Dignity and Quality of Life for a Frail Population
JANUARY 25, 2011

RESEARCH DAY 2011
Advancing oral health through outstanding education, research, and community service.

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Cover Images: Printed with permission.
The ELDERS (Elders’ Link with Dental Education, Research and Service) group at the UBC Faculty of Dentistry has taken a lead role internationally in examining the oral health impact on senior adults. The faculty members who have achieved these new insights will be sharing them with all attendees. In addition, we will hear the voices of dentists who have treated seniors and in some cases become senior citizens themselves. A comparison of the research findings with the personal experiences of these individuals provides a unique format for this Research Day.

I hope you enjoy this program and appreciate that this research is critically important yet quite different in scope and application than the research presented in the first three Research Days. The next 40 years will see amazing changes in the nature of oral healthcare as a considerable portion of the population reaches an advanced age. The UBC Faculty of Dentistry is a recognized leader in this field and will help to guide oral health practice for our seniors.

Thank you for your participation.

Charles F. Shuler, DMD, PhD
Professor and Dean, UBC Faculty of Dentistry

All of our Research Days have presented scholarly achievements of the Faculty of Dentistry and applications of these new findings to improve patient care outcomes. The theme for this Research Day, “Dignity and Quality of Life for a Frail Population”, is particularly important at this time. We hope you will learn how research conducted at UBC is being translated into new approaches for managing geriatric patients.

The provision of oral healthcare in senior adults has gone through dramatic changes in just the past 40 years. In the 1960s, an individual who reached 60 years of age was likely edentulous, wearing complete dentures, and thought it was normal to lose all of their teeth. In 2010, a 60 year-old patient likely has nearly all of their teeth and does not ever expect to become edentulous. The lifespan of a tooth in the mouth has changed such that we are now encountering dental disease in an aging population that has never been previously observed. The fact that people are living longer with their teeth represents a new challenge for oral health professionals. In the older population, physical problems can prevent the practice of routine oral hygiene procedures and, as individuals begin to show signs of dementia, the priority for oral hygiene can become quite low for all of the caregivers involved. Consequently, the dentition suffers in many ways and has a negative impact on quality of life.

The ELDERS (Elders’ Link with Dental Education, Research and Service) group at the UBC Faculty of Dentistry has taken a lead role internationally in examining the oral health impact on senior adults. The faculty members who have achieved these new insights will be sharing them with all attendees. In addition, we will hear the voices of dentists who have treated seniors and in some cases become senior citizens themselves. A comparison of the research findings with the personal experiences of these individuals provides a unique format for this Research Day.

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Thank you for your participation.

Charles F. Shuler, DMD, PhD
Professor and Dean, UBC Faculty of Dentistry
Oh my goodness, Mother, your mouth smells and you look awful!” – and so the conversation – or rather the trauma – began. Jennifer lives in Winnipeg, and Louise, her mother, has been living in a nursing home in Richmond for the last six months since she had a debilitating stroke that left her dizzy periodically and without control of her right arm or the ability to move around without a walker. Louise was frail, so Jen arranged for her to move into a nursing home and helped her to settle – all seemed as well as could be expected. Now on returning for the first time to see her mother, she was shocked. “Why has my mother not seen a dentist?” she asked the Director of Nursing. “Doesn’t anyone help my mother to clean her teeth?” “Yes” was the reply to the second question but “No” to the dentist! “Please call a dentist,” she ordered. This was easier said than done, and now Louise was distressed about her teeth, which she hadn’t noticed previously. Several calls to local dentists finally found the UBC Geriatric Dentistry Program. Eventually a dentist arrived and then a dental hygienist came to see her mother. Subsequently, with more careful attention from the nursing staff, the healthcare team managed to retain only four maxillary teeth as overdenture abutments. All they could achieve in the mandible was a single implant with a magnet-retained overdenture. Nonetheless, it was a compromise that Louise accepted in her unflinching optimism, but Jennifer felt only shame that she had allowed the system to fail her mother.

[Case courtesy of Dr. Michael MacEntee]

Case Learning Objectives:

At the end of the day, participants are expected to be able to:

- Understand the significance of the social environment on oral healthcare;
- Anticipate relationships between general health and oral health in frail people;
- Explain the role of dental personnel on multidisciplinary teams in long-term care (LTC) facilities;
- Identify and manage the most likely cause of caries, periodontitis and gingivitis in LTC; and
- Develop and explain the benefits and limitations associated with multiple options for treating and managing rampant caries, periodontitis and tooth loss for frail people.
UBC Dentistry Research Day 2011
Dignity and Quality of Life for a Frail Population
Tuesday, January 25, 2010 · 8:00 am – 3:00 pm
UBC Student Union Building Ballroom

