The Student Research Group

University of Manitoba, Faculty of Dentistry

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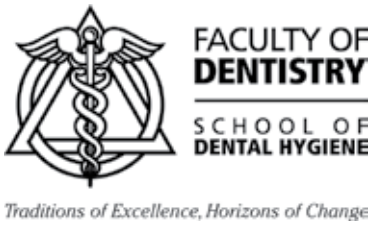
Annual Report August 2008 -August 2009

http://www.umanitoba.ca/dentistry/research/SRG/

Student Research Group Annual Report 2008-2009

University of Manitoba, Faculty of Dentistry

October 26, 2009



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Writer and Editor: Dr. Tammy Bonstein

Production, Design and Editing: Grant Warren

SRG Overview

Alex Serebnitski
SRG President 2007-2009
Graduated in 2009

Once again we had an exciting and successful year. We further increased the impact the SRG has on students in the faculty who are interested in research. Lunch and learn programs and workshops were done on a monthly basis. Presentations ranged from BSc dent student topics to an Hands-on implant course. All this was done with the great help and effort of Dr. Bonstein, Dr. Noguiera, Dentsply and of course the fellow SRG students.

As the outgoing SRG and CADR NSRG president I would like to thank Dr. Bonstein, Dr. Scott and Dr. Iacopino who provided us support and guidance on this exciting project. I would like to acknowledge the SRG students for their time, commitment and dedication to the group: Kris Coulter, Ashley Dykun, Courtney Humphreys, Ben Yakiwchuk who graduated in 2009 and Tiffany Cheung currently in Dent III.

I would also like to wish the best of luck to Michael Greene the new SRG President. I know that Michael will do great things with the group in the years to come. These were the best 4 years of my life and being part of student research in this faculty made this experienced even better.

And remember, research can be fun!

Dr. Tammy Bonstein
SRG Faculty Advisor 2007-2009

Being involved in creating the SRG in our Faculty — by mentoring, inspiring and guiding the next generation of dentist, researchers and educators — has been a truly unique and remarkable experience. We came a long way since 2007, when I first volunteered for the position of the Faculty Advisor to the Group. I am proud to say that together with the students we formed a rock solid base for the group to grow and develop from. With the help of this SRG, our students are leaning not only to excel in dental research, but also to work collaboratively in a successful, dedicated, and professional team. Over and over again, students confirm the tremendous value of this collaborative experience.

The group enjoyed a very active and successful 2008-2009: we further increased the number of members and the visibility of the group both to students and faculty, both internally and nationally. We are currently the biggest and the most active SRG in Canada. The SRG assists the students with funding and traveling opportunities, awards and recognition, and with ongoing faculty support. This report presents the highlights of SRG achievements this year.

I want to thank all participating faculty members for their commitment to our students. The success of the group would not be possible without the support of Dean Iacopino and Dr. J. Elliott Scott, the Associate Dean of Research. I would like to thank the supporting staff at the Dean's office: Kristjana Oliver, Linda Chartier, Grant Warren, and Dawn Silva. It has been a pleasure to work with Alex Serebnitsky, the group's President, Kris Coulter, Ashley Dykun, Courtney Humphreys, Ben Yakiwchuk, and Tiffany Cheung who volunteered numerous evening hours in order to build the group. I want to wish Michael Green, the new SRG President, success with his new leadership position.

SRG Overview

Messages:

Dr. J. Elliott Scott
Associate Dean (Research)

The Student Research Group, the BSc (Dent), Research in Dentistry and You

So what do you want to get out of your dental education? Obviously you want training to be a dental practitioner and establish a successful reputation in this area. But what are you learning in the undergraduate dental program? Will it give you everything you will need to meet criteria to achieve this? Will it meet all potential changes and new developments in dentistry in the next decade or longer? How is the dental curriculum designed to make you proficient and competent?

These are of course questions that are really very difficult or impossible to answer. But what is the dental curriculum and how is it constituted? When one looks at any university educational system, at the course of study, and how it is formed, it really consists of history. The important things identified by the professors or dental clinicians in this case, that constitute the primary basis of knowledge in any field that the students undertakes really represents the history of the field, whether empirical or practical, and the acquisition of the skills or background knowledge establishes legitimacy of the individual to practice or speak in a knowledgeable fashion on the principles or background and in fact, carries with it the legitimacy to express an opinion in that area.

During the course of your dental education you are also given the opportunity to undertake training to acquire future knowledge to build on the basics. This is the research component of your education for only research establishes the knowledge required for the future. Indeed without the foresight of past scientists/clinicians to undertake research what you as a student now learn has past practice or history of you profession would not exist. So why become a participant in the SRG or invest in a BSc(Dent)? The answer is to learn the other side of your profession to acquire the methods, techniques and basics to identify and investigate problems in your chosen field thus ensuring the continuous development of dentistry, both clinical and biological, for the next generation of dentists and researchers.

The SRG and BSc(Dent) offers a unique opportunity for undergraduate dental students to explore and develop the abilities to undertake biomedical research. Indeed while other dental schools in Canada may provide limited opportunities for undergraduate dental students to experience the process of research, our BSc (Dent) program is unique in Canada in that it allows dental students to experience and develop their own research projects from the ground up and acquire a degree for their work. This process well equips the graduate dental practitioner to evaluate research, introduce new methods and practices into their repertoire as well as providing insight and a “step up” for entering potential graduate programs.

More information on the SRG and BSc (Dent) programs are available in the student handbook or at BSc (Dent) Program. You may also contact the Associate Dean (Research), the SRG faculty advisors or any member of the group.

Or visit us on line at:
www.umanitoba.ca/dentistry or www.umanitoba.ca/dentistry/research/SRG.

Research Mentors

University of Manitoba Faculty of Dentistry and the School of Dental Hygiene

The following is a list of supervisors, along with their specific research interests, who were available to mentor members of Student Research Group with their research projects.

Mentor	Email address	Interests
Dr. Sercan Akyalcin	akyalcin@cc.umanitoba.ca	Orthodontics, mechanical testing of orthodontic materials and biomineralization.
Prof. Joanna Asadoorian	joanna_asadoorian@umanitoba.ca	Clinical decision making, continuing competency and quality assurance. Home oral health care products.
Dr. Abhjit G. Banerjee	banerjea@cc.umanitoba.ca	Catching the cancers of mouth early (Oral Cancer Biomarkers & Targets)
Dr. Raj Bhullar	bhullar@cc.umanitoba.ca	The mechanisms of signal transduction in the eucaryotic cell and the role of GTP-binding proteins in cell activation during healthy and diseased conditions.
Dr. Catalena Birek	birek@cc.umanitoba.ca	The molecular mechanisms of oncogenesis in tumours of the head and neck regions.
Dr. Tammy Bonstein	t_bonstein@umanitoba.ca	Dental materials and surface analysis.
Dr. George Bowden	eilleenb@mts.net george-bowden@Umanitoba.ca	Oral microbiology; development of the oral secretory immune response in human infants; interaction between platelets and oral pathogens.
Dr. Doug Brothwell	brothwel@cc.umanitoba.ca	Smoking cessation; epidemiology of dental disease in special needs populations; link between oral health & systemic health; quality management in community dental clinics.
Dr. Prashen Chelikani	chelikan@cc.umanitoba.ca	Biochemistry of membrane proteins, focusing on G-protein coupled receptors (GPCRs).
Dr. Lin-P'ing Choo-Smith	Lin-P'ing.Choo-Smith@nrc-cnrc.gc.ca	Developing optical methods for early dental caries detection & monitoring. (Off campus NRC institute for Biodiagnostics)
Dr. Cecilia Dong	c_dong@umanitoba.ca	Dental caries research.
Dr. James Gilchrist	Jgilchrist@SBRC.ca	Effects of oral bacteria and nicotine upon mammalian cell growth.
Dr. Tana Gilmartin	t_gilmartin@umanitoba.ca	Ethical issues from the perspective of the oral health professional.
Dr. Olga Jilkina,	olga.jilkina@nrc-cnrc.gc.ca	Biochemistry, experimental cardiology, rodent models of diabetic cardiomyopathy and heart failure, biodiagnostics using 31P-MRS and optical spectroscopy/imaging (Off campus NRC institute for Biodiagnostics)
Dr. Algernon Karim	karim@cc.umanitoba.ca	The effect of insulin on enamel synthesis and secretion in an in vitro molar tooth germ system.
Dr. Gilbert Kirouac	kirouac@cc.umanitoba.ca	Brain mechanisms associated with neuropsychiatric diseases.
Dr. Charles Lekic	lekicpc@cc.umanitoba.ca	A model of continued oral health promotion in a pediatric dental practice.
Prof. Laura MacDonald	Laura_MacDonald@umanitoba.ca	Health promotion, eating disorders, diabetes education~oral health connection, persons with disabilities, critical thinking, interprofessional education.
Dr. Nita Mazurat	mazuratn@ms.umanitoba.ca	Malnutrition in older community living dental patients; infection control policy development.
Dr. Randy Mazurat	rmazurat@cc.umanitoba.ca	Implants - outcomes, treatment modalities.
Dr. Archie McNicol	mcnicol@ms.umanitoba.ca	Mechanisms of human platelet activation by orally-derived organisms such as S.sanguis and P.gingivalis.
Dr. Isabel Mello	mello@cc.umanitoba.ca	Translational studies in root canal irrigants, intracanal medicaments and filling materials.
Dr. Getulio Nogueira	nogueira@cc.umanitoba.ca	Oral-systemic impact (diabetes and tobacco smoking) on periodontal disease severity. Contribution of different *Porphyromonas gingivalis* lipid A structures on modulation of innate host responses and bone los during experimental periodontitis; Spectroscopic diagnostic of Periimplantitis.
Dr. Igor J. Pesun	Pesun@cc.umanitoba.ca	Development of an online review of removable partial denture design using HTML and flash computer programs; types of crown and bridge removers.
Dr. German Ramirez	ramirezy@cc.umanitoba.ca	Cranifacial Growth and Development; Prevalence of malocclusions in children; The action of functional appliances in early treatment of malocclusions.
Dr. Renato Roperto	R_roperto@umanitoba.ca	Properties and clinical performance of non-metallic pre-fabricated posts, resin cements and all-ceramic restoration.
Dr. Dieter Schonwetter	schonwet@cc.umanitoba.ca	Dental education; digital curriculum and technology in teaching; oral systemic health; student stress; patient-clinician communication; transfer of learning.
Dr. Bob Schroth	umschrot@cc.umanitoba.ca	Early childhood caries; Aboriginal child health; preschool oral health and pediatric dentistry; health promotion; vitamin D and nutrition; epidemiology; administrative data; health policy and public health.
Dr. J. Elliott Scott	jscott@cc.umanitoba.ca	Developmental regulation of IGF's and MMP's in endodermal and mesodermal cells; regulation of pulmonary surfactant.
Dr. Tony Shaw	Anthony.Shaw@nrc-cnrc.gc.ca	Disease diagnosis by metabolic fingerprinting of biofluids, tissues, and cells. (Off campus NRC Institute for Biodiagnostics)
Dr. Vanessa Swain Dr. Noriko Blight	v_swain@umanitoba.ca n_boorberg@umanitoba.ca	Teaching methodologies and an ongoing project in error management in dentistry.
Dr. Billy Wiltshire	wa_wiltshire@umanitoba.ca	Orthopaedics in orthodontics, adhesion, anticariogenicity, orthodontic biomaterials, epidemiology of malocclusion.
Prof. Mickey Emmons Wener	wenerme@cc.umanitoba.ca	Communication for oral health professionals; Community health & health promotion; Mouthcare training for caregivers.
Specific Assistance		
Dr. Colin Dawes	Colin_Dawes@umanitoba.ca	Saliva and salivary film.
Dr. John Perry	John_Perry@UManitoba.ca	Available, with notice, to assist students in the interpretation of histologic material and radiographs related to their research projects.
Ms. Anne Thornton-Trump	athornt@cc.umanitoba.ca	Library resources.
Mrs. Carol Yakiwchuk	carol_yakiwchuk@umanitoba.ca	Long term care, health promotion, caregiver mouthcare training.

