polymethylmethacrylate discs (PMMA) by endodontic pathogens *Streptococcus mutans* NG8, *Streptococcus gordonii* DL-1, *Enterococcus faecalis* JH2-2 and *Candida albicans* ATCC 110261 for contact guidance/thigmotropic characteristics.

Methods: Micro-grooves of various dimensions (2 μm \times 2 μm \times 2 μm (Width Depth Spacing), 2 μm \times 2 μm \times 4 μm (WDS), 4 μm \times 2 μm \times 2 μm (WDS) for bacteria and 4 μm \times 4 μm \times 2 μm (WDS), 4 μm \times 4 μm \times 4 μm (WDS) for *Candida*) were produced on PMMA to simulate some characteristics of dentinal tubules. Blank discs were used as a control. Discs were incubated with mono-solutions of the tested cells for various time frames (bacteria 1,2,5,7 days; *Candida* 3, 4.5, 6 hours), then washed and prepared for scanning electron microscopy.

Results: All microbes colonised PMMA at all time frames, with 2 days (bacteria) and 3 hours (*Candida*) incubation showing optimal colonisation to observe growth characteristics. A qualitative analysis demonstrated that *C.albicans* hyphae exhibited contact guidance along grooves and edges. In comparison, the bacteria *S. gordonii* and *S. mutans* showed some evidence of chain growth along grooves while *E.faecalis* had no indications of exhibiting contact guidance. When *C.albicans* was incubated on blank PMMA discs the hyphae did not exhibit contact guidance/thigmotropism.

Conclusion: The results suggest that contact guidance may be involved in microbial invasion of dentine.

***In vitro* investigation of wear behaviour of human enamel opposing lithium disilicate glass ceramic and type III gold**

A Lee*, M Swain, C He, K.M Lyons

Sir John Walsh Research Institute, Faculty of Dentistry, University of Otago, Dunedin, New Zealand

This *in vitro* study investigated the effects of heat pressable lithium disilicate glass ceramic (IPS e.max Press) and type III gold on the friction and wear behaviour of human enamel. The friction-wear tests were conducted under two typical wear conditions; two-body (tap-water lubrication) and three-body (food slurry composed of PMMA beads) wear with the selected parameters of 9.8N load, and ~200mm stroke length. The results of this study indicate that the type III gold possess a lower friction coefficient and causes less wear damage on human enamel than does IPS e.max Press. A combination of abrasive and fatigue wear were the main wear mechanisms for the IPS e.max Pres and enamel wear pair, while adhesive wear occurred predominantly for the type III gold and enamel wear pair. This suggests that type III gold would be preferred to IPS e.max Press when considering an option to minimise abrasion and attrition on opposing natural teeth.

Effect of the antimicrobial peptide BM2 on *Enterococcus faecalis* biofilms

Varayini Yoganathan*, R Love, B Monk, J Hale

Sir John Walsh Research Institute, Faculty of Dentistry, University of Otago, Dunedin, New Zealand

Aim: To assess the *in vitro* antimicrobial activity of BM2 peptide against *E. faecalis* biofilms.

Methods: *E. faecalis* biofilms were grown on collagen coated 8-well chamber slides for 72 hours. Following growth the biofilms were subject to 1 hour exposure times to the BM2 peptide 8-64 µg/ml or 0.5-5% sodium hypochlorite (NaOCl). Control biofilms were exposed to phosphate buffered saline. The biofilms were stained with the BacLight LIVE/DEAD stain and examined using confocal laser scanning microscope to characterise the relative biofilm size, structure, and cell viability. Z-stack images were collected from the confocal microscopy and analysed using ImageJ software.

Results: The cell viability of the biofilms was significantly affected following exposure to BM2 and NaOCl. The biofilm thickness and uniformity was also reduced by addition of antimicrobial agents in comparison to the control biofilms.

Conclusion: The results show that the BM2 peptide has antimicrobial activity within a biofilm and supports further investigation as a potential endodontic antimicrobial in the management of *E. faecalis* driven apical periodontitis.

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