8:00 – 8:40 | REGISTRATION & CONTINENTAL BREAKFAST
8:40 – 8:50 | WELCOME
Dr. Charles Shuler, Professor and Dean
8:50 – 9:00 | INTRODUCTION & OVERVIEW OF THE DAY
Dr. Edward Putnins, Professor and Associate Dean of Research & Graduate/Postgraduate Studies
8:50 – 9:00 | MEANING OF THE DAY
Dr. George Beagrie, Dean Emeritus, UBC Faculty of Dentistry
9:00 – 9:25 | PUTTING REALITY INTO DENTAL GERIATRICS RESEARCH
Dr. Michael MacEntee, Professor, Division of Prosthodontics & Dental Geriatrics, Department of Oral Health Sciences
“What have been the challenges in developing and implementing an oral health program for the frail?”
9:30 – 9:55 | FRAILTY AS AN ORAL HEALTH CHALLENGE
Dr. Lynn Beattie, Professor Emerita, Division of Geriatric Medicine, UBC Department of Medicine
“What are the biological and physiological changes as we age?”
9:55 – 10:25 | COFFEE BREAK
10:30 – 10:55 | THE PATIENT’S VOICE
Dr. Ross Bryant, Assistant Professor, Division of Prosthodontics & Dental Geriatrics, Department of Oral Health Sciences
“What are the patient’s thoughts on tooth loss and replacement?”
11:00 – 11:25 | GERIATRICS IN DENTAL EDUCATION
Dr. Mario Brondani, Assistant Professor, Division of Prosthodontics & Dental Geriatrics, Department of Oral Health Sciences
“What curriculum changes are needed to ensure that the next generation of dentists is competent to manage the frail patient?”
11:30 – 11:45 | RESEARCH POSTER AWARDS PRESENTATION
(UNDERGRADUATE & GRADUATE STUDENTS)
11:45 – 12:55 | LUNCH (BOX LUNCH PROVIDED) & RESEARCH POSTER VIEWING
Posters by undergraduate students, graduate students, post-doctoral fellows, research associates, visiting scientists, and faculty members.
1:00 – 1:25 | REACHING OUT TO FRAIL ELDERS
Dr. Chris Wyatt, Associate Professor and Chair, Division of Prosthodontics & Dental Geriatrics, Department of Oral Health Sciences
“What must an oral health program deliver to care for the frail?”
1:30 – 2:45 | THE FUTURE OF ORAL HEALTHCARE FOR FRAIL ELDERS
(Presentation by Hamber Visiting Professor)
Dr. Asuman Kiyak, Professor and Director of Institute on Aging, University of Washington
“Is the oral health community ready, willing and able for the challenge?”
2:45 – 3:00 | CASE WRAP-UP & DISCUSSION

UBC Dentistry Thanks the Following Research Day Sponsors:

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MESSAGE FROM THE ASSOCIATE DEAN OF RESEARCH

To all, thank you for attending the Fourth Annual UBC Dentistry Research Day.

Research Day 2011 is focused on the management and care of the frail elderly. This population is often forgotten and more effort is required to understand and address the unique needs of these patients. I personally experienced many challenges when I was a recent graduate undertaking a locum in an extended-care veterans’ hospital. I still clearly remember some of my initial challenges. I had to review long lists of medications, I often had to work slower and curtail my enthusiasm to treat because the patient had enough for that appointment, and I had to learn the difference between a perfect dentition and a functional dentition. I do remember some of these challenges, but there are many positive powerful lessons and memories as well. When I did learn to evaluate long lists of medications, my transition to private practice was easier. I vividly remember the incredible life stories these patients shared while I was working and I remember when I understood that having 32 teeth is great but having less is also okay. In reality, each of these quiet individuals easily gave me as much as I hope I was able to provide to them.

During the day, we will have several presentations by numerous members of the Division of Prosthodontics & Dental Geriatrics. In addition, we are honoured to include presentations by Dr. Lynn Beattie, Professor Emeritus, Department of Geriatric Medicine, Faculty of Medicine, UBC and the keynote address, which will be delivered by Dr. Asuman Kiyak, Professor and Director of the Institute of Aging at the University of Washington. Collectively, they will discuss the systemic and oral physiological changes that occur with aging, how to best educate future dental professionals, how to effectively manage the oral health needs of frail individuals, and then we will end with a look to the future. In addition, this is the first year that we have asked members of our dental community to reflect on the importance of this day and topic. Overall, it will be an exciting day.

In closing, I would like to express our appreciation to our outstanding speakers, our video commentators, our supporters, and all who have agreed to participate in Research Day 2011. Personally, I would also like to thank all of the members of this year’s Research Day Organizing Committee (Clare Davies, Ingrid Ellis, Alison Kovacs, Michael MacEntee, Jane Merling, and Terry Wintonyk), who continue to work very hard to make this day a success.

Do enjoy Research Day 2011.

Edward E. Putnins, DMD, PhD, DipPerio
Professor and Associate Dean of Research & Graduate/Postgraduate Studies
PRESENTERS
BIOGRAPHIES AND SYNOPSES

· GEORGE BEAGRIE
· MICHAEL MACENTEE
· LYNN BEATTIE
· ROSS BRYANT
· MARIO BRONDANI
· CHRIS WYATT
· ASUMAN KIYAK
GEORGE S. BEAGRIE, LDSRCS, FDSRCS, DDS, Dip Perio, FRCD(C), FICD, FACD
During his tenure as Dean of the UBC Faculty of Dentistry from 1978-1988, Dr. Beagrie’s achievements included the establishment of the Hospital Dentistry Program, development of pre-clinical education in the Performance Simulation Laboratory, designation as a World Health Organization Collaborating Centre for the Use of Human Performance Dentistry, and creation of graduate PhD, combined DDS/MSc and Periodontics Specialty programs. His numerous additional appointments included President of the International Association for Dental Research, President of the Royal College of Dentists of Canada, and Examiner of the National Dental Examining Board of Canada.

MEANING OF THE DAY
The elderly and frail often suffer from eating difficulties while the poor and underprivileged lack food security. Eating is one of the major pleasures in life for all ages, but for these people it sometimes becomes the greatest challenge. Thus during this year’s Research Day, entitled “Dignity and Quality of Life for a Frail Population”, we concentrate on investigative methods and tools for assisting this community of individuals. The past century has seen human life expectancy almost doubled and increased numbers of people over 65 retaining their teeth has led to a more directed approach to the oral health needs of this older population. That Dentistry has a contribution to make in the quality of life of the elderly and frail is indisputable. Only with knowledge and understanding can come the necessary integration and relevance to meet the oral health needs of this society.