Who We Are:

In 2008-2009, 35 students participated in oral health-care research. The research done could not have been achieved without the mentorship, supervision and commitment of the Faculty members.

SRG Summer Research Students and their Supervisors:

Class of 2009 (Fourth year) graduated

- Kris Coulter; Dr. Tammy Bonstein
- Ashley Dykun; Dr. Doug Brothwell
- Amanda Huminicki; Dr. Cecilia Dong & Dr. Lin-P'ing Choo-Smith
- Courtney Humphreys; Dr. Doug Brothwell
- Alex Serebnitski; Dr. Bob Schroth
- Zach Stein; Dr. Billy Wiltshire
- Ben Yakiwchuk; Dr. Dieter Schonwetter

Class of 2010 (Third year):

- Sherif Elsaraj; Dr. Raj Bhullar
- Alex Witzke; Dr. Archie McNicol
- Igal Margolin; Dr. Charles Lekic
- Atul Pruthi; Dr. Algernon C. Karim
- Angela Kehler; Dr. Tammy Bonstein
- Tracy Kolson; Dr. Dieter Schonwetter
- Geoffrey Shaffer; Dr. Dieter Schonwetter
- Evan Ayers; Dr. Doug Brothwell

Class of 2011 (Second year):

- Nathan Jeal; Dr. Bob Schroth
- Nirvani Umadat; Dr. Tammy Bonstein
- Jordan Pang; Dr. Bob Schroth
- Robert Ward; Dr. Billy Wiltshire
- Mark Dolyniuk; Dr. J. Elliott Scott
- Stephen Michaluk; Dr. Tammy Bonstein
- Adam Agpalza; Dr. Archie McNicol
- Kevin Vong; Dr. Tammy Bonstein
- Kunit Nagra; Dr. Charles Lekic
- Tiffany Cheung; Dr. Tammy Bonstein
- Elena Ferrer; Dr. Noriko Blight and Dr. Vanessa Swain
- Carol Lee; Dr. Tana Gilmartin & Dr. Tammy Bonstein
- Michael Greene; Dr. Tammy Bonstein

Class of 2012 (First year):

- William Yeung*; Dr. Isabel Mello
- Jackie Samborski*; Dr. Renato Roperto
- Tom Janaway*; Dr. Billy Wiltshire
- Wisam Helewa*; Dr. J. Elliott Scott
- Phong Luong*; Dr. J. Elliott Scott & Dr. Nogeira
- Megan McFadden*; Dr. German Ramirez
- Dan Kim*; Dr. Igor Pesun

* Students that began projects in the summer of 2009.

Faculty Supervisors

Oral Biology
Dr. Abhijit Banerjee
Dr. Raj Bhullar
Dr. Catalena Birek
Dr. George Bowden
Dr. Prashen Chelikani
Dr. Colin Dawes
Dr. James Gilchrist
Dr. Algernon C. Karim
Dr. Gilbert Kirouac
Dr. Archie McNicol
Dr. J. Elliott Scott
Dr. Tony Shaw

Restorative Dentistry
Dr. Tammy Bonstein
Dr. Cecilia Dong
Dr. Tana Gilmartin
Dr. Nita Mazurat
Dr. Randy Mazurat
Dr. Isabel Mello
Dr. Igor J. Pesun
Dr. Renato Roperto
Dr. Vanessa Swain
Dr. Noriko Blight

Dental Diagnostic & Surgical Sciences
Dr. John Perry
Dr. Getulio Nogueira

Preventive Dental Science
Dr. Doug Brothwell
Dr. Charles Lekic
Dr. German Ramirez
Dr. Bob Schroth
Dr. Billy Wiltshire
Dr. Sercan Akyalcin

School of Dental Hygiene
Prof. Joanna Asadoorian
Prof. Laura MacDonald
Prof. Mickey Emmons Wener

Dean's Office
Dr. Dieter Schönwetter

NRC institute for Biodiagnostics
Dr. Olga Jilkina

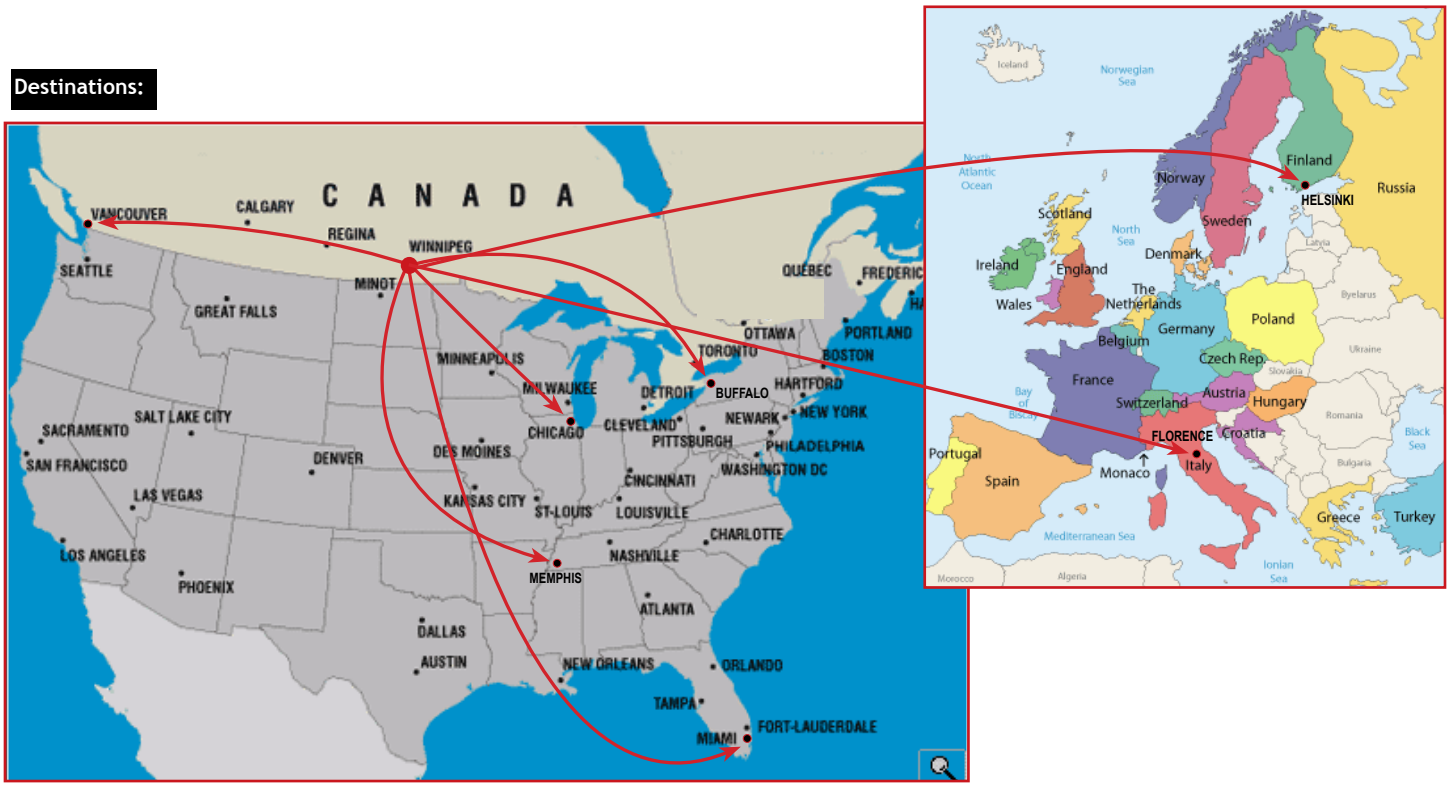
NSERC
Dr. Lin-P'ing Choo-Smith

Library
Ms. Anne Thornton-Trump

Where Did We Go?

In 2008-2009, the SRG members represented the Faculty of Dentistry at conferences, meetings and fellowship programs throughout North America and Europe.

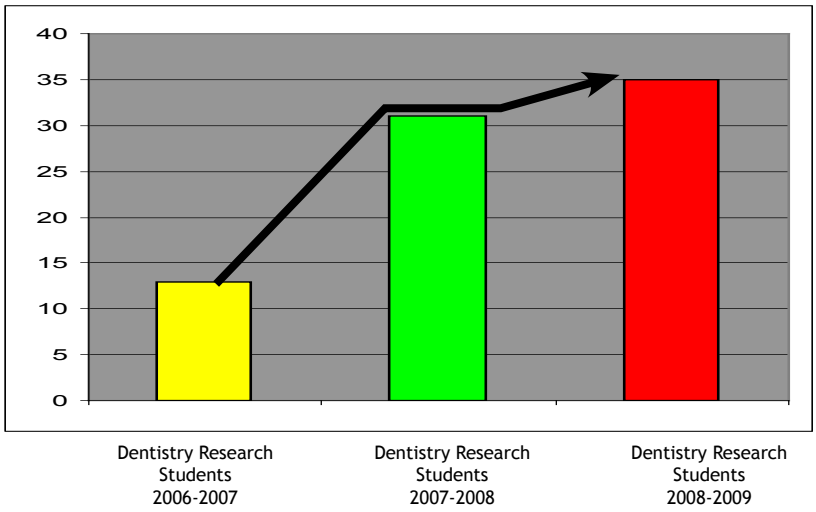
Destinations:



Dentistry Research Students 2008-2009

The number of dentistry research students continued to rise in 2008-09 in spite of the economic downturn that saw substantive reductions in funding for research and travel.

The Faculty of Dentistry still managed to not only maintain the high participation rate of new student researchers but also witnessed significant growth in student research and in SRG members in 2008 – 2009, as indicated by the chart:



Scientific Conferences, Meetings and Fellowships:

NSERC Student Poster Competition

University of Manitoba, Fort Garry Campus
Winnipeg, MB • October 10, 2008

Alex Serebnitski

Project Title:
Documenting pain among children with severe early childhood caries (S-ECC): A pilot study

Supervisors: Dr. Robert Schroth and Dr. Breau
(Dalhousie University)

Supported by: MICH

"The NSERC poster competition was a unique experience. It was a great opportunity to see the variety and quality of research many other faculties are able to produce. It was also interesting to see how people that are not from the dental profession related and presented questions about my poster. I would strongly encourage students to enter these type of events to practice their poster presentation and expose their research to a more broad population." — *Alex Serebnitski*

The Hinman Symposium

Memphis, TN • October 2008

Alex Witzke

Project Title:
Human platelet activation by porphyromonas gingivalis and streptococcus sanguis

Supervisor: Dr. Archie McNicol

Supported by: MMSF

The Hinman Student Research Symposium is a national meeting held in Memphis, TN annually featuring both research posters and oral presentations. The symposium begins with an opening banquet at the prestigious Peabody Hotel with a premier speaker, followed by two days of scientific sessions. The quality of research shown here is cutting edge and all done by dental students. As there is a travel award given out to each dental school, the range of students present is diverse as are the topics discussed.

Being chosen to participate in this event was a great honour, and an excellent chance to learn more about not just my own field of studies, but what research is currently going on in the dental field.

As well as the scientific part of the conference there was a wide variety of opportunities to see the actual city of Memphis, with tours of historic downtown and Graceland arranged by the hosts, as well as the chance to see Beale street in high gear for Halloween celebrations. As well there is a chance to see the famous Peabody ducks perform their walk daily from the roof to the indoor fountain, a tradition dating back to 1933.

All in all it was a wonderful experience, both as a chance to further my dental knowledge as well as to see how dentistry is done across America.

Fortezza da Basso is an old fortress made into a convention center.

Società Italiana di Ortodonzia (SIDO) Orthodontic Conference

Florence, Italy • November 2008

Zach Stein

Supervisor: Dr. William Wiltshire

Project Title:
Dental students' motivations to pursue orthodontic specialty training

Supported by: Faculty of Dentistry, University of Manitoba

Faculty of Dentistry Research Day

Winnipeg, MB • February 25, 2009

This was the Faculty of Dentistry's second Research Day. Lectures, labs and clinic were cancelled for students in order for them to be able to attend the event.

During the day, hosted by Dr. J. Elliott Scott, Associate Dean (Research), (pictured right with Dr. Tammy Bonstein) three SRG members gave presentations; Alex Serebnitski (Dent IV) gave a talk about the SRG, Alex Witzke (Dent III) and Mark Dolyniuk (Dent II) who provided summaries of their research projects.

The Dentsply SRG Award ($500) was given to Alex Serebnitski for his contribution to the SRG. During the intermission, participants of the event learned more about the research at the Faculty from the 20 posters that were presented by the students.

SRG members were also actively involved in the organization part of the event, in particularly Leslie Dalton (pictured below, far left with Elena Ferrer) and Kevin Vong.

Next year we are looking forward for increasing student participation in the event both presenting and attendance.

Please support fellow students and recognize their efforts and time spent during the summer.

2009 Pacific Dental Conference

Vancouver, BC • March 5-7, 2009

CDA/Dentsply Student Clinician Research Program

Nathan Jeal

Project Title:
The relationship between Vitamin D and severe early childhood caries (S-ECC): A pilot study

Supervisor: Dr. Robert Schroth

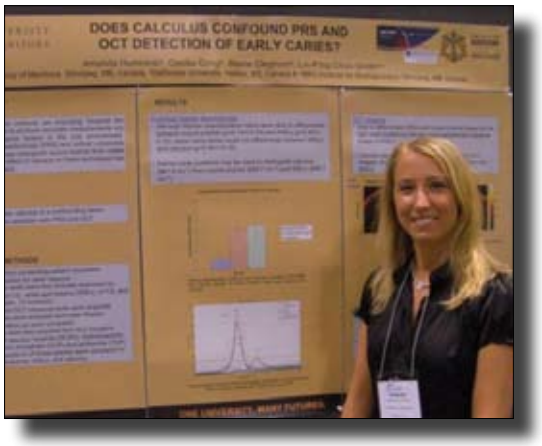
Supported by: Canadian Institutes of Health Research – Institute of Musculoskeletal Health and Arthritis – Studentship in Musculoskeletal, Oral and Skin Health, and Mobility

Abstract published in September 2009 issue of JCDA

Award received: The Pierre Fauchard Academy Scholarship

"Participation in the BSc. (Dent) program has afforded me the opportunity to build on my dental school experience through interactions with talented researchers within our Faculty and at conferences. As part of the process I have developed an appreciation of the planning and diligence required to conduct and publish novel research."

— Nathan Jeal



45th Annual American Dental Students' Conference on Research

Gaithersburg, MD and Washington D.C. • March 2009

Amanda Huminicki

Project Title:
Does calculus confound PRS and OCT detection of early caries?

Supervisors: Dr. Cecilia Dong
and Dr. Lin-P'ing Choo-Smith

Supported by: NORTH & Faculty of Dentistry, University of Manitoba

"Being involved in research has been a very fulfilling and interesting experience for me. I greatly appreciate the guidance my mentors Dr. Dong and Dr. Choo-Smith have provided me, and the support of the Faculty. I would highly recommend performing research to any dental student since it is so rewarding. I have enjoyed both conducting my research and presenting at conferences. This research project has brought me many opportunities and I am carrying on with this research after graduation. The SRG was helpful as a way to connect with other students doing research."

— Amanda Huminicki

IADR Meeting

Miami, FL • April 1-4, 2009

The annual meeting of the International Association for Dental Research was held at the Miami Beach Convention Center in Miami, Florida. The following SRG members represented the Faculty of Dentistry at the IADR meeting: Kris Coulter, Ashley Dykun, Angela Kehler, Alex Serebnitski, Zach Stein, Kevin Vong and Ben Yakiwchuk.

Alex Serebnitski

Project Title:
Documenting pain among children with severe early childhood caries (S-ECC): A pilot study

Supervisors: Dr. Robert Schroth and Dr. Breau
(Dalhousie University)

Supported by: MICH

"Miami was definitely one of the best conferences I got to go to. Aside from the sunny beaches and the exciting night life, the quality and quantity of poster presentations was superb. This was a great forum to interact with our American SRG counterparts."

— Alex Serebnitski

Ashley Dykun

Project Title:
Are dentists needed to perform screenings?

Supervisor: Dr. Doug Brothwell

Supported by: NORTH and CIHR

Kris Coulter

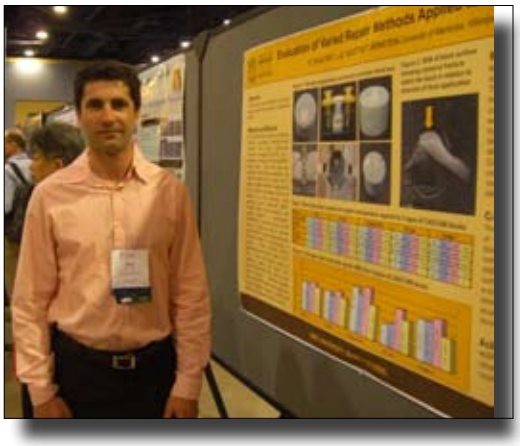
Project Title:
Evaluation of varied repair methods applied to three types of CAD/CAM blocks

Supervisors: Dr. J.E. Scott and Dr. Tammy Bonstein

Supported by: NORTH and Faculty of Dentistry, University of Manitoba

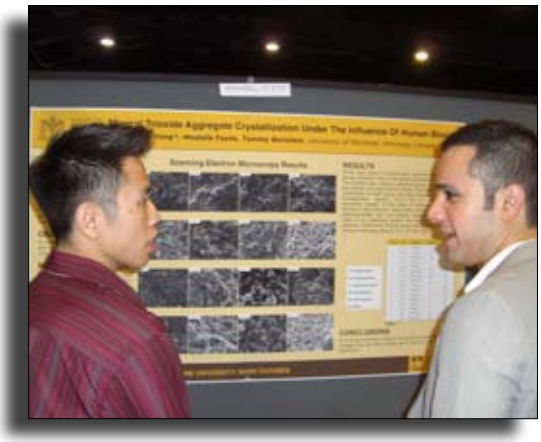
"The research experience offered by the faculty was extremely rewarding as I developed critical thinking skills and professional networks that are helping me provide better care to my patients in general practice today."

— Kris Coulter



IADR Meeting

Miami, FL • April 1-4, 2009



Kevin Vong

Project Title:
Mineral trioxide aggregate (MTA) crystallization under the influence of human blood

Supervisors: Dr. Tammy Bonstein

Supported by: Faculty of Dentistry, University of Manitoba

"Research has given me the opportunity to learn from several professors of different scientific backgrounds (dental materials, cell biology, geological science). It has also given me a free trip to Miami :)."