MARTHA L. MacENTEE, PhD, LDS(I), Dip Prosth, FRCD(C)
Dr. Martha MacEntee, Professor of Prosthodontics & Dental Geriatrics, is Past President of the Association of Prosthodontists of Canada, the International College of Prosthodontists, and of the Royal College of Dentists of Canada. She recently received the Distinguished Scientist Award in “Geriatric Oral Research” from the International Association for Dental Research, and is the senior editor of the book “Oral Healthcare and the Frail Elder: A Clinical Perspective” published by Wiley-Blackwell.

PUTTING REALITY INTO DENTAL GERIATRICS RESEARCH
The ELDERS (Elders’ Link with Dental Education, Research and Service) group at UBC was established to provide administrative structure to the oral health-related needs of our aging population and to the educational needs of dentists and dental students within an overall context of gerontology and research. It is an interdisciplinary group with scholars from many faculties and schools at UBC. This presentation will present a brief history of the ELDERS group, explaining how research in dental geriatrics in this Faculty has evolved over 30 years to address a wide range of clinical problems including late elder caries, implants, oral healthcare in long-term care facilities, and dentistry for elderly immigrants.
Dr. Ross Bryant is an Assistant Professor of Prosthodontics & Dental Geriatrics in the Department of Oral Health Sciences and a member of the ELDERS (Elders’ Link with Dental Education, Research and Service) group at the UBC Faculty of Dentistry. He teaches implant dentistry and prosthodontics, and his research is on the biological and psychosocial impact of tooth loss and dental implant prostheses in older patients. Dr. Bryant treats patients with a focus on implant dentistry at the UBC Dentistry Specialty Clinic. He has been President of the BC Society of Prosthodontists, and the Dental Specialist Society of BC.

The patient interview helps qualitatively identify their problems and guides whether and how treatment might improve their quality of life. Quantitative assessments typically indicate relatively higher unmet needs. With frail elders, we sometimes struggle with our idealistic views on treatment, not only because of less predictable outcomes, but also because the patient’s voice may be diminished by dependence or dementia. The challenge in geriatric dentistry is distinguishing the influence of patient expectations on the outcome of treatment.

Frailty is a common syndrome, seen more often with increasing age. Older persons are often vulnerable and at a precarious risk for an imbalance in demands and capacity to cope, with impending decline as a result. Potential consequences include disability, falls, morbidity, hospitalization, and finally institutionalization. Evaluation domains include nutrition, mobility, activity, strength, endurance, cognition, and mood. Addressing frailty means evaluating assets and deficits and trying to maintain the balance on the asset side. Nutrition and oral health are one of the areas for potential concentration, along with activity and mood. There is increasing evidence that positive gains in multiple factors can maintain the asset balance even in frail older persons.

The patient interview helps qualitatively identify their problems and guides whether and how treatment might improve their quality of life. Quantitative assessments typically indicate relatively higher unmet needs. With frail elders, we sometimes struggle with our idealistic views on treatment, not only because of less predictable outcomes, but also because the patient’s voice may be diminished by dependence or dementia. The challenge in geriatric dentistry is distinguishing the influence of patient expectations on the outcome of treatment. For example, frail elders with depleted dentitions may need more preventive and palliative care than surgical or prosthetic treatment. Elders with dentures can be very positive about their quality of life even without implant support. However, with advancing dementia, these individuals may be better suited to not using dentures.
CHRISTOPHER C.L. WYATT, BSc, DMD, Dip Prosth, MSc, FRCD(C)

Dr. Chris Wyatt is Associate Professor and Chair of the Division of Prosthodontics & Dental Geriatrics at the UBC Faculty of Dentistry. He graduated with a DMD degree from UBC in 1986, a Diploma in Prosthodontics in 1995, and an MSc in Dentistry in 1996 from the University of Toronto. Dr. Wyatt is a founding member of the ELDERS (Elder’s Link with Dental Education, Research and Service) group, and the Director of the UBC Geriatric Dentistry Program. He is Past President of the Association of Prosthodontists of Canada and the BC Society of Prosthodontists, he sits on the Canadian Dental Association Committee on Clinical & Scientific Affairs, and chairs the Geriatric Dentistry Committee of the BC Dental Association.

REACHING OUT TO FRAIL ELDERS

Numerous studies have documented very poor oral health and limited access to dental care among frail older adults residing in long-term care (LTC) facilities. In 1999, Providence Healthcare and the UBC Faculty of Dentistry partnered to implement a comprehensive dental program for 900 elderly LTC residents. The program was not only to provide much-needed service, but also opportunities for education and research. Starting in 2002, the program began delivering dental services; over the first year, 894 residents were seen for oral health assessments. A total of 58% of the residents were recommended for dental treatment, 30% accepted the recommendation, and 26% received treatment. Residents who received dental care showed a significant improvement in their oral health as measured at one and five years.

MARIO BRONDANI, DDS, MSc, PhD

Dr. Mario Brondani received his dental degree from UFRGS in 1993. His MSc in Gerontology (PUCRS 2002) focused on oral health education in long-term care facilities while his PhD in Dental Sciences (UBC 2007) focused on models and measurements of oral health and quality of life in old age. He is currently an MPH candidate (UBC). As an Assistant Professor, Dr. Brondani has been teaching, researching, and providing services within the Canadian elderly population. He is interested in community services, curricular development, outreach activities, interprofessionalism, psychometrics, diversity, and oral cancer.