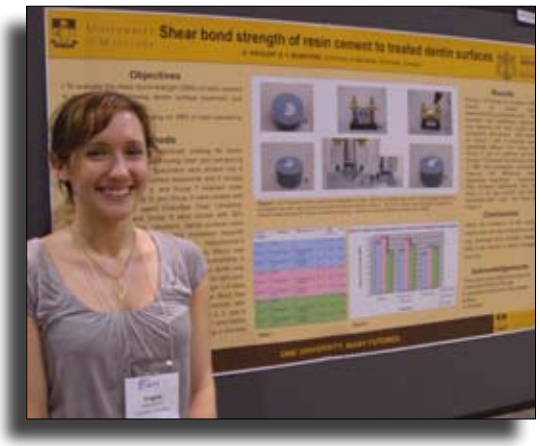
— Kevin Vong

Angela Kehler

Project Title:
Shear bond strength of resin cement to treated dentin surfaces

Supervisor: Dr. Tammy Bonstein

Supported by: MICH



Zach Stein

Project Title:
Motivational factors of dental students to pursue graduate studies

Supervisor: Dr. William Wiltshire

Supported by: Faculty of Dentistry, University of Manitoba

Fellowship:

Initiated this past year by Dr. Tammy Bonstein, the Faculty of Dentistry began a new tradition of an organized diner for the University of Manitoba representatives at the IADR/AADR meetings.

In Miami, an Italian restaurant was chosen. Dean Iacopino and Sharon (spouse), along with Drs. Angaji, Birek, Bonstein, Choo-Smith, Dawes, Lui and Xiang were joined by student researchers Ashley, Ben, Kevin, Alex and Angela.

Midwest Student Research Conference

Chicago, IL • April 17-19, 2008

Benjamin Yakiwchuk

Project Title:
Measuring communication skills of oral health-care students

Supervisor: Dr. Dieter Schönwetter

Supported by: NORTH and CIHR

"Being involved in research has been an eye opening experience that has showed me a challenging and very rewarding aspect of the profession. Through research I have gained more insight into the use of valuable tools which can be applied to everyday practice, as well as allowing me to personally help with the development of the profession. It has been an excellent experience to see other members of the SRG so eager to be involved in research and being a part to help organize methods to be research more accessible to other students." — *Benjamin Yakiwchuk*

Ashley Dykun

Project Title:
Are dentists needed to perform screenings?

Supervisor: Dr. Doug Brothwell

Supported by: NORTH and CIHR

Canadian Student Health Research Forum Poster Competition

Winnipeg, MB • June 2009

Mark Dolyniuk

Project Title:
Characterization of subcellular fractions of lung cells by FTIR and Raman spectroscopy.

Supervisor: Dr. J. Elliott Scott

Supported by: NSERC and MICH

"Performing research on this topic has been both challenging and rewarding. I've learned a lot of techniques I was not previously familiar with, as well has developed some of my own when needed. It was very rewarding to take part in developing techniques that produced results." — *Mark Dolyniuk*

Mark with Drs. McNicol and Nogueira

2009 European Orthodontic Society Congress

Helsinki Finland • June 10-14/09

Robert Ward

Project Title:
Patient perceptions and satisfaction with Invisalign® treatment: A multi-center study"

Supervisor: Dr. William Wiltshire

Supported by: Faculty of Dentistry, University of Manitoba

"I have been very fortunate to be a part of the BSc (Dent) program. I have been given the opportunity to investigate a topic of interest and attend conferences which are both educationally enriching and socially enjoyable. BSc (Dent) research also provides a means of summer employment that is relevant to my career choice. This alone makes the program invaluable. I look forward to completing and defending my project so that I may receive a Bachelors of Science in Dentistry degree."
— *Robert Ward*

Other Events:

Forensic Odontology Summer Elective Program

Bureau of Legal Dentistry, UBC • July 6-17,2009

By Tiffany Cheung

Dentists should be aware that their service to patients continues outside of the dental chair.

The forensic odontology program is about dentistry for the diseased. This program introduces me to several aspects of forensic odontology: DNA extraction, court etiquette, evidence handling, mass disaster response, victim identification, and bitemark analysis.

Guest speakers such as coroners, an anthropologist and a RCMP forensic artist gave me a picture of how a chain of commands is initiated and how dentists fit in the forensic identification team.

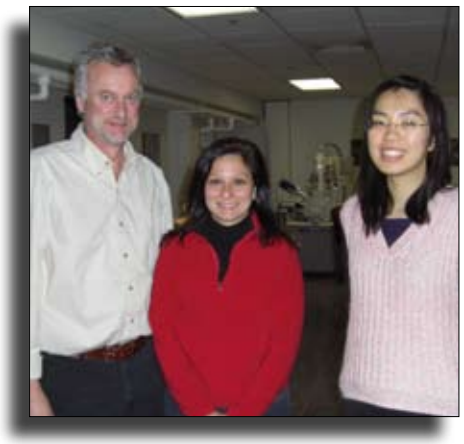
In the course, I had the chance to help identify three victims from two fatal incidents by comparing their dentition against their dental record. In this picture (right), I am sampling saliva from an airbag for an insurance fraud case.

Overall, this course not only taught me scientific knowledge, but also gave me a deeper appreciation of life. The role of dentists is not only limited to curing oral diseases, but to also offer our expertise when the justice system needs it.

For more information, check out:
http://www.boldlab.org/education/elective_program.asp

Last December, I had the privilege to go to Buffalo, NY to conduct my experiment on forensic odontology. It was an unique experience in the way that not only do I get to use a state of art SEM machine, but also able to visit another dental school.

It was nice to look at their teaching facilities and student lounge, as well as decoration in the hallway (e.g. postage stamps with a dental theme, mini dental museum, etc.).



Pictured with Dr. Mary Bush and Dr. Peter Bush, forensic odontology research specialists from the University at Buffalo.

Student Research Group Lunch and Learn

Among the innovative strategies adopted through the past year, the Student Research Group created Lunch and Learn, a series of noon hour sessions that began in early November.

The sessions provided an opportunity for individual members to address the group and provide a glance into their particular project and an update on their progress to date.

In addition to sharing their findings, the sessions help the students build their presentation skills and can provide a boost of self-confidence in preparation for appearances at the various forums and conferences they might attend in the days ahead.

The initial sessions included presentations from Leslie Dalton (pictured right) who presented news from Biodontics annual summer program in Connecticut.

Additionally, the group welcomed presentations from other members including Amanda (pictured left), Kris and Ashley. All meetings were usually well attended and plans are in place to have the series continue as they have drawn favourable reviews from student participants.

"I thought the lunch and learns were a great way to get a better idea of the scope of research in dentistry. It made me realize there is a huge range of topics to be studied and you could do anything from working in a lab to working in a clinic to surveying individuals."

— Jackie Samborski

"The opportunity to be involved in the development of the SRG was challenging as making research a priority in already very busy dental curriculum proved challenging. The success we had validated all of the hard work made by the faculty and student members of the SRG."

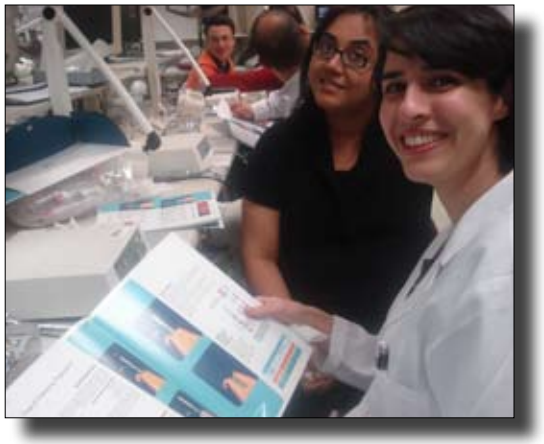
— Kris Coulter

Implant Seminar for the SRG

Organized and presented by Dr. Getulio Nogueira and Dentsply.
January 27, 2009

This seminar included a lecture dinner and an implant workshop. The workshop included an introduction to implant components as well as a hands-on implant placement exercise where everyone gets to place implants into mandible analogues.

We had 14 SRG members registered for the workshop: Samer Mudher, Yachna Dua, Kunit Nagra, Mohamed El Fouly, Nirvani Umadat, Nathan Jeal, Kevin Vong, Leslie Dalton, Kris Coulter, Kurt Scherle, Tiffany Cheung, Evan Ayers, Smaranda Danescu and Alex Serebnitski.



IDDP students (from left) Yachna Dua and Hengameh Akhlaghi

Derek Fleming (Dentsply) and Dr. Nogueira

Leslie and Tiffany

Leslie and Alex

"Our SRG organized its first hands-on implant workshop last year. It was a great opportunity to interact one on one with instructors and people in the field of dental implants. We got to expand our knowledge beyond the capabilities of the curriculum, got some hands on experience and become familiar with implant parts, both surgical and restorative."

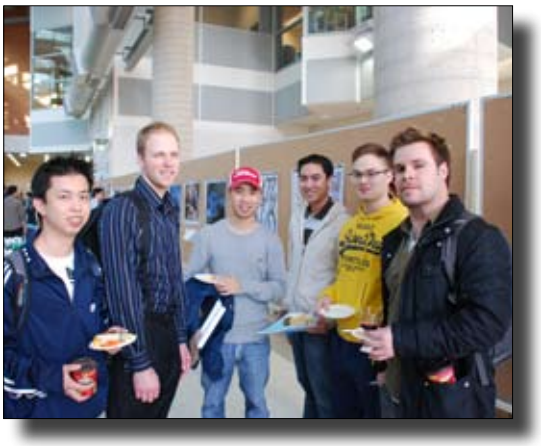
— Alex Serebnitski

Art In Science

Winnipeg, MB • February 25, 2009

This year, Student Research Group members took an active role in the Art In Science exhibition, the closing event for Research Day, 2009.

Tiffany Cheung, a second-year dental student, contributed two images from her research project titled: Analysis of dental materials following incineration conditions.



David, Mark, Phong, Adam, Jordan and Nathan.

Tiffany and Ross

Tiffany's contributions were among the more than 70 works of art on display at this unique and popular event that debuted in 2008.