GERIATRICS IN DENTAL EDUCATION

Despite the exponential growth of the elderly population worldwide, geriatric dental education has been a formal component of only a few dental schools’ curricula. This presentation discusses the dental geriatrics component at the UBC Faculty of Dentistry, taking into consideration the status of the Canadian elderly population, the content of what should and could be taught, the need for extramural activities, the barriers and facilitators in fostering geriatric dental education, and the opportunities for education and research. It uses the Professionalism and Community Service (PACS) module as an example to encourage students to develop comprehensive knowledge and awareness of the needs and dynamics of the aging population in general while interacting with residents of long-term care facilities in particular.
Dr. Asman Kiyak is Director of the Institute on Aging at the University of Washington, Director of the Geriatric Dentistry Program in the School of Dentistry, and a Professor in the Department of Oral & Maxillofacial Surgery. She is also an Adjunct Professor in the Departments of Psychology and Nutrition. She has been on the UW faculty since 1977, and has been Director of the Institute on Aging (IoA) since 1994.

Dr. Kiyak has obtained research funding to study health disparities across ethnic and socioeconomic groups, barriers to health care, and to test new models of oral health promotion for special populations, particularly among older adults. She has also conducted research on older adults' acceptance and use of technology to enhance aging in place. Dr. Kiyak's studies of informed consent in clinical dental practice have led to a new understanding of the importance of dentist–patient communication prior to major dental procedures. Her activities in geriatric dentistry, gerontology, dental informed consent, orthodontics, and behavioral dentistry resulted in a Distinguished Scientist Award in “Behavioral Sciences” from the International Association for Dental Research in 2000, and a Distinguished Professorship at UCLA in 2003. She is a Fellow of the Gerontological Society of America.

Asman Kiyak obtained her BA from the University of Michigan in 1972, an MA in 1974, and a PhD in Psychology from Wayne State University in 1977. She has published over 150 journal articles and book chapters, given numerous lectures at scientific, professional and community meetings, and is the author (with Dr. Nancy Hooyman) of a well-known textbook on aging, “Social Gerontology: A Multidisciplinary Perspective” (Allyn & Bacon, 9th edition, 2010).

THE FUTURE OF ORAL HEALTHCARE FOR FRAIL ELDERLY

The future of geriatric dentistry will be far different from its past! Not only will there be more elders in the population, but these older adults will represent a very different cohort than their parents and grandparents. They will be more educated and in many cases still working, more focused on esthetics and preventive care (in systemic as well as oral health), more aware of healthy aging, and interested in maintaining the teeth they have (i.e. far fewer will be edentulous but more will present with implants placed in their middle years). These “healthy elders” will demand more preventive, restorative, and esthetic services from the dentist. At the same time, however, there will be some elders who will experience dementia or other conditions that require more assistance and make it impossible for them to care for themselves. These elders, either in long-term care facilities or living with some help in their own homes, will present an ethical and healthcare challenge for the dental team. Issues of what dental services to provide, the impact of their systemic conditions on oral health, and how to manage these conditions, as well as the role of others (e.g. physicians, social workers, family caregivers) in caring for this increasingly diverse population, will provide an important new perspective to geriatric dentistry. This presentation will examine each of these challenges.
POSTER ABSTRACTS
Poster Competition Judges

- DR. DIETER BRÖMME
- DR. S. ROSS BRYANT
- DR. JEFFREY COIL
- DR. LARI HÄKKINEN
- DR. CAROLINE NGUYEN
- DR. GETHIN OWEN
- DR. BENJAMIN PLISKA
- DR. N. DORIN RUSE
- DR. RAVINDRA SHAH (CHAIR)
- DR. DAVID SWEET
- DR. J. DOUGLAS WATERFIELD
- DR. LEWEI ZHANG
1 Survey of Irrigation Protocols Used by Dentists in British Columbia
   Abtin H1*, Haapasalo M1, Aleksejūnienė J2
   1Department of Oral Biological & Medical Sciences, Faculty of Dentistry, The University of British Columbia, Vancouver, Canada (UBC); 2Department of Oral Health Sciences, Faculty of Dentistry, UBC

2 The Crystal Structures of Chondroitin and Dermatan Sulfate-Cathepsin K Complexes
   Aguda AH1*, Du X2, Nguyen NT2, Brayer GD2, Brömme D1,2
   1Department of Oral Biological & Medical Sciences, Faculty of Dentistry, The University of British Columbia, Vancouver, Canada (UBC); 2Department of Biochemistry & Molecular Biology, Faculty of Medicine, UBC

3 Patient Experiences of Continuous Positive Airway Pressure and Oral Appliances
   Almeida F1*, Lowe AA1, Chen H1, Ayas N2, Marra C3, Lynd L3
   1Department of Oral Health Sciences, Faculty of Dentistry, The University of British Columbia, Vancouver, Canada (UBC); 2Respiratory Division, Faculty of Medicine, UBC; 3Faculty of Pharmaceutical Sciences, UBC

4 A Culturally Sensitive Oral Cancer Prevention Program for South Asians
   Auluck A1,2*, Hislop G1, Bottorff J1, Zhang L1,2, Rosin M1,4
   1British Columbia Cancer Agency, Vancouver, Canada; 2Faculty of Dentistry, The University of British Columbia, Vancouver, Canada; 3Faculty of Health & Social Development, The University of British Columbia Okanagan, Kelowna, Canada; 4Department of Kinesiology, Simon Fraser University, Burnaby, Canada

5 Transforming Growth Factor Beta Signaling Modulators in Periodontal Disease
   Bains-Dahia S1*, Gauldie J2, Häkkinen L1, Larjava H1
   1Laboratory of Periodontal Biology, Faculty of Dentistry, The University of British Columbia, Vancouver, Canada; 2Centre for Gene Therapeutics, McMaster University, Hamilton, Canada

6 Gene Expression Analysis of Macrophage Polarization by Surface Roughness
   Barth KA*, Waterfield JD, Brunette DM
   Department of Oral Biological & Medical Sciences, Faculty of Dentistry, The University of British Columbia, Vancouver, Canada