Each of the artworks are available at auction for interested bidders with proceeds directed towards fostering student research at the Faculty. This fundraising event garnered more than $1,000 for the SRG with bids being received from all over the city and the university community.

In addition to their contributions to the gallery of displays, group members also took a hands-on role in the running of the event. Kevin Vong and Leslie Dalton were among the volunteers who helped prepare the displays.

The two also assisted to ensure the smooth running of the event that also featured a wine and cheese reception. The efforts of the students directly contributed to helping make the Art In Science portion of Research Day 2009 a total success.

Nisha and Jasbir

Jeff, Kurt, Dr. Bonstein, Alex and Zach.

William, Dr. Birek, Phong and Dr. Lui

Student Awards and Recognition:

Nathan Jeal

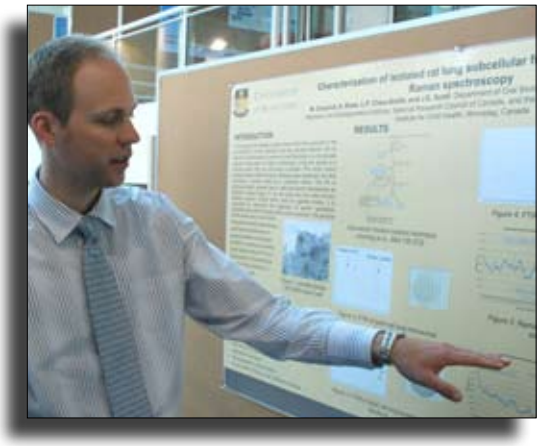
Project Title:
The relationship between Vitamin D and Severe Early Childhood Caries (S-ECC): A Pilot Study

Supervisor: Dr. Robert Schroth

Abstract published in September 2009 issue of JCDA

Award received:
The Pierre Fauchard Academy Scholarship.

Bob Leavens of Dentsply, Nathan and CDA President Dr. Deborah Stymiest



Canadian Student Health Research Forum
Dental Research Award
Winnipeg • June 4, 2009

Mark Dolyniuk

Received the dental poster competition award at the 2009 Manitoba Student Research Poster Competition held June 2-4 in the Brodie Centre at the University of Manitoba's Bannatyne Campus.

Dentsply Student Research Group Award
Winnipeg • February 25, 2009

Alex Serebnitski

For outstanding service to the Faculty of Dentistry Student Research Group at the University of manitoba, Alex Serebnitski was presented with the Dentsply Student Research Group award.

Acknowledgement of Support:

The Faculty of Dentistry Student Research Group at the University of Manitoba would like to acknowledge and thank the following organizations for their kind and generous support over the past year: Faculty of Dentistry, Manitoba Medical Service Foundation (MMSF), Manitoba Institute for Child Health (MICH), the Manitoba Dental Association (MDA), the Network for Oral Research Training and Health (NORTH), the Canadian Institute for Health Research (CIHR) and the Dean's Office Traveling Fund.

FACULTY OF DENTISTRY
SCHOOL OF DENTAL HYGIENE
Traditions of Excellence, Horizons of Change

CIHR IRSC
Canadian Institutes of Health Research / Instituts de recherche en santé du Canada

MDA

the Manitoba Institute of Child Health

International SRG News:

Traveling the Globe

During the annual meeting of the International Association for Dental Research in Miami I attended workshops, business meetings and other social activities which hopefully will further strengthen our connection with the AADR NSRG and help us promote student research on a local and national level.

I got the opportunity to participate in the Canadian Association of Dental Research executive meeting as the first student member of the board, which was very exciting. This means that students now have a voice on the CADR executive board and funding will be provided to the Canadian NSRG through the CADR.

Alex Serebnitski presents on behalf of the National Student Research Group at the CADR Annual General Meeting in Miami 2009

A Meeting of the Minds

At the meeting of the Canadian Association for Dental Research in Miami were (from left) Dr. Debora Matthews CADR Vice-President, (Dalhousie University), Dr Gilles Lavigne, CADR Past Acting President (Dean of Dentistry, University of Montreal), Dr. Florina Moldovan, CADR Councillor (University of Montreal), Dr. Mark Filiaggi, CADR Councillor (Dalhousie University), Dr. Catalena Birek, CADR Secretary/Treasurer (University of Manitoba), Dr. S. Jeffrey Dixon, CADR Past President, (University of Western Ontario), Alex Serebnitski, President, National Student Research Group.

Executive:

From the SRG President

By Michael Greene

I am excited to lead SRG into the coming year. With the support and strong culture of research at the University of Manitoba, SRG members have the opportunity to advance the field of dentistry while collaborating with students, faculty members, and corporate sponsors.

I expect that SRG members will develop a sense of pride in their hard work while gaining an appreciation for research. The SRG will be there to support and enhance the student experience. The work that Alex Serebnitski contributed for SRG in previous years has laid the foundation for which we will continue to expand upon.

WHAT'S NEW?

What's New with the Student Research Group?

- SRG Website
- Group communication with Google groups
- Google event e-calendar
- T-shirts
- Addition of graduate students to SRG

Goals of SRG:

- Promote a strong culture of research at the U of M
  - Link research to clinical practices
- Encourage student participation in research
- Create opportunities and outlets for research
- Promote and support student research
  - Awards
  - Recognition of achievements
- Mentorship for students
- Facilitate collaboration with graduate students and faculty members
- Create funding and travel opportunities

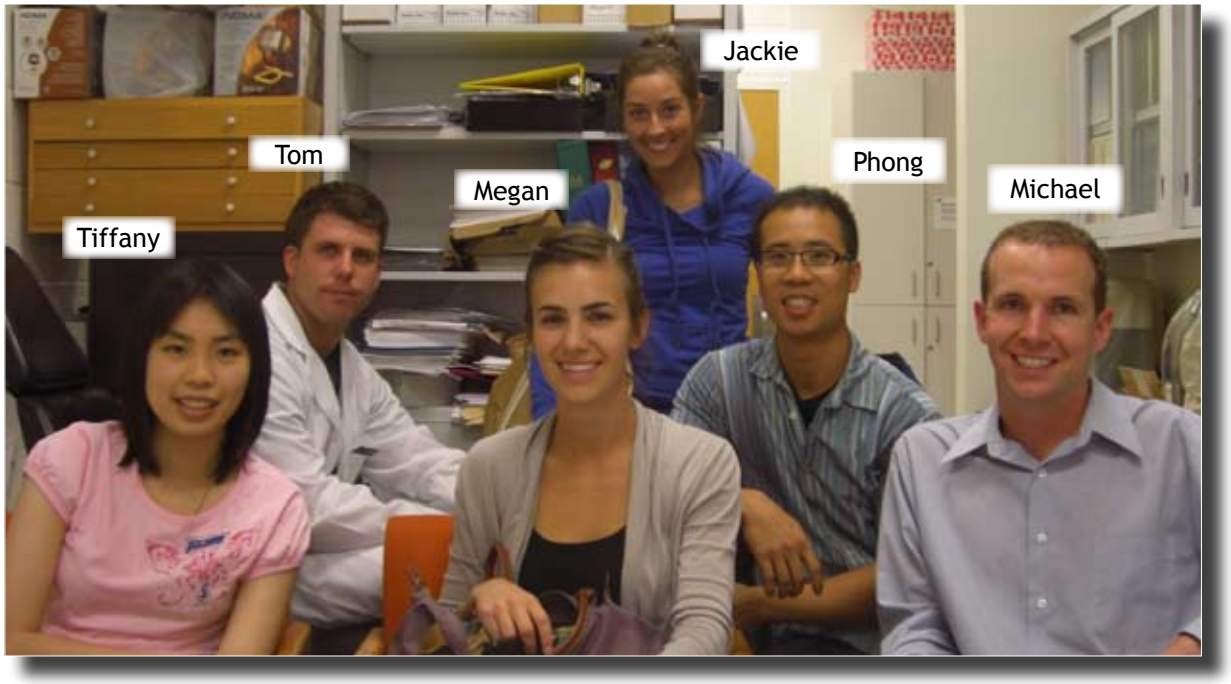
The Future of SRG:

- Develop SRG executive team
  - President
  - Vice-president
  - Treasurer
  - Social representatives
  - Class representatives
  - Webmaster
- Workshops and hands on seminars
  - Implants
- Lunch and learns
- Guest lecturers
- Social and fundraising events
- Participation in Research Day

Tentative design of T-shirts for the Faculty of Dentistry Student Research Group

Meet the 2009-2010 Executive

Executive Members of the Faculty of Dentistry Student Research Group



Join. Explore. Discover.

Student Research Group Representatives

President:	Michael Greene	umgre222@cc.umanitoba.ca
Coordinators:	Tiffany Cheung	umcheu48@cc.umanitoba.ca
	Jackie Samborski	jackiesamborski@hotmail.com
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T-Shirt Designer:	Justin Highmoor	president@dent2012.org
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	Dr. German Ramirez	ramirezy@cc.umanitoba.ca
Associate Dean Research:	Dr. J. Elliott Scott	jscott@cc.umanitoba.ca

How To Join:

If you would like to become a part of the local SRG or the U of M representative in the National Student Research Group please contact Michael Greene, SRG president, any of the coordinators, or faculty advisors for more information.

Visit Us Online:

http://www.umanitoba.ca/dentistry/research/SRG/

Quotes of Note:

"Research has been a challenging and intellectual way to spend my summer. I enjoyed the learning process that went into writing this paper."

— Geoff Shaffer

"I've had a great experience thus far doing research. This project is my first research project throughout my education career. I look forward to finishing it in the next year. I am looking to present my project in the fall of 2010.

— Kunit Nagra

"I have been very fortunate to be a part of the Bsc. DENT program. I have been given the opportunity to investigate a topic of interest and attend conferences which are both educationally enriching and socially enjoyable. Bsc. DENT research also provides a means of summer employment that is relevant to my career choice. This alone makes the program invaluable.

— Bobby Ward

"Research has opened up my eyes to its importance within Dentistry. In participating in a Dental research project, I feel that I have learned something valuable for many years to come."