7 3D Modeling of Brain-Face Relations During Human Embryo Development
   Brownrigg DC*, Diewert VM
   Department of Oral Health Sciences, Faculty of Dentistry, The University of British Columbia, Vancouver, Canada

8 Regulation of Moonlighting Proteins by Matrix Metalloproteinase Processing
   Butler GS*, Overall CM
   Department of Oral Biological & Medical Sciences, Faculty of Dentistry, Centre for Blood Research, The University of British Columbia, Vancouver, Canada

9 Risk Factors for Oral Cancer Development in British Columbia
   Chen A*, Samim F, Lim F, Zhang L, Poh CF
   Department of Oral Biological & Medical Sciences, Faculty of Dentistry, The University of British Columbia, Vancouver, Canada

10 Identification of Cathepsin V Exosites Necessary for Elastin Degradation
    Du X1*, Chen N1, Li C-M1, Brömme D1,2
    1Department of Biochemistry & Molecular Sciences, Faculty of Medicine, The University of British Columbia, Vancouver, Canada (UBC); 2Department of Oral Biological & Medical Sciences, Faculty of Dentistry, UBC
Misexpression of the RA Inactivating Enzyme CYP26A1 Inhibits Jaw Development
Fan CY*, Richman JM
Department of Oral Health Sciences, Faculty of Dentistry, Life Sciences Institute, The University of British Columbia, Vancouver, Canada

Enhancing Learning Through Development of Dental Applied Learning Experiences (DALEs)
Garcha J*, Best L, Black N
Department of Oral Health Sciences, Faculty of Dentistry, The University of British Columbia, Vancouver, Canada

Matrix Metalloproteinases in Scarless Wound Healing
Giannelis G1*, Wiebe C1, Jiang G1, Gallant-Behm C2, Hart D1, Larjava H1, Häkkinen L1
1Department of Oral Biological & Medical Sciences, Faculty of Dentistry, The University of British Columbia, Vancouver, Canada; 2Department of Molecular, Cellular & Developmental Biology, University of Colorado at Boulder, Boulder, Colorado, USA

Effect of Saliva Substitutes on Enamel Measured by QLF Method
Gorovenko MR*, Aleksejūnienė J, MacEntee MI, Wyatt CCL
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Comparative Analysis of Recurrent and Non-Recurrent Keratocystic Odontogenic Tumours
Gu Y*, Chen E, Zhu Y, Zhang L, Poh CF
Department of Oral Biological & Medical Sciences, Faculty of Dentistry, The University of British Columbia, Vancouver, Canada

Translation Methodology Revised for Oral Health-Related Quality of Life
Brondani M, He S*
Department of Oral Health Sciences, Faculty of Dentistry, The University of British Columbia, Vancouver, Canada

Screening for Novel Inhibitors of Cathepsin K
Ho M*, Du X, Brömme D
Department of Oral Biological & Medical Sciences, Faculty of Dentistry, The University of British Columbia, Vancouver, Canada

Potential Molecular Mediators of the RA-Noggin Beak Duplication Phenotype
Holmes SN*, Buchtová M', Nimmagadda S', Trachtenberg AJ2, Kuo WP2, Richman JM1
1Department of Oral Health Sciences, Faculty of Dentistry, Life Sciences Institute, The University of British Columbia, Vancouver, Canada; 2Harvard Clinical & Translational Science Center, Boston, Massachusetts, USA

Wnt5a Induces Matrix Degradation in Facial Mesenchyme via Non-Canonical Pathways
Hosseini Farahabadi S*, Richman JM
Department of Oral Health Sciences, Faculty of Dentistry, Life Sciences Institute, The University of British Columbia, Vancouver, Canada

Satisfaction and Maintenance with Mandibular 1- or 2-Implant Dentures
Huang V*, Bryant SR, MacEntee MI, Walton JN
Division of Prosthodontics & Dental Geriatrics, Faculty of Dentistry, The University of British Columbia, Vancouver, Canada

Effect of Flowable Composite Intermediate Layer on Interfacial Fracture Toughness
Kanda P*, Chehrouri B, Ruse ND
Faculty of Dentistry, The University of British Columbia, Vancouver, Canada

Dental Hygiene Baccalaureate Degree-Completion Education in Canada
Kanji Z1*, Boschma G2, Imai P1, Sunell S1, Craig BJ1
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Macrophage-Mediated Depletion of Hydrogen Peroxide in Cell Culture
Karastathis D*, Waterfield JD, Putnins EE, Brunette DM
Department of Oral Biological & Medical Sciences, Faculty of Dentistry, The University of British Columbia, Vancouver, Canada

Remote-Controlled Titania Nanotube Drug Delivery System
Kim JN1,2*, Kim CY2, Park HJ2, Yoo JY1, Oh SH1
1Visiting Professor, Faculty of Dentistry, The University of British Columbia, Vancouver, Canada; 2College of Dentistry, Wonkwang University, Iksan, Jeonbuk, Republic of Korea

The Effect of Microtubule Disassembly on Palatal Fusion
Kitase Y*, Shuler C
Department of Oral Biological & Medical Sciences, Faculty of Dentistry, The University of British Columbia, Vancouver, Canada

Prediction of Local Recurrence During Follow-Ups Using Fluorescence Visualization
Ko K*, Chen E, Laronde D, Williams PM, Poh CF
Department of Oral Biological & Medical Sciences, Faculty of Dentistry, The University of British Columbia, Vancouver, Canada

How the Turtle Makes its Palate without Palatal Shelves
Leung KJ*, Richman JM
Department of Oral Health Sciences, Faculty of Dentistry, Life Sciences Institute, The University of British Columbia, Vancouver, Canada