— Elena Ferrer

"Research allows me to think dentistry in a different perspective: more scientific and evidence-based. This will be important when I graduate and become surrounded by a sea of new technology and advertisement. I was taking the forensic elective at BOLD (Bureau of legal dentistry) at UBC. It was two weeks long. I got to meet 4 other dental students (3 from UK and 1 from USA) and learned about forensic dentistry"

— Tiffany Cheung

"The research experience has been of utmost value as I have pre-exposure to endodontic treatment on teeth specimen. Having the opportunity to use rotary instruments prior to 3rd year is of exceptional value and has provided me with the opportunity to gain a tremendous amount of experience and understanding in this area."

— William Yeung

"Doing research during the summer was a rewarding experience. I was able to apply concepts and techniques from first-year course work in a practical setting. I also gained patient communication skills that will help me in the upcoming years."

— Megan McFadden

"Designing the experiment for the first time was time consuming and difficult but I learned quiet bit from it. My research is still in beginning stage but hopefully I'll get the opportunity to present my findings by next summer."

— Dan Kim

"Performing research on this topic has been both challenging and rewarding. I've learned a lot of techniques I was not previously familiar with, as well has developed some of my own when needed. It was very rewarding to take part in developing techniques that produced results."

— Mark Dolyniuk

"So far the research i have begun is both challenging and rewarding. I am still in the process of working on my project, but once the results are all tabulated and I get a chance to see the significance of the hard work I have put in, I'm sure I will feel very proud of the work I accomplished!"

— Jackie Samborski

"My research experience has been a wonderful way to spend some time during the summer. It has given me a real world understanding of how medical and scientific discoveries are made. I have also gained an appreciation for how powerful and important the scientific method is."

— Wisam Helewa

"Research has been a challenge for me as I have never done it before. However I am enjoying the challenge. This is my first summer doing research and I am still in the initial stages."

— Thomas Janaway

"Doing research has opened my eyes into a new world where I have experienced the challenges and rewards of working in the public health sector of dentistry."

— Evan Ayers

"Research has given me the opportunity to learn from several professors of different scientific backgrounds (Dental materials, cell biology, geological science). It has also given me a free trip to Miami :)."

— Kevin Vong

"Participation in the BSc. (Dent) program has afforded me the opportunity to build on my dental school experience through interactions with talented researchers within our faculty and at conferences. As part of the process I have developed an appreciation of the planning and diligence required to conduct and publish novel research."

— Nathan Jeal

Student Project Abstract Listings:

Evan Ayers

Project Title:
Métis oral health survey 2009

Supervisor: Dr. Doug Brothwell

Supported by: Faculty of Dentistry, U of M

Tiffany Cheung

Project Title:
Analysis of dental materials following incineration conditions

Supervisors: Dr. Tammy Bonstein

Supported by: Faculty of Dentistry, U of M

Kris Coulter

Project Title:
Evaluation of varied repair methods applied to CAD/CAM blocks

Supervisors: Dr. J.E. SCOTT & Dr. Tammy Bonstein

Supported by: NORTH/IMHA/CIHR; Kuraray America; Ultradent; 3M ESPE; Brasseler USA; Ivoclar Vivadent; Patterson Dental

Mark Dolyniuk

Project Title:
Characterization of subcellular fractions of lung cells by FTIR and Raman spectroscopy

Supervisor: Dr. J.E. Scott

Supported by: Faculty of Dentistry, U of M

Elena Ferrer

Project Title:
Survey of clinical errors occurring in an undergraduate dental program

Supervisors: Dr. Vanessa Swain and Dr. Noriko Boorberg

Supported by: Faculty of Dentistry, U of M

Wisam Helewa

Project Title:
Pulmonary surfactant function after exposure to tobacco smoke, its components or metabolites

Supervisor: Dr. J. E. Scott

Supported by: MMSF

Amanda Huminicki

Project Title:
Determining the effect of the oral environmnt on using Raman spectroscopy and optical coherence tomotraphy for detecting early caries lesions in vitro

Supervisors: Dr. Cecilia Dong and Dr. Lin-P'ing Choo-Smith

Supported by: NORTH

Thomas Janaway

Project Title:
To be confirmed

Supervisor: Dr. William Wiltshire

Supported by: Faculty of Dentistry, U of M

Nathan Jeal

Project Title:
The relationship between Vitamin D and severe early childhood caries (S-ECC): A pilot study

Supervisor: Dr. Robert Schroth

Supported by: MMSF

Angela Kehler

Project Title:
Shear bond strength of resin cement to treated dentin surfaces

Supervisor: Dr. Tammy Bonstein

Dan Kim

Project Title:
Fast splint denture reinforcement

Supervisor: Dr. Igor J. Pesun

Supported by: Faculty of Dentistry, U of M

Carol Lee

Project Title:
Barriers to accessing dental care and oral health impacts of the homeless in Winnipeg

Supervisors: Dr. Tana Gilmartin and Dr. Tammy Bonstein

Supported by: MDA

Megan McFadden

Project Title:
Muscular activity and its assocaition with bite problems and temporomandibular joint noises in children from eight to 12-years-old

Supervisor: Dr. German Ramirez

Supported by: Dr. German Ramirez

Kunit Nagra

Project Title:
The effective use of pit and fissure sealants as preventative measures

Supervisor: Dr. Charles Lekic

Supported by: Faculty of Dentistry, U of M

Jordan Pang

Project Title:
A review of dental surgery for early childhood caries in Manitoba, Canada using healthcare administrative data

Supervisor: Dr. Robert Schroth

Supported by: MICH

Jackie Samborski

Project Title:
Microleakage of porcelain and composite CEREC crowns cemented with a self-adhesive cement

Supervisor: Dr. Renato Roperto

Supported by: Faculty of Dentistry, U of M

Geoff Shaffer

Project Title:
Stress and coping strategies of dental students: An assessment of the dentistry program, University of Manitoba

Supervisor: Dr. Dieter Schonwetter

Supported by: Faculty of Dentistry, U of M

Nirvani Umadat

Project Title:
Effect of varying hydration states on natural tooth shade

Supervisor: Dr. Tammy Bonstein

Supported by: Faculty of Dentistry, U of M

Kevin Vong

Project Title:
Mineral Trioxide Aggregate (MTA) crystallization under the influence of human blood

Supervisor: Dr. Tammy Bonstein

Supported by: MICH, Faculty of Dentistry, U of M

Bobby Ward

Title of Project:
Patient perceptions and satisfaction with Invisalign® treatment: A multi-center study

Supervisor: Dr. W.A. Wiltshire

Supported by: Faculty of Dentistry, U of M

Benjamin Yakiwchuk

Project Title:
Investigating the relationships between socio-demographic factors and treatment length to patient satisfaction communication outcomes

Supervisors: Dr Dieter Schonwetter, Prof. Mickey Wener, and Dr. Nita Mazurat

Supported by: NORTH and Faculty of Dentistry, U of M

William Yeung

Project Title:
Influence of irritant volume and irrigation technique on smear layer removal of curved canals

Supervisors: Dr. Isabel Mello

Supported by: Faculty of Dentistry, U of M

Student Project Abstracts:

Tiffany Cheung

Title of Project:
Analysis of dental materials following incineration conditions

Supervisors: Dr. Tammy Bonstein

Abstract:

The objective is to determine whether dental materials' elemental compositions change before and after incineration and to determine if composite-resin materials from different manufacturers have unique elemental compositions that can be identified using scanning electron microscopy with energy dispersive X-ray spectroscopy (SEM/EDS). METHODS: 47 materials (Table-1) from 7 companies-- 14 composite-resin, 7 flowable resin, 2 permanent cement, 1 temporary cement, 1 temporary crown and bridge material, 1 compomer and 1 temporary filling material-- were tested. The materials were prepared (n=4) according to manufacturers' directions into 188 disks (1cm diameter, 1.5mm thickness) in total. Materials were polymerized (Spectrum800, Dentsply) with minimum output of 400mW/cm2. Samples were randomly divided into 2 groups (n=2). Group 1 (control) samples were embedded (Fastray acrylic resin, Bosworth) and were polished from coarse to fine (abrasive discs, US180, 240, 400, 600, 800, MetLab Corporation). Group 2 samples were incinerated at 800°C for 30minutes (Accu-Therm 250, Jelenko). All samples were carbon-coated (DV-502, Denton vacuum) for SEM/EDS analysis ((S-4000, Hitachi) 120s, 1000X, 25keV, 44.9°). EDS 2006 software was used to display elemental atomic percentages. Statistics were analyzed using ANOVA single factor (α¤=0.05). RESULTS There was no statistically significant difference between sample elemental compositions before and after incineration (p=0.999, Table-1). Most composite-resin from different manufacturers could be identified by unique elements used by manufacturers or by statistically significant difference in the atomic percentage of one or multiple elements detected in the materials (Table-2). Elemental atomic percentage of less than 1 was not detected. Dentsply composite-resin could not statistically be distinguished from Cavex composite-resin. CONCLUSIONS: Within the study limitation, dental materials' elemental compositions can be a useful tool in forensic odontology cases. It is possible to identify dental composite-resin materials from most manufacturers due to their unique elemental compositions that can be detected by SEM/EDS analysis.

Kris Coulter

Project Title:
Evaluation of varied repair methods applied to CAD/CAM blocks

Supervisors: Dr. J.E. SCOTT and Dr. Tammy Bonstein

Supported by: NORTH/IMHA/CIHR; Kuraray America; Ultradent; 3M ESPE; Brasseler USA; Ivoclar Vivadent; Patterson Dental

Abstract:

The study aim was to determine the best repair method for five types of CAD/CAM blocks. Materials and Methods: 5 CAD/CAM blocks, 4-ceramic (Vitablocs Esthetic Line–Vident, ProCAD–Ivoclar Vivadent, IPS e.max CAD-Ivoclar Vivadent, ParadigmC–3M ESPE) and 1 composite (Paradigm MZ100–3M ESPE) were studied. Each block type was sectioned (5X2X10mm) embedded and randomly divided into 4 groups with 2 types of surface treatments: roughened by a fine diamond bur (Brasseler, USA) or air abraded by 30µm aluminum oxide particles (CoJet System–3M ESPE). Clearfil Repair (Kuraray America) was applied according to manufacturers' instructions. A cylindrical mould (2.3798 mm by 4 mm) was used to fabricate cylinders from 2 types of composite resins: flowable (Esthet X Flow–Dentsply) or hybrid (Filtek Z250–3M ESPE). Specimens were stored in water at 37ºC for 24 hours and sheared using the Ultradent method with Zwick Z010 Compression Tester set to move at 1mm/minute (Figure1). Scanning Electron Microscope (SEM) was used to assess the modes of fracture (Figure 2). ANOVA and Tukey tests analyzed the data (α=0.05). Results: MZ100 yielded statistically higher shear bond strengths than the other blocks. The best repair method, regardless of block type, was the CoJet/flowable resin combination. When a bur was used there was no statistical difference between the hybrid and flowable resin regardless of block type. No statistically significant difference was found between bur and CoJet when other variables were controlled. Failed specimens showed mostly cohesive fractures within the blocks. Conclusion: The differences found in the reparability of CAD-CAM blocks may be attributed to block composition. Regardless of block composition the best repairs were obtained with the CoJet/flowable resin combination. With the exception of IPS e.max CAD, all block/surface preparation/resin combinations yielded clinically acceptable shear bond strengths when bonded by Clearfil Repair.

Mark Dolyniuk

Project Title:
Characterization of subcellular fractions of lung cells by FTIR and Raman spectroscopy

Supervisor: Dr. J.E. Scott

Abstract:

The objective is to characterize the isolated subcellular fractions from rat lung using Fourier Transform infrared spectroscopy and Raman spectroscopy. Methods. Lungs were removed from adult Sprague-Dawley rats after an IP overdose of Euthanyl. A 1/4 (w/v) homogenate was prepared in sucrose-EDTA. Sequential centrifugation was performed to separate nuclei, microsomes, and cytosol. Lamellar bodies (intracellular surfactant) were also isolated by centrifugation at 66,000xg on a discontinuous sucrose gradient. Samples were lyophilized, washed and recollected by centrifugation. This was repeated three times. Samples were resuspended in 100ul of saline and dried on either BaF2 (FTIR) or CaF2 (Raman) windows. Results. FTIR characterization showed that the lamellar body fraction contained high levels of lipids but reduced protein levels. Both the microsomal and cytosolic fractions contained much reduced lipids levels but high levels of protein were detected compared to the lamellar body fractions. Raman spectroscopy showed that the spectra of the microsomal and lamellar body fractions differed sharply. Conclusions. FTIR and Raman spectroscopy are useful tools to characterize subcellular organellar compartments isolated from living cells. Subcellular compartments display distinctive profiles using FTIR or Raman spectroscopy and can therefore be differentiated from each other. The FTIR and Raman spectra displayed for each subcellular compartment is a reflection of the biochemical composition of that particular compartment. Future studies will use these characteristic spectra to determine the deleterious effects of various toxins on compartment characteristics. Supported by NSERC and MICH.

Amanda Huminicki

Project Title:
Determining the effect of the oral environmnt on using Raman spectroscopy and optical coherence tomotraphy for detecting early caries lesions in vitro

Supervisors: Dr. Cecilia Dong and Dr. Lin-P'ing Choo-Smith

Abstract:

New caries detection methods are emerging, however the results of these tools can be compromised by some components of the oral environment. Optical coherence tomography (OCT) and polarized Raman spectroscopy (PRS) can distinguish sound enamel from caries lesions in vitro, however the effects of calculus, hypocalcification and stain on these techniques have not yet been examined. OBJECTIVE: To determine whether calculus, hypocalcification and stain are confounding factors affecting early caries detection with OCT and PRS. METHODS: Extracted human teeth were first clinically examined for sound enamel (n=57), white spot lesions (WSLs, n=13), calculus (n=20), hypocalcification (n=14), and stain (n=45). OCT and PRS measurements were acquired and results from teeth with calculus, hypocalcification and stain were compared to those with sound enamel and WSLs. OCT images were analyzed and Raman depolarization ratios (ρ) were calculated. Raman spectra were also acquired from four inorganic components of calculus: brushite, hydroxyapatite, octacalcium phosphate and whitlockite. Raman peak positions of these spectra were compared to those of sound enamel, WSLs, and calculus. On samples with areas of stain, CIE Lab co-ordinates were measured and compared to unstained, sound enamel, and a product-moment correlation analysis was performed. RESULTS: OCT imaging was able to differentiate WSLs and sound enamel based on the light back-scattering intensity and characteristic triangular shape of WSLs. Calculus deposits were clearly recognizable on OCT images indicating further scaling is necessary. OCT images of hypocalcification show increased light back-scattering and a more irregular pattern of scattering than sound enamel and WSLs (which have a characteristic triangular shape), differentiating hypocalcification from WSLs and to some extent from sound enamel. OCT images of stained enamel demonstrate increased light back-scattering when compared to sound enamel, but there is no triangular shape characteristic of WSLs. Therefore, although areas of stain are not easily distinguishable from hypocalcified enamel or sound enamel with OCT, they can be differentiated from WSLs. Further image analysis is required to non-subjectively distinguish sound enamel from stained and hypocalcified enamel.

Raman depolarization ratios were r=0.06 +/- 0.04 for sound enamel, r=0.14 +/- 0.06 for WSLs, r=0.22 +/- 0.14 for calculus, r= 0.08 +/- 0.06 for hypocalcification, and r=0.13 +/- 0.11 for stain. Using Raman peak positions calculus (961.9 cm-1) can be distinguished from sound enamel (959.7 cm-1) and WSLs (959.7 cm-1). Mean values were statistically significant in all cases at $p<0.05$ except for two cases: sound enamel was not statistically significant from hypocalcified enamel, and carious enamel was not statistically significant from stained enamel. Product-moment correlation analyses comparing stain with L, a, b, and dE values found no correlation except for a negative correlation between L and p with r=-0.24 (statistically significant at $p<0.05$). This indicates that with increasing stain (and decreasing tooth brightness, or L value), p increases, and hence the characteristic background fluorescence associated with areas of stain allows differentiation from WSLs. Analyses of Raman peak positions showed sound enamel and WSLs in the absence of calculus are quite consistent while this position for calculus has a broader range. CONCLUSION: Calculus and hypocalcification are not major confounding factors affecting early caries detection using OCT and PRS. Stain does not influence caries detection with OCT. With improved analysis methods, it is possible that PRS analysis in the presence of stain will allow better discrimination between carious and stained enamel. Therefore, a combination of OCT and PRS will help rule out false-positive readings. Thus, OCT and PRS have potential as new technologies for the detection of early caries with high sensitivity and specificity. This project has pointed out further analyses that need to be undertaken to better understand the effects of calculus, hypocalcification, and stain on OCT and PRS technologies.

Thomas Janaway

Project Title: To Be Confirmed

Supervisor: Dr. William Wiltshire

Abstract:

The purpose of the study is to: 1) Look at the prevalence of TM joint signs and symptoms in a weight lifting group. 2) Identify any differences in muscle activity of head and neck muscles between two groups: The first group which will show signs and symptoms of the TM joint, and the second group will not show signs and symptoms. 3) To determine the effect of mouth guards in changing muscle activity when signs and symptoms are present.

Nathan Jeal

Project Title:
The relationship between Vitamin D and severe early childhood caries (S-ECC): A pilot study

Supervisor: Dr. Robert Schroth

Abstract:

Children with Severe Early Childhood Caries (S-ECC) routinely require dental surgery under general anesthesia. S-ECC is an aggressive subtype of Early Childhood Caries (ECC) affecting children < 72 months of age. Those with S-ECC have a reduced oral health quality of life and many are believed to be malnourished, underweight, and have altered growth patterns. The objective of this pilot study was to assess differences in vitamin D (25(OH)D) between children with S-ECC and those free from decay. Methods: During July-September 2008, children <72 months of age with S-ECC were recruited from Winnipeg, MB and surrounding communities. Age-matched controls were caries-free. Parents completed a questionnaire. A serum sample was obtained for 25(OH)D and PTH levels. Results: 38 children were enrolled (50% with S-ECC) with no significant age difference between groups (p=0.82). The majority had inadequate vitamin D levels (< 75 nmol/L) even though assessments were made in the summer period. Statistically significant differences in 25(OH)D levels were found between the groups with children with S-ECC having lower concentrations (52.9 ± 15.1 nmol/L vs. 64.4 ± 21.3, p=0.032). Children with S-ECC were also found to have significantly higher PTH levels than caries-free children (53.5 ± 17.6ng/L vs. 33.9 ± 12.9, $p<0.001$). A greater number with S-ECC had elevated levels of PTH (68.4% vs. 21.1%, $p<0.01$). Conclusions: This is the first study to report differences in 25(OH)D and PTH between preschoolers with S-ECC and cavity-free controls. Specifically, children with S-ECC may be vitamin D deficient and have elevated PTH levels.

Angela Kehler

Project Title:
Shear bond strength of resin cement to treated dentin surfaces

Supervisor: Dr. Tammy Bonstein

Supported by: MMSF, MICH, Bisco, Untradent

Abstract:

To evaluate the shear bond strength (SBS) of resin cement to human dentin following dentin surface treatment and impression taking. To examine the affect of aging on SBS of resin cement to human dentin. Methods: 45 caries-free molars were sectioned, yielding 90 dentin surfaces then embedded in self-curing resin and wet-ground with 180-grit silica paper. Specimens were divided into 9 groups (n=10) based on 3 surface treatments and 3 storage times. Group 1, Group 4, and Group 7 received water treatment; Group 2, Group 5, and Group 8 were treated with 25% AlCl3 hemostatic agent (ViscoStat Clear, Ultradent). Group 3, Group 6, and Group 9 were etched with 35% phosphoric acid (UltraEtch, Ultradent). Dentin surfaces were dried with cotton and received a PVS impression (ImprintII Light Body, 3M ESPE) according to manufacturer's instructions. Bonding agent (One Step Plus, Bisco) was applied to specimens according to manufacturer's directions. A 2.38mm diameter mold (UltraDent), applied on the dentin, was filled with resin cement (DuoLink, Bisco) followed by light cure. Specimens were stored in water at 37°C. Groups 1-3 were sheared after 24 hours using the Notched Shear Bond Test (Ultradent) in a Zwick mechanical testing machine with crosshead speed of 1mm/min Figure-1. Group 4, 5, and 6 were aged for 30 days, and Group 7, 8, and 9 for 1 year before mechanically testing. Results were analyzed using a one-way ANOVA analysis (α=0.05). Results: Groups 1-6 showed an increase in SBS means as follows; water treatment>AlCl3>phosphoric acid. This increase was statistically significant only between the water treated and phosphoric acid groups. SBS values for Group 1 and 4 combined were statistically different from values for Group 3 and 6 combined ($p<0.05$). Groups 7-9 showed the following trend in SBS; AlCl3>phosphoric acid>water, however the differences were statistically insignificant. Specimen SBS increased significantly from 24 hours to 30 days $p<0.05$, and then decreased after 1 year. See Table-1& Figure-2. Conclusions: Within the limitations of this study, results show the use of phosphoric acid may decrease bond strength initially. SBS of the cement to dentin changes with time.