The Differences Among Age Groups of the Early-Staged Oral Cancers
Lubpairee T1,2*, Zhang L1,2, Rosin MP1, Poh CF1,2
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Role of Small Leucine-Rich Proteoglycans in Wound Healing
Mah W*, Jiang G, Larjava H, Häkkinen L
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Critical Role for αvβ6 Integrin in Enamel Biomineralization
Mohazab L1*, Aurora S1, Owen GRh1, Ruse ND1, Häkkinen L1, McKee MD2, Larjava H1
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Characterization of Elastolytic Activities of Cathepsins Expressed in Macrophages
Nho B1*, Percival D2, Brömme D1
1Department of Oral Biological & Medical Sciences, Faculty of Dentistry, The University of British Columbia, Vancouver, Canada; 2Biochemistry, Merck Frosst Canada, Montreal, Canada

Cathepsin S in Experimental Collagen-Induced Rheumatoid Arthritis
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1Department of Oral Biological & Medical Sciences, Faculty of Dentistry, The University of British Columbia, Vancouver, Canada; 2Biochemistry, Merck Frosst Canada, Montreal, Canada

Fatigue Testing of Controlled Memory Wire Nickel-Titanium Rotary Instruments
Shen Y1, Qian W1*, Abtin H1, Gao Y2, Haapasalo M1
1Division of Endodontics, Department of Oral Biological & Medical Sciences, Faculty of Dentistry, The University of British Columbia, Vancouver, Canada; 2State Key Laboratory of Oral Diseases, West China College & Hospital of Stomatology, Sichuan University, Chengdu, China

Dentin and Enamel Structure Revealed by Scanning Electron Microscopy
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Release of Amphiregulin in Lipopolysaccharide-Mediated Loss of Epithelial Barrier
Senini VW*, Firth JD, Putnins EE
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Antimicrobial Efficacy of Chlorhexidine Against Bacteria in Biofilms
Shen Y1*, Stojicic S, Haapasalo M
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An International Perspective on Dental Geriatric Curricula in Three Universities
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Antibacterial Effect of a Novel Root Canal Irrigant
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Evaluation of Canal Instrumentation Using GT Series-X™ versus Prosystem GT™
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Screening Improves Time Delay to High-Risk Lesion Diagnosis
Tam DM1,2*, Biggar H3, Wu J4,5, Poh CF1,2,6
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Connexin-43 Regulates Key Genes Involved in Scar Formation
Tarzemany R*, Jiang G, Larjava H, Häkkinen L
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Investigating the Sustainability of Community Dental Clinics for the Underserved
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Curcumin Affects Proliferation, Migration and Apoptosis in Fibroblasts
Zhang DW*, Brömme D
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RESEARCH SUPPORTERS
Thank you to the following organizations for supporting our research.
This cluster encompasses groups engaged in research on cancer diagnosis and prevention, dental biofilms, dental hygiene, dental instruments and materials, dental sleep medicine, forensic dentistry, and interactive dental anatomy. Our areas of expertise include biomaterials, dental morphology, obstructive sleep apnea, oral cancer, and root canal irrigation. We study matters such as bacterial eradication, cellular interactions, cephalometrics, community outreach programs, computational fluid dynamics, diagnostic tools, DNA analysis, fracture mechanisms, molecular markers, novel disinfection strategies, oral care products, surface characterization, and treatment strategies.

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*We welcome our new faculty to UBC.
COMMUNITY & EDUCATIONAL RESEARCH CLUSTER

The research in this cluster relates to three of the four Canadian Institutes of Health Research themes: health services research; social, cultural, environmental, and population health; and clinical research—and to a range of educational studies. These domains are loosely interconnected and employ various quantitative and qualitative research methods and knowledge transfer. Our members conduct studies on diverse topics such as healthcare promotion, oral implants, dental caries, systematic literature reviews, and community service learning.

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∗We welcome our new faculty to UBC.
**iMATRIX RESEARCH CLUSTER**

iMatrix is an interactive research cluster combining the research interests of 11 highly-active laboratories in oral and biomedical sciences. We conduct basic science research in areas such as cancer, cell behaviour, craniofacial development, integrins, molecular biology, periodontal disease, proteases, proteomics, and wound healing. Highly-motivated undergraduate and graduate students, post-doctoral fellows and other trainees, as well as interested collaborators, are welcome to contact our member laboratories.

**DIETER BRÖMME**, Coordinator, iMatrix Research Cluster, dbromme@interchange.ubc.ca

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<tr>
<th><strong>DIETER BRÖMME</strong></th>
<th><strong>JOY RICHMAN</strong></th>
<th><strong>CHARLES SHULER</strong></th>
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<tr>
<td>Lysosomal proteases and their role in health and disease</td>
<td>Evolution and development of the face and teeth using bird and reptilian models</td>
<td>Studies focused on characterizing the molecular mechanisms regulating secondary palatal fusion with specific emphasis on the TGFβ signalling pathway</td>
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<td>Regulation of cell behaviour on implant surfaces by substratum topography</td>
<td>Synthesis and degradation of proteoglycans in the cell biology of wound healing</td>
<td>Effect of surface topography on activation of the innate immune system</td>
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<td>Cell to extracellular matrix interactions in wound healing</td>
<td>Cell adhesion, integrins and signalling in wound healing and periodontal disease</td>
<td>Proteomic investigation of inflamed periodontal and synovial tissues and cancer to elucidate proteolytic mechanisms of cell signalling and in regulating inflammation</td>
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<th><strong>EDWARD PUTNINS</strong></th>
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<td>Periodontal disease pathogenesis and mesenchymal stem cell regeneration of craniofacial tissues</td>
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GRADUATE RESEARCH OPPORTUNITIES

PhD or MSc in Craniofacial Science
The UBC Faculty of Dentistry offers advanced study leading to a PhD or MSc in Craniofacial Science. The PhD program requires the successful completion of a research-specific curriculum, a comprehensive exam, and defense of a research-based thesis. A minimum of four years of full-time study is typically required. The MSc program requires successful completion of a research-specific didactic curriculum in conjunction with a research-based thesis. This program typically requires two years of full-time study; however, an extended part-time option for an MSc degree is available. Research options in one of the following three broad areas of study are available:

- Population health research explores the complex interactions (social, cultural, environmental) that affect the oral health of individuals, communities, and populations.
- Oral health-related clinical research includes both interventional and observational studies focusing on the following: disease prevention, diagnosis, risk, treatment, prognosis, and health care.
- Basic science research in the areas of biomaterials, cell biology, developmental biology, microbiology, and molecular biology.