Jordan Pang

Project Title:
A review of dental surgery for early childhood caries in Manitoba, using healthcare administrative data

Supervisor: Dr. Robert Schroth

Abstract:

The purpose was to review administrative data related to general anesthesia (GA) for Early Childhood Caries (ECC) in Manitoba, Canada. Objectives included determining the volume of GA, examining regional variations, and age differences. Secondary objectives included examining differences between pediatric and general dentists, and whether children undergoing GA had more physician visits and antibiotic prescriptions in the year prior to surgery. Methods:Administrative data spanned the fiscal years 1997/1998 to 2006/2007. Children ≤ 72 months who had a dental GA were identified by ICD-9 and ICD-10 codes maintained by Manitoba Health. Data were analyzed using SPSS. Analysis included frequencies, means, standard deviations (S.D.), chi-square testing, analysis of variance (ANOVA), and t tests. A p value ≤ 0.05 was significant. Results: 18,544 children had a dental GA over ten years (mean age 3.28 ± 1.02 (S.D.) years). There was also an increase in the number of GAs. The largest portion of children resided in the Burntwood (26.8%) and Winnipeg (23.8%) regions. Both regions had significant increases in dental GAs ($p<.01$, respectively). Two Winnipeg inner-city neighborhoods (Point Douglas and Downtown) accounted for nearly 50% of children in need of surgery. Point Douglas saw a significant increase in the number of GA cases when compared with other areas of Winnipeg ($p=0.004$). Children treated by pediatric dentists were significantly younger than those treated by generalists ($p=0.001$). Surprisingly, there was no difference in physician visits and filled prescriptions for antibiotics in the year preceding surgery between GA cases and the Manitoba population average for children of the same age not requiring GA ($p=.34$ and $p=.24$ respectively). Conclusion: GA for ECC is common in Manitoba and the demand is increasing in several communities. Results are being shared with decision-makers and communities to identify regions where oral health promotion is needed. A review of guidelines on GA use for ECC is warranted.

Geoff Shaffer

Title of Project:
Stress and coping strategies of dental students: An assessment of the dentistry program, University of Manitoba

Supervisor: Dieter Schönwetter

Abstract:

The dental profession is considered to be one of the most stressful work environment and most stressful of all the health professions. The stress experienced by dentists is thought to begin during dental school training. The present study attempts to find out how dental students deal with stressors of the dental school environment. Factors of importance included stress, coping strategies, emotional intelligence (EI) and general health status. Subjects and Methods: A total of 159 students representing the first three years of the dentistry program over two consecutive years participated in the present study. A survey comprised of the General Health Questionnaire (GHQ), Brief COPE, Emotional Intelligence questionnaire (EI), Ways of Coping questionnaire and questions pertaining to students' satisfaction and stress levels were administered to students at the end of the school year. Results: Based on initial findings, the participants demonstrated perceived stress, represented a range of scores in the various coping strategies and GHQ. Findings demonstrated that older as compared to younger students used more positive coping strategies. Students who were satisfied with their decision to study dentistry and to become dentists had lower perceived stress and greater perceived health scores than those students who were not satisfied with either choice. High EI scores predicted the use of more positive coping strategies while low EI predicted the use of more negative coping strategies. High as compared to low EI students also scored higher on the general health questionnaire. Finally, psychologically unhealthy as compared to healthy (GHQ) students tended to use negative coping methods of self blame, keeping to self, wishful thinking, escape avoidance, venting, denial, behavioral disengagement and substance use. Conclusion: The key findings from this study demonstrated that psychological health, emotional intelligence, age, and decision to study dentistry all predict the type of coping strategies used by students during their academic school year. Results are discussed in terms of remediation strategies that would assist students to find more adaptive ways of coping with the stress in dental school.

Nirvani Umadat

Project Title:
Effect of varying hydration states on natural tooth shade

Supervisor: Dr. Tammy Bonstein

Abstract:

This preliminary spectrophotometric study aims to determine if teeth dehydrate and rehydrate in-vivo and in-vitro conditions similarly. Materials and Methods: in-vivo: 10 subjects with caries and restoration-free central incisors volunteered for the study. A spectrophotometric measurement was taken of their left central incisors buccal surface at baseline. The teeth were then isolated with rubber-dams and spectrophotometric readings were taken every 5min. for 30min. The rubber-dam was removed and tooth shade was measured every 10min. for another 30min. In-vitro: 12 caries and restoration-free, extracted human central incisors were cleaned and stored in water at room temperature for 24 hours. The teeth were taken out of the water and spectrophotometric readings were taken at baseline and every 5min. for 30min. The teeth were placed back into water for a period of 30min. with readings taken every 10min. L*a*b* values were recorded and compared for both conditions. Statistical analysis was done to determine significant shade change using ANOVA single factor (α=0.05). Clinically significant shade change was set at Delta-E=2.6 units. Results: No statistically significant difference was found for L*a*b* values when they were examined independently over time in-vitro or in-vivo. Different patterns of dehydration and rehydration were recorded for a* values (Table-1) in-vivo and in-vitro. Delta-E >2.6 was found for both conditions from baseline to 30min dehydration. Statistically significant difference was found between conditions when baseline L*a*b* values were compared to the last spectrophotometric readings (p=0.023). From baseline to the experiment end in-vivo Delta-E mean was 2.2 units; in-vitro Delta-E mean was 1.28 units. Conclusions: Within the study limitations, in-vitro studies can be used to predict dehydration and rehydration pattern changes of L*, b* values of in-vivo teeth. However, a* values cannot necessarily be predicted for in-vivo tooth shade using in-vitro studies.

Kevin Vong

Project Title:
Mineral Trioxide Aggregate (MTA) crystallization under the influence of human blood

Supervisor: Dr. Tammy Bonstein

Abstract:

Objectives: Due to its proven biocompatibility, Mineral Trioxide Aggregate (MTA) is commonly used in pulp-capping procedures and endodontic surgeries. It is therefore critical to investigate its chemical and physical properties under conditions that simulate those of the oral environment. The purpose of this study was to evaluate the surface morphology of both gray and white MTA crystallization under blood immersion at the time of initial set and after one week. Materials and Methods Sixteen dentin sections were created from extracted molars and premolars. One- millimeter diameter cavity preparations were made in each section and subsequently filled with either Gray or White MTA (ProRoot, Dentsply). These samples were placed in one of eight test conditions based on environment (dry, water, saline, blood) and a particular setting time (4 hours or 7 days), refer to Table 1. Blood was acquired from the Principle Investigator and Sodium Citrate was used as an anticoagulant. Surface analysis of the 16 groups was done with Field Emission Scanning Electron Microscopy (FESEM) and Energy Dispersive X-ray Spectroscopy (EDS).Results Three types of crystals were observed among the 16 groups. However, none of the groups exhibited all three types. The crystals were irregular polygonal blocks, needle/needle-like crystals, and large calcium blocks. The underlying surface morphology of each group was also categorized as either homogeneous (groups 4, 10, 11, 15) or heterogeneous (remaining groups). In this study, a homogeneous surface denotes a large coherent mass, where individual particles are indistinguishable from one another. In contrast, heterogeneous refers to an underlying surface that has clear, discernable particles. Furthermore, several groups also exhibited a ruffled surface morphology (groups 10, 11, 15). Conclusions From these preliminary findings, the surface morphology of MTA changes from the time of initial set (4 hours) to one week post placement.

Bobby Ward

Title of Project:
Patient perceptions and satisfaction with Invisalign® treatment: A multi-center study

Supervisor: Dr. William Wiltshire

Abstract:

Introduction: Invisalign® has gained increasing popularity among orthodontic patients recently. However, little scientifically based research data exists on why Invisalign® is increasing in popularity. Aim: To investigate the gender and center differences of patient perceptions and satisfaction of Invisalign® treatment. Material & Methods: 126 patients from three large orthodontic practices from three separate metropolitan areas across Canada were surveyed. Center comparisons were made with the Kruskal-Wallis test. Multiple comparisons were made with the Mann-Whitney U test. Wilcoxon Signed Rank test was used to compare the genders. Results: Significant differences were found between the three centers regarding the satisfaction with the progression of treatment, fashionability of the appliance and whether it would be recommended to others ($p < 0.05$). Mutiple comparisons analysis showed that patients from one of the centers were less satisfied with Invisalign®
treatment. Invisalign® marketing to the public equally influenced both genders. However, females were more likely to be influenced by the endorsement from their Orthodontist and their friends ($p < 0.05$). Additionally, females were more likely to be satisfied with the progression of their treatment ($p < 0.05$). Conclusions: Patients perceptions of Invisalign® differ significantly between different metropolitan areas. Male patients were less satisfied with the progression of treatment than females. However, the individual orthodontist may play a significant role in the perceived excellence and satisfaction of treatment with Invisalign®.

Benjamin Yakiwchuk

Project Title:
Investigating the relationships between socio-demographic factors and treatment length to patient satisfaction communication outcomes

Abstract:

Objectives: The goal of the development of a patient communication questionnaire at the University of Manitoba Faculty of Dentistry was to determine patient satisfaction variables within the scope of therapeutic communication. The aim of this study was to look at the relationship between communication and gender interactions, socio-demographic factors (e.g., age, income), and the length of time of treatment.Methods: A 47-item questionnaire was developed, piloted and refined,and administered to 1152 patients over a one-year period. Results: Patients of female student clinicians, female patients, patients of a higher and the lowest income range, and older patients reported an increase in student communication scores. Conclusion: Patients with a higher education, more visits at the dental clinic, patients with the highest and lowest income levels, and older patients had higher feedback scores. Additional results suggest further research being required in specific areas of socio-demographic factors and their relationship to patient satisfaction in communication.

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