These graduate programs are available as stand-alone degrees or may be completed as a combined diploma in a clinical specialty with a PhD or MSc degree (see criteria below). Clinical specialty training options are available in the following areas.

Endodontics
PhD or MSc combined with a Diploma in Endodontics
- PhD degree (minimum 6 years) or MSc degree (minimum 3 years)
- Diploma in Endodontics

Graduates will be eligible to take the examinations for specialty certification in endodontics offered by the Royal College of Dentists of Canada and the American Board of Endodontics.

Research Focus
- eradication of microorganisms from the root canal system
- development of unique in vitro and ex vivo models for biofilms which simulate oral in vivo biofilms
- industry collaborations on new devices to improve antimicrobial solutions
- safety and effectiveness of instrument systems to deliver disinfecting agents into the root canal
- impact of file design on the eradication of root canal microbes

Clinical Training
- treatment management (including surgery) of diseases and trauma of the tooth root and pulp

Criteria
- Applicants must hold a DMD or its equivalent
- Application deadline: July 1

Orthodontics
PhD or MSc combined with a Diploma in Orthodontics
- PhD degree (minimum 6 years) or MSc degree (minimum 3 years)
- Diploma in Orthodontics

Graduates will be eligible to take the examinations for specialty certification in orthodontics offered by the Royal College of Dentists of Canada and the American Board of Orthodontics.

Research Focus
- craniofacial morphology and function in different populations
- efficiency and efficacy of treatment modalities
- societal and economic strategies that govern access to care
- craniofacial molecular and cellular control mechanisms
- impact of biomaterials on delivering orthodontic mechanics

Clinical Training
- diagnosis, prevention and treatment management of abnormal congenital or developmental relationships of the dentofacial anatomy from infancy to adulthood in diverse populations

Criteria
- Applicants must hold a DMD or its equivalent
- Postgraduate clinical and/or academic experience preferred
- Application deadline: September 1
**Pediatric Dentistry**

PhD or MSc combined with a Diploma in Pediatric Dentistry
- PhD degree (minimum 6 years) or MSc degree (minimum 3 years)
- Diploma in Pediatric Dentistry

Graduates will be eligible to take the examination for specialty certification in pediatric dentistry offered by the Royal College of Dentists of Canada and the diplomate examination of the American Board of Pediatric Dentistry.

**Research Focus**
- biomedical research (craniofacial development)
- clinical research (facial symmetry of cleft lip and palate)
- population health and health services research (oral health promotion and access to care for disadvantaged children)

**Clinical Training**
- diagnostic, preventive, therapeutic and consultative expertise for children and adolescents including those with special healthcare needs at BC Children’s Hospital Dental Department, Oral Health Centre at UBC Vancouver, and community settings throughout the province

**Criteria**
- Applicants must hold a DMD or its equivalent
- Application deadline: October 1

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**Prosthodontics**

PhD or MSc combined with a Diploma in Prosthodontics
- PhD degree (minimum 6 years) or MSc degree (minimum 3 years)
- Diploma in Prosthodontics

Graduates will be eligible to take the examinations for specialty certification in prosthodontics offered by the Royal College of Dentists of Canada and the American Board of Prosthodontics.

**Research Focus**
- geriatric dentistry
- oral implants and related prostheses
- caries management
- psychosocial aspects of aging
- community healthcare needs

**Clinical Training**
- diagnosis, restoration and maintenance of oral function, comfort, appearance and health of patients by the restoration of natural teeth and/or the replacement of missing teeth and contiguous oral and maxillofacial tissues with artificial substitutes
- aesthetics/cosmetic dentistry
- crowns, bridges, veneers, inlays
- complete and removable partial dentures
- dental implants
- TMD-jaw joint problems
- traumatic injuries to the structures of the mouth

**Criteria**
- Applicants must hold a DMD or its equivalent
- Application deadline: October 1

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**Periodontics**

PhD or MSc combined with a Diploma in Periodontics
- PhD degree (minimum 6 years) or MSc degree (minimum 3 years)
- Diploma in Periodontics

This program is recognized by the American Dental Association and the Academy of Periodontology. Graduates will be eligible to take the examination for fellowship in the Royal College of Dentists of Canada and the board examination of the American Academy of Periodontology.

**Research Focus**
- molecular pathology of periodontal disease
- periodontal and skin wound healing
- clinical aspects of tissue healing around implants
- stem cell-mediated regeneration of lost tissues

**Clinical Training**
- management of tooth-supporting structures using non-surgical and surgical procedures
- tooth replacement with implants when needed

**Criteria**
- Applicants must hold a DMD or its equivalent
- Application deadline: September 1
POSTGRADUATE OPPORTUNITIES

General Practice Residency Program
- Advanced postgraduate training in dental specialties in a hospital setting
- Approximately 11 salaried, residency positions per year (one- or two-year)

Applicants choose to apply to the Pediatric Residency, Geriatric Dentistry Residency, or the General Practice Residency. All programs are approved by the Commission on Dental Accreditation of Canada.

A variety of local, provincial and international learning opportunities are available to expand the comprehensive training each resident receives. Community clinics provide oral healthcare to individuals on income assistance, job training and other pre-employment programs. Care to the people of Haida Gwaii supports a community dental health strategy. International experience broadens the scope of learning to understand regional disease processes, treatment modalities and cultural competencies.

Local-Based Residencies
- BC Cancer Agency, BC Children’s Hospital, Vancouver Hospital & Health Sciences Centre, St. Paul’s Hospital, Portland Community Clinic, First United Oral Health Program, Vancouver Native Health Society (and other community clinics)

Provincial-Based Residencies
- Haida Gwaii (Skidegate and Massett dental clinics), Kelowna Gospel Mission, Prince George Native Friendship Centre, Victoria (Cool Aid Community Health Centre)

International-Based Residencies
- Vietnam (University of Ho Chi Minh, National Hospital of Odonto-Stomatology and Ho Chi Minh City Cancer Centre)
- Cambodia (Angkor Hospital for Children, Siem Reap)
- United Kingdom (Solihull, Queen Elizabeth and Birmingham Children’s Hospitals)

Application deadline: October 15
Complete program details at: www.dentistry.ubc.ca/education/postgrad/gpr

Oral Medicine and Oral Pathology Residency Program
- Hospital-based postgraduate specialist residency
- Three pathways: Oral Medicine (OM, three years), Oral Pathology (OP, three years), or Combined (OMOP, four years)

Completion of any of the three pathways leads to a certificate and eligibility for the Royal College of Dentists of Canada fellowship examinations.

Local hospital-based training sites
- UBC-affiliated teaching hospitals: BC Cancer Agency, Vancouver Hospital & Health Sciences Centre, St. Paul’s Hospital

Clinical practice component (training diagnosis, assessment and management)
- oral mucosal disease
- orofacial disorders associated with aging, systemic disease and medical therapies
- non-surgical salivary gland disorders
- rotations in anesthesia, internal medicine, rheumatology, neurosciences, dermatology, diagnostic pathology, oncology, otolaryngology, surgical pathology (including autopsy), head and neck pathology, and dermatopathology
- OM pathway: additional training in dental management of medically complex patients and diagnosis and treatment of orofacial pain and neurosensory disorders
- OP pathway: additional training in surgical and anatomical histopathology and laboratory procedures, techniques and diagnosis

Didactic component
- postgraduate-level seminars, case presentations and literature reviews
- teaching rounds
- ongoing basic and/or clinical research studies

Application deadline: November 1
Complete program details at: www.dentistry.ubc.ca/education/postgrad/omop
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Your Member Services Organization

The British Columbia Dental Association represents all dentists of BC.

We provide programs and services that directly benefit dentists throughout their careers.

We welcome UBC Faculty of Dentistry students as members of the Association.

Our Distinguished Partners
GRADUATE/POSTGRADUATE STUDIES

GRADUATE PROGRAMS
PhD or MSc in CRANIOFACIAL SCIENCE
These programs are research-oriented with no clinical components. The MSc degree normally requires two years full-time study and can also be taken part-time. The PhD degree requires a minimum of three years full-time study. Both offer research training in craniofacial sciences (cellular/molecular, clinical trial, or population health). Application Deadline: January 31

CLINICAL SPECIALTY GRADUATE PROGRAMS
PhD or MSc combined with a DIPLOMA in ENDODONTICS
This program offers a minimum three year MSc degree or a minimum six year PhD degree combined with a Diploma in Endodontics. Applicants must hold a DMD or its equivalent. Application Deadline: July 1

PhD or MSc combined with a DIPLOMA in ORTHODONTICS
This program offers a minimum three year MSc degree or a minimum six year PhD degree combined with a Diploma in Orthodontics. Applicants must hold a DMD or its equivalent. Application Deadline: September 1

PhD or MSc combined with a DIPLOMA in PEDIATRIC DENTISTRY
This program offers a minimum three year MSc degree or a minimum six year PhD degree combined with a Diploma in Pediatric Dentistry. Applicants must hold a DMD or its equivalent. Application Deadline: October 1

PhD or MSc combined with a DIPLOMA in PERIODONTICS
This program offers a minimum three year MSc degree or a minimum six year PhD degree combined with a Diploma in Periodontics. It is recognized by the American Dental Association and the American Academy of Periodontology. Applicants must hold a DMD or its equivalent. Application Deadline: September 1

PhD or MSc combined with a DIPLOMA in PROSTHODONTICS
This program offers a minimum three year MSc degree or a minimum six year PhD degree combined with a Diploma in Prosthodontics. Applicants must hold a DMD or its equivalent. Application Deadline: October 1

For more information on graduate programs visit www.dentistry.ubc.ca or contact: Viki Koulouris, vickybk@interchange.ubc.ca T 604 822 4486 F 604 822 3562

POSTGRADUATE PROGRAMS
GENERAL PRACTICE RESIDENCY PROGRAM
In conjunction with University-affiliated teaching hospitals and community clinics, the Faculty offers positions in a one-year dental residency program beginning June 15. These residency positions may include pediatric or geriatric dentistry. Application Deadline: October 15

ORAL MEDICINE and ORAL PATHOLOGY RESIDENCY PROGRAM
This postgraduate residency training in Oral Medicine and Oral Pathology is offered in conjunction with University-affiliated teaching hospitals. It consists of a three- or four-year hospital-based, stipended residency in one of three pathways: Oral Medicine, Oral Pathology, or both specialties combined. Application Deadline: November 1

For more information on postgraduate programs visit www.dentistry.ubc.ca or contact: Dorothy Stanfield, dstanf@interchange.ubc.ca T 604 822 0345 F 604 822 4532

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